

## **4.0 WORKSHOP RECOMMENDATIONS**

The primary objective of the workshop was to provide an opportunity for NMFS economists to discuss PR exclusively and to network on research and issues facing PR. The group agreed this objective was met fully. While recognized as a good start, it was generally agreed that there is more work to be done. An ad-hoc approach has been the typical route taken to determine what is, and is not, being done in relation to economics 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 Balance, with the development of a research portfolio. The focus of the final day was to review what had been discussed, and to develop recommendations. The following is not a comprehensive list of recommendations, but rather a first cut at some of the issues PR economics can address. A summary of the discussion and recommendations follow.

## Recommendations (not prioritized)

1. Conduct a comprehensive (high level) strategic assessment
2. Improve BCA guidance and expand usage
3. Conduct value of scientific information studies
4. Improve and invest in ecosystem services valuation
5. Inventory and assess legal and institutional barriers to regulatory change
6. Assess current modeling/analytical methods
7. Conduct post implementation regulatory policy analysis
8. Improve two-way communication of PR economic research and management
9. Integrate economics into the PR Science Investment Planning Process (PRSIPP)

For each recommendation below, several components are identified along with the benefits or contribution these analyses can make to PR science, research and management. More specifically, the listings under each recommendation are potential PR economic projects. Examples of research and management discussions within the proceedings are identified to navigate the reader to other portions of this document for more information on that specific recommendation.

### **1. Recommendation: Conduct a comprehensive (high level) strategic assessment.**

- (a) Identify, inventory and assess, at a high level, *all threats by species and stock*; conduct a gap analysis on information needs. Include species that have future regulatory protection needs. Identify transboundary aspects of species and threats.
- (b) Identify *regulatory and economic instruments currently*, at a high level, used to reduce threats to PR (locally, nationally, and internationally), and any analysis of economic benefits and costs associated with the implementation of the instruments. These data can be used to analyze how regulatory economic policy instruments are used differently, in different US regions. For example, how are caps used in Pacific Islands compared to the Northeast?

*Benefit:* This will help identify research needs and identify relevant policy problems (e.g. what can we do now with current data/methods and what are future needs), to look holistically at protection and recovery, from an economic perspective.

## 2. Recommendation: Improve Benefit Cost Analysis (BCA) guidance and expand usage

- (a)
  - i. Develop additional guidance on the use and application of BCA to ensure national consistency of economic analyses in support of PR and PR-related actions. Economic considerations are precluded in the Endangered Species Act (ESA) listing decision of a species, but thereafter in the ESA process, economic considerations are fundamental. In cases where EO 12866 applies, a BCA is mandatory. If EO 12866 does not apply, a CEA is a common option. CEA implicitly assumes benefits exceed costs, and benefits are perfectly homogeneous (since it generally ignores benefits altogether). Consideration of heterogeneous benefits/preferences is necessary even when the environmental goal or biological outcome is the same, since it does not necessarily translate to equivalent economic benefits.
  - ii. Develop a best practices guide on when, and for what purposes, CEA should be used. After the listing decision, CEA can be a very useful tool to help prioritize use of funds oriented toward promoting recovery. For example, in the cases of salmon, CEA can assist in decisions about where and what type of habitat restoration to undertake, whether to concentrate on riparian habitat or removing culverts, etc. This was discussed in the workshop a bit, but was overshadowed by the critical habitat discussion.
- (b) Include all threats, national and international, in BCA. We need to look beyond a single species/FMP rather than conducting a spot analysis (one narrowly focused on a single species and single threat). That is, all human behaviors that threaten a particular species should be included, not just the single behavior that is being regulated to reduce a particular threat in order to protect a particular species. This expanded view is especially important for trans-boundary species (e.g., North Atlantic right whale, leatherback sea turtles) and emerging threats (e.g., future climate change impacts on ice cover for Alaska ice seals). We need to expand beyond the boilerplate description of costs and benefits to position ourselves in an EBM framework.
- (c) Consider adopting the Millennium Ecosystem Assessment (MEA) framework (2005) within a BCA framework in order to incorporate economic impacts more broadly as NMFS moves towards EBM.

*Examples:* See PR Division Chief Discussion in Section 2.3, and Sanchirico et al. (2013).

*Benefit:* A more comprehensive BCA improves the likelihood of choosing an efficient outcome, avoiding unintended consequences, and perhaps identifying an alternative with a greater likelihood of success. Consistent and proper application of this more comprehensive BCA would enhance the defensibility of results.

### **3. Recommendation: Conduct ‘Value of Scientific Information’ studies.**

There is potentially an important role for economists in assessing the value of scientific information. Specifically, this refers to studies that quantify or otherwise describe the 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).

*Examples:* See Section 3.1.6, and Bisack and Magnusson (2014).

*Benefit:* This type of analysis can help to inform decisions on research funding and priorities.

### **4. Recommendation: Improve and invest in ecosystem services valuation**

- (a) PR valuation efforts need to link with the needs of PRD management policy in support of legal mandates. Though policy relevant WTP estimates are increasing in number and quality, more are needed. In general, economic benefits for PR have been marginalized and need equal consideration to economic costs. The lack of benefit valuation studies and their significance and role in decisions is a common concern across regions.
- (b) Invest in expanding benefit-transfer methods. Build expertise and develop formal guidance for drawing economic value information from existing valuation studies. This may be an effective, less costly approach, particularly in cases where time and resources preclude collection and analysis of new data.
- (c) More valuation studies are needed to improve decision making, which could forestall lawsuits from NGOs that allege we are not adequately considering benefits. Needs include: (i) Ecosystem level valuations versus individual species (e.g. value of the corals within a reef system or as individual corals as species and habitat). (ii) Valuations of lesser known species (biological, ecological, and economic information), such as invertebrates (corals) and non-ESA species in general. (iii) Measurement of missing or underrepresented economic benefits such as non-market driven values (cultural, habitat service flows, ancillary benefits/costs related to CHD). Subsistence values are also needed.
- (d) Additional biological research is needed to provide information necessary to measure economic benefits. Specifically, research to demonstrate effects due to regulations, conservation and other management actions. For example, scientists have difficulty articulating the link between habitat and species, but policy analysts are asked in regulatory analyses of CH designation to demonstrate that the cost of the designation is offset by benefits that accrue. Existing valuation studies have focused on the value of the organism and not the value of its habitat, which is needed for these analyses. To be able to construct valuation scenarios in stated preference surveys, we need to

improve knowledge of the biological linkages between the species and habitat since habitat value is a “derived demand” for species.

- (e) Additional methodological work involves addressing issues related to: risk/vulnerability of extinction; uncertainty; validity; aggregation approaches; and whether there is a maximum cap on WTP for all T&E species.

*Examples:* See Sections 3.1.7 and 3.1.8, and Lew and Wallmo (2011); Lew *et al.* (2010); Lew (*in review*); and Wallmo and Lew (2012).

*Benefit:* Improved non-market value estimates allow for better decisions based on comparisons of the full scope of benefits and costs. They enable decision makers to assess options under an economic efficiency criterion and select the option that maximizes or improves social welfare. In the absence of benefit estimates, the option that generates the greatest total net benefit to the nation may not be identified.

## **5. Recommendation: Inventory and assess legal and institutional barriers to regulatory change**

- (a) Identify what is mandated and what could be modified, and consider regional versus cross-regional policies, management and governance. An understanding of legal and institutional barriers during the development and selection of regulatory alternatives (e.g. turtles and FMPs) can inform the economic efficiency analysis, which can lead to more cost- and ecologically-effective mitigation measures. For example:
  - i. Marine Mammals: The Potential Biological Rule is a point estimate that determines the allowable take of marine mammals. However, managing rare-event takes (e.g., 1 take every 5 years) as outlined by the MMPA can be costly. At-sea bycatch reduction mitigation for rare-event takes can run the risk of a decrease in bycatch reduction at an increasingly larger cost (ie. marginal costs) to the point that there is a net loss in economic benefits. Are there alternative mitigation measures that are more cost and ecologically effective?
  - ii. Turtles: Incidental Takes Statements (ITSs) are a legal requirement under ESA. However, is the allocation of turtle takes across threats as stated in the ITS consistent with National Standard 4? (National Standard 4 states: Do not discriminate between residents of different state; any allocation of privileges must be fair and equitable). Recommendation (1) would support this work.
  - iii. Markets: Explore the legal and institutional approaches that exist in order to incorporate international trade restrictions and market access into PR protection. Take inventory of how consumer market approaches, such as dolphin-safe tuna regulations, are carried out across regions. Investigate opportunities to increase species-a- risk protection in international waters by way of the Presidential Task Force Plan to Combat Illegal, Unreported and Unregulated Fishing and Seafood

Fraud, which specifically addresses the stopping or restraining bycatch of protected species.<sup>5</sup>

- (b) Develop cost-recovery methodologies and participate in recovery plan development options. For example, ESA reauthorization discussions can lead to more effective protection and recovery efforts by including options to recover the costs of management actions. For example, user fees can be set before (insurance) or after (damages) an event is incurred (e.g., oil companies, shipping, and fisheries). Currently there are no cost recovery plans in place.

*Examples:* See spill-over effects discussions in Sections 3.1.1 and 3.1.1.1, and specifically, Chan and Pan (2012) and Gjertsen et al (2014). These empirical analyses demonstrate potential conservation losses, gains, and tradeoffs under the current legal environment.

*Benefit:* Identification of institutional barriers that may be limiting current PR conservation efforts, especially those that restrict assessments of all anthropogenic impacts, have the potential to provide immediate research returns, but longer term research is needed to address legal barriers.

## **6. Recommendation: Assess current modeling/analytical methods**

- (a) Assess and inventory analytical methods (e.g., discuss assumptions, robustness checks, uncertainty of estimates, identification problems)
- (b) Identify data and methodological gaps.

*Benefit:* Supports the need for “state-of-the-art” data, modeling techniques, analysis, and results for improving information necessary to assess and design recovery options.

## **7. Recommendation: Conduct post implementation regulatory policy instrument analysis**

- (a) Conduct a high level post implementation economic evaluation of previously adopted PR and non-PR (e.g., fisheries) regulations to identify policy instrument strengths and weaknesses, inconsistencies and inefficiencies across regions, and potential causes or sources of the inefficiencies.

An in depth regulatory instrument exercise showed that, for example, tight turtle caps have led to an unstable swordfish fishery due to sudden closures (e.g., inefficiency) and resulted in negative spillover effects internationally from US actions (e.g., legal barrier within the ESA). This ESA action resulted in increased turtle takes/bycatch due to an increase in foreign swordfish landings. Another question raised was whether the ship strike sunset rule under Atlantic Large Whale Take Reduction Plan in the northeast should become mandatory versus remaining voluntary; the answer

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<sup>5</sup> <http://www.nmfs.noaa.gov/ia/iuu/taskforce.html>

- likely depends on whether the voluntary regulatory policy instrument was successful in achieving protection and recovery goals.
- (b) Identify current and potential compliance problems. An important component to understanding what regulatory policy instruments work well requires us to determine how human (economic) behavior changes (not just costs). We need to consider metrics to measure behavioral changes.
  - (c) Identify and prioritize PR regulatory policy relevant analyses. Identify metrics to prioritize the case studies of PR species and regulations to be potentially analyzed. Available data and analytical techniques may determine which analyses are feasible; however, the contribution of the answer and the amount of time along with the cost of conducting the analyses should be taken into account in the prioritization decision.
    - i. Back Casting, Conduct Counter-Factual Case Studies: Counter-factual analyses can determine the economic outcomes if status quo had continued rather than adopting new regulatory policy instruments. Would the fleet be better off and the takes/bycatch higher if the fishery had continued operating under status quo? Counterfactuals are important, but difficult (e.g., the identification problem), and there are a number of different ways to develop counterfactuals.
    - ii. Forecast: Support the development of expanded and more comprehensive PR recovery and protection planning. Components to consider are: economic incentives; risk of extinction and uncertainty in economic analyses; and single policy instruments that can regulate several species simultaneously (e.g., moving toward EBM) to simplify management, improve compliance and reach recovery goals. Vary policy instrument types by area (or circumstance) to the specific problem/threat rather than implementing broad based restrictions. A comprehensive and more complete set of alternatives, comparing implemented alternatives (2<sup>nd</sup> best) to optimal will illustrate the consequences of various choices in terms of net National benefits.

*Examples:* See Sec 3.1.2 (Holland); Sec 3.1.3.3 (Hilger); Sec 3.1.4 (Lee); Sec 3.1.5 (Speir); and Sec 3.1.6 (Bisack). Specific papers include Holland (2010); Hilger (2015); Lee and Thunberg (2013); Speir and Stradley (*in press*); Speir et al (*in press*); Bisack (2008); Bisack and Sutinen (2006); and Bisack and Das (*in review*).

*Benefit:* Evaluation of previous actions with back-casting and counterfactual analyses improves our understanding of policy instrument choices to better support forecasting needed for regulatory policy analysis.

## **8. Recommendation: Improve two-way communication of PR economic research and management**

- (a) Communicate our ideas to that broader audience. Identify opportunities for economists and other social scientists to learn about the biology of protected species

- and management needs. Consider the following: (i) identify potential projects to communicate our contribution to PR Science; (ii) do outreach for economic research and PR management identifying the strengths and weakness of benefit valuation and other economic methods; (iii) create a sustainable two-way communication channel between economists and PR Division Chiefs at regional offices and the Office of PR; (iv) partner with other social science disciplines, such as anthropologists and sociologists as needed.
- (b) Find common language to explain what we do, what it means and why it matters to non-economists at various levels (i.e. from analyst to manager). Effective two-way communication is critical for non-economists and economists to understand each other. This is especially important to PR managers as they learn when to bring economists into the process and reap the benefits of their inclusion during the planning phase. Compare how other countries communicate multidisciplinary results.
  - (c) Demonstrate the advantage of involving economists early in the development of policies and regulations. Include economists upfront in regional and national PR management and research meetings to allow an exchange of ideas. The Vaquita case illustrated the late involvement of economists and potential benefits that may have been realized with earlier involvement.

*Benefit:* Earlier involvement by economists can result in stronger analysis of anthropogenic impacts, 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.

## **9. Recommendation: Integrate economics into the PR Science Investment Planning Process (PRSIPP)**

- (a) A NMFS PR Economic Working Group has been established to support the needs of the PRSIPP <sup>6</sup> and to continue the work identified in these proceedings. Senior management agreed to the WG formation and a draft Term of Reference document is being circulated among working group members.

*Benefit:* A formalized Working Group will build on the momentum of the workshop and move the recommendations of the workshop forward.. Being part of the PRSIPP will ensure that the funding needs of PR Economics are considered in the planning process.

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<sup>6</sup> The PR Board decided at the May 2015 meeting, PRSIPP responsibilities would transfer to the PR Board. However, the Science and Technology (S&T) group would continue to collect and maintain house the database that collects PR Science needs.