WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

Report of the 122nd Meeting of the Scientific and Statistical Committee
1164 Bishop Street, Suite 1400, Honolulu HI 96813
March 8 to 10, 2016

Program Planning and Research

5.A.1. American Samoa Reef Fish Connectivity Project

Domingo Ochavillo, DMWR, American Samoa, updated the SSC on progress of the American Samoa Reef Fish Connectivity Project. Samples of 3 culturally important reef fish (surgeonfish, parrotfish, and soldierfish) from Savaii, Upolu, Tutuila and Manu'a have been sent to a genomic research facility in Australia, and DNA sequencing is progressing. An SSC member suggested that the mitochondrial DNA sequencing should be expanded to other genetic markers. The SSC looks forward to seeing results from this work.

5.B.1. Integrated Data Poor Stock Assessment Model

Council staff updated the SSC on the CIE review of the Martell age-based model for data poor stocks. Staff pointed out the areas where the CIE reviewer's comments converged and diverged. The theoretical basis for this model approach seems sound and appropriate and it utilizes a wider range of data. It has greater complexity which can be a disadvantage. It was noted that the model does not include quantifiable non-commercial and recreational data. Staff noted that Martell will address the CIE review comments and develop a final product. It was noted that the Data Poor Stock Assessment Model augments, and does not compete with the Science Center's length-based approaches. The SSC notes the potential value of this effort and looks forward to further refinements of the model and opportunities for model comparison.

5.B.2. Kona Crab Stock Assessment

Chris Boggs, PIFSC staff, summarized the results of the desktop review[1] of the Kona Crab Stock assessment completed in 2011. While the reviewer concluded that the basic approach was justified, he noted that there had been significant management strategy change and that the non-commercial catch had not been estimated or considered in the assessment. The reviewer supported the conclusion that the stock had been overfished and that there were many uncertainties about the current status of the stock. Concern was expressed about the impacts of the regulation for non-retention of female crabs since little is known about sex ratios, how they might bias the stock assessment and what the impact might be from post-release mortality due to injury or predation. It was noted that the Science Center is planning to complete a new benchmark stock assessment in 2018.

5.C. West Hawaii Integrated Ecosystem Status and Trends

[1] Only one reviewer and no interaction with the author of the paper

Jamie Gove, PIFSC staff, updated the SSC on progress of the integrated ecosystem assessment that gathers significant stakeholder and community input. This effort has developed a series of indicators through its efforts to merge science and local community knowledge. An Ecosystem Assessment Report is under internal review. This is part of a larger national effort and PIFSC staff hopes to expand the scope.

The SSC recommends that the Integrated Ecosystem Assessment effort be expanded to South Oahu and Mamala Bay where there is intense use from a high human population.

5.D. Marianas Trench Marine National Monument Mapping Application

Brian Dieter, PIFSC staff, described their recent efforts at producing GIS mapping layers that allow click on the button queries to output or view survey and meta-data. **The SSC found this to be an impressive tool that is undergoing further development and refinement. SSC members suggested that it would be beneficial to incorporate more raw data (e.g. to include software scripts to aid access to the data for detailed analysis), to include geopolitical boundaries as well as video output and to expand this effort to other area.**

5.E. The Science of Pelagic Marine Protected Areas

Council staff updated the SSC on the recent letter requesting expansion of the no-take boundaries in the Papahanaumokuakea Marine National Monument (PMNM) from 50 nmi out to the entire Northwestern Hawaiian Islands EEZ. The SSC notes that closed areas and MPAs have become a popular but infrequently monitored and assessed tool for marine management of fisheries and biodiversity conservation. The SSC further notes that large scale pelagic MPAs are different from small scale nearshore MPAs in form, function and effectiveness. Published scientific literature demonstrates that large scale pelagic MPAs may negatively affect fish stocks through displacement of effort unless there are effective management actions outside the closed area.

The SSC emphasizes the following points:

- **Expanding the PMNM will not provide any additional conservation benefits for highly mobile species such as tuna, billfish, sharks and marine mammals that range well beyond the US EEZ.**
- **Laysan and Black-footed albatross are already protected by a suite of domestic and international mitigation measures that will not be augmented by boundary expansion of the PMNM.**
- **Expansion of the PMNM will result in negative socio-economic impacts to the Hawaii longline fishery, Hawaii economy, and the Nation.**
- **Marine resources that occur in the NWHI and surrounding US EEZ are already protected and subject to comprehensive management regulations and monitoring.**

The SSC notes that approximately 28% the US EEZ in the Western Pacific Region has been established as no-take marine protected areas, which far exceeds any other region in the US. None of the other seven regions excludes even 1% of their US waters.

The SSC concludes that designation of large-scale marine protected areas for conservation benefit should be based on science and developed with stakeholder input.

5.F. SSC Work Session on MSE Priorities

The SSC conducted a brainstorming session to develop Management Strategy Evaluation priorities for protected species, insular, and pelagic fisheries. The details on the priorities are found in appendix 1. Briefly, the three subgroups developed 12 priorities:

Insular fisheries

- Evaluate spatial management (BRFAs or vessel area closures), catch limits, bag limits and gear restrictions for the bottomfish fisheries in the Western Pacific region;
- Evaluate existing and potential management strategies for the nearshore fish fisheries in the Western Pacific region;
- Evaluate appropriate management strategies for the nearshore invertebrate fisheries in the Western Pacific Region.

Pelagic fisheries

- Effects and impacts of spatial management in pelagic fisheries (e.g., regional quotas, area closures, site-specific management regimes);
- Characterizing uncertainty and identifying management policies that are robust to uncertainty;
- Impact of tropical tuna fisheries on shark bycatch;
- Quantitative framework to evaluate local pelagic fisheries;
- Overcapitalization/market competition between scales of domestic pelagic fisheries.

Protected species

- Assess effects of the spatial management measures for the Hawaii pelagic and insular false killer whale populations;
- Assess effects of potential spatial and/or temporal management measures for leatherback sea turtle;
- Assess the bycatch mitigation measures for the black-footed albatross.

5.G. Public Comment

The SSC received one public comment which : 1) strongly supported the proposed yellowfin tuna research on connectivity and spatial management strategies for a resident stock; 2) pointed out the need for improvements in the bottomfish stock assessment which should include a focus on who is fishing and the potential impact from the loss of experienced fishermen and changes in skill level; 3) and pointed out the need to focus IEAs on areas proposed for area closures and areas with greater fishing pressure.

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6. Pelagic Fisheries

A. Hawaii & American Samoa longline fisheries reports

Russell Ito (PIFSC staff) presented trends in the Hawaii Longline fishery based on log book data. Despite a two-month closure, 2015 was a record year for number of vessels in the fleet, number of trips, number of sets, number of hooks set, and the landed catch of bigeye, pomfrets, escolar, moonfish, wahoo, blue sharks, mako sharks, and thresher sharks. It was noted that though effort did not increase greatly, bigeye CPUE was high in the Hawaii fishery, a broad-scale phenomenon noted for longline fleets throughout the WCPO in 2014-15. Some members requested that future reports include catch and effort maps showing comparisons over time. Finally, it was noted that total fleet revenue has declined over time but it is likely that reduced fuel costs have allowed continued profitable operations.

Keith Bigelow (PIFSC staff) presented trends in the Am. Samoa Longline fishery. Year on year comparisons indicated declines in number of vessels fishing and number of hooks set, as well as declines in the CPUE of skipjack, mahi mahi, blue marlin, oil fish, and blue sharks. There were 20 active vessels in 2015, and the year on year catch and CPUE of albacore increased in 2015.

The SSC requests that PIFSC provide pelagic catch rates and other fishery statistics for the newly opened sections of the American Samoa Large Vessel Prohibited Area.

B. EPO BET Quota

Council staff presented on the Hawaii longline fishery in the Eastern Pacific Ocean (EPO). Annual EPO longline bigeye limit is 54,000 metric tons for all fleets, but only 34,000 mt were caught. The US longline limit for vessels over 24 meters is 500 mt and the total US longline catch in 2015 was approximately 3,000 mt, which included vessels > 24 and < 24 m. One member of the SSC noted that bigeye stock assessments and reference points in the EPO are different from those in the WCPO, and that if WCPO methodology were utilized in the EPO, the status of bigeye might show a similar level of exploitation as that in the WCPO, i.e. that overfishing is occurring.

The SSC suggested that if the US requests an increase in its catch limit, then it should do so in the context of a plan that does not increase total exploitation pressure on EPO bigeye.

C. Overfishing of EPO swordfish (ACTION ITEM)

Council staff presented an overview of the North Pacific component of the EPO swordfish which has been determined to be subject to overfishing. Spawning stock biomass is well above SB_{MSY} and is similar to the levels of the early 1950s, but fishing mortality is greater than the fishing mortality at MSY. Therefore the stock is considered to be subject to overfishing and Council action is required. The Hawaii deep set longline fleet caught 4 mt (0.04%) of the total EPO catch in 2012.

The SSC recommends continued monitoring of the incidental catch of swordfish in the EPO by the Hawaii deep set longline fishery. Non-retention of EPO swordfish is not warranted for the Hawaii deep set longline fishery due to its minor relative impact and because post-release mortality is unknown.

Further, in regards to international management, the SSC recommends for international management that the US Delegation to the IATTC put forward a proposal that the IATTC take action to limit catches of the EPO swordfish stock to no greater than 5,490 mt annually, the MSY for the stock.

D. Feasibility of YFT stock assessment model for MHI

The SSC heard with interest a presentation by SSC member John Sibert on the feasibility of developing a stock assessment model for yellowfin tuna in the Main Hawaiian Islands. A state-space surplus production model was applied to combined catch data from HDAR and NOAA for the years 1952 through 2012. The preliminary results indicate that the model can detect relative biomass trends, but estimates of absolute biomass depend on application of an independent index of abundance. Choice of abundance index has a large effect on estimates of maximum sustainable yield. Therefore, this model is not suitable for setting catch limits in the MHI.

Catches of YFT from non-commercial fisheries are not included in the combined HDAR and NOAA data. Although this model is preliminary, the model clearly shows that omission of major sources of fishing mortality biases estimates of MSY downward. Commercial and non-commercial fishers need assurance that reporting their catches would not inevitably have the effect of reducing catch limits. Outreach and education efforts with fishermen are warranted.

E. Measuring Productivity in a Shared Stock Fishery: A Case Study of the Hawaii Longline Fishery

The SSC heard with interest a presentation by Minling Pan (PIFSC staff) regarding her recent publication. Pan reviewed methods used to develop an index of productivity that can be used to measure the economic efficiency of the fishing fleet operations over time and to investigate the impact of stock abundance on productivity.

F. International Fisheries

1. Outcomes from WCPFC 12

Council staff reviewed the final results of WCPFC 12 and measures adopted by the Commission.

2. IATTC/Antigua Convention

Council staff discussed the IATTC/Antigua Convention and membership on its advisory committees

G. Public Comment

The SSC was reminded that the longline limited entry program was implemented not only to limit the expanding swordfish fishery, but to avoid overcrowding and competition with small boats from longline vessels originating from other parts of the US.

Another public commenter, referring to John Sibert's study, stated that catch data on yellowfin tuna may not be reflective of the actual numbers being landed. There is a recent sea change in reported catch. If the source of the data is the State of Hawaii's CML records, there is a component that is missing. Aside from the non-commercial data, there is a lot of fish that has gone underground and sold privately due to the low prices that the auction produces. The advent of social media makes selling fish from home quite feasible and profitable. The consumer is also a willing participant because instead of paying $12-15 a pound or higher they can buy top grade fish for $8-$10 a pound. Also this fish is super fresh. The home sold tuna is gone within 2 days. The summer run of ahi coincides with the highest catch period for the longliners and when 100,000 pounds of ahi is sold at the block the local troll caught ahi averages between 1-2 dollars a pound.

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7. Protected Resources

A. Report on 2013-14 Leatherback Sea Turtle Interactions in the Deep-set Longline Fishery Compared to Previous Years

Marti McCracken (PIFSC staff) presented an analysis of interactions between leatherback turtles and the Hawaii deep-set longline fishery. She reviewed hypothesis testing and explained bioequivalence hypothesis testing in comparison with the traditional null hypothesis model approach. She listed the challenges of the 2014 sample that included reduced observer coverage, uneven sample coverage throughout the year, and high nonrandom variability during the beginning and end of the sample year. She performed a post-survey re-stratification to create temporal strata with units of 13 day and 26 day periods that were viewed as exchangeable across the analysis time period (2007-2014).

She described the methodology used to construct a test statistic and calculated the test statistic for combined values of the poststrata (13 or 26 days) and delta (1, 1.1, 1.25, 1.5). McCracken concluded that there was not enough evidence that leatherback interactions in 2014 were not higher than historical levels. The implementation of sampling design in 2014 introduced higher uncertainty in the appropriate test procedures to evaluate the level of interactions in 2014 versus historical levels.

SSC discussion included suggestions for alternative methods to analyze the interactions, the explicit identification of the acceptable levels of error in the current hypothesis testing framework, and the incorporation of environmental covariates in the sampling design and model analysis.

The SSC noted that the leatherback takes in 2014 were higher than the historical average. However, the 2014 Biological Opinion , which included the higher number of leatherback takes in the analysis concluded that this level of interaction does not jeopardize the species.

The SSC recommends that the Council continue to monitor interactions between leatherback turtles and the Hawaii deep-set longline fishery.

The SSC recommends exploring the use of time series regression-based analysis rather than the current laborious process, given remaining uncertainties. Further, such an analysis could include environmental and other covariates to provide take rate estimates that are just as reliable but with much less analytical effort.

The SSC recommends pursuing a follow-up analysis to evaluate patterns of leatherback interactions by spatial, temporal, environmental, operational characteristics, ecosystem characteristics and natural variability. Leatherback turtles are known to aggregate at frontal areas and to make directed movements, which may inform understanding of leatherback interaction patterns in the longline fishery.

The SSC thanks McCracken for her helpful presentation.

B. Report of the Joint and Pacific Scientific Review Group Meeting

Chris Boggs **(**PIFSC staff) presented a summary of the Joint SRG meeting topics held Feb 23-24, 2016. He gave detailed presentations from three topics at the meeting relevant to issues in the Western Pacific Region: (1) Overview of Guidelines for Assessing Marine Mammal Stocks (GAMMS) III, (2) New methodologies being applied to SARs, and (3) Habitat modeling for marine mammal density. The GAMMS III provides guidelines for stock assessment methodologies of marine mammals. The new guidelines involved revisions related to the assessment of very small stocks or small endangered stocks, apportioning of PBR across aggregations, mixed or transboundary stocks, and improvements to the identification and description of prevalent potential unreported mortality and serious injury events. The new methodologies presented at the Joint SRG meeting included the application of novel approaches to estimate marine mammal abundance, improved estimates of rmax for marine mammals, and modeling the detection probability of cetaceans (i.e., the *g(0) problem*). The habitat modeling compared density estimates for a set of marine mammal species compared to empirical estimates from line-transect observational surveys.

The SSC requests further information, from the Pacific SRG meeting held Feb 25-26, 2016, on topics related to fishery interactions with spotted dolphins and on swordfish drift gillnet bycatch that were briefly listed but not covered in detail during the presentation. Boggs indicated that he will identify meeting documents applicable to Hawaii fisheries, to help further refine information requests.

The SSC thanks Boggs for his helpful presentation of SRG discussions, and related follow-up on information requests.

C.\ Rare Events Bycatch Workshop Plan

Council staff presented the background and goals for an upcoming workshop on the modeling of rare bycatch events. Staff described efforts to implement a Council directive to work with the Protected Species Advisory Committee representatives and NMFS to review approaches used in the 2005 and 2014 Biological Opinions to estimate anticipated sea turtle take with the deep-set

longline fishery. One method used in past Biological Opinions to estimate future level of take was to use the product of an average interaction rate and anticipated effort. Additional methods of rare events modeling that may be considered include the control chart method. The goal of the workshop will be to evaluate a range of methods and statistical approaches to determine the level of fishery interaction with protected species (i.e., a rare event).

The SSC thanks Council staff for the presentation and supports the concept of the workshop.

D. Updates on Endangered Species Act (ESA) Consultations

Ariel Jacobs (PIRO) presented on ESA consultations for (1) Kampachi Farms special coral reef ecosystem permit affecting potentially various marine turtle, marine mammal and seabird populations, (2) Hawaiian monk seal critical habitat and Hawaii FEP fisheries and (3) re-consultation on the Hawaii deep-set longline fishery affecting green, loggerhead and olive ridley populations.

The SSC thanks Jacobs for the informative presentation.

E. Updates on ESA and Marine Mammal Protection Act (MMPA) Actions

Pat Opay (PIRO) presented on the ESA listing of 15 Indo-Pacific corals (none in Hawaii) and the analyses underway to support a critical habitat rule for these corals in the waters of American Samoa, Guam, CNMI and PRIAs. He also presented on the proposed rule listing of 11 green turtle DPS (distinct population segments) with 8 proposed as threatened (eg., Hawaii) and 3 as endangered (Guam, CNMI, American Samoa). Final rule is expected to be published in 2016. Opay also presented on the proposed rule to list 14 DPS for the global humpback whale populations. He also advised that NMFS is in the early stages of recovery planning for the Indo-West Pacific scalloped hammerhead shark DPS that was listed in 2014 although no critical habitat has been designated for this species. Status reviews are underway for common and bigeye thresher sharks as well as the oceanic whitetip shark and smooth hammerhead shark that are taken in the deep- and shallow-set Hawaii longline fisheries and American Samoa longline fishery. There is also a petition to list the giant and reef manta rays.

The SSC thanks Opay for a comprehensive and informative presentation.

F. Public Comment

The SSC heard a member of the public express concerns that fishermen are being visually monitored without consent in the Kona troll fishery. Concern was expressed that the historical population estimates for insular FKW in Hawaii used for the purpose of the listing proposal were based upon non-Hawaii FKW populations (i.e. from Palmyra) but the recent SRG discussions suggest this type of approach would not be allowed.

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8. Other Business

A. SSC Operational Guidelines and 3 Year Research Plan

The SSC heard from Council Staff about a draft SSC Operational Guidelines and 3 Year Research Plan. SSC members were asked to review the Plan and send comments by April 30th.

B. 2015 Program Review and 2016 Program

The SSC recommends that the Council staff coordinate with state and territorial agencies to ensure that the marine catch being sold through social media is captured, as such transactions are not being recorded through existing reporting requirements.

The SSC recommends that Council support efforts to establish a permanent research enterprise to support multidisciplinary research and technological innovation for studying Western Pacific marine ecosystems.