

## **2.0 MANAGEMENT AND POLICY (DAY 1)**

### **2.1 Opening**

#### *2.1.1 Chief Economist, NMFS*

Doug Lipton, NMFS Chief Economist, opened the meeting. Participants were reminded to take into account PR management's analytical needs as economists consider PR research. By providing this forum for discussions, it is intended that economists will be able to develop a common understanding of PR economic data and research needs across regions. This will help NMFS in the long run, as we go forward with implementing recommendations. We want to cast a wide net, and then narrow down ideas to feasible PR economics data and research projects, and determine our priorities. These will be adjusted, over time, depending on opportunities, funding, and demands (e.g., Federal Court mandates).

#### *2.1.2 Marine Mammal Commission*

Marine Mammal Commission (MMC) Executive Director and economist Rebecca Lent explained that the MMC is an independent government agency that oversees all the other federal agencies (Department of Commerce [NOAA], Department of Defense [US Navy] and

Department of the Interior Bureau of Ocean Energy Management [BOEM] and Fish and Wildlife Service [FWS]), to make sure they are following the MMPA and conducting the required analyses and research. The MMC is completely independent of NOAA and is a very small organization with only 12 staffers. The MMC has no regulatory role, but if agencies do not follow its recommendations, they are required under the MMPA to provide an explanation. Lent is the sole economist on staff and has been working with the Commission leadership and staff to integrate economic considerations into its oversight and review. The MMC also follows the work of the Fishery Management councils, regional fishery management organizations, and looks beyond federal waters to comment on rule-making in relation to US trade issues.

### *2.1.3 Protected Resource Scientific Investment Planning Process (PRSIPP)*

PRSIPP Chair Lisa Ballance explained that the PRSIPP is a NMFS committee that has representatives from science centers and headquarters, including one economist (Appendix C1). The PRSIPP operates under MMPA and ESA mandates and has almost no budget available for research. With declining trends in federal budgets, abundance surveys are not being completed as mandated, so the PRSIPP steering committee members are reaching out to other federal partners and have developed a strategy to secure an investment in PR science with partnerships external to NMFS, such as BOEM and the US Navy. The PRSIPP annual process is to identify information needs from users of PR science, assess current and potential funding and infrastructure, and decide what can, and will, be done. One of its accomplishments is a list of PR science needs and priorities, along with common information needs with partners; however, the list does not include any economic-related data and research needs at this time. An example of a common information need is long term data on marine mammal distribution and abundance in an ecosystem context. There is a 6-year cycle (306-534 sea days per area) proposal to assess 6 areas for a comprehensive marine mammal survey.

*Questions and Answers:* Economists asked if the PRSIPP experienced conflicts of interest, because it had to partner with other agencies to fund abundance surveys. Ballance stated that although PRSIPP has to partner with outside agencies to fund surveys, it is careful in maintaining its purpose and goals. Another question asked was whether survey data users (e.g., oil companies, shipping organizations, and fisheries) have a cost recovery program in place. Although the answer is no, the industry is stepping up and putting some money forward. In response to whether PRSIPP does forward-looking research to anticipate threats and identify lost causes, since multiple threats may block the recovery of a species, Balance said that some proactive and emerging threat issues are being identified by NMFS science centers. Chief Economist Lipton asked about incorporating linkages to ecosystem based fisheries management (EBFM), habitat, etc. in the PRSIPP process to which she indicated that the PRSIPP committee is trying to do so.

## 2.1.4 NMFS Regulatory Mandates for Economic Analysis

Lew Queirolo, Alaska Regional Economist presented the primary regulatory and administrative procedures governing preparation of economic analyses in support of PR actions. The statutory authority for PR's regulations derive from the MMPA, ESA, Magnuson Stevens Act (MSA), National Environmental Policy Act (NEPA), and Administrative Procedure Act (APA) while mandates for specific economic analyses fall under Executive Order (EO) 12866 and 13563, NEPA, the Regulatory Flexibility Act (RFA), and ESA Section 4 (Appendix C2). Economic considerations are precluded by law in the listing decision of a species, but thereafter, they are fundamental. In general, when a Notice of Proposed Rulemaking is published in the Federal Register it is accompanied by economic analyses consistent with NEPA, EO 12866, and the RFA. Moreover, if a proposed rule concerns designation of critical habitat under the ESA, an economic analysis in support of the designation, in the form of a 4(b)(2) report, is also required.

EO 12866 compels preparation of a comprehensive Regulatory Impact Review (RIR), and has a mandatory requirement that a cost-benefit-analysis (BCA) framework be used to assess all attributable beneficial and adverse economic impacts of each action alternative. The impacts of each action alternative must be contrasted against the baseline, normally the "no action" alternative. Furthermore, the EO prescribes use of a national accounting stance, wherein the net benefit to the Nation shall be maximized, unless another course of action is required by law. To this end, market and non-market, consumptive, non-consumptive, direct, and passive uses yielding economic impacts must be quantified to the extent practical; or addressed qualitatively when meaningful quantification is not feasible. These analytical requirements apply generally to any regulatory action, whether taken under ESA or not. In addition, and more specific to ESA analyses, economic impacts of critical habitat designation or other protections of a species beyond ESA listing depend upon pre-specified physical parameters. Moreover, the additional analysis required under ESA's section 4(b)(2) requires estimating benefits of inclusion and exclusion of any particular area within the critical habitat designation, and when feasible, benefits must be quantified.<sup>3</sup>

*Questions:* Economists were asked why incidental harassment authorizations have no economic analysis requirements. The response was nobody knows why, other than the nature of the costs of harassment of ESA species being "non-market" values. Rebecca

---

<sup>3</sup> When listing a species, the ESA presupposes benefits of avoiding extinction exceed costs, thus the prohibition on taking account of economic effects in the listing decision. Post-listing, proposed regulatory actions under ESA require an evaluation of a set of alternative regulatory approaches that may achieve the specified environmental goal.

Those alternative approaches do not necessarily translate into identical economic benefit streams; thus, the mandate to select the alternative that maximizes net benefits to the Nation.

A Cost Effectiveness Analysis (CEA) assumes benefits are 'strictly homogeneous' and exceed costs. CEA results cannot, therefore, be used to assess 'net benefit' results across alternative actions.

Conservation actions may also be carried out by Federal agencies as part of their obligations under Section 7(a)(1) of the ESA, or as a means to minimize activities that adversely affect a species as part of an interagency consultation. States, Tribes, local agencies, and private entities may conduct conservation actions as a means to minimize or mitigate "incidental take" of species as part of a Conservation Plan under Section 10 of the ESA.

Lent (MMC) is trying, with limited success thus far, to get non-market value information introduced into such analyses. Economist Robert Hicks, of the College of William and Mary, was invited to speak at the MMC's annual 2014 meeting on "Economic Valuation for Marine Mammals." Recent BOEM analyses of possible offshore energy development in the Atlantic noted that non-market valuation studies were time-consuming, complex, and expensive, and therefore not included in the net social value calculations.

Dan Holland (NWFSC) asked whether the valuation studies really provide estimates of values of individual takes. Older studies seemed to, but more recent studies are focused on population level values, though you can potentially calculate marginal animal value in some cases. Denise Johnson (SERO) noted that the focus on existence value devalues impacts on individual animals that are not endangered. Dan Lew (AFSC) responded that more recent studies are measuring use and non-use values, in addition to existence value. Some separate those values explicitly, but most do not, though they can sometimes be teased out.

*Discussion:* PR-related (non-market) benefit valuation, its significance, and its role in PR and PR-related decisions are common concerns across regions. The significance of these benefits in the decision-making process needs to be more fully and clearly explained. While EO 12866 and EO 13563 identify what constitutes a sufficient analysis, and conveys the need to quantify both benefits and costs when feasible (and when not, at least a qualitative description); participants agreed that benefits have been marginalized relative to costs, but should require equal consideration. There was much discussion and eventual agreement that a cost-effectiveness-analysis (CEA) is inappropriate when it presumes equivalent benefits across alternatives (such as the benefit of one less individual taken regardless of alternative), because the same environmental goal or biological outcome does not necessarily translate to equivalent economic benefits when there are heterogeneous benefits/preferences. The goal is to determine whether net benefit of the proposed action is positive. Lew Queirolo (Alaska Regional Office [AKRO]) added that OMB guidance directs us to conduct CBA; not CEA, because of the latter's incorrect underlying assumption that benefits are homogeneous. Holland expressed the concern that a comprehensive assessment of all benefits, especially to quantify them, would require a considerable budget; which would be an unnecessary expense given that OMB guidance does not require benefits to be quantified.

## **2.2 NMFS's Regulatory History for Protected Resources (2000 to 2014)**

The economic regulatory history discussed in this section spans 15 years. Prior to the meeting, economists provided a detailed list of the PR economic analyses conducted within their region. Across NMFS, summary observations about the economic analyses conducted to support PR regulatory actions include:<sup>4</sup>

- Economic support was provided for 72 PR regulatory actions according to regional economists, of which 31% of these (22 actions) were outsourced, in whole or in part, by

---

<sup>4</sup> Data supporting Table 1 and Table 2 can be found in Appendices B1-B5.

PR directly to external economic consultants including ENTRIX, Industrial Economics and Northern Economics. NMFS economists supported 69% of the actions (50 in total) identified. (Labor costs are not assessed here.)

- The majority of the economic support has been dedicated to large whales (25%) and turtles (24%) followed by fish (19%), small cetaceans (15%), and pinnipeds (11%). Roughly 6% of the actions addressed protection for abalone, corals, and sea birds. Of the 9 taxa identified, each region provided regulatory support for 4 to 5 different taxa.
- Approximately 31% of the economic analyses supported critical habitat actions with the majority of these actions outsourced to consultants.
- Approximately 50% of the PR regulatory actions mitigated commercial fishery interactions.
- Other mitigated threats to marine mammals include subsistence harvesting and lethal and non-lethal interactions with vessels, such as whale watching, commercial ship strikes, and small boat tours.
- Threats to fish (primarily salmon) include agricultural interactions, hydropower, development in general (habitat, water quality runoff, fish passage) while the major mitigated threat to corals was substrate disturbances.

## **2.3 Summary of Economic Presentations by U.S. Region and Canada**

Economists gave presentations highlighting analyses performed in their region (Appendix B1). This gave the working group an opportunity to view the range of members' involvement in specific PR projects we have been asked to address. Each region has a unique set of taxa (turtles, whales, dolphins, pinnipeds, fish, corals), threats (commercial, recreational, climate change, offshore energy, etc.), and policy instruments that have been evaluated in terms of the protection provided and economic impacts. Below are highlights and unique features of regional presentations.

### **2.3.1 Alaska**

Alaska's Regional Economist Lew Queirolo stated the majority of analyses in Alaska were in support of establishing critical habitat (Appendix C3). Highlights include:

- Steller sea lions received an allocation of the pollock quota, pollock being the primary constituent element (PCE) within the Critical Habitat Designation (CHD) for this species, based on assertion of prey competition with commercial fisheries.
- CHD was defined by the concentration of copepods for the North Pacific Right Whale, similar to the North Atlantic Right Whale (NARW). CH areas will likely shift with climate change. There were no fishery interactions; however, offshore energy (oil impacts on copepods and euphausiids PCE) was identified as a primary threat to the NPRW CH.

- The concept of “passive use” or “non-use” values was introduced as a benefit for establishing CH for the Cook Inlet Beluga Whale.
- Bearded and ribbon seals at or near carrying capacity listed and designated CH based on threats of future disturbance from climate change caused by lost ice cover (PCE), fishing, and potential tourism.
- Native subsistence harvesting of fur seals requires a regulatory analysis exercise.
- Benefits of CH are to focus on benefits of habitat and not on the animals, but economists demonstrated the connection, using a study of the Giant Panda bear CH as an example.

### 2.3.2 *Pacific Islands*

Dr. Minling Pan, economist from the Pacific Island Fisheries Science Center (PIFSC), stated that their economic research focused primarily on protected species interactions with fisheries and tourists (Appendix C4). Pan provided a brief summary of the studies conducted in support of the decision-making process behind CHD conservation actions/regulations related to protected species, and listed studies that are still needed.

- Studies and findings include the tradeoffs between sea turtle (Loggerhead, Leatherback, Olive Ridley, Hawksbill, and Green) conservation goals vs. economic returns to the Hawaii longline fishery, which harvested highly migratory species such as bigeye tuna and swordfish. A spatial temporal model was built to examine policy options in order to balance these goals and returns.
- An evaluation of spillover effects resulting from domestic regulatory changes imposed on the Hawaii longline swordfish fishery in order to protect endangered sea turtles concluded that a lower Hawaii swordfish production limit (due to restricted sea turtle caps) may actually increase sea turtle bycatch stock-wide.
- The proposed CHD for Hawaiian monk seals has created fear among fishermen. Further research is needed to understand economic impacts of losing access to fishing grounds and potential loss in food chain; we also need to understand the scope and scale of interactions (direct and indirect) with fisheries and the impacts on those fisheries and the continued recovery of the Main Hawaiian Islands (MHI) population.
- The Hawaiian False Killer Whales (FKW) interaction with recreational and commercial fisheries, mostly longline tuna. The FKW complex is classified into three stocks; each of which holds different status. As MHI- insular FKW declined during the 1990s and 2000s, gear modifications and bycatch take cap that triggered a closure of Hawaii longline tuna fishery are the primary tools with which to reduce interactions with insular FKW.
- Tour activities associated with spinner dolphins present a general threat to the marine mammals in this region. Non-strategic animals are disturbed because the 50-yard-distance-from-animal regulations are being violated by swim tours with spinner dolphins. Questions of interest relate to industry scale, economic impacts (such as tours, medical healing related activities) and non-market values of swimming with dolphins

(including non-tour participants). How can human behavior change to reduce the disturbance?

- Market and non-market values are needed for endangered (but recovering) green sea turtles, as tour activities, such as viewing and swimming with green sea turtles, is increasing in Hawaii.
- Global scale processes are a major threat to coral listings (15 species of the 22 were found in the PI). Need cost-benefit ratio of small scale management along with market and non-market values of resources.

### 2.3.3 *Southwest*

Stephen Stohs, Southwest Fisheries Science Center (Appendix C4):

- The focus is on highly migratory species: leatherback and loggerhead sea turtles are interacting with a drift gillnet swordfish fishery. Management tools include time-area measures, gear restrictions and CHD; proposed future management includes hard caps for a list of protected species.
- Non-Government Organizations (NGOs) petitioned for passage of CHD for leatherbacks off the West Coast, and questioned whether the small boats could block passage. The CHD review team decided to exclude the drift gillnet fishery as a primary constituent element, based on the observation that a small fleet could not obstruct migratory corridors. CHD was based on areas with high densities of brown sea nettle jellyfish; distribution of jellyfish may shift with climate change.
- There are interactions with large charismatic megafauna, primarily sea turtles and marine mammals. Despite periods of years between observed interactions, rare event bycatch rises to a regulatory priority due to population status concerns (e.g., anthropogenic mortality approaching PBR for sperm whales) and protection laws.
- Endangered leatherback and loggerhead sea turtle bycatch in commercial swordfish fisheries has been a high priority. Since 2001, the primary swordfish fishing grounds for the drift gillnet fishery close each year during the peak season. The shallow-set longline (SSLL) swordfish fishery shut down in 2004 and though RIR work was initiated for the return of SSLL permits with gear improvements (circle hooks, mackerel bait that would not attract turtles), the permits were eliminated in the regulatory approval process.

### 2.3.4 *Northwest*

Dan Holland, Northwest Fisheries Science Center, shared the following (Appendix C5)

- Species of interest are west coast salmon and steelhead, southern resident killer whales, Puget Sound rockfish (3 species), green sturgeon, eulachon and black abalone.
- Primary management tools are habitat conservation and restoration, fish passage, bycatch, prey availability, and rules to limit disturbance.
- There is little focus on benefit side of CHD. The focus is on the cost, with the benefits of exclusion identical to costs of exclusion. CHD has been created for salmon/steelhead,

killer whales, eulachon and black abalone, though the interest lies in cost-effectiveness analysis. Types of activities affected by CHD for economic analysis of salmon are dams, federal lands management, transportation, utility lines.

- RFA and RIR for whale watching are similar to the dolphin situation in Hawaii. Insufficient information on benefits of whale watching industry may impact analysis.
- Conservation Banking and Mitigation Banking - Habitat (riparian) that affect salmon and steelhead. No economic research.
- Cost-Effective Recovery Actions for Endangered Spring Chinook in the Wenatchee River Basin; biggest bang for buck analysis. Combines biological models/data with economic data to assess cost-effectiveness of alternative recovery actions (Anderson et al. 2013a). Non-market valuation to estimate changes in economic value from a set of closures to conserve Puget Sound rockfish.
- Anderson et al. (2013b) use non-market values to estimate economic value of recreational fishing to anglers in WA and OR.
- Potential needs include:
  - Welfare estimates for whale watching;
  - Cost estimates and economic impacts from evaluation of prior studies;
  - More cost-effectiveness to prioritize actions to promote salmon recovery; and
  - Valuation work to prioritize trade-offs in salmon recovery.

### *2.3.5 Southwest Fisheries Science Center, Santa Cruz*

Cameron Speir, SWFSC (Appendix C7):

- Primary focus is on freshwater habitat issues for salmon: Central Valley CA Chinook and steelhead, and Southern OR/ Northern CA coast coho salmon
  - Dam removals on Klamath River: an agreement among stakeholders was reached to remove four dams at taxpayer and ratepayer expense. Federal government restores habitat and gives some compensation to commercial users
  - The Department of Interior and NMFS conducted a joint analysis, composed of a 3-year study where recommendations were based on using a non-market valuation and cost-benefit analysis framework.
    - Project on hold due to need for Congressional authorization and funding source from State of California.
- Recreational Use Survey in Sacramento Valley:
  - Several dozen dams ranging in size;
  - Analysis of change in recreational use in reservoirs versus change in river-based fishing;
  - What is value of recreational fishery if the dams are removed, or if they allowed fish to pass around dams?

### 2.3.6 Southeast

Denise Johnson, Southeast Regional Office (SERO)

- Limited analytical capacity for PR due to SERO economists leaving and not being replaced until fiscal years 2014 and 2015 and the region's organizational structure. In the SERO, all socioeconomic expertise lies within the Sustainable Fisheries Division (SFD) and SFD staff do not have a standing mandate nor program in place to address PR issues or meet the needs of PR regulatory issuance. Socioeconomic assistance is provided to the PR Division on an infrequent and ad hoc basis, if time permits around SFD responsibilities. In the SEFSC, the Social Science Research Group is also primarily focused on the needs of SFD and does not develop tools, conduct research or collect information to address PRD issues other than the effects of PR regulations on managed fisheries.
- Primary, but often limited, analyses related to gear interactions with right whales (gillnets), bottlenose dolphins (gear modifications and closures), turtles (TEDs, gear restrictions), Gulf Sturgeon (CH), smalltooth sawfish (CH) and corals (CH).
- Coral preservation issues include offshore dredging of sands to replenish beaches, offshore cables; black markets for coral are not considered. Analysis could have more fully assessed benefits. Questions on the value of corals are raised because corals are considered both species and habitat. No primary data to assess coral benefits were collected; everything used was secondary.

### 2.3.7 Northeast

Kathryn Bisack, Northeast Fisheries Science Center (Appendix C7):

- Historical Context: Consistent sampling of fisheries to estimate protected species bycatch and abundance surveys began in the Northeast when the Protected Species Branch was founded in 1991.
- Threats analyzed in the Northeast are primarily related to commercial fisheries except for large whale interactions with ship strikes. Regulatory work has used cost-effectiveness analysis framework.
- Policy instruments include gear modifications (VA poundnet, scallop dredge, sink gillnet, lobster and pot fisheries). Some modifications have been implemented as a result of PR take-rate reductions observed in commercial fishery experiments, while other gear modifications (e.g. Mid-Atlantic sink gillnet fishery) were based on counter-factual-analysis using NEFOP observer data. Alternative policy instruments used in the Northeast include year-round, seasonal and dynamic closures. A dynamic closure is triggered if the density of animals observed on an aerial survey exceeds a benchmark value.
- Single-species management is prevalent with gear types, such as gillnet, which take multiple PR species such as harbor porpoise, bottlenose dolphins, white-sided and common dolphins, loggerhead sea turtles, large whales and sturgeon. Further, equity and cost issues may exist with single species management which restricts the Virginia (VA)

poundnet fishery to 1 loggerhead turtle take, for example, while scallop dredgers fishing outside the bay are allowed 161 loggerhead turtle takes according to the NMFS 2014 Incidental Take Statement.

- To improve compliance, a gear inspection program was implemented in the VA poundnet fishery. The sink gillnet fishery was given an incentive to comply in the form of a “threat;” consequential closures, if non-compliance rates were exceeded. (Compliance rates are only measured in the sink gillnet fishery in relation to harbor porpoise gear regulations.)
- We rely on biological assessments to determine whether implemented policy instruments are working.

Potential analyses:

- Consider turtle CEA of alternative conservation strategies and conservation banking, for loggerhead and leatherbacks, similar to west coast (Gjertsen et. al. 2014).
- Economic feasibility analysis of whether the sink gillnet fishery can reach a zero rate mortality goal (ZMRG) for harbor porpoise. In addition, New England sectors showed an interest in learning about a potential allocation of the harbor porpoise potential biological removal (PBR) rate among sector and non-sector groups similar to groundfish catch shares. For example, if the sector did not exceed its take of porpoise, it would be exempt and not suffer from closure threats. Consequential closures were included in the 2010 harbor porpoise Take Reduction Plan if non-compliance rates exceeded a benchmark rate.

### 2.3.8 Fisheries and Oceans Canada

Gisele Magnusson, Fisheries and Oceans Canada (Appendix C8):

- Canada’s federal regulatory framework for aquatic/marine protected species is quite young. Key regulations include the Species at Risk Act (SARA, 2002) and Marine Mammal Regulations (1993). These are very different from the MMPA proposed 2015 amendments that will include minimum approach distance). The Fisheries Act (amended 2012) provides more general protection to individuals and habitat.

In support of protected resources (i.e. SARA), regulatory CBA is done:

- To list or not list a species under SARA and provide CH protection which must be enacted 1-3 years after listing (which is required but cannot be considered before protection occurs)
- Most analyses are very straightforward, and qualitative (quantitative cost estimates required if annual cost >\$1/year).

The SARA also requires economic analysis of action plans to assess: (1) direct costs of implementation and benefits if fully implemented; and (2) a 5-year review of socio-economic impacts.

- Most quantitative CBAs have been for commercial species (e.g. Porbeagle shark, rockfish, salmon etc.) and most have resulted in a decision not to list the species.

- Very limited experience with CBAs for CH; it just started in 2013.

Key challenges include:

- Identifying benefits (sciences cannot link potential management changes for data poor species; lack of support for willingness-to-pay (WTP) studies and results, and dealing with cultural values for Aboriginal/First Nations).
- Data access (funding, industry pays, non-traditional industries e.g. forestry)

*Opportunities:* There are research and recovery requirements that need to be addressed for many transboundary species (e.g. killer whales, salmon) that could prove beneficial.

## 2.4 A Conversation with PR Division Chiefs about Future PR Economic Needs

Workshop objectives included looking forward to near-future economic data collection, and research and analyses needs based on PR management needs. To support these objectives a conference call was held with PR Divisions Chiefs before the workshop. Prior to the call, PR Division Chiefs were provided a short description on how economics, as a discipline, can be an asset in developing mitigating conservation strategies for protection of ESA and MMPA species.

Doug Lipton, NMFS Chief Economist, opened the call by asking, besides what threats—other than those that are fishery-related—should we consider? What followed was a discussion about the threats PR managers now face and their regional priorities for the next 5 years; the tradeoffs are and the types of analysis that can be undertaken. The remaining text within this section captures the discussions on the August 11<sup>th</sup> call (Appendix C10).

### 2.4.1 Alaska

Jon Kurland, Director PR division of the Alaska Regional Office, stated this list is a non-exhaustive overview of current needs and concerns:

- There is a need to improve market value estimates in relationship to wildlife viewing and non-market (subsistence/cultural, habitat service flows, and tourism) values which may be unique to Alaska.
- Offshore energy development is huge and growing.
- Cruise and whale watching ships interactions can result in lethal interactions along with harassment in feeding and resting areas.
- Climate change has effects on resources; what are the economic impacts? An ice seal exercise was presented as an example; consider ice cover changes in coming years and the relative distributional changes, the foundation required for an economic analysis.

### 2.4.2 West Coast

Lynne Barre, Marine Species Branch Chief, West Coast Regional Office

- The Orca's main threat is prey reduction or lessened availability due to commercial and recreational fishery competition for salmon. In the recreational fishery there may be a conflict between orcas and abalone.
- Large whale fishing gear entanglements are a concern.
- Non-fishery threats include ship strikes, noise, and offshore energy.
- Similar to Alaska, benefits (market and non-market, use and non-use) are needed.
- Need to learn more about recovery techniques, conservation banking for sea turtles, and how the tradeoffs work since nesting beaches are outside US for some species.
- Invertebrates/abalone may eventually open to the recreational fishery.
- Post-analysis of PR policy instruments was requested to learn what does and does not work in order to design more successful future instruments.

This region ranked the primary and secondary threats for each taxon:

- Large Whales (commercial fisheries, ship strikes; noise and offshore energy);
- Small cetaceans (commercial fisheries, ship strikes, whale watching and contaminants; noise and offshore energy);
- Pinnipeds (intentional killings; commercial fishing interactions);
- Turtles (commercial and recreational fisheries; intentional killing, subsistence harvesting, climate change, habitat destruction); and,
- Fish primarily salmon (habitat destruction; commercial and recreational fisheries, subsistence harvesting, climate change).

### 2.4.3 Pacific Islands

Jean Higgins, Endangered Species Biologist, Pacific Islands Regional Office

- Local needs in Hawaii are often about gaining trust with local fishing communities to gain access to information necessary to better address threats to various PR species. Perception issues can hinder our ability to get quality information and participation in regulatory efforts. Post-regulation analyses may assist in alleviating public fear in relation to a recent CHD proposal. For example, are perceived and actual impacts similar across communities?
- The pelagic population of False Killer Whales is under a take reduction plan (TRP) for commercial fishery interactions; the Main Hawaiian Islands Insular (MHII) population interacts with a fishery that lacks recreational fishery information. An understanding of non-market values associated with fishery activities in the islands may improve our ability to move beyond these barriers.
- Multiple groups (tours, tourists, local residents and spiritually driven individuals) contribute to the disturbance of spinner dolphins near shore areas; swimming with the dolphins is in high demand, as are killer whale watch tours. Understanding non-market

values associated with local community use of an area that has a large influx of tourists because marine resources are present in their local bay is important.

- It is essential to realize the costs and benefits of implementing smaller local scale management actions in relation to recovery of many listed coral species and the health of reef systems as a whole. This should include market and non-market costs.
- International threats are largest for leatherback, loggerhead and olive ridley sea turtles. Disease outranks recreational fishing interactions with Hawaiian green turtles, and there are poaching issues in the territories. Hawaiian Hawksbill turtles face habitat loss along with recreational fishery interactions. A major concern similar to other PR species is that recreational fisheries are not well reported.

#### *2.4.4 Southeast*

David Bernhart, Assistant Regional Administrator, Southeast Regional Office

- Corals are a priority. The discussion focused on whether corals should be valued as an individual species or as part of an entire reef, as an ecosystem service.
- Other PR species have the traditional commercial fishing interactions; however, recreational fishing is growing rapidly and there are concerns with vessel strikes and harassment.
- Regulatory priorities will force the Southeast to look at valuation associated with threats such as oil/gas/wind development in the Gulf, as well as coastal development.
- Commercial dolphin tours, different than whale watching in the northeast, also have harassment issues.
- Valuation work is needed for these iconic species.
- There is a concern that our models lack the ability to assess threats related to climate change, which is specifically identified as a threat to corals and sea level rise is a looming issue.

#### *2.4.5 Northeast*

David Gouveia, Marine Mammal and Sea Turtle Conservation Coordinator, Greater Atlantic Regional Fisheries Office

- The formation and styles of sector management along with changing multispecies fish regulations have affected the gillnet fishing industry and therefore harbor porpoise bycatch in the Northeast. Perhaps a comparison of vessel behavior pre- and post-sectors may assist. How will fishing effort shift with new closures for the large whale plan – the MA Restricted Area Closure.
- Non-compliance with pinger regulations is a concern; sectors want individualized pinger compliance accountability measures. Their willingness-to-pay (WTP) for additional gear modifications versus a closure to protect PR species needs to be addressed, and the cost tipping point established.

- Whale watching guidelines are weak; understanding how the public's WTP would vary by different viewing distances may be helpful by audience (commercial whale watch, recreational boaters and fishermen). Should outreach vary by group to improve compliance and public perceptions?
- Increasing pinniped populations may be responsible for losses in fishermen's catch and an increase in shark sightings that have resulted in closed beach days in summer months. Public perceptions and outreach remains an issue.
- An understanding of PR interactions with the recreational fishery and its contribution to the economy is needed.
- Harassment issues associated with drones being used to improve whale viewing and causing seals to evacuate their haul-out sites is a new and rising threat.
- Aquaculture is an emerging issue.
- Improved understanding of public perceptions is necessary to advance our communication and management ability.

#### ***2.4.6 Office of Protected Resources***

Nicole Le Beouf (Chief, Marine Mammal and Sea Turtle Conservation Division), Angela Somma (Director, Endangered Species Division), and Cathryn Tortoric (Acting Deputy Director)

- Harassment of marine mammals includes swim-with, feeding and recreational interactions;
- Recreational fishing takes of PR species, such as sea turtles and dolphins;
- Economic and social issues are driving the rapid decline of the Vaquita in Mexico. There is also a need for social science information regarding the potential buying out of gillnet fisheries in the upper Gulf of California, among a myriad of other issues related to the Vaquita.
- Economic analysis is needed for upcoming critical habitat designations and listings associated with imports.

## **2.5 End of Day 1: Wrap-Up Discussion**

At the end of the first day, participants had a general discussion on valuation, benefit needs, and regulatory analysis. The main points are summarized below.

### **1. Estimation of Benefits**

- Missing information includes: non-market values associated with harassment to PR species; species not listed as endangered, cultural values, and individual species.
- Need to address Ecosystem Based Management needs: Corals have value as an individual species and as habitat.
- Heterogeneity in benefits needs to be considered, since preferences can vary by region.

## 2. Regulatory Analysis

- Economic analysis is not needed at ESA listing, because it presupposes benefits exceed costs to avoid extinction; but thereafter, economic considerations are fundamental.
  - Market and non-market values should be quantified if possible and qualitatively explained (at a minimum) according to OMB guidance.
  - Need guidance on CBA for PR to ensure consistency across regions
  - Data will dictate how far we can actually go in terms of quantitative economic assessments of alternatives.
  - Different goals can have different benefits and the alternative ways to achieve a single goal can have different adverse and beneficial impacts. The principal approach is to choose the alternative that both satisfies the goal and achieves the highest net benefits to the Nation. Using a CBA framework requires benefit valuation of PR species.
  - More comprehensive analyses are needed rather than a spot analysis. One approach could categorize each species by threats (locally, nationally, and internationally) and compare costs and benefits by threat. This information could be useful for managers to prioritize which threats to address, and in which order.
3. U.S. Caribbean Council is moving from species-specific FMPs to island-specific FMPs. The new geographical focus should allow for greater discussion of economic and social benefits at the island level.
  4. Regional managers too infrequently seek economic advice about new regulatory alternatives.
  5. We operate in a second or third best world; does it make sense to point out problems when not using first-best instruments? Participants agreed it is preferred to fully explore the economic impacts of all regulatory alternatives, even if an action or alternative is controversial. If we have a timeline for future PR regulatory actions, we may be able to collect data and conduct PR economic research that improves the regulatory decision-making process.
  6. We need to look holistically at protection and recovery from an economic perspective and to identify research needs.
  7. Post Regulation: There is a lack of follow-up on the effectiveness of implemented regulatory alternatives in satisfying the desired goals, especially the impacts on human behavior. Although biological indicators, such as annual PR bycatch estimates, are used to assess effectiveness of implemented regulatory alternatives, there are no similar periodic assessments of regulated human behaviors with impacts on PR species. PR managers asked for these analyses and want to know how effective their regulations will be at meeting goals. The interesting follow-up question is whether particular regulations had the intended consequences on human and biological behavior. The pre- and post-implementation evaluations will help us assess the current quality of our pre-implementation cost and benefit analyses and could

improve our future ability to estimate the economic costs and benefits of proposed rules.

The topics discussed will be assimilated into the workshop recommendations found at the end of the document. There was more material presented than time allowed for discussion.