WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

128th Meeting of the Scientific and Statistical Committee
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Council Office Conference Room

REPORT

4. Report from the Pacific Islands Fisheries Science Center Director

Michael Seki, Director of the Pacific Islands Fisheries Science Center (PIFSC), provided an update on the Center's activities and programs. Included in the SSC agenda are reports on the Main Hawaiian Islands Deep 7 Bottomfish benchmark stock assessment, electronic monitoring implementation project, HICEAS activities, and a mention of the Guam reef fish benchmark assessment. One of the critical pieces in the deep 7 bottomfish assessment, aside from the improved fishery dependent data from the series of workshops with the fishermen, is the incorporation of the fishery independent survey information using the Modular Optical Underwater Survey System (MOUSS) and research fishing. The Center has been involved in the development of the MOUSS system.

The NOAA ship *Oscar Elton Sette* will conduct 3 surveys in the Marianas Archipelago: 1) cetacean assessment survey; 2) BioSampling expedition; 3) insular reef fish surveys. Fish otolith preparation training was conducted in Guam and Saipan. The 2017 population survey for monk seals showed a continued 2% annual population growth. There were 2 symposia held associated with the West Hawaii Integrated Ecosystem Assessment. The SSC noted that there might be a significant opportunity lost due to the delay in the 2018 ASRAMP cruise for collecting the fishery independent reef fish surveys in American Samoa.

The SSC thanked Seki for the informative presentation.

5. Insular Fisheries

A. Main Hawaiian Islands Deep 7 Bottomfish Fishery

1. Report on the WPSAR of the Main Hawaiian Islands Deep 7 Bottomfish Fishery

SSC member Steve Martell presented the highlights and findings of the benchmark assessment review for the Deep 7 bottomfish fishery. A benchmark assessment for the Main Hawaiian Islands (MHI) Deep 7 bottomfish complex was prepared for the Western Pacific Stock Assessment Review (WPSAR) process, which was conducted November 13-17, 2017 in Honolulu, HI. The review panel included two reviewers contracted through the Center for Independent Experts (CIE): Dr. Cathy Dichmont (Australia), Dr. Henrik Sparholt (Denmark), and chaired by a member of the Western Pacific Regional Fishery Management Council (WPRFMC) SSC. The WPSAR generated three individual panel reviewer reports and one consensus report by the WPSAR Chair. The panel's decisions were presented by individual terms of reference.

The SSC acknowledged the PIFSC Stock Assessment Program for proactive stakeholder engagement through the hosting of five data workshops. The SSC also thanked fishermen for their time, contributions, and engagement with the process. The SSC deemed the WPSAR review as comprehensive and adequately addressing the Terms of Reference.

The SSC concurred with the findings of the WPSAR reports.

The SSC thanked Steve Martell for the informative presentation.

2. Stock assessment for the Main Hawaiian Islands Deep 7 Bottomfish Complex 2018, with Catch Projections Through 2022

Brian Langseth, PIFSC, presented the final benchmark assessment of the MHI Deep 7 bottomfish complex. This benchmark assessment was reviewed by the WPSAR panel on November 13-17, 2017. The assessment used a Bayesian surplus production model fit to bottomfish catch and effort data from commercial catch reports for fishing years 1949-2015. The CIE panel recommendations concerning the initial 2014 assessment update were addressed in this benchmark and included the following: 1) improvements in data filtering and standardization techniques; 2) the inclusion of a fishery-independent estimate of abundance; 3) reevaluating the assumptions for prior values; and 4) exploration of a single-species assessment model for opakapaka (*Pristipomoides filamentosus*). The surplus production model for the Deep 7 complex was used to evaluate the risk of overfishing as a function of alternative annual reported catches from fishing years 2018 through 2022. The projections included uncertainty in the posterior distribution of estimated bottomfish biomass in 2015 and population dynamics parameters estimated from the assessment model.

The Deep 7 bottomfish stock complex in the MHI was categorized as not overfished ($B/B_{MSY} < 0.844$) and not experiencing overfishing ($H/H_{MSY} > 1$) in 2015. The single species assessment for opakapaka produced similar overall results to the model for the Deep 7 complex.

The SSC discussion focused on the considerations of wind and under- and un-reported catch scenarios. The SSC encouraged future efforts to continue to implement WPSAR short- and

medium-term recommendations and reconsider approaches to better understand under- and un-reported catch. The SSC recommends the following improvements to the next benchmark assessment to address SSC's methodological concerns:

The SSC recommends exploring the use of a unified modelling approach based on for instance the Tweedie likelihood which was shown to be a better approach than a 2-stage approach like the delta-Normal[1] and may be able to better address area by year effects. The SSC continues to be concerned about the use of two separate models and then having to combine by post-model multiplication with the attendant problems with variance estimation for the combined model.

The SSC acknowledges that this benchmark assessment is a significant improvement from the previous assessment. Therefore, **the SSC finds the 2018 benchmark stock assessment of the Main Hawaiian Islands Deep 7 Bottomfish Complex to be best scientific information available for the purposes of setting harvest reference points and determining stock status.**

The SSC recommends that the raw time series data used in the CPUE standardization be made available to the Council for improving the data standardization modeling. The SSC further recommends these data be provided for further analysis by independent contractors and then report their results to the 130th SSC.

The SSC recommends the formation of the P* Working Group to determine the risk level at which the fishery will be managed based on the scientific uncertainties in the new assessment.

The SSC thanked Brian Langseth for the informative presentation.

B. Options for Refining Precious Corals Essential Fish Habitat (Action Item)

Agenda Item 5B was not taken up at the 128th SSC Meeting and will be presented at a future SSC Meeting.

C. Ecosystem Component Classification (Action Item)

Council staff presented on the status of the Ecosystem Component Amendment to the Fishery Ecosystem Plans (FEPs) for the Hawai'i, American Samoa and Mariana Archipelagos. This amendment will reclassify the current management unit species (MUS) as "species in need of federal management and conservation," which require specifications, descriptions, stock assessments and other actions, and as "ecosystem components" are exempt from FEP requirements. Council staff worked with the Division of Aquatic Resources in finalizing the

[1] Foster S, Bravington M (2012) A Poisson–Gamma model for analysis of ecological non-negative continuous data. Environmental and Ecological Statistics 150: 250–258

Swallow B, Buckland S, King R, Tom, M (2016) Bayesian hierarchical modelling of continuous non-negative longitudinal data with a spike at zero: An application to a study of birds visiting gardens in winter. Biometrical Journal 58: 357–371

Hawaii MUS list upon their request to increase the cut-off threshold from 20% to 50%. This designated all of the coral reef species as ecosystem components. The Archipelagic Plan Team met on January 26, 2018 and recommended to further refine the MUS list based on the ability to generate assessments for those species. In addition, the Plan Team recommended that collaborative management be established between the State/Territory and the Council for the remaining MUS. Council staff also provided an overview of the regulations that would apply to ecosystem component species. Regulations that would allow the Council to monitor and collect data would be applied to the ecosystem component species. Regulations that would conserve the ecosystem and apply an ecosystem-based approach will also be applied to the ecosystem component species.

A working group was established to further discuss the species lists, data availability, and implications of the movement of species from MUS to ecosystem component designation. The discussions focused on the nexus between species with adequate data inputs for stock assessments and species of interest. In reference to MUS that exist within both federal and state, commonwealth, or the territories waters, consequences and benefits of co-management and how co-management potentially could be realized was also assessed. The working group concluded that MUS in the current list with insufficient data to generate an assessment to inform the Annual Catch Limits will be designated as ecosystem components. However, these species will be prioritized for further research and data collection. For the coral reef fish species that the State of Hawaii requested to include in the MUS, the working group recommends to limit the species to the ones that have a stock assessment[2].

Tables 1-4 are the final list of species that are in need of conservation and management in American Samoa, Guam, CNMI, and Hawaii.

Table 1. Recommended list of management unit species for the American Samoa FEP

Scientific Name	Common Name	FAMILY	FEP GROUP
Caranx lugubris	black trevally, jack	Carangidae	BF Multi-species complex
Lethrinus rubrioperculatus	redgill emperor	Lethrinidae	BF Multi-species complex
Aphareus rutilans	(lehi) (silverjaw jobfish)	Lutjanidae	BF Multi-species complex
Aprion virescens	grey snapper, jobfish	Lutjanidae	BF Multi-species complex
Etelis carbunculus	red snapper	Lutjanidae	BF Multi-species complex
Etelis coruscans	longtail snapper	Lutjanidae	BF Multi-species complex
Lutjanus kasmira	blueline snapper	Lutjanidae	BF Multi-species complex
Pristipomoides filamentosus	pink snapper (paka)	Lutjanidae	BF Multi-species complex
Pristipomoides flavipinnis	yelloweye snapper	Lutjanidae	BF Multi-species complex
Pristipomoides zonatus	flower snapper (gindai)	Lutjanidae	BF Multi-species complex
Variola louti	lunartail grouper	Serranidae	BF Multi-species complex
Acanthurus xanthopterus	Yellowfin surgeonfish	Acanthuridae	CRE-Fishes
Naso lituratus	Orangespine unicornfish	Acanthuridae	CRE-Fishes
Elagatis bipinnulata	Rainbow runner	Carangidae	CRE-Fishes

[2] Nadon, M. O. 2017. Stock assessment of the coral reef fishes of Hawaii, 2016. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-60, 212 p

Lutjanus bohar	Twinspot/red snapper	Lutjanidae	CRE-Fishes
Lutjanus gibbus	Humpback snapper	Lutjanidae	CRE-Fishes

Table 2. Recommended list of management unit species for the Guam section of the Marianas FEP

Scientific Name	Common Name	FAMILY	FEP GROUP
Caranx ignobilis	giant trevally, jack	Carangidae	BF Multi-species complex
Caranx lugubris	black trevally, jack	Carangidae	BF Multi-species complex
Lethrinus rubrioperculatus	redgill emperor	Lethrinidae	BF Multi-species complex
Aphareus rutilans	red snapper, silvermouth (lehi)	Lutjanidae	BF Multi-species complex
Etelis carbunculus	red snapper (ehu)	Lutjanidae	BF Multi-species complex
Etelis coruscans	red snapper (onaga)	Lutjanidae	BF Multi-species complex
Lutjanus kasmira	blueline snapper	Lutjanidae	BF Multi-species complex
Pristipomoides auricilla	yellowtail snapper	Lutjanidae	BF Multi-species complex
Pristipomoides filamentosus	pink snapper (paka)	Lutjanidae	BF Multi-species complex
Pristipomoides flavipinnis	yelloweye snapper	Lutjanidae	BF Multi-species complex
Pristipomoides sieboldii	pink snapper (kalekale)	Lutjanidae	BF Multi-species complex
Pristipomoides zonatus	snapper (gindai)	Lutjanidae	BF Multi-species complex
Variola louti	lunartail (lyretail) grouper	Serranidae	BF Multi-species complex
Naso lituratus	Orangespine unicornfish	Acanthuridae	CRE-Fishes
Naso unicornis	Bluespine unicornfish	Acanthuridae	CRE-Fishes
Carangoides orthogrammus	Goldspot trevally	Carangidae	CRE-Fishes
Caranx melampygus	Bluefin trevally	Carangidae	CRE-Fishes
Caranx sexfasciatus	Bigeye trevally	Carangidae	CRE-Fishes
Elagatis bipinnulata	Rainbow runner	Carangidae	CRE-Fishes
Myripristis berndti	Bigscale Soldierfish	Holocentridae	CRE-Fishes
Sargocentron spiniferum	Long-Jawed Squirrelfish	Holocentridae	CRE-Fishes
Lethrinus olivaceus	Longface Emperor	Lethrinidae	CRE-Fishes
Lethrinus xanthochilus	Yellowlip Emperor	Lethrinidae	CRE-Fishes
Monotaxis grandoculis	Bigeye Emperor	Lethrinidae	CRE-Fishes
Aphareus furca	Silvermouth/Jobfish	Lutjanidae	CRE-Fishes
Lutjanus fulvus	Flametail Snapper	Lutjanidae	CRE-Fishes
Scarus schlegeli	Chevron Parrotfish	Scaridae	CRE-Fishes
Variola albimarginata	White margin Lyretail Grouper	Serranidae	CRE-Fishes
Lethrinus harak	Thumbprint emperor	Lethrinidae	CRE-Fishes
Lethrinus obsoletus	Orange striped emperor	Lethrinidae	CRE-Fishes
Siganus argenteus	Forktail rabbitfish	Siganidae	CRE-Fishes

Table 3. Recommended list of management unit species for the CNMI section of the Marianas FEP

Scientific Name	Common Name	FAMILY	FEP GROUP

Caranx ignobilis	giant trevally	Carangidae	BF Multi-species complex
Caranx lugubris	black trevally, jack	Carangidae	BF Multi-species complex
Lethrinus rubrioperculatus	redgill emperor	Lethrinidae	BF Multi-species complex
Aphareus rutilans	red snapper, silvermouth (lehi)	Lutjanidae	BF Multi-species complex
Aprion virescens	grey snapper, jobfish	Lutjanidae	BF Multi-species complex
Etelis carbunculus	red snapper (ehu)	Lutjanidae	BF Multi-species complex
Etelis coruscans	red snapper (onaga)	Lutjanidae	BF Multi-species complex
Lutjanus kasmira	blueline snapper	Lutjanidae	BF Multi-species complex
Pristipomoides auricilla	yellowtail kalikali	Lutjanidae	BF Multi-species complex
Pristipomoides filamentosus	pink snapper (paka)	Lutjanidae	BF Multi-species complex
Pristipomoides flavipinnis	yelloweye snapper	Lutjanidae	BF Multi-species complex
Pristipomoides sieboldii	pink snapper (kalekale)	Lutjanidae	BF Multi-species complex
Pristipomoides zonatus	flower snapper (gindai)	Lutjanidae	BF Multi-species complex
Naso lituratus	Orangespine Unicornfish	Acanthuridae	CRE-Fishes
Naso unicornis	Bluespine Unicornfish	Acanthuridae	CRE-Fishes
Carangoides orthogrammus	Yellow Spotted Trevally	Carangidae	CRE-Fishes
Caranx melampygus	Bluefin Trevally	Carangidae	CRE-Fishes
Caranx papuensis	Brassy Trevally	Carangidae	CRE-Fishes
Caranx sexfasciatus	Bigeye Trevally	Carangidae	CRE-Fishes
Caranx sp. (juvenile)	EE: Juvenile Jacks	Carangidae	CRE-Fishes
Scomberoides lysan	Leatherback	Carangidae	CRE-Fishes
Elagatis bipinnulata	Rainbow Runner	Carangidae	CRE-Fishes
Lethrinus harak	Blackspot Emperor	Lethrinidae	CRE-Fishes
Lethrinus obsoletus	Yellowstripe Emperor	Lethrinidae	CRE-Fishes
Lethrinus olivaceus	Longnose Emperor	Lethrinidae	CRE-Fishes
Lethrinus xanthochilus	Yellowlips Emperor	Lethrinidae	CRE-Fishes
Monotaxis grandoculis	Bigeye Emperor	Lethrinidae	CRE-Fishes
Lutjanus gibbus	Humpback Snapper	Lutjanidae	CRE-Fishes
Parupeneus barberinus	Dash & Dot Goatfish	Mullidae	CRE-Fishes
Siganus argenteus	forktailed rabbitfish	Siganidae	CRE-Fishes

Table 4. Recommended list of management unit species for the Hawaii FEP

Scientific name	**Common name**	**FEP Group**
Pleurocorallium secundum	Pink coral	Precious coral
Hemicorallium laauense	Red coral	Precious coral
Kulamanamana haumeaae	Gold coral	Precious coral
Acanella spp.	Bamboo coral	Precious coral
Antipathes griggi	Black coral	Precious coral
Antipathes grandis	Black coral	Precious coral
Myriopathes ulex	Black coral	Precious coral

Hyperoglyphe japonica	Raftfish	Seamount groundfish
Beryx splendens	Alfonsin	Seamount groundfish
Pseudopentaceros wheeleri	Armorhead	Seamount groundfish
Aphareus rutilans	Lehi, Deep/Silvermouth	Deep 7 complex
Pristipomoides filamentosus	Opakapaka, Pink snapper	Deep 7 complex
Etelis coruscans	Onaga, Longtail snapper	Deep 7 complex
Pristipomoides sieboldii	Kalekale, Lavender jobfish	Deep 7 complex
Etelis carbunculus	Ehu, Squirrelfish snapper	Deep 7 complex
Hyporthodus quernus	Hapu'upu'u, Shapon, Sapon	Deep 7 complex
Pristipomoides zonatus	Gindai, Buninas, Flower snapper, Tai	Deep 7 complex
Aprion virescens	Uku	Non deep 7 complex
Heterocarpus spp.	Deepwater shrimp, Nylon shrimp	Crustacean
Ranina ranina	Kona crab	Crustacean
Naso unicornis	Bluepine unicornfish	CRE-Fishes
Caranx ignobilis	Giant trevally	CRE-Fishes
Caranx melampygus	Omilu	CRE-Fishes
Parupeneus porphyreus	Kumu	CRE-Fishes
Chlorurus perspicillatus	Spectacled parrotfish	CRE-Fishes
Scarus rubroviolaceus	Redlip parrotfish	CRE-Fishes

D. Public Comment

Three public comments expressed concern about the potential for increasing trends in under- and un-reported catch for Deep 7 bottomfish (on account of social media, increasing commercial license fees, new fishing techniques, stable prices, increasing costs) and expressed interest in future work to better understand this issue.

One public comment requested more outreach from the State of Hawaii on how to accurately report catch and effort for Deep 7 bottomfish trips.

All three public comments thanked PIFSC leadership and the PIFSC Stock Assessment Program for their efforts to engage commercial bottomfish fishermen in the stock assessment process and expressed appreciation from the fishing community.

6. Program Planning and Research
A. Report on the National SCS Meeting 6

SSC member Justin Hospital presented a summary of the 2018 National SCS meeting. The meeting focused on the use of management strategy evaluation (MSE) to inform management decisions by regional fishery councils. Topics included defining what MSE is and when and how to implement it. MSE is a process to assess consequences from a range of management options that focuses on trade-offs under uncertainty, not necessarily on seeking an optimal strategy. NMFS is building capacity within the Science Center of each Council region by hiring one full-time employee whose role is to work with the Councils on their MSE priorities. Representatives from the WPRFMC at the meeting were SSC members Cabrera, Harley, Hospital, Martell, Pilling and Council staff Sabater. The group presented a list of MSE priorities for the Western Pacific region. The National SCS meeting briefing book is available at www.fisherycouncils.org/ssc-workshops/scs6-briefing-book.

The SSC thanked Hospital for his presentation.

B. Potential Ecosystem Indicators for Nearshore Fisheries

Thomas Remington, SAFE report coordinator for the Council, updated the SSC with efforts to integrate data from fishery ecosystem relationships. The initial exploration focused on identifying environmental correlates of CPUE in American Samoa, CNMI, Guam, and the MHI. Significant linear relationships were observed between certain variables, such as sea surface temperature and precipitation, and certain stocks in the Western Pacific. SSC members suggested ways to improve the analysis, including the use of structural equation models and the exploration of additional environmental covariates. Future efforts will focus on ways to integrate these types of data into stock assessments for the region to inform an ecosystem-based fishery management approach.

C. Implementing Ecosystem-Based Fisheries Management in the Western Pacific Region

SSC member, Michael Seki, provided background, goals, and examples of ecosystem-based fisheries management (EBFM) in the Western Pacific region. EBFM is a new paradigm in marine resource management with a goal of integrating ecological, environmental, and societal considerations in science-based decision-making for fisheries management. Seki suggested ways to integrate science activities into management advice, including presenting scientific advice in plain language, better communication of science needs by managers to scientists, and the need to maintain and support data streams and time series.

National EBFM working groups were tasked with facilitating the development of regional plans for EBFM implementation. A draft plan for the region has been created and is being vetted before being finalized by the end of 2018. The EBFM working group for the region is Lumsden and Moews-Asher (NOAA PIFSC), McGregor and Hall (NOAA PIRO), and Sabater (WPFMC).

SSC member, Hilborn, detailed the shortcomings of EBFM to support fisheries at the expense of environmental concerns (e.g. impact of regulations on economic viability of fisheries and fishing dependent communities).

The SSC recommends that the SSC be provided an opportunity to review and comment on the draft EBFM Regional Implementation Plan.

D. Updating the Management Strategy Evaluation priorities

Council staff requested input from the SSC on updating the "Priorities for Management Strategy Evaluation in the Western Pacific Region" document. The document listed a set of MSE priorities identified as low, medium, or high priority for insular fisheries, pelagic fisheries, and protected species.

The SSC formed working groups to update the report with new or updated MSE priorities. The pelagic fisheries/protected species MSE working group is Kingma (coordinator), Kobayashi, Pilling, Harley, Schaefer, and Hospital; and the insular fisheries MSE working group is Sabater (coordinator), Itano, Camacho, Tenorio, and Okano.

The SSC recommended the following for consideration by the working groups in the update of the MSE priority document:

1. trade-offs between the longline and purse seine fishery as it relates to maximum sustainable yield and conservation measures for bigeye tuna stocks in the Pacific; and

2. alternative rules for the conservation and management of protected species beyond the potential biological removal (PBR) approach looking at trade-offs and impact to the fishery and protected species.

E. Review of the Terms of Reference for the WPSAR of the Kona crab benchmark assessment

Council staff described each of the terms of reference for the WPSAR of the Kona crab benchmark stock assessment. The SSC approved the terms of reference and endorsed SSC member Martell to chair the WPSAR panel.

An SSC member, Hilborn, commented that a production model may not be appropriate for this taxon given the life history of the species and the change in selectivity of the catch. The TOR for the WPSAR review allows the review panel to comment on the appropriateness of the model for the species.

F. Public Comment

There were no public comments.

7. Pelagic Fisheries

A. Hawaii Longline Fisheries

1. Hawaii Annual Longline Fisheries Report

Russell Ito (PIFSC) provided a report on 2017 Hawaii longline fisheries statistics. The report covered the deep-set and shallow-set fisheries targeting bigeye tuna and swordfish, respectively. The presentation highlighted statistics indicating that 2017 saw the highest historical effort in the deep-set fishery in terms of vessels and hooks deployed. Yellowfin catch in the deep-set fishery in 2017 was also at a record level. A shift in deep-set and shallow-set fishing locations as a result of the expansion of the Papahanaumokuakea Marine National Monument was also noted. The SSC thanked Ito for his report.

2. Framework for Managing Sea Turtle Interactions in the Hawaii Shallow-set Longline Fishery (Action Item)

Council staff presented a proposed framework for SSC consideration with regards to managing sea turtle interactions in the Hawaii shallow-set longline fishery. The presentation covered background information on existing regulations that apply to the shallow-set fishery which includes gear and bait requirements and annual hard caps on loggerhead and leatherback interactions. The fishery has been subject to 100% observer coverage since 2004, providing NMFS and the Council with over a decade's worth of information available to assess the effectiveness of the measures intended to reduce sea turtle interactions. Gear requirements implemented in 2004 successfully reduced sea turtle interactions in the shallow-set longline fishery by approximately 90 percent. The shallow-set longline fishery targeting swordfish is highly seasonal, with effort typically increasing in October and peaking in March. When the hard cap limit is reached, the consequence to the fishery is closure for the remainder of the calendar year. A hard cap closure during periods of peak market demand for Hawaii swordfish can create a disruption in the U.S. domestic swordfish market without necessarily serving a conservation basis. Further, spillover market effects may increase sea turtle interactions within the region.

Loggerhead turtle interactions in the Hawaii shallow-set longline fishery since the start of the current fishing season (2017 fall through 2018 summer) were higher than levels observed since the fishery reopened in 2004 through 2016. The existing management measures do not provide for early detection of and response to higher interaction rates, hotspots, or fluctuations that may indicate a potential for higher impacts to sea turtle populations or a fishery closure early in the calendar year.

The potential framework presented by staff included a) specification of hard caps; b) in-season measures to implement a temporary closure when a certain proportion of the loggerhead or leatherback limit is reached; c) real-time spatial management measures to monitor and manage interaction hotspots and fluctuations; and d) establishment of a fleet communication program to facilitate implementation of real-time spatial management measures and dissemination of interaction information to the fleet.

The SSC noted that there are different ways in which to determine what the hard cap values are and how to manage them. The SSC also noted that real time spatial management by the Council would be overly complicated and not an efficient use of resources.

Based on experience with other fisheries, the SSC recommends that industry solve this problem by considering a non-regulatory, transferable interaction quota system, or by managing the fleet wide sea turtle interactions based on a hard cap with other innovative and efficient methods (e.g. risk pools).

The SSC also recommends that the Council consider how improved communication with fishery participants may be implemented to provide more timely information to the fleet on sea turtle interactions.

The SSC recommends that staff review examples of industry-led transferable bycatch quota systems including the application of such systems to ESA listed species for consideration by the industry, Council, and SSC. Staff should engage with SSC members including Martell, Hospital and Lynch.

a. Preliminary Analysis of Observed Sea Turtle Interactions

T. Todd Jones (PIFSC) presented a characterization of the observed loggerhead turtle interactions in the Hawaii shallow-set longline fishery. The presentation covered the spatial distribution of interactions and overlap of the TurtleWatch temperature band (17.5-18.5°C), observed loggerhead size, and loggerhead nesting trends.

The SSC noted the increasing trend since 2012 in the interaction rate with loggerhead turtles, expressed as interactions per 1000 hooks in the shallow set longline fishery. About 50% of the interactions take place in the 17.5-18.5°C temperature band, which is the basis for the NOAA product Turtle watch to avoid interactions.

The preliminary characterization of the loggerhead interactions did not show the recent shallow-set longline effort or loggerhead size to be anomalous compared to previous years.
The SSC noted that the proposed refinements to the analyses will be useful and were reported to involve: 1) interaction rates, 2) temperature interaction bands, 3) hatchling productivity and survivorship, and 4) assessing tradeoffs in interaction rates for consideration of spatial management.

The SSC recommended TurtleWatch should display both the number of turtle interactions and the number of turtles per unit of swordfish weight.

The SSC thanked Jones for his presentation.

B. US Territory Longline Bigeye Specification (Action Item)

Council staff presented background information on the most recent WCPFC tropical tuna measure (CMM 2017-01), bigeye stock status, and recent fisheries statistics. Options related to Council's specification of 2018 US Participating Territory bigeye longline limits and limits on the amount of catch that could be transferred under Specified Fishing Arrangements were also presented. It was reported that projected impacts to bigeye as result of the options and allocation agreement scenarios includes full implementation of CMM 2017-01, whereby 10,000 mt of

latent longline bigeye catch in relation to Japan and Indonesia is included.

With regards to bigeye stock status, some members expressed concern with the most recent bigeye growth estimate that was included in the 2017 stock assessment. The SSC noted that the WCPO bigeye growth estimate used in the 2017 stock assessment will be reanalyzed with additional otolith samples from large bigeye in mid-2018 by the Commonwealth Scientific and Industrial Research Organization (CSIRO). The new growth model will be considered at the WCPFC's Scientific Service Provider (SPC) preassessment workshop in April for presentation at WCPFC Scientific Committee in August.

The SSC finds that the methodology used to assess the relative impacts of the specification limits is appropriate and utilizes a similar approach to the analyses conducted by the SPC to evaluate the effectiveness of the WCPFC tropical tuna measure.

Based on the evaluation conducted by Council and PIFSC, the SSC further notes that projected impacts from the options are believed to not lead to bigeye overfishing and are consistent with Commission management objectives.

The SSC further finds that projected impacts are essentially the same with regards to Option 2 (Status Quo limits) and Option 3c (allocation limits of up to 2,000 mt per territory).

C. American Samoa Longline Fisheries

1. American Samoa Annual Longline Fisheries Report

Keith Bigelow (PIFSC) presented the 2017 American Samoa longline fishery data annual report. The number of vessels and the catch of albacore were reported to be at historically low levels since the fishery began in the early 2000s.

The SSC noted the continued attrition in the longline fleet including both alia vessels and larger monohull vessels.

The SSC thanked Bigelow for his report.

2. American Samoa Large Vessel Prohibited Area (Action Item)

Council staff presented the LVPA action that will be considered by the Council at its 172nd meeting. The action aims to reduce regulatory barriers that may impede fishing efficiency of the larger longline vessels while taking into consideration, among other things, impacts on small vessels and protecting American Samoa cultural fishing practices. The presentation covered the level of participation by longline and troll vessels and poor economic conditions that have beset the longline fishery. The LVPA was established when alia longline vessels numbered around 40, whereas only 1 alia longline vessel has operated in recent years. Attrition has also been observed in the number of large vessels operating in the fleet, with 25 vessels fishing in 2002, and 14 operating in 2017. It was also noted that one large vessel was recently sold in late-2017 and has left the fishery.

The presentation described a range of spatial LVPA exemption options under consideration and the Council's existing preferred alternative that would implement an LVPA exemption area seaward of 12 nm around Tutuila, Manua Island, and Swains. The Council's preferred alternative also includes a 2 nm closure to longline vessels around the offshore banks, which was included in response to public comments provided at the 171st Council meeting.

a. Report on American Samoa Cultural Fishing

Danika Kleiber (PIFSC) presented recent research in American Samoa on the issue of cultural fishing. PIFSC researchers conducted interviews while visiting American Samoa during the week of February 5th 2018. The study involved interviews with alia and longline fishermen and other stakeholders. One of the outcomes of the research was the development of a conceptual model of American Samoa cultural fishing that identified factors that can be used to evaluate cultural fishing.

The SSC noted that the distribution of fish for sharing is central to cultural fishing and protection of Samoan cultural practice. SSC members noted that the source and the species of fish are not as important, but for cultural purposes it is important to understand the quantity of the fish flowing into the community as well as the aggregate benefits that the different sectors provide to the Territory.

The SSC also noted that the term cultural fishing is better understood as fishing for culture.

With regards to the LVPA exemption alternatives, the SSC finds that the PIFSC report, along with other surveys and ethnographic research, provides a sufficient basis to evaluate the impacts of LVPA alternatives on American Samoa cultural fishing.

The SSC also reiterates its previous recommendation that the Council consider alternatives 3, 4, 5, and 6 to address the large vessel economic situation while also preventing gear conflicts and supporting preservation of cultural fishing opportunities.

The SSC thanked Kleiber for her presentation.

3. American Samoa Swordfish Trip Limit (Action Item)

Council staff presented the American Samoa longline swordfish trip limit action under consideration by the Council at its 172nd meeting. The presentation noted that the trip limit was established in 2011 in conjunction with Amendment 5, which required hooks to be set below 100 meters in depth to minimize the incidental catch of green sea turtles. Amendment 5 also included a limit of 10 swordfish per trip which mirrored regulations applicable to the Hawai‘i deep-set longline fishery. The presentation showed that 97% of trips involve catches of less than 10 swordfish. Swordfish discards as a result of the trip limit regulations result in unnecessary discards and loss of revenue for an economically distressed fishery. Swordfish discards also reduce local swordfish supply including swordfish that may be given away to the community and for cultural reasons.

The SSC recommends that the Council consider removing the swordfish trip limit. The

SSC concludes that removal of the trip limit would not have adverse impacts to the swordfish stock, and would eliminate unnecessary regulatory discards that currently reduce revenue for the longline fleet and reduce local swordfish supply. The SSC also noted that removal of swordfish trip limit would not lead to increased sea turtle interactions because gear configurations and fishing effort will remain the same.

D. Electronic Monitoring and Reporting

1. Electronic Monitoring in the Hawaii Longline Fisheries

Matt Carnes (PIFSC) reported on the project to equip Hawaii longline vessels with camera systems in support of video monitoring of the fleet. Camera systems have been deployed on 18 Hawaii shallow-set and deep-set vessels. The presentation noted that the video review produces data similar to human collected observer data with the exception of shark bycatch. The open source video review software was able to reduce review time significantly. Optimal camera placement is vessel specific for species detection and identifications, especially non-retained species. Species landed on deck were easy to detect and enumerate.

It was noted that half of the on-board systems have been plagued with blurry camera images making it impossible for species identification.

The SSC recognized the potential significant time and funding savings as compared to human observers.

The SSC encourages PIFSC to expedite completion of the project for wider-scale use in the Hawaii longline fisheries.

The SSC requested PIFSC report back to the SSC at the next meeting regarding progress made to expedite development.

The SSC thanked Carnes for his presentation.

2. Electronic Reporting in the Hawaii Longline Fisheries

Ashley Tomita (PIFSC) provided a status update on the electronic reporting (ER) in the Hawaii longline fishery. It was presented that ER implementation in the fleet began in 2014 and has been met with challenges. PIFSC has overcome some of these challenges and is continuing to develop the on-board reporting systems. It was noted that ER in the Hawaii longline fishery would reduce time lags associated with bigeye catch projections, which rely on the existing paper logbook and dealer reports.

The SSC notes that on-board electronic reporting has been implemented globally in many fisheries and recommends that PIFSC expedite its development of these applications for use in these fisheries.

The SSC requested PIFSC report back to the SSC at the next meeting regarding progress made to expedite development.

The SSC thanked Tomita for her presentation.

3. PIRO Observer Program Electronic Reporting

Eric Forney (PIRO Observer Program) presented on the observer electronic reporting project that involves on-board reporting of observer data via satellite transmission. A key feature of the system is that it does not rely on any of the ship's equipment (e.g. VMS) and is a stand-alone unit. Electronic observer reporting has the potential to substantially reduce time lags in observer data as the information is automatically entered in a database and debriefing can occur on a daily basis rather than at the end of the trip.

The SSC thanked Forney for his presentation.

E. International Fisheries

1. WCPFC 14 Outcomes

Valerie Post (PIRO) reported on the outcomes of the 14th Regular Session of the WCPFC, which was held December 3-8, 2017 in Manila. A major outcome of the meeting was a new 3-yr tropical tuna (skipjack, yellowfin, bigeye) conservation and management measure, which includes longline and purse seine provisions that apply to 2018 only. Other adopted measures at WCPFC14 include: a) port statement measures, 2) observer safety, and 3) harvest strategies for North Pacific albacore and Pacific bluefin. Several working groups were formed and will hold intersessional meetings on the following topics: 1) FADs, 2) South Pacific albacore, 3) ER/EM, 4) sharks, and 5) observer reports and safety.

The SSC thanked Post for her report.

F. Public Comment

There were no public comments.

8. Protected Species

A. Report of the Albatross Workshop

Jeffrey Polovina, PIFSC retired, provided a report of the Council's Workshop on the Factors Influencing Albatross Interactions in the Hawaii Longline Fishery convened on November 7-9, 2017. The workshop explored the potential drivers, and implications of higher black-footed albatross interaction rates observed in 2015-2016, in the context of longer-term oceanographic variability, shifts in fishery effort and distribution, changes in albatross at-sea distribution, areas of local productivity and albatross demography and population trends. Analysis prepared for the workshop indicated that fleet dynamics combined with environmental variables (Pacific Decadal Oscillation and east-west winds) were associated with the higher sighting rates in 2015-2016. Population modeling conducted for the workshop also indicated that the black-footed albatross population may experience decline only if high levels of interaction continue over all north Pacific longline fleets. The full workshop report is currently in preparation as a NOAA Technical Memorandum with outcomes from the workshop to be included in the 2017 SAFE reports.

The SSC thanked Polovina for his informative presentation.

B. Report of the 2017 Hawaiian Islands Cetacean and Ecosystem Assessment Survey

Amanda Bradford, PIFSC, provided a report of the 2017 Hawaiian Islands Cetacean Ecosystem Assessment Survey (HICEAS) for cetaceans and seabirds within the U.S. Exclusive Economic Zone around the Hawaiian Islands. The HICEAS survey effort was completed in December after 7 legs spanning 179 days at sea aboard two vessels. Data collection goals for the survey included cetacean density, abundance, population structure, range and ecosystem observations.

Survey data from HICEAS will be used to update false killer whale abundance estimates with an initial density estimate by April 2019 and paired estimates sometime in 2019.

The SSC thanked Bradford for her informative presentation.

C. False Killer Whale Take Reduction Measures

Council staff provided a briefing on considerations for approaches to minimize injuries of false killer whales released alive in the Hawaii longline fishery. This briefing responds to a Council directive from the 171st Meeting in October 2017, in which the Council directed staff to work with industry representatives, PIRO and PIFSC to consider alternative approaches to minimize injuries on false killer whales released alive, including considerations for the serious injury determination guideline review, in preparation for the April 2018 False Killer Whale Take Reduction Team (FKWTRT) meeting.

The current abundance estimate for the pelagic stock of false killer whales (which is the focus of the False Killer Whale Take Reduction Plan (FKWTRP)) is 1,540 (CV=0.66), based on the 2010 HICEAS survey, and the potential biological removal (PBR) of 9.3. Prior to the 2010 survey, the pelagic stock abundance was based on the 2002 survey and was estimated at 484 (CV=0.93) with a PBR of 2.5. Gear solutions that mandate "weak" circle hooks that are intended to straighten out and release hooked animals have not proven effective and can put crewmen at risk. This

highlights the importance of developing better ways to release whales that are free of hooks or trailing gear which would normally classify the interaction as an MSI.

The SSC recommends that NMFS further explore gear-based solutions to release false killer whales without hooks and/or with minimal amounts of trailing gear. The SSC requests NMFS to provide a report of the FKWTRT meeting at the June 2018 SSC meeting.

SSC members noted the importance of fishermen and industry to be involved in the FKWTRP and FKWTRT process and that all available information on the "weak" hook performance be made available to the Team.

D. Updates on Endangered Species Act and Marine Mammal Protection Act Actions

Kevin Brindock, PIRO, presented updates on ESA and MMPA actions of relevance to fishery management actions, including recovery planning for loggerhead turtles, false killer whales, monk seals and Indo-Pacific corals; ESA critical habitat for green turtles, MHI insular false killer whales and corals; responses to ESA listing petitions on oceanic whitetip shark, giant manta ray, chambered nautilus and giant clams; and FKWTRP implementation. Since the October SSC meeting, NMFS issued a proposed rule to designate critical habitat for the MHI insular false killer whale distinct population segment. The proposed critical habitat area encompasses waters from the 45 m to 3200 m depth contour around the main Hawaiian Islands. Within this depth range, some areas are proposed for exclusion due to economic and national security considerations. NMFS also issued final rules in January 2018, listing the oceanic whitetip shark and the giant manta ray as threatened under the ESA.

The SSC thanked Brindock for his informative presentation.

E. Public Comment

There was no public comment.

9. Other Business

A. 129th SSC Meeting

The 129th SSC meeting will be in June 5-7, 2018 at the Council Office, Honolulu, Hawaii

B. Updates from the Social Science Planning Committee

Craig Severance and Justin Hospital, SSC members, provided a summary of the outcomes of the Social Science Planning Committee meeting held at the Council Office on March 5, 2018. The committee updated the Human Dimensions Research Priorities using a thematic approach and flexible research activities under each theme.

The committee reviewed the expanded socioeconomics modules of the SAFE report and reached consensus the narrative sections were a vast improvement. The SSC will review these for Council consideration at the June meeting.

The SSC thanked the presenters for their informative presentation.

C. Revisions to the SSC three year plan

Council staff presented the updates on the SSC three year plan. Comments were received from the Regional Administrator and incorporated in the plan. Council staff will develop a process to monitor progress in the described actions and issues in the plan.

D. Review of the BSIA Framework and the Guidance document procedures to determine stock status and rebuilding progress

Council staff presented on the updates to the NMFS Best Scientific Information Available Framework. NMFS initially developed a BSIA document to clarify the BSIA determination process. This was vetted through the CCC in February 2017 and four Councils provided comments on the draft document. NMFS addressed the comments received and developed the white paper which was presented at the February 2018 Council Coordinating Committee in Washington DC. This white paper outlines the general BSIA framework steps and recommends the each Regional Office-Science Center-Council groups document how they apply the BSIA framework.

The SSC formed a working group comprised of Lynch (SSC lead), Hilborn, Franklin, and Itano to work with Council staff to draft a comment letter to be submitted to the CCC on April 15, 2018. The working group will also provide recommendations to the WPSAR Steering Committee on potential improvements to the WPSAR process that would support the BSIA determination process.