



WESTERN
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COUNCIL

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FINAL REPORT

4. Pacific Islands Fisheries Science Center Director Report

Michael Seki provided the Pacific Islands Fisheries Science Center (PIFSC) Director's report to the Western Pacific Regional Fishery Management Council (Council) Scientific and Statistical Committee (SSC), highlighting COVID-19 update for research cruises and research activities, territorial bottomfish stock assessment improvement efforts, and life history program pelagic and bottomfish research. Other updates included the 2021 protected species field season, new studies from the Social-Ecological & Economic Systems Program, an overview of the Main Hawaiian Islands (MHI) bottomfish surveys, and subsequent outreach in cooperation with the Pacific Islands Fisheries Group (PIFG) and industry partners.

SSC members asked about the recovery of the green turtle population at French Frigate Shoals and the 344 entrapments at Tern Island. PIFSC staff noted green turtle population increases do not seem to be as high as previous observations, and the 344 entrapments were accurate and likely attributable to several factors (i.e., habitat changes from Hurricane Walaka, general degradation of the island, and a high nesting year). The SSC appreciates the timely follow-up provided by PIFSC staff on these questions, including clarification that 289 of the 344 entrapments were hatchlings.

An SSC member asked about BFISH surveys in Hawaii and whether expanding surveys to describe seasonality would reduce uncertainty in stock assessments. Seki noted that fishery-independent surveys are expensive but there may be an expansion of this effort to the territories.

An SSC member inquired about monk seal pup survival and the effect of predator control programs. PIFSC staff noted Galapagos shark predation has been a persistent challenge but there has been no increase in tiger shark predation. The depleted population at French Frigate Shoals continues to show signs of recovery, but the trend may not persist.

The SSC thanked Seki for an informative presentation.

5. Program Planning and Research

A. Report on the Territorial Creel Survey Expansion

B. Report on the CIE Review of the Territorial Creel Survey Expansion

Felipe Carvalho and Hongguang Ma, PIFSC-Stock Assessment Program (SAP), and Toby Matthews, PIFSC-Cooperative Institute for Marine and Atmospheric Research (CIMAR), presented a report documenting the creel survey design and expansion algorithm, a case study of the surveys in Guam, and a summary of the review of the survey documentation by the Center for Independent Experts (CIE). The report describes the process to estimate annual catch, effort, and catch rate from shore-based and boat-based creel surveys in the three United States Pacific Island territories by detailing the current survey design and expansion methods, including recent modifications incorporated in the R scripts used in the total catch estimations.

The boat-based creel surveys in Guam were used as a case study to describe how effort and catch rate estimates for different fishing methods at different ports are combined to estimate total catch for the territory. Trolling and bottomfishing are the most common fishing methods in Guam, with non-charter trolling and bottomfishing dominating the total catch. An interview pooling approach is used when there is insufficient data per domain but is generally not utilized for more than 10 percent of the survey samples. The non-charter bottomfishing method was used to detail the expansion steps for producing the total catch for a highly targeted deepwater bottomfish species.

Sensitivity analyses were conducted to evaluate the impact of the interview pooling algorithm and selection of representative ports on the estimation of the total catch. There is little difference in the total catch across four selected pooling algorithms or four different representative port selection scenarios. Interview pooling choices and representative port selections had a more significant impact on species-level catch than the total catch. However, impacts were still minor for the species frequently caught by trolling and bottomfishing.

The report was subject to a CIE review. Overall, the review was generally positive, with the reviewers concluding that the surveys are well-designed and have suitable coverage. The reviewers recommended standardizing the sampling design and removing overlapping periods. The reviewers also recommended the use of estimators that account for cluster sampling. The estimators were deemed reasonable but needed improvements to better account for variance in the multi-stage cluster sampling design.

SSC members acknowledged that the documentation of the survey design and expansion algorithm and the subsequent review is a step forward in transparency for understanding this important data stream. An SSC member asked if there were any recommendations from the CIE reviewers that the SAP felt were impossible to implement. Since the SAP just received the report the day before, they still need to review the technical conclusions and recommendations. The reviewers were realistic about expectations regarding island fisheries, but the implementation of many of the CIE recommendations depends on logistical constraints (e.g., randomizing starting points and times). PIFSC staff are still in the process of reviewing the recommendations and will be providing the National Marine Fisheries Service (NMFS), the SSC, and the Council a copy of their response.

An SSC member noted that the report clarifies the survey design and the estimation process. It magnified sampling issues and the shortcomings in the process of data collection. The review, however, focused on algorithms that contribute to data products and not on issues in data collection. PIFSC will initiate the review of the creel survey design to determine deficiencies, focusing on the logistics of implementing the surveys. The review will determine how to incorporate the CIE recommendations for the survey expansion, including some simulation work to examine the benefits of modifying the surveys and, ultimately, recommend changes to the surveys that allow their data to be used appropriately in the future stock assessment models.

The SSC recommends PIFSC implement the CIE recommendation on increasing the level of survey effort for bottomfishing to reduce variability by making it a priority for the territories.

The SSC thanked Carvalho, Ma, and Matthews for the detailed presentation.

C. Improving Collaboration Between Stakeholders: Territorial Bottomfish Stock Assessment in the Pacific Islands

Mia Iwane, PIFSC-CIMAR, presented the results of the Cooperative Research project to develop a stakeholder engagement strategy in support of the improvement of bottomfish stock assessments in the territories. Recent stock assessments in the Pacific Islands region have generated controversy and highlighted geographical, relational, and experiential disconnects between federal managers and scientists, fishing communities, and local agencies. Iwane interviewed over 40 fishers and federal and territorial scientists and managers from Guam and Hawaii to explore these challenges. Interviews documented conflicting stakeholder narratives around fisheries, data, and science, partially due to communication challenges. Interviews also elucidated stakeholder conflicts, power dynamics, and institutional constraints that, if navigated carefully, may improve communication, trust, and collective understanding among stakeholders. Therefore, both technical and process-focused components of engagement are critical to building and maintaining resilient collaborative networks across stakeholder groups. Several best practices for engagement were presented.

An SSC member asked for ways to operationalize these conclusions either by creating guidelines or improving language in questionnaires that data collectors use. The findings are being applied to the PIFSC-SAP engagement strategies, but the process requires cooperation from all involved groups. Different institutions should invest in their capacity to engage with other groups. An SSC member suggested that training could better operationalize the information from the project.

An SSC member thought it was interesting to deal with differences in status and power by separating groups to communicate in smaller groups but noted the need for caution in certain environments. Doing so could strengthen dividing lines and inhibit communication across these groups. It is important to understand the local context, and a neutral facilitator could be utilized to encourage the softer-spoken individuals to participate.

The SSC supports the concept of constructive outreach and engagement by all

groups involved in the management process. The SSC recommends all management partners to consider the implications of this work, and to be reflexive and conscious of language in stakeholder engagement. This may become critically important in future data workshops with fishers where attention to culturally-based protocols will be essential.

The SSC thanked Iwane for an informative presentation

D. Report on the American Samoa Bottomfish Data Workshop with DMWR

Marc Nadon, PIFSC-CIMAR, and Erin Bohaboy, PIFSC-SAP, presented the results of an evaluation of the available datasets for the bottomfish fishery in American Samoa. PIFSC scientists developed the Bottomfish Data Evaluation Report that examined the quality and quantity of available data streams in the American Samoa bottomfish fishery and consulted with leadership and staff of the American Samoa Department of Marine and Wildlife Resources (DMWR) on interpreting these datasets through a virtual Bottomfish Fishery Data Workshop on November 9, 2021. This was the first among a series of workshops organized by the Council, PIFSC, and DMWR to increase stakeholder engagement and improve the next benchmark stock assessment scheduled for finalization in 2023. The workshop highlighted the availability and quality in the catch, effort, length, and weight data for each bottomfish management unit species (BMUS) from the various available datasets to evaluate their ability to implement a new stock assessment model. DMWR staff provided insights on the implementation of data collection and the changes in the bottomfish fishery over time. Despite difficulties in collecting comprehensive catch and catch per unit effort (CPUE) data, there is sufficient information to conduct a single-species age-structured assessment with the availability of length data for most American Samoa BMUS except for the pink-snapper (*Pristipomoides filamentosus*) and likely the ruby snapper (*Etelis carbunculus*) due to a confounding species in the data (*E. boweni*) that was recently described and made taxonomically different from *E. carbunculus*.

An SSC member sought clarification on the type of age-structured assessment model and the types of outputs generated to guide management. The PIFSC-SAP is currently planning to use a Stock Synthesis framework for both data-limited and data –moderate species. Size structure data can then be jointly assessed in the synthesis framework, and any additional data could be integrated in the future as needed using the framework.

The SSC asked if the PIFSC-SAP envisioned classifying species under different tiers associated with the amount and quality of data. The BMUS are not currently tiered based on data availability, but this could be done by cross-referencing evaluation criteria from the data report.

An SSC member noted that using a single-species, age-structured model is a great step forward for biological realism but could face additional complications (e.g., selectivity issues). There will be difficult science decisions that will translate to more technical management decisions.

Based on the available data evaluated in the report and outcome of the data workshop, there is a general sense that it is feasible to move away from a multi-species complex surplus-production model and towards single-species, age-structured assessments.

Therefore, the SSC supports PIFSC-SAP in developing single-species, age-structured stock assessments for the American Samoa BMUS. If practicable, the SSC suggests simple single-species production models using Bayesian software tools developed at PIFSC also be examined in addition to the age-structured assessments.

The SSC notes that there may be a potential management shift from output controls to input controls, where the annual assessment process would rely more on estimating fishing inputs and practices that lead to sustainable fishing mortality rates. **The SSC recommends that the Council direct staff work with NMFS to explore input control approaches to limit fishing mortality and contrast them with the current output control framework and use of annual catch limits (ACLs).** This is consistent with the National Standard 1 provision 600.310(h)(2), allowing the Council flexibility in applying ACLs for data-limited fish stocks.

The SSC thanked Nadon and Bohaboy for the informative presentation.

E. SSC Working Group Report on American Samoa Bottomfish Data Evaluation

SSC member Domingo Ochavillo presented a summary of the virtual Data Workshop held on November 18, 2021, where PIFSC-SAP staff presented the Data Evaluation Report to the SSC Working Group. The Working Group discussed the data availability, quality, and appropriateness for various models used in stock assessments. There were several concerns about the changes in nature of the fishery over time that may have implications for size selectivity in the BMUS fishery. Some of the information needed by the PIFSC-SAP to better understand the changes in the fishery and associated stocks over time may be gathered during the stakeholder workshop scheduled for January 2022 and through qualitative interviews of fishers and data collectors. Given the state of the available data, the Working Group also discussed the use of data-limited approaches, such as the length-based spawning potential ratio approach. The SSC received the seven Working Group recommendations from the workshop.

An SSC member suggested that the group should support all recommendations to explore data sources further and examine the history of the fishery through fishery participants. An SSC member also suggested that there may be United Fishing Agency (UFA) export records available for evaluation, but PIFSC recently evaluated those data.

An SSC member recalled a multi-species variable catchability study from the 1980s that found that *P. zonatus* was typically the first species to experience depletion, which may help explain the data trends. An SSC member noted that when the export program was active, American Samoa fishers initially sent large ehu the UFA auction but the buyers did not want them, so their revenues barely covered freight. Small ehu was not common in the catch. Many large onaga was also caught, but they were not ideal for the Hawaii market that prefers plate-sized fish.

An SSC member who has studied the cultural and ceremonial importance of fish in American Samoa noted that it had been a generation since his surveys asked what fishers did with unsold catch, which was high. There may be some size selectivity for bottomfish where large fish are used for occasional ceremonial purposes, and smaller fish are used for the regular Sunday *toona* 'i. A separate survey would be required to collect more information on the

proportions of sold and unsold bottomfish catch, but this effort must be balanced with the compressed timeline and utility for a length-based assessment. Additional information may be gleaned from the January 2022 data workshop with fishers.

The SSC recommends that the Council request PIFSC, in collaboration with the SSC Working Group, to explore other historical datasets.

The SSC accepts the SSC Working Group recommendations. The SSC recommends that the Council and PIFSC address the recommendations in the Working Group Report.

F. Fall Council Coordinating Committee Report

1. Area-Based Management Working Group

Council staff presented on the formation of the Council Coordinating Committee (CCC) Working Group on area-based management and noted that the CCC wants a draft report of regional area-based measures for federal waters in the United States exclusive economic zone (EEZ) by May 2022. The CCC is operating on the definition of “conservation” agreed upon before their October 2021 meeting. Recommendations should go through the SSC Working Group on area-based management before going to the SSC; Council staff noted a recommendation from the September 2021 SSC meeting to reconvene the working group with four current SSC members. There was a March 2019 meeting group that also included several SSC members.

An SSC member noted, regarding principle #7 about science-based methods to identify conservation areas, that the SSC would support evidence-based approaches to area-based management over implementation due to convenience.

The SSC recommends that the Council provide a comment letter to NMFS, based on CCC subcommittee report, that conservation areas defined under America the Beautiful 1) be informed by empirical evidence and scientific veracity, 2) be adequately monitored and enforced, 3) be adaptive to address climate change - especially in the Pacific Islands, and 4) recognize existing subsistence and native rights.

2. Environmental Justice

Council staff provided an update connecting the Biden Administration’s Underserved Community/Environmental Justice (EJ) priorities to the Western Pacific region’s fisheries management. The CCC included EJ on their October meeting agenda, requesting presentations from the Executive Directors of both the North Pacific and Western Pacific councils. The CCC discussed EJ, and all agreed that the issue is broad and would require sustained engagement through a regional lens. The CCC recognized that overarching solutions would not be adequate in addressing such a multifaceted issue. The conversation on EJ is only just beginning, and additional funding is required for appropriate implementation. The CCC expressed a desire to convene a workshop prior to its next meeting in May 2022 to delve deeper into the issue.

The SSC supports the efforts associated with EJ. An SSC member noted that EJ is a critical issue with respect to earning more trust and understanding in the territories and Hawaii.

The SSC supports the efforts because there may be ways that available data can contribute to an understanding of relevant injustices. Another SSC member noted that additional attention on EJ would help collaboration and communication with the stakeholders, especially in the territories.

The SSC recommends the Council to consider environmental justice concerns and suggests effort be made to examine data that will elucidate environmental justice issues.

G. Public Comment

Manny Duenas, Council member and president of the Guam Cooperative Fishermen's Association, expressed concerns about the weakening of the life history research in Guam and noted the need to take life history seriously. In his opinion, Duenas believes that the life history research should be examining the seasonal appearances of fish in the territories. Duenas suggested that the CILI application should be incorporated with creel surveys, as he believes that the surveyors do not appropriately interview fishers or measure their catch. He commented that fishers in Guam were dissatisfied with the most recent bottomfish stock assessment and have attended meetings in large numbers to voice their concerns.

6. Protected Species

A. Hawaii Longline Fishery Seabird Mitigation Measures

1. Modification of Seabird Interaction Mitigation Measures in the Deep-set Longline Fishery (Action Item)

Council staff presented the alternatives and impacts analysis for the draft regulatory amendment to the Pacific Pelagic Fishery Ecosystem Plan (FEP) to modify seabird interaction mitigation measures in the Hawaii deep-set longline fishery. The Council at the September 2021 meeting recommended, as the preliminary preferred alternative, 1) replacing blue-dyed bait with tori line; and 2) removing strategic offal discard from the regulatory requirement, with the addition to include best practices training on offal management as part of the required annual protected species workshop. In addition to the preliminary preferred alternative, the draft regulatory amendment analyzes an alternative that would modify and retain regulations for offal management. Staff presented the draft tori line regulatory specifications, including discussion on whether materials for the tori lines should be specified in regulations, as well as updated analysis comparing the potential outcomes of implementing revised offal management best practices under non-regulatory training or through a regulatory change.

The SSC reiterated its previous recommendation supporting Alternative 2 (replace blue-dyed thawed fish bait with tori lines, remove the regulatory requirement for strategic offal discharge, and provide best practice training for offal management at protected species workshops). The SSC notes that the preferred alternative mitigation measures and regulatory specifications are based on the best scientific information available (evidence-informed). The SSC supports the regulatory exemption for the tori line attachment point height.

2. Hawaii Shallow-set Longline Fishery Experimental Fishing Permit

Lynn Rassel, Pacific Islands Regional Office (PIRO) Sustainable Fisheries Division, provided an overview of the Experimental Fishing Permit (EFP) process and application submitted by the Hawaii Longline Association. The EFP application requests an exemption to existing seabird mitigation measures for the Hawaii shallow-set longline fishery under the Pelagic FEP for the purpose of conducting a pilot study to test tori lines when starting the setting operations earlier than the current night setting requirement.

The SSC supports the proposed study under the EFP.

The SSC thanked Rassel for the informative presentation.

B. False Killer Whale Issues

1. Report of the False Killer Whale Weak Hook Study

Diana Kramer, PIRO Protected Resources Division, provided an update on the weak hook study that evaluated target and non-target species catch rate and value of two hook types. The study used a 4.5 mm shank diameter circle hook meeting the current regulatory requirement under the False Killer Whale (FKW) Take Reduction Plan as the control, and a 4.2 mm shank diameter circle hook as the treatment. The draft report was presented to the Take Reduction

Team (TRT) on October 27, 2021, and TRT discussion focused on clarifications and comments on the draft report. PIRO is expected to schedule a follow-up meeting of the TRT in early 2022 to consider the implications of the study results on the Take Reduction Plan modifications. The final report was not available in advance of the SSC's discussion of this agenda item, and details of the results were not presented.

Council staff highlighted key comments from the TRT meeting. Captains that participated in the study provided perspectives and noted inconsistencies in hook collection protocols, although Kramer clarified that this was limited to one observer on one vessel. Captains indicated that additional data on other gear failures could have been documented during the study, as thicker monofilament required changing out gear. There were also concerns about the representativeness of the catch during the study period, as catch rates were very low. Declines in bigeye and yellowfin revenue were somewhat balanced out with incidental species, but approached industry thresholds (i.e., 10% decline) for support of weak hooks.

SSC members reiterated concerns with the draft report and requested timely access to the final report. Kramer indicated intentions to distribute the final report within a week, and the SSC received the final report on December 2, 2021.

The SSC tasks the FKW Working Group to work with staff as appropriate to develop the Council position on the implications of the study results in preparation for the in-person TRT meeting in 2022.

The SSC thanked Kramer for the informative presentation.

2. Hawaii Longline Acoustic Monitoring Study

Erin Oleson, PIFSC, presented on the FKW acoustic monitoring study in the Hawaii longline fishery. The PIFSC Cetacean Research Program began deploying passive acoustic monitors on longline gear in 2012 in collaboration with the PIRO Observer Program and individual fishers within the longline fleet. Recordings from the initial deployments indicate that FKW were heard near the gear more often than noted by fishery observer catch depredation records and were most commonly detected during the haul. Deployments of acoustic recorders on fishing sets have continued since 2014 through voluntary cooperation of longline captains and fishery observers. Acoustic data collected from 42 different longline boats during 59 trips revealed that within a subset of these recordings a mechanical sound was consistently detected at the start of the haul. On those sets with the noise detected, 80% had reports of catch depredation by the fishery observer. The current phase of this project aims to identify the source of this sound on the fishing vessel through collection of in-air recordings near suspected onboard equipment, as well as the distance at which FKWs might be able to detect this noise using an array of underwater recorders deployed on the gear. A facilitator for the project is currently recruiting new participating vessels to deploy recorders.

SSC members inquired about potential gears responsible for noise identified during haul, and hydraulics and mainline reels were noted as the most common feedback from industry. SSC members also inquired about whether the design array included a known point generating noise and whether it was sensitive enough to detect signatures across vessels (gear differences).

Oleson indicated that the design does not include generating a known source highlighting potential complications with that, and noted efforts are underway to try to quantify the character of noises and how variable they are across vessels and sets.

The SSC thanked Oleson for the informative presentation.

3. Take Reduction Plan Research Priorities

Kramer provided an update of the FKWTRT research priorities, highlighting the four priority areas recommended by the FKWTRT, which are crew training, depredation research, post-hooking mortality research, and data synthesis. Kramer also provided an overview of projects funded under the FY2021 appropriation funds for FKWs.

SSC members inquired about the motivation and types of tags used for the telemetry study, and Kramer indicated the efforts were merely to track movements of FKWs. SSC members also asked for clarification on the handling tools project. Kramer noted that this effort is to address ongoing issues and concerns from industry regarding fly back, and the project seeks to determine devices that can achieve the goal of straightening the hook while minimizing fly back risk to crew and captains.

The SSC thanked Kramer for the informative presentation.

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

Kramer presented on the current status of Endangered Species Act (ESA) consultations for the pelagic longline fisheries, US purse seine fishery, and bottomfish fisheries in the MHI and territories. The US purse seine consultation was completed in September 2021, the bottomfish fishery consultation is expected to be completed by February 2022, the Hawaii deep-set longline fishery consultation is expected to be completed by March 2022, and the American Samoa longline fishery consultation is expected to be completed by April 2022.

The SSC thanked Kramer for the informative presentation.

D. ESA and Marine Mammal Protection Act Updates

Kramer provided the ESA and Marine Mammal Protection Act (MMPA) updates, including the final insular FKW recovery plan, final rule on the approach regulations, proposed rule on time-area closures for Hawaiian spinner dolphins, and FKW interactions in the Hawaii longline fishery.

SSC members noted support for the spinner dolphin measures and were appreciative that adequate transit clearance was provided for vessels. SSC members highlighted references to the small boat fishery in the FKW recovery plan, suggested that complete reporting by the fleet may be impractical, and questioned whether marine mammal predation and interactions are reported in State catch reports.

The SSC thanked Kramer for the informative presentation.

E. Public Comment

Manny Duenas commented regarding the Magnuson-Stevens Fishery Conservation Management Act and the MMPA. He commented that the PIFSC Director Report was ambiguous regarding the status of the sea turtle population in the Northwestern Hawaiian Islands (NWHI) and noted that there may be impacts to sea turtles in the NWHI from a sea wall built around an atoll in the area. He expressed concerns about US fisheries being regulated for potential impacts despite the lack of stock assessments for protected species. He asked whether there has been any tagging with FKWs encountered in fishing interactions, noting that discussion on impacts to turtles started with mortalities but later included other types of interactions. He suggested that a broader range of studies is needed than what is currently done to fill these information gaps and encouraged the SSC to help with these efforts. He expressed his appreciation to SSC for critically reviewing the protected species reports.

7. Pelagic and International Fisheries

A. American Samoa Longline Fishery Report

Keith Bigelow, PIFSC, provided the 2021 semi-annual report for the American Samoa longline fishery. The report covered fishery statistics including participation, effort, and catch. Progress on implementation of electronic reporting and any ancillary updates was also presented. The American Samoa CPUE was the lowest in history in 2020 with about eight albacore per 1,000 hooks, noting the CPUE to break even is 12 fish per 1,000 hooks. The fishery in 2020 caught just over 30,000 albacore, which is the lowest production in history of the fleet. There have been interruptions in flights slowing down the processing of logbooks at PIFSC.

The SSC thanked Bigelow for his informative presentation.

B. Hawaii Longline Fishery Report

Russell Ito, PIFSC, provided the 2021 semi-annual report for the Hawaii longline fishery (deep-set and shallow-set components). The report described fishery statistics including participation, effort, and catch in 2020 and 2021. There was a peak of 220 trips in March 2021 and an increase in monthly trips since the COVID-19 pandemic. Early 2021 had about 2,200 longline sets of per month through June, and there was a peak of six million hooks in June. CPUE for bigeye tuna peaked in January through April 2020 at four fish per 1,000 hooks. This was followed by a steep decline, then a temporary spike in CPUE to four fish per 1,000 hooks during the winter of 2021, followed by CPUE through 2021 that was lower than 2020. Swordfish catches have been quite high in 2020 and 2021 relative to previous years. The fishery also experienced changes in gear modifications for shark conservation, electronic logbook systems (ELogs), and recovery from COVID-19.

Ito then provided a summary of the implementation of ELogs. The NOAA Office of Law Enforcement is replacing old vessel monitoring system (VMS) units that are having issues with the ELogs synchronizing with VMS. The California boats have been outfitted with ELogs. Replacement tablets have been made available and VMS connectivity greatly improved. The ELog systems are being updated to add additional fields, including bait types. Ito also anecdotally shared that some fishers are using milkfish for bait due to a shortage of sanma.

An SSC member asked about COVID impacts to the fishery. Another SSC member shared some new information on this issue from an ongoing COVID recovery study, which indicates preliminary 2021 revenue was 84% higher than 2020 (from March to August) largely due to significant price increases. Prices (March to August) were 60% higher than 2020 and 35% higher than a 2015 to 2019 baseline. Ito clarified that catches were down, but the higher price of fish helped to offset that; however, fuel prices are starting to have a strong negative impact on revenue. There was a comment from Council staff about the importance of maintaining frequency of PIFSC visits to docks and the auction, which are very useful for gleaning anecdotal information on the fishery. An SSC member asked about the acceptance of the ELogs by industry, and Ito responded that this is an ongoing process but has been improving. An SSC member asked about the switch to milkfish bait, and Ito responded that this is due to markets/supply. The milkfish bait seems to be an acceptable substitute that is very resilient, with some baits being reused. Ito noted that the bait switch has unknown impacts to CPUE.

The SSC thanked Ito for the informative presentation.

C. Hawaii Community Tagging Program

Melanie Hutchinson, PIFSC-CIMAR, provided an overview of the Hawaii Community Tagging Program. The Hawaii Community Tagging Program began in 2016 as a collaborative research program focused on the use of advanced telemetry technologies to elucidate shark movement behavior and habitat requirements. The focus began on bigeye thresher sharks but shifted to oceanic whitetip sharks as the program was developed. Research objectives are geared towards filling data gaps identified by regional fishery management organizations (RFMOs) as critical for implementation of effective conservation strategies for shark populations impacted by commercial fisheries. This work depends on the efforts and local ecological knowledge of the fishing community to deploy tags, collect data, and pursue practical, sustainable solutions to mortality mitigation. The program has conducted eight workshops and trained 160 fishers in Hawaii as participants. One of the major issues addressed in community outreach includes the improved identification of sharks. Research objectives include improving knowledge of habitat use, stock structure and demographics around Hawaii, and research to reduce risk of key shark species in fisheries. Tagging initiatives include the use of acoustic tags, satellite tags, and individual identification tags.

Molly Scott, PIFSC-CIMAR, summarized oceanic whitetip shark movements related to fish aggregating devices (FADs) using electronic tags. Other efforts investigated the association of silky and oceanic whitetip sharks with offshore aquaculture pens and State FADs. Movement patterns of these sharks can be discerned with respect to presence and absence of FADs and aquaculture pens.

Hutchinson also provided summaries of large scale satellite tagging studies throughout the Pacific Ocean and the impacts of habitat conditions on vertical movement. Depredation mitigation efforts were also presented, including galvanic releases on ‘jugs’ and magnetic deterrents. The use of photo identification was also used to observe movement and site fidelity of over 150 individual sharks.

Scott summarized outreach efforts and future steps which include collaboration with other scientists to develop improved species distribution maps and partnering with the US Animal Telemetry Network and International Ocean Tracking Network.

An SSC member asked about the estimation of population size for silky sharks in Hawaii. Hutchinson replied that this would be difficult with existing tagging data, but the photo identification database could be valuable for this task. An SSC member asked about extending the effort to Deep-7 bottomfish fishers. Hutchinson replied that the project accepts any fishers who wish to participate, which presently includes some bottomfish fishers. Council staff asked about silky shark interactions with the purse seine fishery. Hutchinson responded that there is much data on that topic, including her PhD work on post-release survivorship of sharks in the purse seine fishery, which showed that survivorship of juvenile silky sharks can be high if released before the purse seine net is ‘sacked up.’ Hutchinson also shared some insights into the

spatial distribution of adult silky sharks with a potential high abundance area around Hawaii. An SSC member commended the study and commented generally on depredation issues in Hawaii.

The SSC thanked Hutchinson and Scott for the informative presentation.

D. Horizontal Movements, Utilization Distributions, and Mixing Rates of Yellowfin Tuna

Kurt Schaefer, Inter-American Tropical Tuna Commission (IATTC), presented on a recently peer-reviewed publication he led entitled “Horizontal movements, utilization distributions, and mixing rates of yellowfin tuna tagged and released with archival tags in six discrete areas of the eastern and central Pacific Ocean.” A total of 1,522 yellowfin tuna were captured, tagged, and released with surgically implanted archival tags (ATs) in six discrete areas of the eastern and central Pacific Ocean from 2002 through 2019. Of 483 ATs returned (31.7%), 227 ATs from yellowfin (48–147 cm in fork length) at liberty from 32 to 1,846 days provided suitable data sets which were processed using an unscented Kalman filter model (UKFsst model) with sea-surface temperature measurements integrated in order to obtain most probable tracks and movement parameters. Although some differences were observed in the movement patterns for fish from within and among the six release areas, 99% of the 227 fish remained within 1,000 nm of their release locations, indicating limited dispersion and fidelity to release locations. The median movement parameter D , which defines dispersion from the UKF_{sst} model, for the fish released in the offshore equatorial areas showed much greater dispersion rates compared to those for the fish released along the coast or around islands. The rates of mixing of yellowfin among the release areas were found to be dependent on the distances between release areas, with, in general, the greatest mixing occurring among areas in closest proximity, whereas for the two areas offshore Mexico and the two offshore equatorial areas, the rates of mixing were nonexistent or negligible.

An SSC member commended this study as being a very comprehensive and robust view of movement dynamics for this species in a large portion of the Pacific. An SSC member asked if the movement results differ markedly from a purely diffusive process or if there was any indication of directed orientation particularly for individuals further from their apparently preferred area. Schaefer responded that the tagging results indicate that movement is more complex than simple diffusion and that orientation behavior is still to be examined. An SSC member expressed agreement about the observed retention of individuals to certain areas. Schaefer commented on the apparent lack of large-scale migration in this species and noted that aspects of their life-history (e.g., feeding, spawning) appear to constrain them to certain oceanographic conditions, commensurate with observations of limited movement. An SSC member asked about fin-clips and whether genetic data show similar patterns of mixing. Schaefer responded that tissue samples were not collected.

The SSC thanked Schaefer for the informative presentation.

E. SSC Working Group on Area-Based Management

Council staff presented on the SSC Working Group for area-based management. The impetus for this working group is the recommendation from the SSC at its 141st Meeting in

September 2021, which was recommended by the Council at its 187th meeting. The aim of the working group is to provide advice on the use of area-based management to achieve goals provided by the Biden Administration ‘America the Beautiful 30 x 30 Initiative’ and ongoing United Nations Biodiversity Beyond National Jurisdiction (BBNJ) negotiations. The 30 x 30 Initiative consists of a goal to conserve 30% of lands and water by 2030. This initiative is to be congruent with eight guiding principles of the ‘America the Beautiful’ Executive Order. The BBNJ negotiations have similar aspirations, but for waters on the high seas, and are to not interfere with existing legal instruments and frameworks such as RFMOs. Council staff provided an overview of additional international issues, including the expected opening of the Phoenix Islands Protected Area (PIPA) in Kiribati, which is adjacent to the US Pacific Remote Island Areas (PRIA). A summary of major domestic area closures, to be evaluated by the Area-Based Management Working Group, was provided with their objectives available data sources, and existing analyses to expand upon. Council staff provided an overview on its work plan and scope of deliverables, of which the first deliverable is expected at the March 2022 Council Meeting, consisting of an outline of a policy-focused paper to address domestic and international issues impacting Western Pacific Region fisheries.

SSC member Ray Hilborn added some additional details on the recently published paper on ABMT, and the importance of clearly articulated objectives for effective spatial management.

An SSC member asked about multiple objectives when using area-based management. Hilborn responded that multiple objectives are likely necessary but reiterated that they are often poorly laid out, and that there is clear evidence that permanent closures are not effective. Council staff asked about scope of newer initiatives given the rapid timeline being imposed by the Executive Order, though guidance is forthcoming from additional meetings. Council staff clarified that the PIPA elimination still awaits Parliamentary action. Hilborn added information on dynamic ocean management, recognizing changing ocean conditions and changing fish distributions requires non-permanent, non-fixed spatial measures. There was additional SSC discussion on the arbitrariness of the 30-year time frame of various initiatives. An SSC member noted that specific language is needed for clear definitions, and that some text will be presented for SSC review. Hilborn added that a more appropriate aspiration is to conserve 100% of lands and waters, noting that to date, existing US fishery management mechanisms are focused on sustaining targeted fish species; however, that can be expanded to all biodiversity without absolute closures.

The SSC endorsed the workplan for the SSC Working Group on Area-Based Management as presented and expect an outline for a policy-focused paper centered on domestic and international issues impacting Western Pacific Region fisheries.

F. International Fisheries

1. SPRFMO Science Committee

John Syslo, PIFSC, presented on updates of the 9th South Pacific Regional Fisheries Management Organization (SPRFMO) Science Committee, which was held from September 27 to October 2, 2021. The SPRFMO Science Committee was preceded by a jack mackerel data workshop, habitat monitoring workshop, and deepwater workshop. The United States reported no catch of MUS in 2020 within SPRFMO jurisdiction.

An SSC member asked if Peru, Chile, New Zealand, Australia have resolved their differences with respect to stock and fishery dynamics for jack mackerel. Syslo responded that there have been improvements but that there are remaining issues to be resolved.

The SSC thanked Syslo for the informative presentation.

2. Preparations for the 18th WCPFC Regular Session

Council staff presented on preparations for the 18th Regular Session of the Western and Central Pacific Fisheries Commission (WCPFC). The meeting will be held virtually November 28 to December 6, 2021 (US dates). Major key topics include a revised tropical tuna conservation and management measure, South Pacific albacore tuna management, and a US proposal to strengthen international shark measures by banning wire leaders in longline fisheries.

An SSC member asked if the South Pacific albacore stock assessment team suspects underreporting of catch given the apparent disconnect between stock status and catch magnitude. Council staff responded that there is a recognized need for better life history data and movement information, that catch in the south of 20° latitude area does appear inconsistent, and the primary fleet in this area is from China. An SSC member asked about localized depletion. Council staff noted that several island countries are exhibiting declining catch rates. SSC members asked about the US proposal to increase observer coverage and other means of monitoring (e.g., electronic monitoring, or EM). Council staff clarified the proposed increase and emphasized the importance of in-person monitoring of these fisheries.

Council staff followed up and reported on updates to the 18th WCPFC Regular Session and status up ongoing negotiation. WCPFC 16th Science Committee (SC16) advice, agreed by consensus in the prior year, was reiterated, which states temperate waters are buffering the stock biomass of bigeye tuna and stock depletion levels in the tropical regions should not be increased with a goal to increase bigeye tuna yields. The US proposed a management objective be added to account for spatial unevenness in depletion. However, there was opposition for such an objective being ‘too complex,’ while the Forum Fisheries Agency (FFA) favored a ‘zone-based management’ approach for longline fisheries to increase balance of fishing inside the EEZs of Pacific Island nations. This may be in opposition to SC16 advice. The US also proposed increasing US longline catch along with three other nations by 3,000 mt equally and to increase longline observer coverage minimum from 5% to 10%. The US observer program for the Hawaii fishery has been in existence for 30 years. So far, there has been opposition to the US proposals. The US has stated its differences from ‘distant water fisheries’ and its compliance and monitoring record. Scientific analyses in stock projections were provided to show such an increase in longline catches as proposed by the US, under varying stock recruitment scenarios, would still achieve likely stock biomass targets for the WCPFC.

SSC members noted the importance of territorial agreements on the territorial economies. If the Hawaii fleet reaches its limit early and does not have the territorial agreements, significant social and economic disruption will occur not only in the fleet but to Hawaii consumers. An SSC member noted that this is a complex policy situation and asked if the increase is sustainable and/or reallocated elsewhere. Council staff responded the US proposal is not to reallocate from

other nations, but to expand catch since Indonesia and Japan underutilize their catch limits by leaving approximately 10,000 mt of bigeye left uncaught in recent years. An increase in US longline bigeye tuna catch of 3,000 mt does not indicate a significant risk of breaching a limit reference point, per recent Secretariat of the Pacific Community (SPC) analyses.

Simonds noted that members of the WCPFC have continued to delay progress of a new tropical tuna measure, either with an expected new stock assessment or by claiming uncertainty on the impacts of the stock. This has been ongoing for eight years and, meanwhile, there is no incentive for the US.

The SSC endorses continuation of specified fishing agreements between Hawaii-based US vessels and Participating Territories and recommends that the US ensure that Paragraph 9 of the current Conservation and Management Measure for tropical tunas be retained to formally recognize these agreements within the WCPFC.

The SSC endorses the US proposal to increase longline catch for the US fishery and to increase the WCPFC observer coverage minimum for WCPFC longline fisheries because it is supported by best available science as provided to the WCPFC Scientific Committee. The SSC further recognizes that analyses provided by the WCPFC Scientific Services Provider demonstrates that the bigeye tuna stock is in a condition that may sustainably withstand a modest increase in longline catch for the Hawaii-based fishery, noting it operates in a region of low levels of biomass depletion.

SSC member Dr. Shelton Harley was recused from consideration of this matter and associated SSC recommendations

G. Public Comment

Duenas commented on the nearly complete lack of local fresh fish in Guam, milkfish as bait (i.e., not effectively raised and not effective as bait), and disagreement with NOAA book promotion of blue sharks for eco-tourism. He expressed gratitude for the Hawaii shark project, and asked that similar effort be made for Guam. Duenas also commented on distant water fishing fleets and associated impacts to the PRIA and territories.

8. Other Business

Council staff provided an overview of the Minderoo Foundation Global Fishing Index, which rates the US as a 'C' grade and fails to rate any nation with an 'A' or 'B' grade - painting a rather dour depiction of fisheries management in general. The report states that United Nation's Sustainable Development Goal (SDG) 14 is far from being met for all nations. The report investigates 1,465 fish stocks from 142 coastal states, estimating how healthy these stocks are with respect to nascent biomass and biomass associated with maximum sustainable yield (MSY). Stocks were 'assessed' in three groups: stocks with official assessments, stocks with catch and effort series applied to a Bayesian Schaefer Model, and stocks with catch only with a CatchMSY approach. Experts that developed the report consisted mostly of consultants and those with experience in small-scale fisheries. Only one person from a RFMO provided input.

Milani Chaloupka provided an overview of shortcomings of the report that states that 50% of assessed stocks are overfished with 10% on brink of collapse. The US was assessed in the same "high" level of "governance capacity" as Indonesia. The US stocks were not put through a valid assessment. Chaloupka suggested the CCC should tell each of the SSCs to prepare a report on the status of US fisheries for publication in a high impact journal followed by media and marketing campaigns. US fisheries should not be subjected to third party condemnation and thus need to market themselves more proactively in national and international fora.

Ray Hilborn provided an overview of comments he publicly released responding to the Minderoo Report, noting this report did not gain much media attention outside Australia. Hilborn mentioned that the Minderoo Report was largely driven by the Sea Around Us Project, which may be biased. Hilborn also noted that the CatchMSY approach used in the report is not accepted as a legitimate technique. Furthermore, it was noted that fisheries managed towards MSY on average will be overfished 50% of the time due to the definition of an average MSY value with natural fluctuations, rather than due to mismanagement.

An SSC member asked what sort of examination this report is to be given. Chaloupka responded there was only one respondent from an RFMO, but most fisheries are handled by RFMOs. Respondents and inputs on data sources were rather limited. Review of relevant publications was not addressed in the report at all. An SSC member questioned the evaluations, noting US territories had poor scorings – American Samoa was graded a 'D' and CNMI an 'F.'

The SSC recommended that Councils coordinate (via the CCC) with their SSCs to develop a more comprehensive assessment of US fisheries and publish it in a peer reviewed journal to support evidence-informed discussion.