WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

137th Meeting of the Scientific and Statistical Committee
September 9-10, 2020
Web Conference

FINAL REPORT

4. Report from Pacific Islands Fisheries Science Center Director

Michael Seki, PIFSC Director, reported on the Science Center's activities and research updates. In response to the operational challenges posed by the COVID-19 pandemic, PIFSC cancelled eight research cruises and all laboratory work. Some mission critical activities are ongoing, such as preparation of the MOUSS for BFISH20, BFISH life history sample processing, and electronic reporting (ER) outreach with conditional authorization. With regards to ER, approximately 60 of the 145 active longline vessels in the Hawaii longline fleet are participating in the program; PIFSC and PIRO are developing an instructional video that will be loaded on tablets to assist captains and crew with the Elog-it software. Updates were also provided on the collaborative international sampling for life history of Pacific billfish, automated bycatch estimation in the Protected Species Toolbox, the Western Pacific Fishery Information Network transition of the Hawaii Division of Aquatic Resources (HDAR) reporting systems from Visual FoxPro to MySQL, recent publications on monk seal and sea turtle research, start and status of the 2020 MHI bottomfish fishery independent survey with the Pacific Island Fisheries Group (PIFG), and personnel updates.

Former PIFSC Deputy Director Evan Howell has transitioned to his new position as the Director of the NMFS Office of Science and Technology. Acting PIFSC Deputy Director for the initial 90 day period, are Logan Gregory (Deputy Director, NMFS Office of Law Enforcement) and Jennifer Samson (PIFSC Ecosystem Sciences Division).

An SSC member inquired on the issue of PIFSC staff remote access to operational data, and received clarification that the current system only allows for confidential catch logs to be accessed at the NOAA facility. PIFSC staff clarified that since July, three international fisheries program (IFP) staff enter data remotely at their home and secure log sheets in safes. Data can be accessed by IFP staff remotely for further processing. The SSC noted that the roll out of electronic logbook reporting will significantly augment this operational issue, and noted that it has previously made recommendations to expedite the implementation of the electronic reporting for the pelagic fisheries.

An SSC member inquired why the blue marlin is low on the research priority list considering that the species will be assessed by the ISC in 2021. It was asserted that species of management concern and their assessment schedule should be considered in the prioritization. PIFSC responded that the life history samples will not be collected, processed, or analyzed in time for the data to be included in the 2021 ISC assessment.

5. Program Planning and Research

A. Interagency US Seafood Trade Task Force

Council staff presented the Council's effort to engage the federal government in the creation of the Interagency US Seafood Trade Task Force. The Seafood Trade Task Force was created through the Presidential Executive Order on Promoting American Seafood Competitiveness and Economic Growth, issued on May 7, 2020. This Task Force is to develop a strategy that includes supporting "fair market access for United States seafood products." The Council at its June 2020 meeting requested that the Seafood Trade Task Force evaluate all impacts of foreign-sourced fishery products on domestic fisheries and markets. The evaluation should include foreign-sourced fishery products, specific to Hawaii and Guam, with known seafood safety concerns such as carbon-monoxide gassed tuna. The issue is even more critical for US Pacific Islands, such as Hawaii or Guam, where 'cheaper' tuna and tuna-like products are harvested by fisheries that do not meet typical US fishery standards and often preserve the product by gassing the product with carbon monoxide. This process creates an illusion of product freshness and can create deleterious health risks to the unsuspecting general public. The Council also requested that the Seafood Trade Task Force include representatives of the Council Coordinating Committee (CCC) in its activities.

In July, the Interagency Seafood Trade Task Force issued a "Request for Information" from interested parties to make public comment on ways to achieve the stated objectives of the Task Force, which are: improving access to foreign markets for US seafood exports through trade policy and negotiations; resolving technical barriers to US seafood exports; and otherwise supporting fair market access for US seafood products. The Task Force is to be Co-Chaired by NOAA International Fisheries and the Office of the United States Trade Representative. The Council responded to the request by providing a statement that in order for US fisheries to reach the stated objectives and mitigate the growing US 'seafood trade deficit', US fisheries need to be operating at capacity and not be limited in production due to spatial closures that may not be beneficial to the resource, administrative delays, or international quotas that are below levels commensurate to fishing capacity. The Council noted that US production and supply wanes or faces limitations, it is supplanted by far less sustainable foreign sources to meet market demand. Many of these foreign seafood sources lack sufficient monitoring practices, conservation measures, and regulatory compliance in comparison to US fisheries.

B. Report on the Council Response to President Trump's Executive Order 13921 and 13924

Council staff reported on the draft Council response to President Trump's Executive Order 13921 that promotes American seafood competitiveness and economic growth and 13924 on regulatory relief to support economic recovery from the COVID pandemic. At its 136th meeting, the SSC formed a subgroup to review the preliminary list of regulations, guidance, order, and other similar agency actions. The subgroup met on July 17 and discussed the member's comments on the draft document. The subgroup suggested that much of the protected species issues could be consolidated and all issues could be categorized into major themes such as (1) expanding fishing areas, (2) expanding market/economics, and (3) management streamlining. The report includes a list of 16 ranked priority actions with six of the priorities under the Magnuson-Stevens Act, four under Endangered Species Act, three under Marine

Mammal Protection Act, and three under other statutes. The document was strengthened by framing the statements utilizing the keywords found in the executive order on how the regulation creates a burden on domestic fishing and how the recommended actions would increase fishery productivity and promote seafood competitiveness. The draft document underwent a series of reviews by the Council Executive Committee, PIRO-Sustainable Fisheries Division, PIFSC-Director Office, other federal partners, and the Western Pacific fishing industry partners. Council staff presented the burden on domestic fishing, the recommended action, and the proposal for initiating the action for all 16 priorities.

An SSC member asked for clarity on these recommendations since they are primarily policy related. However, although a sub-group worked on these recommendations, no formal action or approval was requested from the SSC.

C. Development of a Council Policy on Offshore Energy

Council staff presented on the draft Council policy on offshore energy. At the May 2020 CCC Meeting, the Councils discussed issues and concerns regarding offshore wind development projects. At the Council's 182nd meeting in June 2020, the Council directed staff to draft a Council Offshore Wind policy that considered the following concerns: (1) the potential area closure around the offshore wind area will take away fishing grounds; (2) the wind turbines will act as fish aggregating devices that will affect the annual migration patterns of yellowfin tuna; (3) schools of juvenile fish around these turbines attract seabirds and may interact with protected species; and (4) the undersea cables from these offshore wind farms will impact the bottom substrate further compromising the benthic habitats. Council staff drafted an offshore energy policy for the Western Pacific Region that addresses these issues. The draft policy describes various best practices for offshore energy development as it relates to fisheries activities. Comments were received from various partners and stakeholders.

The SSC asked about how a reimbursement fund would be created to compensate fishermen for loss of income. Clarity is needed on how this would be implemented.

The SSC inquired about policies or protocols in responding to 1) system or structure failures due to typhoons or other disasters and 2) the decommissioning of structures. The Bureau of Ocean Energy Management (BOEM) may have existing requirements for examination and input.

The SSC recommended that when studies are being conducted, research should be done in coordination with the Council and the state or territory. Studies should examine the impact across different species that would interact with the floating wind turbines in a manner similar to FADs.

The SSC asked about the location of the proposed wind farm. The location is south of Oahu between Ewa Beach and Penguin Banks[1].

[1] https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/Hawaii/UPDATED-FINAL-MAPProgression-Portrait-%283-9-16%29.pdf

D. Public Comment

Ted Peck, Progression Energy, described a proposed wind farm that would be 12 miles offshore of Oahu with the location TBD. There would be 1-1.5 mile spacing between floating windmills with no exclusion zone between floats. There would be 3-4 dozen turbines that are basically anchored “vessels”, not fixed structures.

Ed Watamura stated that ahi during summer run exhibit a noticeable migration pattern observed by fishermen which travels from Kauai to Oahu and further down the island chain through time. Would the ahi migrational pattern be affected by offshore wind farms?

6. Island Fisheries

A. Main Hawaiian Island (MHI) *Aprion virescens* (uku) Fishery Report on the P* and SEEM Analysis

SSC member Jason Helyer, Chair of the P* and SEEM Working Group, presented the results of the P* and SEEM Analyses that quantified the scientific and management uncertainties, respectively. The assessment information dimension contributed a small reduction of 0.7 percent because the 2020 benchmark assessment utilized numerous data sources including species specific life history information, fishery dependent commercial and non-commercial catch data, and fishery independent source of biomass and mean length data for uku. A 2.5 percent reduction was scored for the assessment information dimension attributed to the main source of uncertainty being available reproduction and environmental information used in the assessment. This is to allow more improvement in the model. No reduction score was given to the stock status dimension because the stock is not overfishing and overfishing is not occurring. The PIFSC Life History Program provided the scores for the productivity attributes while the fishermen provided the scores for the susceptibility attributes. The average productivity attribute score was 5.7 percent while the susceptibility attribute score was 2.7 percent. The average score for the productivity and susceptibility dimension is a 4.2 percent reduction. Adding all the reduction scores from all four dimensions resulted in an overall reduction of 7 percent from the 50 percent risk of overfishing (overfishing limit). The acceptable biological catch (ABC) that accounts for the scientific uncertainties is at 43 percent risk with a corresponding harvest level of 297,624 pounds.

The SEEM working group utilized a scoring system ranging from 0-10 for each member and the final dimension score was an average of the member scores. The social dimension was a 1 percent reduction to accounting for the growing non-commercial fishery. Uku is not a culturally important deepwater snapper like onaga or opakapaka. A reduction score of 0.9 was given to economic dimension acknowledging that this is an economically important species by weight and is a substitute species for ahi when its not biting. No reduction scores were given to the ecological dimension. The management uncertainty reduction scores originated mostly from the monitoring (-2.1%) and the management (-3%) of the uku fishery. The monitoring reduction scores were mostly from the high variability in the HMRFS data and the monthly level reporting from the Fisher Reporting System. The reduction scores from the management sub-dimension were from the lack of mechanism to close state waters should the ACL is projected to be reached.

The working groups also discussed the potential allocation of the ACL/ACT for the commercial and non-commercial fisheries. The working group reached consensus that allocating the ACL/ACT would create division between the two fisheries sector, place unnecessary burden on the commercial fishery while the non-commercial sectors will remain unmanaged, and the monitoring method to track catch for each sector is not adequate to meet the near-real time standards for an in-season accountability measure.

SSC members noted the lack of input from non-commercial fishers in the P* and SEEM processes and discussed the need to improve engagement with the non-commercial fishing community. There was also discussion about considering the long-term yield implications associated with different quota levels, such as for a stock that is underutilized. Regarding the

SEEM score, it was noted that this is one of the first SEEM processes to result in recommended ACL reductions due to social and economic considerations.

The SSC thanked Helyer for his presentation.

B. Setting Acceptable Biological Catch for fishing year 2022-2025 (Action Item)

Council staff presented the options for the SSC to consider in setting the ABC for the main Hawaiian Islands uku fishery for fishing year 2022 to 2025. The option are based on the P* Analysis conducted on July 21, 2020. Alternative 1 is no action where the SSC will not set the ABC for fishing year 2022 to 2025. This will not be compliant with the requirements of Magnuson-Stevens Act, National Standard 1 and the Hawaii Fishery Ecosystem Plan that requires the specification of ACL. Allowing the uku fishery to be unmanaged is expected not to have adverse impacts on the target stock because the historical catch was shown to be below the overfishing limit in the benchmark assessment. Alternative 2 is status quo where the current ABC of 127,205 pounds[2] will be rolled over for fishing year 2022 to 2025. This alternative is complaint with the ACL specification requirements but not National Standard 2 where it does not utilize the best scientific information available[3]. This alternative will not have an adverse effect on the target stock because the three year average of the recent catch is below the current ACL and ABC. Alternative 3 utilizes the most recent assessment and is based on the most recent P* analysis that sets the ABC at 43 percent risk of overfishing with a corresponding catch at 135 mt (297,624 pounds). This alternative will not cause an adverse effect on the target stock because the recent commercial catches are below the commercial component of this ABC at 51 percent of the total catch.

Three alternatives were presented for the accountability measures (AMs). Alternative 1 is to split the annual catch limit (ACL) or annual catch target (ACT) between the commercial and non-commercial sector and apply an in-season AM where catches from both sectors are tracked through the Fisher Reporting System (FRS) and Hawaii Marine Recreational Fishing Survey (HMRFS), respectively. Should the ACL/ACT be reached then the fishery in federal waters will close. However, the monthly level reporting for FRS and the two-month wave for HMRFS limits the ability to track the catch in near-real-time. The State of Hawaii also has no fishery management plan or regulations in place to close the commercial and non-commercial fisheries within 0-3 nm if the ACL/ACT is projected to be reached. Alternative 2 applies the in-season AM to the commercial fisheries only. It has the same issues as Alternative 1 except that there is a disproportionate management burden on the commercial fisheries only. Alternative 3 is a post-season AM where the catch at the end of the fishing year will be tallied and compared to the ACL/ACT. The commercial catch will use a 3 year average while the non-commercial catch will utilize a 5 year average due to the large variability in the annual catch estimates. Should the total average catch exceeds the ACT there will be no overage adjustment. If the total average catch exceed the ACL, the following ACL will be reduced by the amount of the overage and the ACT will be lowered accordingly.

[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.

[3] Nadon MO, Sculley M, Carvalho F. 2020. Stock assessment of uku (Aprion virescens) in Hawaii, 2020. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-100, 120 p. doi:10.25923/57nb-8138

The SSC discussed concerns regarding the quality and variability of the HMRFS data. The large variability in the HMRFS data on an annual level will likely be exacerbated on a finer 2-month wave and would be compounded by issues related to the survey design and data expansion algorithms. Thus, HMRFS data are not suitable for in-season tracking for the non-commercial uku fishery. Further, the SSC discussed the allocation of ACLs between the commercial and non-commercial sectors. An SSC member reiterated a previous SSC recommendation that the HMRFS data should not be used for management purposes (including allocation). SSC members also noted that although the commercial fishery could be tracked on a monthly level, the commercial and non-commercial fishery can only be managed in federal waters.

The SSC selected Alternative 3 that sets an ABC equivalent to 135 mt (297,624 lb) based upon a P* of 43% and a post-season accountability measure based upon the 3-year average for commercial catch and 5-year average for non-commercial catch.

B. Options for Hawaii Small-Boat Fishery Permitting and Reporting (Action Item)

Council staff presented on the options for mandatory permitting and reporting in the Hawaii small-boat fishery. At its 181st meeting, the Council heard a report of scoping sessions and directed staff to explore options for providing mandatory federal permits and reporting requirements for the Hawaii small-boat fishery. The Council worked with DAR, OLE, NMFS PIRO and NMFS PIFSC and fishermen to review the Council's effort in arranging the options paper and potential public meetings to ensure that all concerns are considered in the process. Due to COVID-19, the Council held a virtual Fishers Forum and Public Meeting to discuss these options on August 27 via WebEx. Options being considered by the Council include: 1) No Action; 2) variations on a mandatory permitting and reporting system (including by sector or by species); 3) a registry system; and 4) a pilot permit system. Analysis of the options and the report of the public meeting will be provided to the Council for its consideration at its 183rd meeting.

The SSC discussed that in deliberating the preferred option, the SSC should consider the option that would generate the necessary fishery information for the non-commercial sector. SSC members reiterated their position that all fish that are caught in the fishery should be counted. However, it was also noted that enforcement would be a major challenge, particularly under mandatory permitting requirements. Pilot permitting projects may provide an opportunity to promote buy-in from the non-commercial fishing community and provide data to inform a full-scale permitting and reporting scheme including catch and effort data for this sector. SSC members also noted the importance of conducting extensive outreach on the improvement of management reference points when more and accurate data is available.

The SSC recommended a pilot mandatory permitting and reporting project and this project be conducted on a small-scale across on all island areas.

C. Public Comment

Robert Duerr, Outdoor Writers Association of America, provided a written comment. He

expressed appreciation that fishermen were included as stakeholders. He expressed concerns regarding mandatory permitting and reporting citing 85% of the fishermen sell their catch and may have CMLs, but it is still unknown how many are reporting. He also commented that majority of the ancillary species are not overfished and the only pelagic species of concern is bigeye tuna. He expressed concern that these are misidentified and reported as ahi (yellowfin tuna) and are caught mainly on private FADs and sold on the roadside and should be captured in the fishing reports. He also commented that DLNR has a record of using opinion and not science to regulate fisheries. He added that fisheries are not a priority of DLNR citing the elimination of two fisheries priorities in the 2019 legislative package. He also expressed concern about enforcement that there is no dedicated state marine patrol and realistically the US Coast Guard will not serve as fish cops. He also asked about the alignment of federal mandatory permitting with the Hawaii Constitution that “fishing shall be free”. He acknowledged the good work that the Council is doing for the fishermen and advised to engage that fishermen as partners and not fee payers. He also recommended having the agenda item displayed on the screen so that the public knows which part of the agenda is being discussed.

7. Protected Species

A. Tori Line Demonstrations and Field Trials in the Hawaii Longline Fishery

Council staff and Milani Chaloupka, SSC member, provided the preliminary report on a Cooperative Research project conducting demonstrations and field trials to evaluate the operational practicality and efficacy of tori lines for mitigating albatross interactions in the Hawaii deep-set longline fishery.

The project identified tori line designs suitable for the Hawaii longline fishery, conducted day-trials of multiple tori line designs on commercial longline vessels (Phase 1), and conducted field trials on four vessels during normal fishing operations to evaluate the efficacy of tori lines in deterring seabird interactions (Phase 2). The project focused on light-weight designs for practicality and safety, considering previous concerns with gear entanglements from earlier trials in the fishery. A short-streamer type tori line was used in the Phase 2 field trials, which utilized electronic monitoring technology to collect data on albatross attempts and contacts on baited hooks. Preliminary results from the Phase 2 data analysis indicate that tori lines are effective in reducing albatross contacts on baited hooks when used in conjunction with existing seabird bycatch mitigation measures.

SSC members inquired about the use of double tori lines in the Hawaii fishery, and received clarification that the project focused on single tori lines based on research from other areas on small longline vessels. An SSC member advised against streamerless tori line designs due to the fact that such lines would likely have the effect of trawl warps (wires used to tow trawl nets) which are known to be a hazard to birds based on experience in New Zealand. The SSC noted that the current study did not evaluate effectiveness of tori lines compared to other existing mitigation measures such as blue-dyed bait, and that additional at-sea trial would be warranted for such evaluation.

The SSC found that tori lines are effective in deterring seabird interactions in the Hawaii deep-set longline fishery, and recommended that the Council consider including tori lines as an additional seabird mitigation option for all Hawaii longline fisheries.

B. Endangered Species Act (ESA) and Marine Mammal Protection Act Updates

Adam Kurtz, PIRO Protected Resources Division (PRD), presented on the current status of ESA consultations for the pelagic longline fisheries, US purse seine and bottomfish fisheries in the MHI and territories. The purse seine fishery consultation is expected to be completed by November 2020, bottomfish and American Samoa longline fishery consultations by December 2020, and the Hawaii deep-set longline fishery consultation by February 2021.

Kurtz provided the ESA and Marine Mammal Protection Act (MMPA) updates, including the not-warranted finding for the *Pocillopora meandrina* ESA-listing petition, not-warranted finding for the leatherback turtle DPS petition, and status of the coral and humpback whale critical habitat designation. Details on the insular false killer whale Recovery Plan under the ESA were presented, which primarily focus on data collection and analyses to evaluate the extent of impacts, development of non-longline gear modification to deter depredation, and outreach.

Updates were also provided on the False Killer Whale Take Reduction Plan implementation, including the reopening of the Southern Exclusion Zone on August 25, 2020, and a proposed rule on Guidelines for Safely Deterring Marine Mammals.

An SSC member inquired whether the coral critical habitat proposal development is on track to be completed by October 2020, noting that this is an interest to the Council due to potential additional regulatory burden. Kurtz confirmed that the process is on track.

The SSC thanked Kurtz for an informative presentation.

C. Reasonable and Prudent Measures and/or Reasonable and Prudent Alternatives for the Hawaii and American Samoa Longline Fisheries (Action Item)

Council staff provided a brief update on the development of RPMs or RPAs for the Hawaii and American Samoa longline fishery. The anticipated completion date for these consultations have been further delayed and draft impacts analyses or additional information on potential RPMs or RPAs from the ongoing ESA consultations have not been made available to date. Council staff will continue to work on the development of potential PRMs and RPAs as new information becomes available for future consideration by the SSC and Council.

The SSC reiterated its previous concerns regarding RPMs that required significant changes to the Hawaii shallow-set longline fishery despite the minor change rule for federal actions that do not jeopardize ESA-listed species.

D. Public Comment

No public comment

8. Pelagic Fisheries

A. American Samoa Longline Fishery Report

Keith Bigelow, PIFSC, provided the 2020 semi-annual report for the American Samoa longline fishery. The report covered fishery statistics including participation, effort, and catch up to July 1, 2020. Notably, South Pacific albacore longline CPUE in the first half of 2020 was substantially lower than the value observed in 2019.

The SSC thanked Bigelow for the presentation.

B. Hawaii Longline Report Fishery Report

Russell Ito, PIFSC, provided the 2020 semi-annual report for the Hawaii longline fishery (deep-set and shallow-set components). The report covered fishery statistics including participation, effort, and catch up to July 1, 2020. Presentation of recent developments revolved around the substantial COVID impacts to industry.

An SSC member asked if the albacore catch increase is related to the spatial pattern of fishing effort. An SSC member asked about ahi prices in post-COVID environment. There are concerns about longline vessels remaining economically viable. It was noted that an updated report on COVID impact to fisheries under Council jurisdiction is being prepared by SSC member Justin Hospital as part of a national study on impacts to fisheries from COVID.

The SSC thanked Ito for his presentation.

C. Oceanic Whitetip Shark Population Projections

Joel Rice presented on oceanic whitetip shark population projections for the western and central Pacific Ocean (WCPO) stock. The updated stock assessment for oceanic whitetip shark presented to the 15th WCPFC Science Committee showed that the stock was overfished and undergoing overfishing, but also highlighted a small reduction in stock depletion, and improvements in recruitment and F-based reference points under certain catch scenarios. However, since oceanic whitetip sharks are late-maturing and fishing mortality on juveniles is high, uncertainty remains as to the level of effectiveness of the non-retention measure in place for the last 3-4 years of the assessment and the impact of the measure on the timeline for recovery. Future projections for the 2019 WCPO oceanic whitetip stock assessment are completed in order to assess the impacts of recent conservation and management measures and future fishing mortality on recovery timelines, using updated estimates of post-release mortality. The projections demonstrate the effect of a range of post assessment (2017 and on) catch trends on the estimates of population growth rate. Population projections are carried forward to estimate the mean time and probability of the population reaching thresholds of 50%, 25%, and 12.5% of current (2016) biomass levels, with results suggesting 10-16 years to achieve this level of recovery. The study also attempted to better understand the impact of US longline fisheries on stock dynamics.

An SSC member asked about an initial fishing mortality parameter used in the

projections. Rice clarified that initial fishing mortality was based on historical estimates of fishing intensity. An SSC member asked about the simulated effects of the US longline fishery and assumptions of post-2016 no-change in fishery removals. Additional simulations with declines from 2016 catch levels might be useful.

The SSC noted those scenarios which demonstrate patterns of stock recovery could better inform potential future management measures.

The SSC thanked Rice for his presentation.

D. Oceanic Whitetip Shark Working Group and Research Activities

Keith Bigelow and Council staff presented on formation of an oceanic whitetip working group which has been formed to prioritize analyses and develop a roadmap for analyses needed for anticipated management actions to satisfy ESA requirements and those under the MSA Sec 304(i).

An SSC member asked about the timeline of modeling efforts at PIFSC with regard to future Pelagic Plan Team and SSC meetings. Bigelow responded that some work (e.g., EBFM, post-release mortality) will be completed prior to December inter-sessional Pelagic Plan Team meeting, but other work will be completed later in CY 2021. An SSC member also asked about the proposed work (BREP) on an improved line-cutter for reducing trailing gear with intent to reduce post-release shark mortality. Status updates for this project, as well as the highlighted list of projects in the presentation, will be presented at the December SSC meeting.

The SSC recommended that updates on the EBFM project with respect to oceanic whitetip sharks, post-release mortality, individual vessel impacts on oceanic whitetip sharks, and the line-cutter project be provided to the SSC at its December 2020 Meeting and to the Inter-Sessional Pelagic Plan Team Meeting.

The SSC recommended that the Oceanic Whitetip Shark Working Group proceed with investigating Monte Carlo analyses of longline mitigation measures exhibited by Harley et al (2015) and that updates be completed and reviewed by the Plan Team before the March 2021 SSC meeting.

The SSC thanked Bigelow for the presentation.

E. Roadmap to Effective Area-Based Management of Blue Water Fisheries

Ray Hilborn, University of Washington, presented on outcomes of the workshop which was held June 15-17, 2020 and the resulting peer-reviewed paper ready for submission to *Fish and Fisheries*. The workshop was chaired by Dr. Ray Hilborn (University of Washington) and Vera Agostini (United Nations FAO) and included 34 of the top area-based fishery management experts from Intergovernmental agencies, NGOs, RFMOs, and academia – many of whom bridge the gap between conservation goals and industry and bridge the gap between science and policy.

Participants noted that implementation of area-based management tools (such as closures or restrictions) are done without weighing objectives, having a proof-of-concept beforehand to achieve these objectives, or planning on how to evaluate area-based measures thoroughly through time. These planning steps are critical - especially for highly dynamic ecosystems that support blue water fisheries where "set it and forget it" may not be appropriate. Workshop participants all agreed that ABMT are not a silver bullet for managing fisheries or their ecosystems. Marine Protected Areas (MPAs) are often most synonymous with ABMT but are merely a single tool in a vast tool box of ABMT that are not strictly about permanent closures. Workshop participants discussed several 'static' vs 'dynamic' AMBTs and their benefits and limitations. Static implies management of an area with a fixed area delineation while dynamic implies managing area(s) that may shift in time and space.

Council staff noted that the ABMT Workshop report would be available soon after the upcoming Council meeting. Work on associated publications, such as a manuscript discussed by Hilborn, was continuing.

An SSC member asked whether there was much discussion during the meeting on the use of technological advances within the fishery (e.g. echosounder buoys connected to Fish Aggregating Devices) and their potential use to gather remotely-sensed information on (e.g. biomass estimates) when they drift into regions subject to area-based management measures. Hilborn noted that examples of this would be useful to add to the manuscript and requested that examples be given by SSC members. An SSC member also noted the unexpected impact of the recently implemented Palau sanctuary which led to increased pressure on reef fish resources.

The SSC thanked Hilborn for the presentation.

F. Report on the Hawaii Longline Eddy Project

Martin Arostegui and Peter Gaube, of the University of Washington, presented on a project entitled "Eddy Structuring of Catch in the Hawaiian Longline Deep-set Sector" with Phoebe Woodworth-Jefcoats and Don Kobayashi, PIFSC. Mesoscale eddies and fronts, dynamic oceanographic features on the spatial scales of 0.1-100 km, are energetic and highly dynamic habitat patches for pelagic species across the world's oceans. Highly mobile species and the resource users that target them constantly move and adapt in response to ocean conditions, yet the role of mesoscale features in structuring pelagic ecosystems remains largely unknown. The aim is to examine the influence of these mesoscale oceanographic features on the distribution of target and non-target species of the Hawaiian longline fishery.

The analysis identified eddy-related effects on catch probability in most species. These effects largely consisted of increased catch probability in anticyclones versus cyclones, particularly when comparing the cores of these features. For example, the logbook and/or observer-based models for albacore, skipjack tuna, yellowfin tuna, bigeye tuna, shortbill spearfish, striped marlin, wahoo (ono), escolar, and pomfret (monchong) all exhibited heightened catch probability in anticyclones versus cyclones overall and/or an intra-eddy spatial pattern consisting of increased probability in anticyclone cores and decreased probability in cyclone cores relative to the exterior of the eddy. Opah were the only species found to have higher catch probability in cyclones than anticyclones, possibly as a result of this species being the only fully

endothermic pelagic predator.

The SSC inquired on the capability to forecast eddy location and strength, their specific utilisation by fishing gears, and the importance of other oceanographic features (e.g., meanders, filaments) for fisheries. Arostegui noted (with input from Gaube) that once formed, eddies could remain for extended periods. Other (sub-mesoscale) oceanographic features had not been examined in the current study, but that the majority of kinetic energy is due to mesoscale eddies. Approaches to test model fit were discussed, which would be examined during further work. In response to a question on the potential bias of fishing data from effort that might be directed toward persistent eddy fields and to particular eddy types, Arostegui noted that current effects were globally estimated, but more spatially disaggregated modelling was planned.

The SSC thanked Arostegui for the informative presentation.

G. Bigeye Tuna Recruitment Project

Phoebe Woodworth-Jefcoats, PIFSC, presented a recently published paper in *Fisheries Oceanography*, entitled "Toward an environmental predictor of tuna recruitment". Bigeye tuna are of global economic importance and are the primary target species of Hawaii's most valuable commercial fishery. Due to their high commercial value, bigeye tuna are relatively well studied and routinely assessed. Larval and adult bigeye surveys have been conducted for many years and are supported by ongoing research on their physiology and life history. Yet, modeling stock dynamics and estimating future catch rates remain challenging. The authors demonstrate that an appropriately lagged measure of phytoplankton size is a robust predictor of catch rates in Hawaii's bigeye tuna fishery with a forecast window of four years. A fishery-independent tool is presented with the potential to improve stock assessments, aid dynamic fisheries management, and allow Hawaii's commercial longline fishing industry to better plan for the future.

The SSC inquired whether the developed relationship still held at alternative spatial scales. Woodworth-Jefcoats noted that this had not yet been examined, but was planned. An SSC member noted that the abundance of 2 year old fish within the fishery would be a more timely corroboration of model-predicted good recruitments. Related to this, Woodworth-Jefcoats confirmed that cooler sea surface temperatures and higher chlorophyll levels were predicted to relate to larger phytoplankton and larger bigeye recruitments. The SSC noted that estimates developed by the model could be compared to recruitment levels estimated within regional stock assessments, which were publicly available. Finally, the SSC noted that when performing the forecast analysis, all years of data were included. A more appropriate approach was to exclude 'future' years' data from the relationship when developing that forecast.

SSC thanked Woodworth-Jefcoats for the presentation.

H. International Fisheries

1. North Pacific Striped Marlin Rebuilding Measures

Council staff presented on a rebuilding plan and stock projections of Western Central North Pacific (WCNPO) striped marlin**.** A 2019 stock assessment for WCNPO striped marlin

found the stock to be overfished and experiencing overfishing relative to MSY-based reference points. The WCPFC at its December 2019 Regular Session endorsed a rebuilding plan for spawning biomass to reach a target of 20% unfished biomass levels under stochastic projection scenarios with at least 60% probability of reaching the target. The timeline for the rebuilding plan is 15 years. Stock projections were included in the assessment report, however the target was either reached within four years or never at all based on static catch reductions. The Council alternatively requested staged or phased reduction in catch projections. These improved projections will be used in a US-led proposed measure to develop catch limits for WCPFC fisheries at the December 2020 WCPFC Regular Session. US catch limits arising from any Commission measure will satisfy requirements under MSA Section 304(i) to rebuild international stocks and will also be incorporated in Pelagic FEP Amendment 8.

2. Western Central Pacific Fisheries Commission (WCPFC)

a. 20th International Scientific Committee Plenary Outcomes

Mike Seki, PIFSC, presented on the 20th Session of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC20) held virtually in July. New stock assessments on Pacific bluefin tuna and North Pacific albacore were presented at ISC20. Other issues include catch reporting, management strategy evaluations for the North Pacific albacore stock, shark working group reports, billfish working group report, and bluefin tuna management advice. Notably, the 21st ISC plenary meeting is scheduled to be held in Kailua-Kona in July 2021.

The SSC thanked Seki for the presentation.

b. 16th WCPFC Scientific Committee

Graham Pilling, SPC, presented on outcomes of the 16th Regular Session of the Scientific Committee of the WCPFC (SC16) held virtually from August 10 to 19, 2020. New stock assessments on Western and Central Pacific bigeye tuna, yellowfin tuna, North Pacific albacore, and bluefin tuna were presented at SC16. Conservation advice and recommendations for these stocks were made at SC16. It was noted that there was a proposed work stream aimed at reducing the complexity of the stock assessments for the key tuna stocks. This work could feed into a proposed independent review of the stock assessments which is currently scheduled for early 2022.

The SSC asked if there was any expectation regarding ongoing life history work to help further refine the stock assessments for bigeye and yellowfin tuna. Pilling noted that there was some work on bomb radiocarbon aging approaches to be discussed at the current SSC meeting and potential for work in the future taking advantage of the strontium marking of some released tuna during tuna tagging programs. Pilling also noted that there is a need to improve our biological understanding in other areas such as length at maturity.

The SSC thanked Pilling for the presentation.

3. Tropical Tuna Allocation Concept Paper

Council staff presented updates on the Council's concept note that was developed to address allocation scheme for WCPO tropical tunas as the current conservation and management measure (CMM-2018-01) expires in 2020. Also discussed will be anticipated stock projection results from the SPC following SC16.

I. Workshop on the Use of C-14 for Tropical Tuna Age Validation

Jessica Farley, CSIRO, summarized outcomes from a Workshop on Bomb Radiocarbon Age Validation for Tuna and Billfish in the Western and Central Pacific Ocean (WCPO) that was held virtually in early July 2020. Experts in otolith ageing and bomb radiocarbon methods discussed the encouraging results from preliminary radiocarbon work for tuna and agreed that the application of radiocarbon methods to validate age estimates derived from tuna and billfish otoliths from the WCPO was feasible. A design study is being developed, using available otolith samples from the WCPFC Tuna Tissue Bank and other collections, and a draft research plan was proposed for consideration at SC16. The recommendations from the workshop include that the: 1) SC16 note the proposed research plan to continue the bomb radiocarbon age validation for bigeye tuna. 2) SC16 notes the proposed research plan for bomb radiocarbon age validation for yellowfin tuna.

An SSC member made 3 comments: 1) Area specific C14 records from corals are required as reference samples, but show large variation in the Pacific, and are sparse and variable, 2) there are critical assumptions involved about C14 uptake in otoliths of tropical tunas, coupled with home range and vertical habitat utilization distributions throughout their ontogeny; 3) There is a high level of uncertainty and lack of precision in the ages for yellowfin and bigeye tunas using the C14 dating method, published by Allen Andrews.

The SSC discussed the importance of proxy records for C-14 (e.g. corals) for age-validation, and if the method is suitable for bigeye tuna application.

An SSC member noted that bigeye tuna inhabit deeper water but there is overlap with areas of C-14, and that the C-14 approach is likely applicable beyond just bottomfish in the Pacific for which C-14 has been utilized with success. Another SSC member supported statements that bomb radiocarbon dating is effective for bottomfish analyses and worth exploring for tunas.

Council staff reminded the SSC that the Council made a request to NMFS to contribute to the analyses using bomb radiocarbon dating to validate bigeye tuna age and growth in October 2019.

The SSC thanked Farley for the presentation.

J. Public Comment

Ed Watamura (Council Member) commented on the impact of trailing gear on oceanic whitetip shark survival and inquired on the lack of progress on developing a line cutter.

Eric Kingma (Hawaiian Longline Association) commented on the recent bigeye catch rates that were reported in the PIFSC presentation to the SSC have dropped off considerably in the 3rd quarter. Kingma also summarized the current fishery and market conditions.

Allen Andrews clarified that otoliths from yellowfin and bigeye tuna young of the year reference data as a method of validating the C-14 method for age-validation in the Pacific.