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## WPRFMC Round Robin Session Report

### Incorporating Ecosystem Considerations in Developing Fishery Management Alternatives

#### *Institutional Framework for Ecosystem Consideration in Fishery Management*

Ecosystem-based fishery management changes not only the biological emphasis from single species to ecosystems and brings into the mix disciplines that have not traditionally been part of fisheries management. The Western Pacific Regional Fishery Management Council (WPRFMC) is utilizing a multi-step, multi-disciplinary approach to develop and implement Fishery Ecosystem Plans (FEPs) for the Western Pacific Region. This will require increased understanding of a range of issues to be successful including trophic relationships, biological and ecosystem indicators, ecosystem models, and the ecological effects of fishing and non-fishing activities on the marine environment. In addition, the organizational structure for administering and monitoring FEPs is broader than for fishery management plans and explicitly incorporates community input and local knowledge that is essential to good resource management.

A series of workshops was convened by the WPRFMC to facilitate understanding of an ecosystem-based approach to fishery management. These workshops brought together scientists and other experts from various disciplines from fisheries and ecosystem to sociology and economics and policy development to formulate recommendations for implementation of ecosystem approach on an archipelago scale. The workshop resulted in a transition from Fishery Management Plans to Fishery Ecosystem Plans in 2009. A concise summary of the approach is found in Glazier<sup>1</sup> (2011). Although the FEPs are still primarily stock oriented, applying a place-based approach allows for a more localized focus on the issues surrounding the stocks as part of an ecosystem. This approach has facilitated the inclusion of institutions and individuals not included in a stereotypical fishery management scenario and broadened management considerations for the stocks.

In the Western Pacific Region, the management of ocean and coastal activities is conducted by a number of agencies and organizations at the federal, state, county, and even village levels. These groups administer programs and initiatives that address often overlapping and sometimes conflicting ocean and coastal issues. The Council expanded the mechanisms for participation in the Council process by establishing the Regional

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<sup>1</sup> Glazier E. (ed.). 2011. Ecosystem Based Fisheries Management in the Western Pacific. Wiley-Blackwell Publishing, ISBN: 9780813821542. Pp. 312

Ecosystem Advisory Committees (REAC) in order to increase collaboration with federal, state, and local management bodies, as well as other governmental and nongovernmental organizations, communities, and the public. The committees for American Samoa, Hawaii, and the Mariana Archipelago are comprised of Council members and representatives from federal, state, and local government agencies; businesses; and non-governmental organizations that have responsibility or interest in land-based and non-fishing activities that potentially affect the area's marine environment.

Further, the Council's Scientific and Statistical Committee (SSC) is composed of nineteen members, with expertise and experience in ecosystem analysis and modeling, ecology, fisheries science, and local fisheries. SSC fishery biologists from American Samoa, Guam, Hawaii and Commonwealth of Northern Mariana Islands provide in-depth knowledge of local fisheries.

*Incorporating Ecosystem Consideration in Fishery Management: An Example from the Annual Catch Limit (ACL) Process*

The current Bottomfish Management Unit Species described in the FEPs are comprised of both shallow (mostly reef fish) and deep (deep water snappers and grouper) components. Ecosystem considerations were included in the 2011 Main Hawaiian Island (MHI) Bottomfish Stock Assessment. The stock assessment focused only on the primary stock complex of six snappers and one grouper (termed the Deep 7 complex) rather than mixing shallow and deep water species. The assessment incorporated new research information on the life span of *Pristipomoides filamentosus*, the primary Deep 7 catch, based on bomb radiocarbon and lead radium dating. The Deep 7 bottomfish complex was assessed as a single unit stock in the main Hawaiian Islands.

Conducting the stock assessment modeling on only the heavily targeted Deep 7 species provided a better assessment of the status and management advice for these key management species than if all bottomfish species had been included. By limiting the assessment only to the main Hawaiian Islands made the assessment ecologically consistent since it has been shown that the larval connectivity is patchy for the Deep 7 species along the chain from the main Hawaiian Islands and the Northwestern Hawaiian Islands. Environmental forcing was also considered in the assessment.

The MHI Deep 7 bottomfish stock is considered as a Tier 1 stock within the Council Annual Catch Limit (ACL) specification process. Under this process, a P\* and SEEM Analysis is to be applied to determine Acceptable Biological Catches (ABC) and ACL. The P\* Working Group was made up of one Council member and three SSC members. Council staff and a NMFS Pacific Islands Regional Office staff attended when the Working Group convened.

There were four scoring criteria employed to reduce P\* from a 50% probability of overfishing the stock:

- 1) Assessment information;
- 2) Uncertainty characterization;

- 3) Stock status; and
- 4) Productivity and susceptibility.

Regarding assessment information, the working group reached consensus that the catch history and standardized catch history information was sufficiently reliable to conduct the stock assessment. Species specific information and fishery independent sources of information, which included tagging, and spatial analysis, were adequately addressed in the assessment. On uncertainty characterization, the working group unanimously agreed that the stock assessment model used adequately characterized model uncertainty. On stock status, since the stock is currently not overfished and not experiencing overfishing and is well below the overfishing benchmark, the percent reduction score (from  $P_{max}$ ) was low but was adjusted higher since the assessment was done on a complex and not individual species making up the complex. On productivity and susceptibility, bottomfish life history experts were consulted on the species productivity and vulnerability to fishing that yielded a score of 4.9. The overall reduction from the  $P^*$  maximum of 50% OFL was a  $P^*$  value of 40.8 which corresponded to an ABC of 345,522 lbs. The Social, Economic, Ecological and Management Uncertainty (SEEM) Analysis was used to determine appropriate ACLs which will be described in detail in the succeeding section.

Another example of application of ecosystem considerations in the ACL process was for reef fishes. Reef fishes are considered as Tier 5 stocks where only catch information is available. However, other sources of biological and ecological information were available that helped inform the ACL process. This included:

- 1) Size frequency distribution by species from catch and underwater visual census (UVC) data;
- 2) Temporal trend in size for each species from catch and UVC data;
- 3) Biomass information to the species level derived from UVC data; and
- 4) Coral reef habitat area estimation which was used as a biomass expansion factor

The size frequency distribution of species found in the catch and the UVC data were similar, indicating that fishery in general does not select by size. However, spear fishing gear is highly selective and tends to harvest larger individuals. The temporal trend analysis showed no significant decline in sizes of species harvested in the fishery compared to the same species observed in the census surveys. Catch data plotted against biomass information showed small amounts being harvested relative to biomass on a family level. This result led to the decision by the SSC to set the ABC equal to 1 times the 75<sup>th</sup> percentile of the long term catch history (this being favored over using means because it is a non parametric estimate that would maintain the annual catches below the ABC 75% of the time unless a unique event occurred in the fishery that could lead to a sudden increase in catches).

## **Integrating Social Sciences into the WPRFMC SSC Decision Making Process**

The SSC has five members with backgrounds in the social sciences including cultural anthropology, archaeology, resource economics and sociology. All have extensive experience with fisheries and fishing communities in one or more parts of the Western Pacific Region. Two are also experienced fishermen.

The SSC works closely with Council staff. When action items such as plan amendments are put forth to the SSC in NEPA like format with a range of alternatives, the SSC may choose to recommend one or more alternatives, modify the alternatives or propose other alternatives. The social science members do not usually see these items prior to the circulation of meeting documents and rely heavily on staff for development of potential costs, benefits, and the impacts of proposed alternatives. This is an area, perhaps, where pre-meeting communication and interaction with Council staff could flesh out various scenarios for impacts of potential Council actions and lead to more effective SSC social science input. On a few issues such interaction does occur, especially if select members are placed on working groups as happened with the Sociological, Economic, Ecological and Management Working Group (SEEM) used to help develop the ACL for Hawaii Deep 7 Bottomfish. However, such interactions are not consistent or institutionalized.

SSC members are generally uncomfortable about recommending a specific “policy” action when it involves social and economic considerations, such as “allocation.” SSC members generally believe that that social science should be used to contribute by fleshing out the range of potential impacts, ramifications, and unintended consequences to fisheries and fishing communities of actions the Council chooses to take. This puts the emphasis on science, just as the SSC does with regard to biological issues. MSRA is clear that social and economic data on fisheries and fishing communities is to be taken into consideration by SSCs in their deliberations, especially in the ABC-ACL-ACT process.

Social science types on the WPRFMC SSC have to be continually conscious and aware about their important role in developing or contributing to recommendations that may become the Council’s policy choices. Some members are more assertive than others, and some have suggested that the social sciences members should be more assertive on matters of social and economic consequence. Some members are also able to put on different hats, disclose their affiliation and still provide their independent professional advice on matters affecting fishing communities during the scoping and/or Draft or Final Environmental Impact Statement public input process. In this regard the academic and private sector SSC members often have more flexibility than NOAA employees.

The WPRFMC has not yet been forced to make major resource allocations between fisheries sectors, but it will most certainly be forced to do so in the future. The role of the SSC is not to direct the Council toward specific choices on issues that are clearly policy issues that fall within the Council’s purview. The SSC’s role is to apprise

the Council of the potential range of ramifications, repercussions, unintended consequences, both social and economic (quantitative and qualitative), that could impact fishermen, their families, and their communities. Here is an area where post facto or post impact assessments of actual versus projected scenarios and impacts could be useful to all the Council SSCs. The somewhat qualitative reviews of the impacts of past closures in the Hawaii Longline fisheries are a case in point.

The long-term tenure of many members of the WPRFMC SSC is partly a result of the severe regional shortage of people with adequate training and background as well as the need to have region-wide representation. An obvious recommendation is to nurture the development of fisheries social scientists based within the region, especially those from the indigenous population. Given the median age of current SSC members, this should be a priority. Another recommendation is to have the social science members of the SSC caucus and have more in depth discussion of their proper appropriate role in the SSC process. A third recommendation is to encourage the social science SSC members to be more assertive in the SSC process, even if this requires expanding the education of non-social science members. A fourth recommendation might be for the chair to specifically query the SSC members as to their comments and concerns regarding the socio/economic ramifications of every consensus SSC recommendation made on day three.

*Incorporating Socio-Economic Consideration in Fishery Management: An Example from the Annual Catch Limit (ACL) Process*

The SEEM Working Group reviewed and assessed four dimensions of the Deep 7 Bottomfish fishery. The group included two SSC members, two state fishery managers, an economist and fishery biologist from PIFSC, an economist and social scientist from NMFS-Pacific Island Regional Office, and three active bottomfish fishermen.

The group met twice to develop a scoring system and flesh out the most significant factors to consider under each dimension. It was assumed that only negative scores could be used since positive scores on some socially and economically important dimension factors might place the ACL above ABC. Ultimately the group scored those factors, but it reached consensus that the positive scores would not used numerically in reducing the ACL from ABC but that these social, economic and ecological dimensions could be used to guide the council on the social and economic importance of the fishery. The scoring provided a rationale for why the ACL should equal the ABC on these three dimensions. The score on the fourth dimension, management uncertainty, was utilized to reduce the ACT from the ACL.

The four dimension factors were first presented as straw man factors, then evaluated by the group, and then refined and selected with the following rationale:

Social Dimension:

1. Perpetuates cultural and traditional values
2. Provides symbolically-valued and culturally-important fish

3. Bottomfishing is a unique highly skilled occupation that is waning and should be maintained
4. Contributes to Hawaii's food security

Economic Dimension:

1. There is economic reliance of other industries on the fishery (multiplier effect)
2. Financial security of the fishery and its participants is readily compromised by management decisions
3. Provides a unique product(never frozen, fresh low carbon footprint signature fish in regional cuisine)

Ecological Dimension:

1. Uncertainty of ecosystem dynamics
2. Shift of fishing pressure onto species outside Deep 7 upon closure of the Deep 7 fishery

Management Uncertainty Dimension:

1. Unreported recreational landings
2. Commercial catch reporting, including misreporting
3. Weather influences ability to fish and productivity of fishing
4. Monitoring, including ability to forecast
5. Recreational discard mortality associated with high-grading

Members of the team generated individual scores on each dimension. The positive average scores indicated the social cultural and economic importance of the fishery and supported the recommendation that the ACL be set equal to the ABC. However, due to management uncertainty, the SEEM Working Group recommended an Annual Catch Target (ACT) which was 6% lower than the ABC/ACL

The SEEM working group recommendations were reviewed and supported by the SSC in their recommendation to Council in setting the Deep 7 ACT.

### **SSC – Council Interactions in Policy Development**

The WPRFMC is comprised of several advisory groups: 1) Advisory Panels; 2) Plan Teams; 3) REAC (see above); 4) Council-established advisory bodies (Social Science Research Committee; Sea Turtle Advisory Committee; Non-Commercial Fisheries Advisory Committee; Marine Mammal Advisory Committee; Fisheries Data Coordinating Committee; Marine Spatial Planning Committee; Hawaii Bottomfish Advisory Review Board). Specialized working groups may also be convened as needed.

***Advisory Panel:*** The Council receives advice from a panel of recreational and commercial fishermen, charter boat operators, buyers, sellers, consumers and others knowledgeable about the fisheries in the region, including indigenous fisheries. The panel

includes subpanels for the American Samoa, Hawaii and Mariana archipelagos; Pacific Pelagic Ecosystem.

***Council-established advisory bodies:*** The Council convenes these advisory bodies (composed of experts and stakeholders respective to each advisory bodies) to have focused recommendations on specific issues.

The Plan Teams are the primary body responsible for reviewing the functioning of the FEPs. The PTs put together the annual reports. The PTs are comprised of teams of scientists, managers and industry representatives who make recommendations to the Council based on their annual review of the region's federally managed fisheries.

The Social Science Research Committee reviews socio-economic issues surrounding the different fisheries and national policies that affect the community.

The Sea Turtle Advisory Committee reviews and makes recommendations on the status of the sea turtle population and on management measures that affect the turtle stocks and have impacts on the fishery.

The Non-Commercial Fisheries Advisory Committee provides recommendations on non-commercial data reporting and management of the recreational, subsistence, and traditional fishing.

The Marine Mammal Advisory Committee focuses on issues surrounding marine mammal population as well as their interactions with fisheries. It was formed primarily to address interactions between Hawaii longline vessels and false killer whales, which has been superseded by a False Killer Whale Take Reduction Team constituted under the Marine Mammal Protection Act. The Council decided to maintain the team in case other fishery/marine mammal interactions require a Council response.

The Marine Spatial Planning Committee was formed as in response the National Coastal Marine Spatial Planning initiative. This committee has a science sub-group that deals with the data compilation and analysis and a management sub-group that deals with implementation.

Lastly, the Hawaii Bottomfish Advisory Review Board provides recommendations pertaining to issues specific administration of catch limits for the Hawaii bottomfish fishery, which managed under a catch limit prior to the implementation of ACLs.

Many of the recommendations from these advisory groups that have scientific implications are vetted through the SSC prior to consideration by the Council. Similarly, scientific aspects of recommendations arising during Council meeting discussions are also considered by the SSC at subsequent meetings

The SSC operates by consensus; no votes are taken but minority opinions may be recorded in the SSC minutes or recommendations. At the beginning of an SSC meeting SSC members are assigned by the Chair to rapporteur various agenda items. An attempt is made to insure cross-disciplinary expertise when making rapporteur assignments. Rapporteurs are responsible for capturing the draft wording and justification for an SSC consensus.

As noted previously, the SSC also reviews many of the recommendations produced by the plan teams, the advisory panels, and the regional ecosystem advisory committees REACs. Some of these recommendations may be supported or modified. Others may receive no comment and be passed on to Council as policy items more appropriately considered within the Council's purview.