WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

145th Meeting of the Scientific and Statistical Committee
September 13-15, 2022
Hybrid Meeting

FINAL REPORT

4. Pacific Islands Fisheries Science Center Director Report

Michael Seki provided the Pacific Islands Fisheries Science Center (PIFSC) Director's report, highlighting a pause to full staff re-entry at the Inouye Regional Center due to the "Medium" CDC Community Level status, but are expected to move to "Green" soon. Staff continue to work remotely, but are also able to work in the office. Updates were provided on the ongoing fieldwork surveys with some COVID-19 complications. It was noted that ~49% of the Bottomfish Fishery-Independent Survey in Hawai'i (BFISH) work on the NOAA Oscar Elton Sette is completed. National Marine Fisheries Service (NMFS) staff worked with the Council Archipelagic Plan Team sub-group members on the status determination criteria, annual catch limit accountability measures, monitoring bycatch, and life history. Staff are also continuing to pursue the development and implementation of electronic data reporting. PIFSC Fisheries Research and Monitoring Division (FRMD) staff traveled to Saipan and Guam in August to reinitiate engagement with the fishing communities and fisheries agencies.

Updates on protected species work such as the Hawaiian monk seal research, cetacean surveys and green sea turtles were presented. The Hawaiian monk seal research at the Papahanaumokuakea Marine National Monument concluded with a record number of pups born since 2004. Oceanographic field work surveys for marine mammals were conducted, comprising ocean-glider based, passive acoustic surveys around the Main Hawaiian Islands. Passive acoustic recorders were fitted on long-line fishing vessels for additional data collection. Data from green sea turtle nest monitoring conducted at French Frigate Shoals suggests increasing female hatchlings as a result of increasing beach temperature. Additionally, males have been found to be reproducing twice as often as females.

Bigeye Tuna (BET) Oceanography Cruise collected conductivity, temperature, and depth (CTD), zooplankton, and mRNA and eDNA samples. PIFSC staff also supported the development of the regional fisher observation reports. The Rainier Integrates Charting, Hydrography, and Reef Demographic (RICHARD) mission concluded work in the Mariana Islands, which included bathymetric mapping and life history work that will inform the territorial bottomfish assessment of management unit species. An updated report on the RICHARD mission will follow once the Rainier returns to port.

The Executive Director inquired whether monk seal distributions are predicted to shift northward as a result of climate change. Seki noted that although monk seal populations have been increasing, there are currently no predictions for monk seal movement northward. SSC members recognized the initiative taken by the Advisory Panel for the regional fisher observations and noted that the information collected through this effort should provide PIFSC an avenue to refocus research priorities.

An SSC member inquired whether the sampling on the BET cruise generated data regarding spawning areas for bigeye tuna and other tuna species, and received further information from Don Kobayashi, PIFSC and SSC member, who indicated that staff are still sorting through the large amount of samples collected. Kobayashi noted that there were a lot of larva that were likely *aku* (skipjack tuna) in the collections, but genetic analysis will be needed to confirm species. In response to an SSC member inquiry whether PIFSC plans to continue data collection to improve ecosystem-based fishery management (EBFM) for the most important fishery in the region, Seki indicated he hopes they will continue forward in the future, and noted that social documentation is needed and also important going forward.

5. Protected Species.

A. False Killer Whale Interaction and Depredation Analysis

Robert Ahrens, PIFSC FRMD, presented the results of an evaluation of the potential impacts of effort displacement on false killer whale depredation during Southern Exclusion Zone (SEZ) closures. The analysis is in response to a Council recommendation from the March 2022 meeting, and a follow-up to the preliminary analysis presented at the June 2022 SSC meeting. Based on the results of the spatiotemporal binomial model and gaussian spatiotemporal model, closing the SEZ appears to have displaced effort south and east, where there is potential for increasing interactions with other protected species (giant manta rays, oceanic whitetip sharks, and olive ridley turtles) as well as increased interactions with foreign fishing fleets. Depredation probability was higher in winter months, whereas cumulative fishing effort over the previous 7 days had a weak positive effect on depredation rate.

SSC members inquired into the definition of depredation events used in the analysis and suggested alternative approaches towards how spatial and temporal considerations could be defined in the modeling framework. Ahrens acknowledged a variety of modeling alternatives were available but highlighted the stability of effort patterns in the results.

The SSC noted the seasonal effect being weak and not likely to have much meaning given the rarity of events and cautioned about putting too much emphasis on the permit effect findings. However, SSC members found value in further engagement with captains to better understand their perspectives on the drivers of depredation rates (acoustic signatures, bait, other factors).

The SSC noted the analysis confirms that the SEZ closure displaced fishing effort out of the SEZ and EEZ, while the probability of depredation does not differ substantially between inside and outside the SEZ. The model suggests that the tradeoff to the SEZ closure is effort displacement into areas with higher interaction rates for other protected species (oceanic whitetip sharks, giant manta rays, olive ridley turtles) and areas with higher foreign vessel presence, and further analysis would be warranted to quantify the extent of those tradeoffs. Structural equation modeling is a robust statistical approach to simultaneously resolve complex relationships between multiple responses such as the potential effect of the SEZ closure on displaced fishing effort.

The SSC recommends that PIFSC (i) investigate operational aspects, including temporal, spatial, gear-related and acoustic signatures of vessels at both extremes (high and low) to reduce depredation rates; (ii) continue discussions with the Hawaii deep-set longline captains to better understand industry perspectives on the drivers of depredation rates; and (iii) explore the use of structural equation modeling to help quantify the potential direct effects of the SEZ closure on longline fishing effort and any subsequent indirect effects on protected species interactions such as oceanic whitetip sharks, manta rays and olive ridley turtles.

The SSC thanked Ahrens for the informative presentation.

B. Protected Species Interaction Estimation

Chris Long, PIFSC, presented an analysis to evaluate the use of a machine learning algorithm (ensemble random forest model) for estimating protected species interactions. This was a follow-up to the presentation at the June 2022 SSC meeting on the impact of observer coverage level

changes on the bias and precision of estimated protected species encounters. The ensemble random forest (ERF) model used 2005-2020 observer data from the Hawaii shallow-set longline (SSLL) fishery, which has 100% coverage and allows for estimating bycatch using multiple methods and comparing estimates to true take. The analysis focused on oceanic whitetip sharks, loggerhead turtles and leatherback turtles, with the model using a set of 26 environmental covariates derived from GPS coordinates of longline set and retrieve locations. The algorithm used these data to assess and learn which variables were most associated with sets that had bycatch in the training data, and the resulting models were used to predict protected species bycatch for all 2021 SSLL sets and adjusted these predictions by accounting for known rates of Type 1 and Type 2 error.

The ERF algorithm was more effective at predicting sets with higher bycatch rates (oceanic whitetips) than lower bycatch rates (loggerheads and leatherbacks). The ERF model estimates of oceanic whitetip sharks closely matched the actual 2021 value. The loggerhead estimates were biased lower, whereas the leatherback estimates were biased higher. Mean ERF estimates were more precise compared to the Horvitz-Thomson estimator currently used for estimating protected species interactions, while the accuracy and level of bias using ERF bycatch estimation depended on the method for accounting for Type 1 and Type 2 error as well as estimator accuracy for species per set with interaction when this number is greater than 1.

An SSC member asked how this modeling approach could account for abundance changes over time, and Long confirmed the model has no spatial component, but indicated the model assumes habitat variables are associated with environmental factors and are consistent over time.
The SSC noted that the only variables used to predict bycatch in the modeling framework were surface factors and discussed the utility of including additional environmental parameters such as salinity and subsurface data fields, or the incorporation of other covariates such as vessel operational characteristics and species interactions (e.g., interaction patterns with one protected species being associated with another). Long highlighted the difficulty of predicting rare events, temporal constraint requirements that preclude the use of certain environmental factors, and offered an understanding that fishing operations were consistent across vessels for the shallow-set fishery, but acknowledged this could be explored further if this was not the case, as well as species level interactions.

The SSC acknowledged that estimating rare interactions is difficult irrespective of the model approach.

The SSC recommends that PIFSC explore additional covariates such as vessel operational characteristics and species-level relationships.

The SSC thanked Long for the informative presentation.

C. ESA Section 7 Consultations

1. Status of the Hawaii Deep-set and American Samoa Longline Fishery Draft Biological Opinion

Dawn Golden, PIRO Protected Resources Division (PRD), provided a status update on the Hawaii deep-set and American Samoa longline fishery draft biological opinions (BiOps). Both consultations are expected to be completed in early 2023. In the interim, NMFS will issue a supplement to the 2014 DSLL BiOp focusing on oceanic whitetip shark and giant manta rays by

September 30, 2022, and a supplement to the 2015 ASLL BiOp for the same two species by October 30, 2022.

An SSC member inquired whether the BiOps would be completed by the dates provided. Golden confirmed that the supplements to the 2014 DSLL and 2015 ASLL are the current priority and are on track for completions by September 30, 2022 and October 30, 2022, respectively. Golden was hesitant to give a solid deadline other than "early 2023" on the full DSLL and ASLL BiOps, noting their intent for additional collaboration with PIFSC on modeling results and the review process.

The Executive Director indicated that the expectation is that the drafts of the full DSLL and ASLL BiOps would be ready for review by the March 2023 SSC meeting. The Executive Director reported that progress is being made on the ESA-MSA policy directive to improve how NMFS and the Councils work together on ESA consultations, noting that the preference is to work on mitigation as soon as a species is listed.

The SSC thanked Golden for the informative presentation.

2. Final Bottomfish Fishery Biological Opinion

Melissa Snover, PIRO PRD, presented on the final bottomfish BiOp issued on August 26, 2022. The BiOp covers the bottomfish fisheries under the American Samoa, Marianas Archipelago, and Hawaii Fishery Ecosystem Plans (FEPs). The BiOp concluded that the operation of the MHI, Guam and CNMI bottomfish fisheries are not likely to jeopardize oceanic whitetip shark populations, and the impacts from the American Samoa bottomfish fishery was determined to be discountable due to no known interactions with the species. These overall findings and conclusions remain the same from the draft version that the SSC reviewed at the June 2022 meeting. Some of the language in the Reasonable and Prudent Measures (RPM) and conservation recommendations were modified in response to Council comments.

At the June 2022 meeting, SSC concluded that the RPM was neither reasonable nor prudent for oceanic whitetip sharks in the bottomfish fisheries because the proposed measure (monitoring) would not minimize impacts to the species. The RPM was retained in the final BiOp for the purpose of monitoring impacts of incidental take, but the purpose was clarified in response to Council comments. The SSC noted that the anticipated level of mortality of one oceanic whitetip shark over five years for each of the island areas were rounded up from a low number closer to zero (0.1-0.15).

An SSC member inquired about application of the monitoring requirement for oceanic whitetip sharks, for which NMFS has not applied Section 9 take prohibitions. Snover highlighted the incidental take statement requires monitoring to assess the impact of fisheries. Golden referenced a recent consultation applying this approach for another species that does not have take prohibitions (scalloped hammerhead shark), the need to continue to monitor for jeopardy, and case law affirming this strategy. The SSC member further questioned whether this potentially exceeds agency authority. Golden indicated that NOAA General Counsel could respond to questions regarding legal authority to require monitoring when there is no Section 9 take prohibition in place.

Council staff thanked PIRO staff for addressing Council comments in the final BiOp and thanked SSC for their review of the draft bottomfish BiOp at the 144th SSC meeting. Staff noted this was the first time the process has been implemented as intended in the ESA-MSA policy directive and associated regional agreement, and expressed hope that this example would be followed with the forthcoming DSLL and ASLL BiOps.

The SSC recommends that the Council seek clarification from NOAA General Counsel regarding NOAA's authority to require monitoring of oceanic whitetip sharks because there are no Section 9 take prohibitions in place.

The SSC thanked Snover for the informative presentation

D. Public Comment

There was no public comment.

6. Island Fisheries

A. Development of Status Determination Criteria for the Hawaii Kona Crab Fishery

Thomas Remington, Council contractor, provided a report on the development of status determination criteria (SDC) for the Hawaii Kona crab fishery. The Hawaii Archipelago FEP does not specify SDC for Kona crab thus, despite the results of the stock assessment, the stock status of MHI Kona crabs remains "unknown."

The SSC recommends the Council take into account the following considerations in further developing this management action:

- **Data challenges identified during the last stock assessment highlighted uncertainty in non-commercial landings;**
- **New studies since the last assessment may provide an improved understanding of survivability and habitat utilization of Kona crab;**
- **Pending regulatory changes by the State of Hawaii to allow for the retention of female crabs will no longer make the harvest control rules consistent with the last stock assessment and associated SDC under option 2; and**
- **Utilizing SDC from other fisheries (option 3) would be challenging due to regional differences in Spanner crab fisheries.**

The SSC further recommends that although the Hawaii FEP would not be in compliance with the MSA, the Council should consider deferring action until this additional information can be considered by the Archipelagic Plan Team.

B. Report on Uku EFH WPSAR

David Itano, SSC member, reported on a Western Pacific Stock Assessment Review (WPSAR) external review of Essential Fish Habitat (EFH) models for Main Hawaiian Islands uku (*Aprion virescens*). The Franklin model[1] developed a Level 1 estimate of uku relative abundance based on two presence-absence models using boosted regression trees. The models utilized shallow water diver observations (<30 m) and baited remote underwater video (BRUV) data (30 – 300 m) which in combination covered the full vertical habitat range of the species. Tanaka et al. (2022)[2] developed a Level 2 generalized additive mixed-effects model using the diver data exclusively to estimate Uku population density for shallow-water areas (<30 m). Neither study examined egg or larval abundance, concentrating on EFH for large juvenile, sub/adult and adult stages. A variety of static and dynamic covariates were examined in the Level 1 and Level 2 modeling approaches. Both approaches represent a great improvement over the existing literature-based description of Uku EFH.

The SSC recognizes the models reviewed by WPSAR as vast improvements over the status quo and considers both models best scientific information available (BSIA). The SSC endorses the WPSAR recommendations. Future work should consider post-stratification techniques to address under-sampled habitats.

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[1] Franklin, E.C. 2021. Model-based essential fish habitat definitions for the Uku *Aprion virescens* in the Main Hawaiian Islands. Report to Western Pacific Regional Fishery Management Council. 34 pp.

[2] Tanaka K. R., A. L. Schmidt, T. L. Kindinger, J. L. Whitney and J. C. Samson. 2022. DRAFT: Spatiotemporal assessment of *Aprion virescens* density in shallow MHI Waters, 2010-2019. NOAA NMFS-PIFSC draft NOAA Technical Memorandum.

The SSC thanked Itano for his presentation.

C. Report on Ecosystem-based Fisheries Management Thresholds for Hawaii Nearshore Fisheries

Mary Donovan and Shannon Hennessey, Arizona State University, presented on a project to address the need for defining ecosystem-reference points in the form of threshold relationships between indicators and human and environmental pressures for nearshore ecosystems in Hawai‘i. The project aims to develop methodology to develop EBFM frameworks that are applicable to management. Utilizing existing data sets, the project identified threshold relationships between indicators and environmental drivers and estimated thresholds for coral reef ecosystem species. Preliminary conclusions identified commonalities and differences in thresholds across species and species groups with implications for management that are based on species complexes. This is the first step of developing analytical tools to explore thresholds in relation to human drivers with a potential to investigate patterns of thresholds for area-based management.

SSC members provided feedback on statistical methods and future directions noting an interest in how the project will inform management targets.

The SSC thanked Donovan and Hennessey for their presentation.

D. Improving the Collection of Hawaii Recreational Catch and Effort Data

Roy Morioka, Hawaii Fishermen's Alliance for Conservation and Tradition, presented on numerous approaches to improve fisheries catch and effort data in Hawaii. He noted that there already exists the commercial marine license and Hawaii Marine Recreational Fishing Survey (HMRFS) as well as a vessel registry and a bottomfish vessel registry and proposed defining the universe of fishermen using these registries to accurately account for what they are harvesting through direct surveys. He explained the challenges in data collection and proposed solutions for NMFS and the Council for improving data collection in Hawaii.

The SSC discussed the merit of pilot projects to improve information on non-commercial fisheries catch. An SSC member noted that previous efforts to survey non-commercial fishers were well received and efforts should be continued.

The SSC recommended the Council direct the Social Science Planning Committee to work with Morioka and staff to further develop a process for improving non-commercial data collection and provide a report to the SSC.

The SSC thanked Morioka for his presentation and appreciates his efforts and continued dedication to pursuing better data.

E. Public Comment

There was no public comment.

7. Program Planning

A. Alternatives for Fishing Regulations in the NWHI (Initial Action)

Council staff presented background information on the status of the proposed fishing regulations in the NWHI. At its 191st meeting, the Council preliminarily supported Alternative 2, prohibiting commercial fishing and permitting non-commercial fishing in the Monument Expansion Area and directed staff to continue analysis of the options for initial action. Staff presented draft alternatives for the SSC to discuss regarding the prohibition of commercial fishing and permitting of non-commercial fishing. At its 192nd meeting, the Council will consider taking initial action to permit and require reporting for non-commercial fisheries in the NWHI, and may identify a preliminary preferred option and direct staff to develop the associated analyses to amend its Hawaii Archipelago and Pacific Pelagics FEPs.

SSC members inquired on the status of the definitions of customary exchange and subsistence fishing within the MSA and how these fit into the Options. A working group of SSC members met to discuss the definition of subsistence fishing and developed a working definition of "Subsistence Fishing" and provided options for the SSC to consider regarding the subsistence definition.

A subgroup of the SSC discussed these options in detail and presented the outcomes to the full SSC. An SSC member requested that sustenance and subsistence be further clarified and/or defined in the subgroup report.

The SSC endorses the working group report (Appendix 1), which includes the working definition of subsistence fishing as: *Subsistence fishing means fishing for food to eat and to share without a monetary profit motive and may include fishing with any legal gear and the transport and holding of fish or fish products that can be shared or gifted among both immediate and extended family and friends in ways that contribute to community sustainability, food security, and social solidarity.*

The SSC recommends that the Council consider these options for defining "Subsistence Fishing" for any MEA Permit:

- **Define Subsistence Fishing to include the exchange of fish and fish products for food or for non-edible items if the exchange is of a limited or non-commercial nature;**
- **Define Subsistence Fishing to include Customary Exchange as defined in 50CFR665.12;**
- **Define Subsistence Fishing to include Customary Exchange as defined in 50CFR665.12 without cost recovery;**
- **Subsistence Fishing would align with the definition of fishing within the PMNM and be defined as *fishing for bottomfish or pelagic species in which all catch is consumed within the MEA, and that is incidental to an activity permitted under this part.***

B. Alternatives for an Aquaculture Management Framework in the Western Pacific (Final Action)

Council staff presented background information on offshore aquaculture currently operating in State of Hawaii waters and the possible expansion into Federal waters and other parts of the

western Pacific. If managed sustainably, aquaculture has the long-term potential to supplement seafood demands in island communities and enhance export commerce while providing employment and easing pressure on wild fish resources. In order to ensure activities are environmentally sound, economically sustainable and minimize impacts to wild fish stocks and capture fisheries, the Council and NMFS must have the ability to implement a program to review, permit and monitor proposed aquaculture projects and activities.

The purpose of this amendment is to allow long-term sustainable aquaculture in federal waters by establishing a federal management program for developing an aquaculture industry in the exclusive economic zone of the Pacific Islands Region (American Samoa, Guam, Hawaii, the Pacific Remote Islands, and the Northern Mariana Islands). A program is needed to provide the Council and NMFS with a framework that offers a review and authorization of where, how, and how much aquaculture is developed to regulate and manage aquaculture activities in federal waters.

At its 190th meeting in March 2022, the Council reviewed the Draft Aquaculture Management Framework Programmatic Environmental Impact Statement (PEIS) alternatives and supported NMFS publishing the Final PEIS. Further, the Council supported PEIS Alternative 3 as its preliminary preferred alternative, and directed staff to incorporate the PEIS into an omnibus aquaculture FEP amendment that includes management measures and procedures and to present the analysis of the alternatives for Council consideration. At its 192nd meeting, the Council may consider taking final action on Aquaculture Management Framework in the Western Pacific.

Based on the alternatives, an SSC member suggested only considering Alternatives 2 and 3, and indicated Alternative 3 as the preferred alternative given it provides the most flexibility. SSC members then inquired whether Alternatives 2 and 3 would only include cultured organisms or a captured broodstock. Further, SSC members questioned how these species would count against the ACL. Council staff noted that the capture of broodstock will count against the ACL for any MUS.

The SSC recommended Alternative 3 as it would provide flexibility with new innovative facilities and extended permit duration. Moreover, this recommendation is consistent with the preliminary preferred option identified at the 190th Council Meeting.

C. Status Update on Territorial BMUS Revision

Council staff presented a status update on the Territorial bottomfish management unit species (BMUS) revision. Five different working groups met to discuss the revision for each island area as it pertains to the specific MSA components (Status Determination Criteria, ACL/AM, Monitoring and Bycatch, EFH, Fishing Communities). Draft working group reports are currently in press and will be presented for SSC and Council input in December. Council staff requested SSC input on the approaches taken by each working group and the plans for community and stakeholder engagement.

An SSC member emphasized the importance of community and stakeholder engagement and the need to follow cultural protocols during local engagement. Other SSC members commended Council staff for the highly positive community stakeholder engagement during recent Council family meetings in Guam and the CNMI. Staff indicated they will work with the local social

scientists to ensure all cultural protocols are followed during community and stakeholder engagement in the Marianas (December 2022) and American Samoa (February 2023).

D. Report of the 7th National Scientific Coordination Subcommittee Meeting

Frank Camacho, SSC member, presented the outcomes of the 7th National Scientific Coordination Subcommittee (SCS7) held August 15-17, 2022, in Sitka Alaska. The meeting was hosted by the North Pacific Fishery Management Council, and focused on various aspects of addressing EBFM, including ecosystem indicators, multi-species modeling and addressing distributional shifts in managed stocks. The three primary themes of this meeting were:

- How to incorporate ecosystem indicators into the stock assessment process?
- Developing information to support management of interacting species in consideration of EBFM.
- How to assess and develop fishing level recommendations for species exhibiting distributional changes?

SSC members Shelton Harley, Erik Franklin and Frank Camacho represented the Western Pacific Council at the meeting, and reported on the summary and highlights of the meeting. Experiences from the other regions suggest that climate change effects will be an increasing concern leading to non-stationarity in environmental conditions that result in "winners" and "losers" for managed species and fishery sectors. Data limited fisheries will be challenged to predict effects of environmental changes so management actions may be more reactive (than proactive).

An SSC member mentioned that data-limited fisheries in the Western Pacific region would be challenging given various non-stationary scenarios. In contrast, for data-rich fisheries, more uncertainty is often perceived given the vast directions and indicators that could be considered in ecosystem models. In response, an SSC member mentioned how scenario planning approaches are now being used in Alaska and developed on the U.S. east coast. Therefore, SSC members indicated the need to address the disconnect between current stock assessment approaches and non-stationarity of ecosystems.

The SSC endorsed the following next steps for implementing EBFM into the management of the WP region, identified by the WP delegation to SCS7, and recommends the Council consider these priorities in EBFM-related planning:

- **Identify reliable ecosystem indicators to incorporate into stock assessments, as well as resources needed to improve and enhance data collection for monitoring the indicators and providing information to understand ecosystem changes and their effects;**
- **Conduct scenario planning for extreme environmental events to assist with economic and social resilience of fishing communities;**
- **Collaborate and share ideas among regions to explore expanded management options;**
- **Support efforts to build flexibility into stock status, reference point, and rebuilding guidelines when incorporating ecosystem considerations;**
- **Consider approaches to link allocations to climate-related changes in abundance for data-rich pelagic fisheries;**

- **Identify scenarios where quantitative decision making tools could help improve understanding of ecosystem considerations for fisheries in the WP region. Priorities include interactions between protected species taken in the region's longline fisheries and current management approaches, and considering ways to incorporate ecosystem considerations into bottomfish assessments and reference points.**

E. Preparations for the Ecosystem-based Fisheries Management Workshop

Council staff presented the EBFM Workshop draft agenda developed in conjunction with PIFSC and PIRO. The goal of this workshop is for staff from the three agencies to work collaboratively to highlight the topics, issues and needs of the Western Pacific region as fisheries management is steered towards an ecosystem approach. This workshop will provide a venue for staff to highlight priorities for a future series of workshops that will include various to be determined stakeholders. A draft agenda is currently being developed and includes topics such as priorities, implementation of EBFM, climate change and coordination.

An SSC member requested engagement of socioeconomic and academic stakeholders in the series of workshops following the agency to agency workshop on October 4, 2022. Council staff acknowledged this request and confirmed that socioeconomic and academic stakeholders will be involved.

F. University of Hawaii Fisheries Program Development

Council staff presented on development of a fisheries program at UH Manoa. This agenda item was discussed at the 144th SSC Meeting in June 2022. UH Manoa is currently considering the hire of a cluster of fisheries faculty members. UH Manoa had previously approved the Coastal and Marine Resources Program (CMRP) from 2005 that was not implemented. A fisheries program is needed to build capacity for employment and professional development in Hawaii, the US Pacific Territories, and the broader Indo-Pacific region, noting the importance fisheries have for culture, food security, and economic development. There is a need for academic and professional development infrastructure in the Pacific Islands, rather than reliance on 'mainland-centered' infrastructure.

An SSC member mentioned that UH Hilo is considering developing an undergraduate fisheries program that could feed students into a potential graduate program at UH Mānoa. Development of the USGS Fisheries Cooperative Research Unit, located in Hilo, will help supplement the fisheries program. Other SSC members mentioned that the Pacific Islands always look to Hawaii as a source for fisheries training and programs.

G. Public Comment

There was no public comment.

8. Pelagic and International Fisheries

A. Longline Fishery Reports

1. Hawaii Longline Fishery Report

Russell Ito, PIFSC, provided the 2022 semi-annual report for the Hawaii longline fishery (deep-set and shallow-set components). The report covered fishery statistics including participation, effort, and catch up to July 1, 2022.

In the first half of 2022, there were 140 vessels operating, a slight decline from the second half of 2021. 850 total longline trips took place in the first half of 2022, a decrease of ca. 100 trips from compared to the first half of 2021. Lower fishing effort in the US EEZ around Hawaii can be attributed to the periodic closure of the SEZ. Albacore and yellowfin tuna catches are slightly up while bigeye tuna catch was slightly down. Specifically, the catch of bigeye tuna in the first half of 2022 comprised 14,000 fewer fish than the same period in 2021. bigeye tuna CPUE has gradually declined below 4 bigeye per 1000 hooks. Swordfish catch from the shallow-set fishery has increased since 2019. Striped marlin catch was lower than the previous year, which was also the case for mahi-mahi, ono, and skipjack tuna. In summary, the season was generally characterized by lower catches, higher fuel costs but higher prices for most species.

An SSC member asked about recent opah catch. Ito responded that opah has been on a steady decline since 2018. An SSC member asked about the increased catch of yellowfin tuna and if this is related to fuel costs and targeting this species with trips closer to port. Ito responded that this may be true. An SSC member asked about other spatial patterns in fishing effort with respect to SEZ closures or other factors that may be shifting fishing distributions. Ito noted some increases in fishing effort to the southwest of Hawaii in recent periods. The Executive Director asked about when the longline bigeye tuna quota was reached. PIFSC staff responded that 130mt remained of the US longline WCPFC quota and US attributions to American Samoa began August 25, 2022. An SSC member asked about high market prices for tuna and low catches. Ito responded that this was an example of supply and demand, and that the higher prices have helped to keep vessels economically viable. Council staff asked about high mahi-mahi prices and if this is caused by increased demand or low supply. Ito responded that mahi-mahi catches have been on a steady decline since 2010, and suggested that trollers may not be able to fill in the market demand.

The SSC recommends that PIFSC staff report on recent information on market prices and trends to better understand underlying market dynamics and targeting in the Hawaii longline fishery.

The SSC thanked Ito for his informative presentation.

2. American Samoa Longline Fishery Report

Keith Bigelow, PIFSC, provided the 2022 semi-annual report for the American Samoa longline fishery. The report covered fishery statistics including participation, effort, and catch up to July 1, 2022. There were increases in albacore catch and CPUE for this time period relative to 2021, specifically increasing from 8.9 fish per 1000 hooks to 13.3 fish per 1000 hooks for the first half of the year. There was notable progress with electronic reporting with 8 of 9 vessels successfully pairing their tablets with the vessel monitoring system. Bigelow noted that there is a current shortage of PIFSC staffing for American Samoa longline and alia fishery data.

The SSC inquired if the albacore CPUE for the first half of the year would let the fleet 'break even' financially. Bigelow said that the January to July 2022 catch rate would be considered profitable.

The SSC thanked Bigelow for his informative presentation.

3. American Samoa Large Vessel Prohibited Area (LVPA) Performance Review

Council staff presented on fishery performance of all pelagic vessels fishing and reporting catch in American Samoa, including 'large' longline vessels greater than 50 feet long. The American Samoa Large Vessel Prohibited Area (LVPA) was established in 2002, and prohibited longline fishing of vessels greater than 50 feet length for 50 nm seaward of three American Samoa island areas with the intent to increase performance of small longline and trolling vessels. The Council recommended and NMFS implemented an exemption to the LVPA in 2016 that allowed certain U.S. longline vessels 50 ft and larger to fish in portions of the LVPA. The 2016 LVPA exemption was repealed in 2017 following litigation, and reinstated in July 2021 after the 9th Circuit Court of Appeals reversed the earlier District Court decision. The reinstated LVPA exemption action included a provision for the Council to annually review the effects of the exemption on catch rates, small vessel participation, and sustainable fisheries development initiatives. Data presented are provided in the 2021 SAFE Report, which do not have any reported data from alia longline vessels in 2021. Longline vessels targeting albacore experienced an increase in catch-per-unit effort from 2020 to 2021. Trolling vessels also experienced a significant increase in pelagic management unit species CPUE from 21 lbs trolling per hour to 33 lbs trolling per hour. Skipjack trolling CPUE doubled from 2020 to 2021 and experienced the greatest CPUE since 2012 in the most recent year.

Alia longline and troll vessel participation continuously declined since the establishment of the LVPA in 2002. However, trolling catch rates for skipjack tuna increased recently. There was no detectable effect of the LVPA since 2002 on small vessel fishing effort and the LVPA does not appear to be a factor attributable to the decline in fishing performance (especially for albacore tuna).

An SSC member asked about widespread public perception of the LVPA and suggested that increased communication with the fishing community would be necessary to fully understand the effect of the LVPA. An SSC member asked about the species breakdown of tunas and if other species replace albacore. An SSC member noted a recent paper using a counterfactual-based statistical modeling approach that is relevant to this discussion (Gilman et al 2020[3], and see also the evaluation methodology review section in Hilborn et al 2022[4]).

The SSC recommends that the Council request PIFSC to work with vessel owners to infer socioeconomic impacts of the LVPA (and the recent exemption of large vessels) and inform trends in fishery participation.

[3] Gilman E, Chaloupka M, Fitchett M, Cantrell D, Merrifield M (2020) Ecological responses to blue water MPAs. PLoS One 15(7):e0235129

[4] Hilborn R, Agostini V, Chaloupka M, Garcia S, Gerber L, Gilman E, Hanich Q, Himes-Cornell A, Hobday A, Itano D, Kaiser M, Murua H, Ovando D, Pilling G, Rice J, Sharma R, Schaefer K, Severance C, Taylor N, Fitchett M (2022) Area-based management of blue water fisheries: Current knowledge and research needs. Fish and Fisheries 23: 492-518

B. Longline Gear Modifications and Impacts on Catch of Target and Non-Target Species

Molly Scott, PIFSC, presented the results from a recently published study. In this two-part study, Scott et al. (2022)[5] investigated options to optimize fishing gear configurations for US Pacific pelagic longline vessels to maintain target catch rates while reducing bycatch mortality, injury, and harm. In part one, a paired-gear trial was conducted on a deep-set tuna longline vessel to compare catch rates and catch condition of target and non-target species between wire and monofilament leader materials. Temperature-depth recorders (TDR) were also deployed on hooks to determine sinking rates and fishing depth between the two leader materials. Scott noted that shark CPUE would need to be corrected for use in stock assessments because these abundance indices are biased downward due to bite-offs. In part two, hooks of different configurations (size, diameter, shape, metal type, leader material) were soaked in a seawater flume for 360 days to obtain quantitative estimates of breaking strength, as well as the time taken for gear to break apart. They found that switching from wire to monofilament leaders reduced the catch rate of sharks by ca 41% due to bite-offs, while maintaining catch rates of the target species (bigeye tuna). However, trailing gear composed of monofilament did not break apart even after 360 days. In contrast, branchlines with wire leaders began to break at the crimps after approximately 60 days. Additionally, the breaking strength of soaked fishing hooks was greater for larger, forged hooks composed of stainless steel typically used in US Pacific longline fisheries, which are of interest to the False Killer Whale Take Reduction Plan discussions. These results have implications for bycatch mitigation strategies deployed in the US Pacific pelagic longline fisheries.

The SSC received further clarification from Bigelow about the effect of the monofilament trailing gear on post-release survival rates for sharks, and noted that per Hutchinson et al (2021)[6], the post-release mortality estimate for a shark released with 10 m of trailing gear was ca. 8%, whereas removing all trailing line with only the hook left in the shark could reduce the mortality estimate to ca. 3%.

The SSC discussed the need for a more comprehensive approach for addressing potential cross-taxa conflicts and tradeoffs of species-specific bycatch mitigation measures in the Hawaii longline fishery, noting similar discussions of tradeoffs regarding the SEZ closure effects under agenda item 5.A and recognizing the increasing focus on EBFM as discussed at SCS7. An extensive analysis by Gilman et al (2019)[7] provides a framework for addressing this cross-taxa tradeoff issue. The weighted branch lines required for seabird mitigation measures, which also helps to sink gear to desired depth, may have negative impacts on sharks and other species due to crew safety issues for cutting the leader as close to the shark as possible. An SSC member also pointed out that TDR data showing shallower hook depths for branch lines using monofilament leaders compared to wire leaders may lead to unintended tradeoffs stemming from the recent

[5] Scott M, Cardona E, Skidmore-Rossing K, Royer M, Stahl J, Hutchinson M (2022) What's the catch? Examining optimal longline fishing gear configurations to minimize negative impacts on non-target species. Marine Policy 143: 1-12

[6] Hutchinson, M., Siders, Z., Stahl, J., Bigelow, K. (2021) Quantitative estimates of post-release survival rates of sharks captured in Pacific tuna longline fisheries reveal handling and discard practices that improve survivorship. NOAA PIFSC Data Report DR-21-001

[7] Gilman E, Chaloupka M, Dagorn L, Hall M, Hobday A, Musyl M, Pitcher T, Poisson F, Restrepo V, Suuronen P (2019) Robbing Peter to pay Paul: replacing unintended cross-taxa conflicts with intentional tradeoffs by moving from piecemeal to integrated fisheries bycatch management. Reviews in Fish Biology and Fisheries 29: 93-123

switch in leader material in the Hawaii deep-set longline fishery, if industry considers increasing the size of weights used on branch lines to attain desired hook depth. The SSC acknowledged that reviewing current developments in biodegradable leader material and alternative materials for crimps would be worthwhile, but noted that the tradeoff of higher gear cost and replacement frequency will likely be a barrier to adoption by industry. The SSC further noted that recent and ongoing advances in line cutter designs should be considered in alleviating the tradeoffs between trailing gear removal and crew safety.

The SSC recommends that a SSC subgroup and Council staff prepare a 1-page infographic to provide a simple communication tool on the potential cross-taxa impacts for various management measures in place for the Hawaii-based pelagic longline tuna fishery. The draft infographic should be provided for review at the next SSC meeting.

The SSC thanked Scott for her informative presentation.

C. PacIOOS

1. Updates to PacIOOS Scientific Products and Voyager Data Portal

Melissa Iwamoto, Director and Principal Investigator of the Pacific Islands Ocean Observing System (PacIOOS), presented on new services provided and the Voyager Data Portal. PacIOOS Voyager is a free, interactive, online mapping experience on the familiar Google Maps platform. It is also mobile friendly. Iwamoto oversees the execution of PacIOOS, collaborating with staff, partners, and users to advance PacIOOS strategic goals across the region.

The SSC made several inquiries on monitoring infrastructure. The SSC asked about water quality monitoring stations in the CNMI and potential funding opportunities for more monitoring infrastructure. Iwamoto responded that there are efforts to situate more instruments in the area and will be holding stakeholder workshops toward this effort as well as seeking partners on the ground. The SSC also asked about Guam partnering on any joint proposals for the infrastructure bill and other funding opportunities. Iwamoto pointed out the age of some instruments that need replacing and the need for more regional partners and increased collaboration. The SSC also asked about including the core ARGO and specifically the biogeochemical (BGC)-Argo drifters, and if PacIOOS could help acquire more buoys for our region. Iwamoto noted the challenge of not being able to control the locations of the drifters but noted that PacIOOS would be willing to support getting more drifters.

The SSC asked about Hawaii fisheries data in the Voyager data portal and suggested adding non-confidential fisheries data. Iwamoto responded that the only such data would be tagged animal data but would support adding other data streams. Council staff asked about fishery forecasting tools being hosted on Voyager. Iwamoto responded that such data visualizations can be easily included.

The SSC recommends that the Council request PacIOOS provide a presentation to the Council's advisory committees, specifically on the Voyager data portal.

The SSC thanked Iwamoto for her informative presentation.

2. Pacific Islands Region Acoustic Telemetry Network

Tom TinHan, PacIOOS, presented on data products available through PacIOOS that can inform animal movement analyses. TinHan develops and manages the Pacific Islands Region Acoustic Telemetry (PIRAT) Network and supports regional acoustic telemetry projects.

An SSC member asked about any issues concerning deploying acoustic arrays such as conflicts with other ocean users. TinHan responded that the contractor who does most of the fieldwork has a lot of experience with logistics. An SSC member asked about sharing and participation patterns by groups of researchers. TinHan responded that researchers are becoming more comfortable with the data sharing and that there are data access safeguards in place on the network. An SSC member noted that there are HIMB shark researchers working in the Marianas under SK funding and that a Guam network will be established, and also noted that reared bumphead parrotfish will be released and tracked to identify critical habitat for this species.

The SSC thanked TinHan for his informative presentation.

D. International Fisheries

1. UN Ocean Conference and BBNJ

Council staff provided a brief presentation on behalf of Colin Brinkman, State Department, who could not attend, regarding updates on the UN Ocean Conference and the Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ). The UN Ocean Conference was held June 27 to July 1, 2022, in Lisbon, Portugal. BBNJ Fifth Conference was held August 15 to 26, 2022, at the UN Headquarters in New York. BBNJ did not reach an agreement and another session will be held at a later date. The UN Ocean Conference led to several US commitments to combat climate change and illegal, unreported, and unregulated (IUU) fishing.

An SSC member asked about funding opportunities. Council staff responded that there are several funding opportunities available for infrastructure, restoration, and recovery.

2. ISC22 Working Groups and Plenary

Seki presented on outcomes of the 2022 meeting of the International Science Committee (ISC) for Tuna and Tuna-like species in the North Pacific Ocean held July 8 to 17, 2022, in Kona, Hawaii. Topics of interest were a 2022 benchmark assessment for North Pacific striped marlin, North Pacific blue shark assessment, Pacific bluefin stock assessment, and progress of a management strategy evaluation on North Pacific albacore.

The ISC Plenary decided at this point to revert to the previous 2019 assessment for North Pacific striped marlin due to a postponement on the delivery for the planned new benchmark assessment over concerns encountered with the incorporation of a new growth parameter considered for this assessment. The new benchmark assessment will be presented at the 2023 ISC Plenary. The north Pacific blue shark was assessed as not overfished and not experiencing overfishing. The Pacific bluefin tuna are overfished but not experiencing overfishing, with a rebuilding program underway.

An SSC member asked about age validation for striped marlin. Seki responded that no additional research is planned on this for incorporation in the 2023 benchmark assessment but that there will be continued examination of existing age and growth data. An SSC member asked about

added research and the timeline of the growth evaluation. PIFSC staff confirmed that growth modeling for striped marlin will be improved this year, but that no additional biological data will be incorporated into the next assessment. Seki noted that the working group did and will incorporate data improvements such as with the incorporation of data from the Japanese drift gillnet fishery. An SSC member asked about the 2023 North Pacific albacore assessment, which was confirmed to be a benchmark assessment.

The SSC recommends that PIFSC prioritize life history work on species that lack contemporaneous information and are considered to be overfished or experiencing overfishing.

The SSC thanked Seki for his informative presentation.

3. WCPFC 18th Science Committee

Bigelow and Valerie Post, PIRO, presented on outcomes of the 18th Science Committee of the WCPFC (SC18) and the WCPFC Science Management Dialogue (SMD). SC18 was held virtually August 10-18, 2022. The SMD was held virtually August 19 and 22, 2022. A 2022 stock assessment for skipjack tuna was provided by the SPC and the harvest strategy work plan was discussed at SC18. Meanwhile, additional meetings and the ongoing future of the WCPFC SMD process remains in doubt at this stage.

An SSC member noted the lack of consensus on SC18 skipjack tuna management advice.

The SSC thanked Bigelow and Post for their informative presentations.

4. Recommendations to the PAC

Council staff discussed 2021 recommendations to the US Permanent Advisory Committee (PAC) to the WCPFC and anticipated items for the upcoming PAC meeting to be held October 27 and 28, 2022. The PAC will inform US positions going into the WCPFC annual meeting held November 27 to December 4, 2022, in Da Nang, Vietnam. Additionally, emerging issues will be provided to the SSC with respect to outcomes of the SC18 and SMD.

The issue of the proposed expansion of the Pacific Remote Island Marine National Monument (PRIMNM) will also be proposed for the agenda for the next PAC meeting. The PAC will also deliberate on tropical tunas, noting the current conservation and management measure (CMM) expires at the end of 2023. In December 2021, the US proposed amending the current CMM which included a bigeye catch limit increase for the US longline fishery and provisions for recognition of an American Samoa purse seine fleet. Findings from recent PIFSC analyses of the oceanic whitetip shark is also proposed for the agenda for this upcoming meeting.

An SSC member asked about the American Samoa longline fishery and requested issues with the fishery be added as an agenda item. An SSC member noted the importance of electronic monitoring in poorly observed longline fleets versus purse seine fleets.

The SSC recommends the Council to request the PAC support the Council's position against the proposed expansion of the PRIMNM.

E. South Pacific Albacore Fishery Forecasting

Roberto Venegas, Council contractor, presented on the progress of a Council-supported project. involving the development of a predictive albacore tuna catch forecasting model for (1) American Samoa longline fisheries operating within its EEZ and (2) for US vessels in the South Pacific that target juvenile albacore in troll fisheries in the high seas east of New Zealand. The study identified variables impacting trolling/jigging for albacore, linking any likely commonalities between fishery performance in the South Pacific high seas waters within range of vessels originating from American Samoa.

An SSC member asked if the model could help interpolate or otherwise predict missing remote sensing data. Venegas indicated that he could not fill in gaps, noting some uncertainties with interpolating that kind of data. Another SSC member noted that the area around American Samoa had a significant amount of cloud cover leading to missing data, and suggested that they use a coarser spatial or temporal scale. Venegas indicated that this is a generic issue and that the coarser resolutions would miss important details. An SSC member asked if the project is finished or continuing. Venegas responded that the project is coming to a close. The SSC noted that the project should incorporate economic information and analyses shared with the PIFSC ESD.

The SSC thanked Venegas for his informative presentation.

F. Proposal to Expand the Pacific Remote Islands Marine National Monument

Bob Richmond, Director, Kewalo Marine Laboratory, University of Hawaii, is an author and science advisor of the Pacific Remote Island Coalition that proposed an expansion of the Pacific Remote Islands Marine National Monument. Richmond provided a perspective for the proposed expansion. The proposal suggested renaming the monument to fit the cultural heritage of the Pacific Islands. Existential threats to biodiversity in the monument are identified as deep-sea mining, climate change, and fishing. Richmond claimed that large MPAs help ensure protections for large spawning female fish known as BOFFFFs (big, old, fat, fecund, female fish), alleviation from fishing pressure, and distributional effects of climate change. The location of the proposed expansion was claimed to be in an area likely to feel the greatest effects of climate change and in need of refuge from fishing, including island areas where sea level rise engulf inhabitable areas.

The SSC unanimously expressed concern over the lack of data to support claims that the proposed expansion of the PRIMNM would yield the benefits as claimed in the proposal document. The SSC asked about the analytical framework for assembling the data in the evaluation of the expansion proposal. Richmond said that quality of input data will dictate an approach used, but did not offer details on any analytical framework. The SSC found that having no analytical framework to evaluate the proposed expansion would be counter to evidence-informed management. No effectively-managed marine resource management regime has been known to be based on the use of large static closed areas in lieu of other fishery management tools and without proper data-driven evaluation. The SSC noted these issues were thoroughly addressed in Hilborn et al (2022)[8] with particular attention to counterfactual-based evaluation of the efficacy of bluewater MPAs like the PRIMNM in Gilman et al (2019[9], 2020[10]).

[8] Hilborn R, Agostini V, Chaloupka M, Garcia S, Gerber L, Gilman E, Hanich Q, Himes-Cornell A, Hobday A, Itano D, Kaiser M, Murua H, Ovando D, Pilling G, Rice J, Sharma R, Schaefer K, Severance C, Taylor N, Fitchett M (2022) Area-based management of blue water fisheries: Current knowledge and research needs. Fish and Fisheries 23: 492-518

[9] Gilman E, Kaiser M, Chaloupka M (2019) Do static and dynamic marine protected areas that restrict pelagic

The SSC asked if social and economic impacts were considered in the proposal, from neighboring communities (like Kiribati) that may be influenced by China, as well as communities that are distant from the PRIMNM but may benefit from extraction in these waters. Richmond said there are members of the Coalition that advocate for human benefits, particularly Pacific Islanders.

An SSC member said that as a native practitioner, future access to resources is important, and asked why preclusion of human activity is a focus of the Monument. Richmond argued that MPA concepts have roots in many indigenous cultures and the approach does not necessarily separate humans from nature. The SSC disagreed and asserted that the Monument establishment process does not follow indigenous protocols.

The SSC noted that the spatial scale of the proposed expansion of the PRIMNM is miniscule relative to the range of highly migratory species such as tropical tunas which are transient visitors to the proposed expansion area, and asked what is the purported benefit. Richmond responded that the US longline fishery hits its annual bigeye tuna catch limit early each year and has to 'purchase' catch limits from the territories. However, SSC members clarified that the US longline fishery operates primarily in waters hundreds of miles north of the proposed expansion area and the real issues is the impact on the US purse seine fishery. The SSC also noted that the tropical tunas are internationally recognized as not overfished and not experiencing overfishing, and the exclusion of US fishing would only benefit foreign fisheries.

The SSC asked about BOFFFFs and the tradeoff with having a larger number of smaller females, and noted that no fishery management plan in the world uses BOFFFF in their management. Richmond cited literature on propagule quality.

An SSC member asked if indigenous cultural concerns are taken into account in balance with science, and whether environmental justice is given due consideration in the MPA proposal process. Richmond responded that scientific perspectives were sought by indigenous cultural practitioners in his experience, but was unable to answer the question regarding environmental justice considerations.

The SSC noted that there are many deleterious impacts of MPAs for American Samoan communities and that the expansion would jeopardize the local tuna-based economy in American Samoa by limiting fishing opportunities for US-flagged purse seine vessels that offload in Pago Pago.

The SSC asked that territorial government agencies be brought into the decision making process earlier so that their input can be heard, and requested that it be made clear who the beneficiaries are for proposed MPAs, as it presently remains unclear. An SSC member asked who were consulted in the territories for the current proposal. Richmond responded that he does not know. The SSC pointed out that it is difficult to manage sustainable fisheries when there are imbalances in access.

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fishing achieve ecological objectives? Ecosphere 10(12): e02968

[10] Gilman E, Chaloupka M, Fitchett M, Cantrell D, Merrifield M (2020) Ecological responses to blue water MPAs. PLoS One 15(7):e0235129

An SSC member noted that there are many important data streams from human activities for monitoring ecosystem health and that these would cease to exist with formation of large closed areas. Richmond agreed that a multifaceted approach is needed for sustainability.

The SSC recommends the Council inform the White House and relevant federal agencies on the lack of scientific justification for previous and proposed expansion of marine national monuments in the Pacific that prohibit US tuna fisheries based on input from the SSC. The Council should also reiterate the SSC's June 2022 recommendation to request a comprehensive evaluation of the unintended consequences, including social and economic impacts, be conducted and evaluated through a transparent and public process if further closures are considered.

The SSC recommends the Council request the Pacific Remote Island Coalition to directly address and consult with fishing communities in the US Pacific Territories along with territorial agencies.

The SSC thanked Richmond for his presentation.

G. Public Comment

There was no public comment.

Appendix 1: SSC Working Group Meeting Report

September 14, 2022 8:00 a.m.

Participants: Craig Severance, Justin Hospital, Debra Cabrera, Kirsten Leong, Danika Kleiber, Joshua DeMello, Kitty Simonds

Council staff presented the issue for the group to consider noting that non-commercial fishing does not allow for barter or trade. To include barter and trade, the Council would need to develop an additional fishing permit for subsistence fishing that could allow for such cultural activities. The inclusion of cost recovery, as in customary exchange, could also be included to provide for the community to participate in the fishery.

Participants noted that the decision is whether to support the idea that some extraction should be possible or no extraction should be allowed. The definition of customary exchange may be controversial so the group thought developing a definition of subsistence that fits the need would be more appropriate.

Discussion centered around cost recovery and whether fishing in the MEA would be practical if it were not allowed. It is important to consider and respect the native Hawaiian voice, but not allowing customary exchange may cut off groups of people who otherwise could not afford to participate. If there is no extraction, how many participants could actually participate. The Council wants to afford people the opportunity to do what they want can within the regulatory regime, whether people have money to go up there or not. It was noted that equity and environmental justice issues were a concern.

The Working Group developed a working definition of "Subsistence Fishing" and noted that the best approach was to provide options for the SSC to consider regarding the subsistence definition:

a. Define Subsistence Fishing w/o customary exchange

Subsistence Fishing means fishing for food to eat and to share without a monetary profit motive and may include fishing with any legal gear and the transport and holding of fish or fish products that can be shared or gifted among both immediate and extended family and friends in ways that contribute to community sustainability, food security, and social solidarity. Subsistence fishing may include the exchange of fish and fish products for food or for non-edible items if the exchange is of a limited or non-commercial nature.

b. Include Customary Exchange w/cost recovery

Subsistence Fishing means fishing for food to eat and to share without a monetary profit motive and may include fishing with any legal gear and the transport and holding of fish or fish products that can be shared or gifted among both immediate and extended family and friends in ways that contribute to community sustainability, food security, and social solidarity. Subsistence fishing may include customary exchange as defined in 50CFR665.12.

c. Include Customary Exchange w/o cost recovery

Subsistence Fishing means fishing for food to eat and to share without a monetary profit motive and may include fishing with any legal gear and the transport and holding of fish or fish products that can be shared or gifted among both immediate and extended family and friends in ways that contribute to community sustainability, food security, and social solidarity. Subsistence fishing may include customary exchange as defined in 50CFR665.12, without cost recovery.

d. Subsistence fishing = sustenance fishing only, aligning with the PMNM permits

Subsistence Fishing means fishing for bottomfish or pelagic species in which all catch is consumed within the MEA, and that is incidental to an activity permitted under this part.