



WESTERN
PACIFIC
REGIONAL
FISHERY
MANAGEMENT
COUNCIL

**139th Meeting of the Scientific and Statistical Committee
March 16-18, 2021
Web Conference**

FINAL REPORT

4. Report from PIFSC Director

Michael Seki provided the PIFSC Director's report to the SSC noting topics such as COVID-19 impacts to PIFSC field programs, the realignment of the WPacFIN and IFP programs, recent efforts by the Life History Program, updates on protected species programs, the development of longline electronic reporting informational videos, a new report on socioeconomic indicators in West Hawaii, recent efforts for the MHI bottomfish surveys, the PIFSC Annual Guidance Memorandum for Fiscal Year 2022, and efforts to improve the territorial bottomfish stock assessment. Improvements that have already been or may be applied to the BMUS assessments include performing a review and update of the territorial boat-based creel survey expansion algorithm, holding data workshops with the fishing community, increasing the sample size of the creel surveys, focusing the Life History program on BMUS, and exploring the feasibility of conducting fishery independent surveys, alternative stock assessment modeling approaches and restructuring of species currently assessed within a combined bottomfish complex.

The SSC noted that it was pleased to see emphasis placed on improvements to the territory bottomfish stock assessment and requested further details on the plans to implement these improvements, but this discussion was deferred to a later agenda item. The SSC inquired if PIFSC provides technical support for purse seine fishery data, and it was clarified that, while PIFSC does receive the data, it is not readily accessible due to confidentiality issues. Purse seine data are collected under the South Pacific Tuna Treaty, not the MSA. The SSC also asked about the long-term monitoring of green sea turtles on French Frigate Shoals, and Seki stated that last year was impacted due to COVID-19 but there is hope to continue monitoring this year.

SSC members commended the PIFSC efforts to conduct workshops on fisheries data collection in the territories and to explore alternative assessment models for data limited situations.

The SSC thanked Seki for his presentation.

5. Program Planning and Research

A. NMFS Briefing on Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad

Council staff presented the summary of section 216 of President Biden's Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad. Section 216 (a)(i) directs the Secretary of Interior, Secretary of Agriculture, Secretary of Commerce through the Administrator of NOAA and the Chair of Council on Environmental Quality to solicit input from the State, local, Tribal and territorial officials, agricultural and forest landowners, fishermen, and other key stakeholders in identifying strategies that will encourage broad participation in the goal of conserving 30 percent of the US lands and waters by 2030. Section 216 (c) directs the Secretary of Commerce through the Administrator of NOAA to initiate efforts to collect input from fishermen, regional ocean councils, fishery management council, scientists, and other stakeholders on how to make fisheries and protected resources more resilient to climate change, including changes in management and conservation measures, and improvements in science, monitoring, and cooperative research.

SSC members provided a series of presentations on recent marine protected area (MPA) research and inventories of regional area-based management.

Erik Franklin, University of Hawaii, presented recent research exploring the effectiveness of four Oahu MPAs, finding three out of four Oahu MPAs provided limited protection for herbivorous fish assemblages in comparison to reference areas outside the MPAs. An SSC member questioned the efficacy of some MPAs given the range and diurnal movements of some reef fish species that would take them outside the MPA boundaries. Additionally, it was noted that the lack of comparable habitat adjacent to Hanauma Bay could help to retain reef fish within the bay and maintain protection from fishing pressure.

Frank Camacho, University of Guam, presented an inventory of area-based management on Guam. Approximately 11% of Guam nearshore waters and about 1.5% of Federal nearshore waters are protected through MPAs. All MPAs are located in accessible leeward waters raising potential safety at sea concerns pushing fishermen to the windward side of the island. The Department of Defense imposes additional area-based closures in support of base security and episodic training activities. Approximately 24% of Guam's EEZ is protected under the Trench Unit of the Marianas Trench Marine National Monument.

Domingo Ochavillo, American Samoa Department of Marine and Wildlife Resources, estimated nearly 25% of marine waters around American Samoa are already under some form of area-based management established by multiple agencies with varying degrees of monitoring and enforcement. Approximately 18% of waters are managed under a no-take designation. Ochavillo described numerous challenges including local interest in revisiting rotational closures, exploring an archipelagic perspective, and the need to strengthen management infrastructure.

In considering existing contributions to National 30x30 goals in Section 216 (a)(i), Council staff noted that approximately 52% of the Hawaii EEZ are currently protected with MPAs, equivalent to approximately 24% of the United States EEZ.

SSC members questioned the specific scientific goals and effectiveness of creating additional protected areas within the Pacific Islands Region.

The SSC recommended a subcommittee consisting of Ray Hilborn, Don Kobayashi, Milani Chaloupka, Frank Camacho, and Erik Franklin be assigned to work with Council staff to provide scientific input in response to Section 216(a) and 216(c).

The SSC thanked Franklin, Camacho, and Ochavillo for the informative presentations.

B. SSC Three-Year Plan

Erik Franklin, acting SSC Chair, presented the elements of the SSC Three Year Plan. The plan provides the framework on the issues and topics the SSC will be tackling in the next three years. Some activities would require the formation of SSC Subgroups and some would require SSC members to work on topics based on their expertise and provide a report back to the SSC. The Three Year Plan attempts to set the scientific direction in line with the priorities of the new administration in addressing climate change and promote the resilience of fisheries and protected species in fisheries management.

Michael Seki shared written comments submitted by PIFSC in response to the draft SSC three-year plan. Comments related to notice and public participation for intersessional meetings, the role of SSC members in stock assessment data workshops, clarity in document review, and timelines for sharing results of international stock assessments that PIFSC staff contribute to.

An SSC member requested more explicit consideration of shifting stock distributions in response to climate change under the stock assessment dynamic harvest control rules item (2e).

An SSC member noted a lack of explicit recognition of human dimension elements in the three-year plan, but acknowledged it is implicit in Ecosystem-based Fisheries Management items. The SSC noted that the Social Science Planning Committee will be meeting in April 2021 and could provide additional priorities for consideration.

An SSC member inquired about the feasibility of data reviews becoming a part of the WPSAR process, and PIFSC representatives emphasized the intention to increase engagement with the SSC throughout the stock assessment process in the future, which should alleviate the need for a separate data review outside of future data workshops.

The SSC deferred endorsement of the plan for the SSC Working Group to review the revisions suggested by PIFSC and to add socio-economic priorities to the SSC plan after the Social Science Planning Committee meets in April 2021. The SSC intends to review and finalize the Three Year Plan at its June 2021 meeting.

C. Updates to the Pacific Island Stock Assessment Prioritization

John Syslo, PIFSC, provided an update on the results of the Pacific Island Stock Assessment Prioritization. Following the approach of Methot et al. 2015 (NOAA Technical Memo; "Prioritizing Stock Assessments"), an expert panel scored 14 factors addressing assessment frequency, and managers from throughout the Pacific Islands Region provided factor weights.

Factor scores scaled by factor weights provide guidance for determining assessment frequency of managed stocks. Preliminary results showed that the status indicators dominate the current stock rankings where the American Samoa and Guam BMUS takes the top two spots. Fishery importance was the next influential factor resulting in some pelagic MUS like wahoo and mahimahi ranking third and fourth, respectively. These species are currently not assessed. These results are non-binding and would inform the discussion of the WPSAR Steering Committee meeting.

The SSC thanked Syslo for an informative presentation.

D. Integration of the 'Catch it Log it' app information into fisheries assessments and monitoring

T. Todd Jones, Rob Ahrens, Felipe Carvalho, PIFSC, and Brett Schumacher, PIRO, presented on the evaluation of the integration of CatchIt LogIt electronic reporting with the existing data collection systems (e.g. creel surveys, commercial receipt books, and biosampling). The CatchIt LogIt system will cover the commercial sector of the fisheries if it is fully implemented with the mandatory license and reporting regulations. The non-commercial fisheries are larger in some territories compared to the commercial sector. The voluntary nature of the non-commercial fisheries does not allow for full coverage of the fishery. The evaluation provided recommendations on the future revision of the CatchIt LogIt to collect more length and species composition information for the non-commercial fisheries which generate data for species level length-based assessments.

An SSC member noted the short timeline between now and the 2023 benchmark assessment model for American Samoa and questioned whether there is time and interest by the stock assessment team to consider splitting the currently assessed complex into a shallow and deepwater complex and employ a length-based assessment approach to the deepwater snapper component. PIFSC staff confirmed that the Stock Assessment Program has the flexibility to regroup within a complex and has the expertise to employ length-based methods if appropriate. PIFSC indicated that in addition to data workshop results, they would share updates once final decisions are made on the assessment framework and selected composition of species within a complex.

An SSC member recognized the potential for the app to be a cost-effective data collection tool, but expressed concerns about understanding app coverage, reporting rates, and effective strategies to move towards a probabilistic sampling framework. Discussion highlighted research needs related to working with local agencies to understand app usage rates, monitoring refusal rates and rationales, as well as follow up surveys to detail potential reporting bias. PIFSC staff expressed concerns about the ability to derive total catch with app data alone.

SSC members questioned the underlying incentive for fishers to continue to use the app in the long term. In response, Council staff described ongoing outreach efforts to the fishing community, presence at tournaments and events, collaborative projects aimed at recognition for app participants, and dashboards in the app that provide both individual and community-level data summaries.

An SSC member stressed the importance of including quality photos in the app to ensure species identification is accurate and cited past work in American Samoa. An SSC member identified the need for integration and improvement of all the data collection methods (i.e., creel, biosampling, and app).

Moving forward, PIFSC staff emphasized that the priority is to work with and improve the existing creel survey programs, with the app moving forward coupled with mandatory licensing and reporting for commercial harvest, and PIFSC intends to work with the Council and the local agencies to explore integration of data from the app in the future.

The SSC recommended the integration of creel survey, commercial receipt book, biosampling, and app-based data collection systems to generate the data elements from the different sectors of the territorial fisheries to meet the requirements of stock assessments. The SSC acknowledged the need to modernize the creel surveys to account for recent changes in the fisheries and provide an improved probability sampling design to generate catch estimates and quantifiable variability. These data shall be augmented by the mandatory app-based data collection system through CatchIt-LogIt. For non-commercial fisheries, further development of the app should be undertaken to provide useful information, which may include length data, on this important sector of the territorial bottomfish fisheries.

The SSC thanked Jones, Ahrens, Carvalho, and Schumacher for an informative presentation.

E. Socio-Economic Context for Fisher-Shark Interaction in the Marianas

Mia Iwane, PIFSC, reported on the outcome of the socio-economic survey work to document fisher-shark interaction issues in the Marianas. The project aimed to document fishers' observations and compare stakeholders' (fishers, researchers, and managers) perceptions around sharks and fisher-shark interaction mitigation strategies, within the Marianas' broader socioeconomic context. Data were collected through semi-structured interviews, group discussions, and public meetings with fishers, researchers, and managers in Guam and Saipan, Rota, and Tinian of the CNMI. Fishermen pointed to issues related to economics, research, politics, regulations, and on-the-water impacts. The fishermen also offered solutions from their perspectives. Structuring discussions around sharks' behavior and impacts to fisheries may be productive and unifying as a short-term strategy, while actively addressing (pelagic) shark research gaps and establishing abundance baselines will have critical value in the long-term.

The SSC thanked Iwane for an informative presentation.

F. Public Comment

There was no public comment.

6. Island Fisheries

A. Main Hawaiian Island (MHI) Deep 7 Bottomfish Fishery

1. Report on the MHI Deep 7 Bottomfish Western Pacific Stock Assessment Review

Erik Franklin, WPSAR Chair, presented the findings of the Tier 2 WPSAR Panel hybrid review conducted on November 16 to December 17, 2020. The two SSC panel members were David Itano and Steve Martell. The update assessment (Syslo et al. 2021) incorporated an updated time series of data with additional data filtering and used the methods of the preceding benchmark assessment including a Bayesian surplus production model fit to standardized CPUE for the Deep 7 complex and a single species (opakapaka). The panel determined the stock assessment update met all the requirements of the Terms of Reference. The panel determined that the update assessment represents the best scientific information available (BSIA) and can be used for management of the Main Hawaiian Islands Deep 7 bottomfish fishery. A number of prioritized recommendations were presented to improve future bottomfish stock assessments

The SSC accepted the results of the WPSAR review and supported the panel’s conclusions and recommendations.

The SSC thanked Franklin for the presentation.

2. 2021 Deep 7 Bottomfish Stock Assessment Update

John Syslo, PIFSC, presented the peer-reviewed main Hawaiian island deep 7 bottomfish stock assessment update. The assessment followed methods from the 2018 benchmark stock assessment and used a Bayesian surplus production model fit to bottomfish catch and effort data from commercial catch reports for fishing years 1949-2018 and a fishery-independent survey conducted in fishing years 2017-2020. Similar to the 2018 benchmark assessment, a single-species assessment model for opakapaka (*Pristipomoides filamentosus*) was also updated with corresponding data. 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 2021 through 2025. The stock remains not overfishing and not experiencing overfishing. The biomass estimate slightly increased and the harvest rate slightly decreased. Harvest level reference points slightly increased on the short-term scale.

An SSC member inquired on the confidence in the shape parameter and structure of the model given the diagnostics results from the Bayesian inferences. Syslo is confident of the model since there is a good fit of the CPUE data. SSC noted that incorporating process error would be important for the next benchmark stock assessment. An SSC member noted that opakapaka and onaga are the only targeted stocks within the assessed complex and inquired if the team has the data and ability to attempt a single species assessment for onaga. Although PIFSC only has preliminary age and growth data for onaga, PIFSC will continue to explore whether single species models are possible.

The SSC accepted the stock assessment update as the best scientific information available (BSIA) for the Council to use for management decisions.

The SSC thanked Syslo for an informative presentation.

3. Updates to the Acceptable Biological Catch (Action Item)

Council staff presented the current scientific information available to evaluate whether a change in the probability of risk of overfishing is warranted. The 2021 stock assessment update maintained the types of data input but added three more years of catch, effort, and fishery independent data sets. Both the deep 7 complex and the single-species assessment were updated. The current Acceptable Biological Catch (ABC) incorporates uncertainties in the assessment information from the catch history, species specific data, sources of mortality, tagging data, spatial analysis. Additional scientific buffers were attributed to uncertainty characterization, stock status, and productivity/susceptibility of the species in the complex. The assessment update just added three years of data and did not introduce new scientific data, and the recent catch is below 50 percent of the current ABC.

The SSC recommended retaining the risk of overfishing level at 42 percent accounting for scientific uncertainty. The catch level associated with this level of risk is 510,000 pounds that corresponds to the acceptable biological catch for the main Hawaiian island deep 7 bottomfish fishery for the fishing year 2021-22, 2022-23, and 2023-24.

B. Territorial Bottomfish Fisheries

1. Approaches for Managing the American Samoa Bottomfish Fishery

Council staff presented on the three approaches for managing the American Samoa bottomfish fishery: 1) the federal Bottomfish Management Unit Species Rebuilding Plan; 2) Territorial Bottomfish Fishery Management Plan (FMP); and 3) the Community Development Program (CDP) Plan. The rebuilding plan presents three alternatives for the Council to choose from. First is the no action/status quo alternative which utilizes the existing Interim Catch Limits of 13,000 lb with in-season accountability measures that the Council requested at the 180th Council meeting in October 2019 and was implemented through emergency rule making by NMFS. Second is implementing an Annual Catch Limit (ACL) of 1,500 lb with an in-season accountability measure which would rebuild the stock in nine years assuming that the catch can be controlled below the ACL. Third is a closure of the federal waters from bottomfishing which is the maximum action the Council and NMFS can take given the majority of the fishery is in territorial waters.

The Territorial Bottomfish FMP was developed by the American Samoa Department of Marine and Wildlife Resources (DMWR) to govern the management of the bottomfish fishery in the territorial waters (0-3nm). The plan will be vetted through the fishing community for comments and once approved would be implemented and enforced by DMWR. Some of the conservation measures included in the plan are related to improving monitoring of the fishery, vessel marking and notification, spatio-temporal closures, and catch-based limits.

The third piece is the CDP which is a provision under the Magnuson-Stevens Conservation Act (sec 305(i)(2)) authorizes the Council and NMFS to establish a CDP for fisheries under its authority. The intent of the program is to provide indigenous communities access to fisheries that they traditionally depended on but may have lost the capabilities to support continued

participation due to economic and regulatory barriers. This plan is also developed by DMWR and will be submitted to the Council and NMFS for approval. The plan recognizes the importance of bottomfishing to the cultural fabric of the indigenous Samoans. The plan includes limited access to the federal waters to harvest BMUS for traditional, cultural, and community purposes. Access and fishing activities will be monitored through the CDP plan.

An SSC member pointed out the importance of the deep-water snappers to maintain traditional *fa'a samoa* that the American Samoa CDP would facilitate.

2. Impact Analyses of the Guam BMUS Rebuilding Plan (Action Item)

Council staff presented on the Environmental Assessment of the Guam BMUS Rebuilding Plan. At the 138th meeting in December, the SSC also selected an option for the rebuilding plan to address the overfished stock in Guam. The SSC recommended either 27,000 or 31,000 pound because both options mitigate the short-term impacts to the fishery by allowing moderate levels of take while achieving the rebuilding of the stock within T_{max} . The Council selected the 31,000 pounds as its preliminary preferred alternative. Since then, staff received an updated biomass projection from PIFSC that is consistent with the NS1 definition of T_{max} . The new information drastically changed the rebuilding timeframes of the options provided in December 2020. It extended the rebuilding timeframe for the 27,000 pound ACL from four years to eight years and the 31,000 pound ACL from six years to 19 years. This was due to the recreated catch data to fill 2020 and 2021 used to do the biomass projection starting in 2022. The high catch in 2019 of 37,000 pounds increased the three year average catch which was further adjusted to be consistent with the catch data used in the assessment. This then makes the 31,000 pound alternative no longer compliant with the NS1 guideline to rebuild within 10 years.

Several SSC members expressed concern about the release of the updated projections only one month after the SSC supported either 27,000 or 31,000 pound ACL at 138th SSC meeting. T. Todd Jones (PIFSC) responded that the NS1 requirement of 50% probability of reaching B_{MSY} was not considered in the assessment. Therefore, additional projections were conducted to meet the regulatory requirement.

The SSC reiterated its previous recommendation of 27,000 pounds ACL because the 31,000 pound ACL is no longer viable based on the updated projection. The 27,000 pound ACL is estimated to rebuild the BMUS stock in Guam in eight years.

C. Public Comment

There was no public comment.

7. Protected Species

A. Seabird Mitigation Measures in the Hawaii Longline Fishery

1. Options for Modifying Shallow-set Longline Fishery Seabird Mitigation Measures

Council staff presented on an options paper on the potential modification of seabird interaction mitigation measures in the Hawaii shallow-set longline fishery. The options paper considers whether blue-dyed bait and/or offal discharge requirements in the shallow-set fishery may warrant modifications at the same time that the Council considers action on those measures for the deep-set longline fishery later in 2021. There is limited available data to determine whether removal of blue-dyed and/or offal could lead to increased interactions, if removed without replacement measures. Additional research will be needed to consider replacement measures in the shallow-set fishery. Industry representatives have indicated that a higher priority would be to allow for start of setting operations before sunset (currently required to night-set if stern-setting), and thus additional research and development of combination of measures would be warranted.

The SSC noted that a key driver for the proposal was to increase the operational flexibility for the shallow-set fleet, in particular what combination of measures might allow setting to occur during daylight hours. The most significant consideration would be whether tori lines (with appropriate technical standards reflecting the fishing operations) could be added. Changing requirements for blue-dyed bait was not an immediate priority for the fleet. It was noted that options to be considered would be within those measures currently in place for WCPFC and IATTC.

One SCC member noted that improving operational efficiency for the fleet could result in increased catch rates of the target species (swordfish) and therefore seabird interaction rates per unit of target catch would be an important performance indicator. The SSC noted that night setting was generally recognized as a ‘gold standard’ for seabird mitigation, but in some areas tori lines were more effective during periods of full moon.

The SSC recommended that the Council support an experimental study to evaluate the effectiveness of various mitigation combinations to reduce seabird interactions in the SSL fishery.

2. Draft Tori Line Specifications for Deep-set Longline Fishery

Council staff provided a brief status on the development of draft tori line specifications for the Hawaii deep-set longline fishery. The 2019-2020 cooperative research project developed a tori-line design comprising a light-weight backbone and short streamers that was found to be effective in deterring seabird interactions and meets tori line standards under the WCPFC and IATTC requirements. Potential regulatory specifications for tori lines in the deep-set longline fishery will be developed for SSC and Council review at the June 2021 or later meeting.

The SSC thanked Council staff for the update.

B. Shallow-set Longline Reasonable and Prudent Measures Working Group Update

David O'Brien, PIRO SFD, provided a progress report on the implementation of the work plan for the Reasonable and Prudent Measures (RPMs) in June 2019 Biological Opinion that require evaluation and potential development of additional mitigation measures beyond those implemented through Pelagic Fishery Ecosystem Plan Amendment 10 (sea turtle hard cap revision and trip limits). Of the 23 terms and conditions under the six RPMs, 14 have been completed, 4 are underway, 4 are pending, and 1 is overdue.

An SSC member noted that the recent publication by Adam Ayers, PIFSC, outlined industry willingness to creatively contribute to mitigation efforts and asked whether the findings in that paper were considered in developing outreach education and training efforts for owners, captains and crews. Another SSC member noted that there had been a recommendation from the Social Science Planning Committee that the Council adopted at the March 2020 meeting that a social scientist be added to the working group and suggested followup.

The SSC thanked O'Brien for the informative presentation.

C. SSC Working Group on False Killer Whale Take Reduction Measures

The SSC at the December 2020 meeting formed a working group composed of David Itano, Milani Chaloupka, Craig Severance and Jim Lynch to develop recommendations on alternative approaches to weak hooks for reducing impacts to false killer whales in the Hawaii deep-set longline fishery. The working group is proposing to develop a comprehensive issues document on the topic and will present an outline for SSC input.

Working group members outlined their ideas for the proposed effort and requested SSC input on the outline. A number of SSC members supported the concept and potential utility of the proposed paper.

The SSC endorses the FKW WG paper outline and recommends that the WG continue to develop the paper for consideration at an upcoming SSC meeting.

The SSC thanked WG members for the informative presentation.

D. ESA Consultations for the Hawaii Deep-set Longline Fishery, American Samoa Longline Fishery, and Bottomfish Fisheries

Joel Moribe, PIRO 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 consultation is in review and the Hawaii deep-set longline consultation has been paused pending further information, while the American Samoa longline fishery consultation is expected to be completed by May 2021, and the bottomfish consultation expected to be completed by June 2021.

The SSC thanked Moribe for the informative presentation.

E. Endangered Species Act and Marine Mammal Protection Act Updates

Moribe provided the ESA and MMPA updates, including the proposed designation of critical habitat and an upcoming recovery planning workshop for ESA-listed coral species, main Hawaiian Islands insular false killer whale recovery plan status, and False Killer Whale Take Reduction Plan implementation status.

An SSC member asked about the trigger for the false killer whale Southern Exclusion Zone (SEZ). Kevin Brindock, PRD, noted that the new trigger for closing the SEZ based on the new abundance estimates was 4 false killer whale mortalities or serious injuries. Another SSC member asked whether the coral critical habitat designations on hard substrate considered percent algae coverage. Another SSC member asked if non U.S. ranges of coral populations were taken into account in the ESA listing and critical habitat designation. Ann Garrett, PRD, responded that non U.S. populations were considered in listing but that critical habitat designation only considered habitat in U.S. jurisdictions.

The SSC noted that the coral critical habitat public comment period has been extended twice and ends very shortly (March 27) though a request for another extension has been received.

The SSC thanked Moribe for the informative presentation.

F. Public Comment

There was no public comment.

8. Pelagic and International Fisheries

A. American Samoa Longline Annual Fishery Report

Keith Bigelow, PIFSC, provided the 2020 annual report for the American Samoa longline fishery. The report will cover fishery statistics including participation, effort, and catch. Report is missing ~30% of data, which is still being processed by PIFSC.

An SSC member asked about trends in albacore CPUE and if there was any information on the value of the catch in 2020, given anecdotal information on increased demand for albacore products driven by the COVID pandemic. Bigelow responded that the cannery in American Samoa is still in operation and the American Samoa fleet had a local market, but that there is no economic data to report.

The SSC thanked Bigelow for the presentation.

B. Hawaii Longline Annual Fishery Report

Russell Ito, PIFSC, provided the 2020 annual report for the Hawaii longline fishery (deep-set and shallow-set components). The report will cover fishery statistics including participation, effort, and catch.

An SSC member asked that since fish catch was not severely impacted based on data shown here, the question is where did the fish catch go in COVID situation where flights to ship fish off island were limited and demand by restaurants was severely impacted, and what were the overall economic impacts. Ito responded that local pathways for fish catch were substantially elevated, facilitated by social media in some instances, generally sold for very depressed prices or donated. Pricing was substantially lower due to reduced markets and large supply. Science Center is still working on analysis of economics/pricing information. The SSC noted that the fishing industry also helped the community during the COVID pandemic.

An SSC member commended the presentation of informative maps of catch and effort, and asked about bigeye tuna CPUE on shallow-set gear seen in the quarterly time-series plot. An SSC member commented about the shifts in fishing distributions of the fleet in 2020 compared to the previous ten years. Another SSC member commented about the bigeye tuna CPUE values in 2020 being lower than previous years.

An SSC member noted the trends in non-tuna catches, and asked what factor might be driving the lower catches last year. Ito noted that the fishermen also felt non-target species catches were down, but did not provide any opinion on why.

An SSC member asked if future reports could include weight or length composition data from the most recent year of longline fishery. Ito responded that timely 2020 size data is not available (PIFSC got data today) but data from 2 years prior would be available. Ito also commented on the bigeye tuna season and how this would impact size frequency data.

The SSC thanked Ito for an informative presentation.

C. Monte Carlo Analyses of Longline Mitigation Measures

Bigelow presented work to re-evaluate longline mitigation measures using possible alternative gear configurations in longline fisheries using a Monte Carlo analytical framework developed by Harley et al. (2015). In 2015, there were analyses of longline mitigation measures, which pooled together the US observer data and all international observer data, and evaluated a series of ‘what-if scenarios’. These included scenarios such as US-specific fleet and also stock-wide impacts if all fleets (or just the US fleets) converted from Japanese tuna hooks to circle hooks. Another scenario could be the impact on total catch estimates for a fleet and/or other fleets to phase out the use of wire leaders, replacing with monofilament or other materials. The analyses may quantify interaction rates if fleets did not set shallowest hooks nearest to the float, given that oceanic whitetip sharks and other species of concern habituate waters closer to the surface. These analyses will also include target and non-target species, including marlins.

The SSC noted that the US fleet is already applying most of these ‘best practices’, so the results are unlikely to influence the results of the projections by Joel Rice, previously presented. It was noted that the difference could be in the percentage of unobserved shark bite offs when switching to monofilament leaders.

An SSC member asked if there were any considerations to evaluate sensitivities of post-release mortality estimates for sharks by tagging duration, including those beyond 60 days. Bigelow clarified that they are inclined to consider 60 days as an appropriate post-release evaluation period because estimates beyond that timeframe seem less representative of fishery induced mortality. The SSC concurred with using the 60-day post-release mortality estimates.

The SSC suggested updating the probability of bite offs using the same mako shark parameter for the monofilament leader coefficient as the most comparable species for which significant coefficients were obtained, and to also concentrate on the post-release mortality assumptions based on the recent work by Hutchinson et al. The SSC noted that evaluation of leader material on target and non-target species would be informative, and suggested that the analyses of shallow hook were not a high priority due to the low expected benefit of removing a few hooks out of 25-30 hooks between floats compared to a measure such as removal of shark lines.

The SSC thanked Bigelow for an informative presentation.

D. Oceanic Whitetip Shark Working Group Report and Options Document to Address MSA 304(i) Obligations

Bigelow reported on the Oceanic Whitetip Working Group, its findings, and options to address the Council’s statutory requirements to act under its MSA 304(i) obligations. These include: 1) Domestic regulatory and non-regulatory actions to address the relative impact of fishing vessels of the United States on the WCPO oceanic whitetip shark stock to satisfy requirements under Magnuson-Stevens Fisheries Conservation and Management Act (MSA) Section 304(i); 2) International recommendations to the Department of State or Congress; or actions that will lead to ending overfishing and rebuild the Western and Central Pacific Ocean (WCPO) oceanic whitetip shark stock. The Working Group came up with options to address these obligations.

These include improved handling, reduction of trailing gear left on sharks in domestic and international fisheries, increased international observer coverage in particular regions where risk of interactions are highest, and development of effective line-cutter devices/protocols.

The SSC endorses the Oceanic Whitetip Shark Working Group findings.

The SSC thanked Bigelow for an informative presentation.

E. Wire Leader Regulatory Amendment for the Hawaii Longline fishery (Action Item)

Council staff presented a draft regulatory amendment evaluating the options to prohibit the use of wire leaders in the Hawaii deep-set longline fishery. In response to a proposal presented by the Hawaii Longline Association (HLA) at the 184th meeting in December 2020, the Council directed staff to prepare a regulatory amendment to the Pelagic FEP to evaluate options to prohibit the use of wire leaders in the Hawaii deep-set longline fishery for Council action at the March 2021 meeting. Most vessels in the Hawaii deep-set longline fishery use steel trace wire leaders in the terminal portion of the branchline between the hook and the weighted swivel to reduce the risk of crew injuries resulting from the flyback of weighted branchlines. Wire leaders also make it difficult to remove the terminal portion of the branch line from sharks or other protected species that cannot be brought on board. Longer trailing gear left on sharks and sea turtles have been shown to reduce post-hooking survivorship. Monofilament nylon leaders may facilitate early release of sharks and improve post-hooking survivorship if they sever the line and escape.

The SSC noted the importance of bringing sharks alongside the boat to allow positive species identification, and use of long-handled line cutter for achieving expected benefit from mono leaders. An SSC member asked about the safety issue reconciliation with the proposed action regarding gear flyback. Council staff responded that outreach and training with respect to crew safety is a priority in the HLA proposal. Staff also noted that a Hawaii longline fisherman had developed a floater tool that appears to reduce flyback hazards.

The SSC noted that the higher catch rate of target species (thus fewer sets to achieve bigeye quotas) may imply further reductions in the level of shark interactions, and that the leader transition may provide the additional benefit of harvesting the same amount of fish with less fishing effort and commensurately fewer shark interactions. Council staff noted that the overall effect may depend on potential changes in behavior in the fleet, and could consider this in the amendment analysis.

An SSC member asked about the percentage of HLA members in the Hawaii-based fleet. Council staff responded that only a handful of vessels are not HLA and these vessels tend to be California-ported, such that ~90-95% are members of HLA.

F. Addressing MSA 304(i) Obligations for Western & Central North Pacific Striped Marlin

1. Addressing Mitigation Measures to Move Towards Ending International Overfishing

Council staff presented on the Council's MSA 304(i) obligations to develop recommendations to move towards ending international overfishing of Western and Central North Pacific (WCNPO) striped marlin. Council staff provided a compendium of international actions that could meet those criteria. This included improving upon the uncertainty in billfish catch and discard accounting, increasing the use of circle hooks away from tuna or J-hooks, limiting annual catches of WCPFC members, and supporting international rebuilding efforts proposed by the US.

An SSC member asked what information was available on unreported catch and discard rates for other fleets. Council staff noted this was a large uncertainty, given inconsistency in catch reports. An SSC member noted IATTC sources might be considered the best catch data available.

An SSC member noted that the suggested maximum limit of 500mt for WCPFC members and the US consultative draft rebuilding plan may compete with each other, thus that consideration could be to make those an either/or option.

The SSC recommended the Council consider, in order to satisfy MSA 304(i) international obligations: 1) an improved standardized reporting system of billfish catch and discards for all WCPFC fisheries, 2) the use of circle hooks in all WCPFC longline fisheries, 3) limiting WCPFC member catches to 500 mt per year, and 4) supporting a consultative draft to rebuild WCNPO striped marlin. The SSC noted that the inclusion of both the 500mt WCPFC member limit provision and the current US consultative draft text may conflict, therefore the SSC recommended Council staff liaise with PIRO on the development of the draft rebuilding plan.

2. US Catch Limits for North Pacific Striped Marlin (Action Item)

Council staff presented on alternatives for catch limits of North Pacific striped marlin for the Council to act based on its MSA 304(i) obligations to enact domestic measures to reduce overfishing by accounting for the relative impacts of US fishing vessels. US impacts on the stock could be quantified by its catch history – 6% of all catch biomass since 1975 and approximately 19% of catch biomass used in the stock assessment from years 2013-2017. The stock is overfished and experiencing overfishing, per the 2019 assessment. The stock is internationally managed and beholden to an interim rebuilding plan stating the stock must reach 20% spawning biomass in absence of fishing ($20\% SSB_{F=0}$) by the year 2034. Any catch limit or rebuilding strategy must have at least 60% probability of reaching the target within the rebuilding period. PIFSC developed catch scenario projections in four phases (2021-2024, 2025-2028, 2029-2032, 2033-2034) that gradually reduce total international catches in order to reach the interim rebuilding target. Phase 1 (2021-2024) effectively ends overfishing relative to the Council's FEP in the first year and rebuilds the stock to B_{MSY} by the conclusion of 2023. Alternatives under consideration are 1) no action, considering the fishery transitioning from wire leaders, 2) catch limits from 2021-2024 that correspond to a 13.4% reduction from 2013-2017 US catch biomass, 3) catch limits from 2021-2024 that correspond to a 34.4% reduction from 2013-2017 US catch biomass, and 4) annual catch limit of 457 mt, consistent with previous Council action and

WCPFC CMM 2010-01. The Council will consider catch limits as a mechanism to end its relative impact on overfishing so that it may be congruent with a future internationally mandated WCPFC measure. A new stock assessment is expected in 2022, per recent developments with the ISC Billfish Working Group.

An SSC member noted the issues of at-sea monitoring of the deep-set longline fishery, which has implications for monitoring regulatory discarding where the limit is reached. The impact of post release mortality was also noted.

The SSC noted that the recovery target ($20\%SSB_{F=0}$) was calculated to be much higher than the B_{MSY} , and that recent fishing mortality was recently close to F_{MSY} . The SSC noted that a rapid rebuilding rate would lead to economic implications, particularly where the species was not a specific target.

An SSC member asked about substantial changes in magnitude and uncertainty seen in the time series of biomass and fishing mortality rate. Council staff commented there were changes in Japanese longline (one of the largest sources of fishing mortality) CPUE indices due to Japanese logbook changes in the early 1990's that also coincide with the moratorium of the high seas driftnet fishery and the inclusion of length composition data in the mid 1990's. Japanese scientists wish to reconcile these issues.

An SSC member asked how switching from wire to monofilament leaders might affect striped marlin catch rates, deducing that perhaps monofilament could incur higher catch rates of billfish based on their eyesight. Council staff noted that catchability might be reduced based on results of a previous study (Ward et al., 2008), although that study had a very low sample size and there were concerns about the analyses. The analyses of wire leaders on striped marlin catch rates in Hawaii longline fisheries are in progress.

An SSC member asked if new life history information would be included in the upcoming 2022 benchmark assessment. This was addressed by PIFSC in the public comment section. PIFSC will not have updated life history information for inclusion in the 2022 stock assessment.

SSC noted that if a new benchmark assessment occurred in 2022, the last year of data and stock status in that assessment would be 2020. Therefore, there would be a two-year lag in data inputs, which should be considered.

The SSC recommended that discard mortality be included within future rebuilding scenario analyses.

The SSC recommended that once a new benchmark stock assessment is completed (tentative 2022) future rebuilding efforts by the US should utilize the phase-in approach based on a target fishing mortality rate rather than a rebuilding timeline.

G. International Fisheries

1. SPRFMO Science Committee

Jim Ianelli, NMFS, presented on the happenings of the Science Committee of the South Pacific Regional Fisheries Management Organization (SPRFMO). The 8th SPRFMO Science Committee was hosted by New Zealand and held virtually October 3-8, 2020. Ianelli summarized jack mackerel and squid assessments, and discussed comprehensive habitat monitoring efforts.

Council staff asked if there was any issue which would prevent American Samoa to develop an exploratory fishing operation within the SPRFMO convention boundary along seamounts for deepwater species. Ianelli responded that other countries (e.g., Cook Islands) are exploring seamount fisheries but there could be jurisdictional complexities (e.g., Peru).

Council staff asked if any such species, including squids, have any status indicators. Ianelli responded that there is work underway exploring depletion estimators and other analyses of 'vulnerable biomass'.

The SSC thanked Ianelli for an informative presentation.

2. Report of Outcomes of the 17th Session of the WCPFC

Valerie Post, PIRO, presented on outcomes of the 17th Regular Session of the WCPFC which was held virtually December 7-15, 2020. Outcomes include discussions on tropical tuna measure, which rolled over for another year.

The SSC thanked Post for an informative presentation.

3. Conceptual Frame for Workshop on Bigeye Tuna Management in WCPO Longline Fisheries

Council staff reviewed a conceptual frame of a proposed workshop for bigeye tuna management in WCPO longline fisheries. The workshop has two proposed themes: 1) area/zone-based management versus flag based and 2) management objectives and evaluation. The overarching goal is to develop recommendations to update WCPFC CMM-2018-01, specifically management measures for WCPFC longline fisheries targeting tropical tunas, taking into account contemporaneous economic cost-benefit analyses and best available science.

An SSC member noted that objectives listed for the longline fishery such as stability in catch rates may not be met if the bigeye stock was fished at levels leading to depletion levels consistent with a 20% level of risk.

An SSC member asked whether climate change was captured within these future projections. It was noted that any historical changes would be in part captured by sampling historical recruitment patterns when assuming future recruitment. In turn, WCPFC conservation and management measures were time-limited, and hopefully the move toward robust harvest strategies would occur before major climate impacts occurred.

An SSC member asked about how presumed skipjack range contraction potentially impacts bigeye abundance. It was noted that this is unknown and has not been investigated.

4. Outcomes of the 34th FAO Committee on Fisheries

Council staff debriefed the SSC on the United Nations Food and Agriculture Organization 34th Committee on Fisheries, which was held virtually February 1-5, 2021. The Council's Executive Director was a member of the US delegation. Relevant topics included climate change, IUU fishing, and the FAO work plan that included area-based management tools.

H. Public Comment

Seth Atkinson (Earthjustice) stated their support for the HLA's initiative to convert from wire to monofilament branch lines which facilitates cutting the trailing line close to an embedded hook in the mouth of sharks. Earthjustice supports alternatives codifying the removal of wire leaders in longline fisheries into regulation. Atkinson encourages conservation measures including mandatory circle hooks and monofilament branch lines for export to international fisheries. Recommendations suggested by Earthjustice also include eliminating shallow hooks in deep-set fishery and switching to non-stainless steel circle hooks - as they corrode more quickly and should be shed faster from hooked sharks.

T Todd Jones (PIFSC) provided an update as of July 2020 on the PIFSC Life History Program including striped marlin, blue marlin, and swordfish with international collaboration across the Pacific. They are going to focus on age and growth and maturity for input into stock assessments. Tissue sampling is underway but there will not be any updated life history information such as age and growth available for 2022 striped marlin stock assessment.

Eric Kingma (Hawaii Longline Association) commented on the activities of the fleet in 2020, with trip limits applied to avoid oversupply at auction. However, the fleet lost considerable money (\$35-45 million) compared to recent years. No fish was wasted, and vessels shifted to retail and direct to consumers locally and there were some shipments to the continental US. Kingma also noted that monofilament branch lines are being adopted by HLA to address relative impact and any ESA issues that might arise. HLA does not support removing the shallowest hooks, given the uncertainty in the information and the potential economic impact of doing so. Nor is HLA supportive of switching to non-stainless steel circle hooks as they don't last as long, resulting in greater operating expense for fleet.