WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

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FINAL REPORT

4. Pacific Islands Fisheries Science Center Director Report

Tia Brown provided the Pacific Islands Fisheries Science Center (PIFSC) Director's report. She highlighted stock assessment improvement initiatives including the results of the bottomfish fishery-independent survey in Hawaii, report of the main Hawaiian Islands (MHI) Deep-7 data workshop, and report of the shore-based life history research and training. Also highlighted were the status of sampling through the International Billfish Biological Sampling (IBBS) Program; updates on the Hawaiian monk seal population; loggerhead turtle satellite tagging deployment; representation at the 41st International Sea Turtle Symposium; updates on social science and economics initiatives; and update on the Rainier Integrates Charting, Hydrography, and Reef Demographics (RICHARD) mission. PIFSC also announced Charles Littnan as the new PIFSC Director, who will assume his new position on June 20, 2023. Littnan provided brief remarks, noting his broad background working with communities and ecosystems through his work on protected species, and PIFSC's continued commitment to the SSC and Council to provide best scientific information that supports management decisions.

Executive Director Kitty Simonds welcomed Littnan, and said that she expects to be engaged on protected species issues through the SSC and the Council more frequently to ensure the continuation of the important fisheries in the region.

SSC members asked about the method of deploying satellite tags on sea turtles, and the status of bigeye tuna research. Brown clarified that the tags are deployed by observers on commercial longline vessels. Bigeye tuna and highly migratory species are still a top priority for PIFSC, with plans to conduct exploratory surveys in summer 2024 to collect data and target areas needed for foraging area research. PIFSC will present on that work as results become available.

An SSC member asked how the data streams could be improved, noting concerns from Hawaii bottomfish fishermen about the Hawaii Marine Recreational Fishing Survey (HMRFS). PIFSC staff indicated that they will be working on engaging fishermen to improve non-commercial data, which will include pilot tests to create strata using the vessel and bottomfish registry for the fishing effort survey and conduct a targeted Access Point Angler Intercept Survey to improve catch estimation for bottomfish, particularly for uku. Another SSC member asked about the targeted sampling strategy for IBBS, and PIFSC staff indicated that the life history program developed comprehensive sampling to support sampling of striped marlin for the International Science Committee for Tuna and Tuna-Like Species in the North Pacific (ISC).

SSC congratulated Littnan and thanked Brown for her role in serving as the ex-officio member on the SSC.

5. Island Fisheries

A. American Samoa Bottomfish Management Unit Species (BMUS)

1. American Samoa BMUS WPSAR Report

Erik Franklin, Western Pacific Stock Assessment Review (WPSAR) Chair, provided a report on the review of the American Samoa bottomfish stock assessment. The WPSAR determined if the data were appropriate, the assessment model was properly applied, and if the final results are scientifically sound. The SSC reviewed the results in proportion to the Terms of Reference.

SSC discussion centered around the issues of lessons learned, the role of sensitivity analysis, use of indicator species for the 2 unassessed species, the potential for incorporating catch per unit effort (CPUE) data and bridging time series, and the appropriateness of the WPSAR team's recommendations for next steps. The SSC noted the importance of having translators available when needed, and sensitivity to audience perception of the meaning of the preliminary results prior to WPSAR review. An SSC member suggested that the sensitivity analyses were critical to informing the results and suggested the use of global sensitivities analysis. An SSC member noted the logistical problems but felt that the benefits of holding the WPSAR Review in the territory were great and suggested taking WPSAR to the Territories and Commonwealth for their upcoming BMUS Stock assessments. The SSC agreed with the WPSAR that the terms of reference were met with yes answers, and agreed with the WPSAR results and recommendations for further work**.**

The SSC accepts the results of the WPSAR review and supports the panel's conclusions and recommendations.

2. American Samoa BMUS Benchmark Stock Assessment Report

Marc Nadon, with Felipe Carvalho and Megumi Oshima, PIFSC, presented a benchmark stock assessment for the American Samoa bottomfish fishery. The stock assessment differed from previous efforts and included nine single-species, age-structured models in a stock synthesis modeling framework. This model fits a population model to relative abundance and size composition data in a likelihood-based statistical framework to generate maximum likelihood estimates of population parameters, derived outputs, and their associated variability. The SSC reviewed the results of the stock assessment for consideration of best scientific information available (BSIA).

Nadon noted that the benchmark stock assessment started in 2020 when PIFSC fully assessed the data for bottomfish in American Samoa. PIFSC held data workshops in American Samoa with the fishing community that provided feedback on the data before conducting the stock assessment. The data workshops were used in fixing several data issues such as no Manu'a data from 2016 to 2021, species misidentification and species appearing and disappearing during the assessment period. Nadon emphasized that this assessment used an age-structured integrated population model framework (Stock Synthesis) and split the BMUS species complex into individual species models.

There were concerns from the SSC regarding CPUE and the sensitivity analyses and whether other models or analyses would have been more appropriate. PIFSC responded that the WPSAR recommended additional analyses such as a factorial and global parameter sensitivity analysis

and these will be incorporated into the next stock assessment.

Model-based inference to support evidence-informed management is often contested or even refuted in challenging socio-political settings such as fisheries management. Models are good at mapping assumptions into inferences but that inference is fraught with uncertainties[1]. The American Samoa BMUS stock assessment used local or single-parameter perturbation sensitivity analysis approaches to address this issue to support confidence in model conclusions — this form of parameter sensitivity analysis has many limitations[1]. However, the models used for the stock assessment (and input data standardization) and the myriad of embedded assumptions should preferably be assessed using global sensitivity analyses (GSA) coupled with variance-based estimators[1,2]. GSA addresses many sources of uncertainty simultaneously in a simulation-based framework and is an essential part of a model workflow to promote model transparency and subsequently to support evidence-informed public policy[2].

The SSC recommends that global rather than local based sensitivity analyses become a routine component of stock assessment workflows to better support confidence in model-based inference for management decision-making.

The SSC expressed concerns regarding the potential for fisher behavior to influence size selectivity in the fishery. The SSC encouraged PIFSC to consult with fishermen to determine if there is size selectivity in the fishery.

The SSC appreciates PIFSC's efforts in pursuing improvements to the American Samoa bottomfish benchmark stock assessment and considering the SSC's previous concerns regarding the appropriateness of assessing the mixed bottomfish complex. The SSC commended PIFSC scientists for the quality of the analysis, documentation, and provision of model code.

The SSC accepts the 2023 benchmark assessment as BSIA. The SSC recommends that the Council direct staff to convene the P* and SEEM working groups to quantify the uncertainties to set the Acceptable Biological Catch and specify the Annual Catch Limits for the American Samoa BMUS.

3. American Samoa FEP Amendment for BMUS Revision (Action Item)

Thomas Remington, Lynker, presented on refining the American Samoa bottomfish management unit species (BMUS) to reflect the current state of the bottomfish fisheries in American Samoa. The current list of 11 species would be modified by removing five species and re-categorizing them as ecosystem component species (ECS) and adding seven species either previously ECS or unclassified. Revision of the species list also includes developing status determination criteria (SDC), essential fish habitat, monitoring and bycatch, annual catch limits (ACLs), and consideration of fishing communities. The SSC noted that the deep-water *Pristipomoides* and *Paracaesio* species proposed to be added to the American Samoa BMUS occur in small

[1] Saltelli A, Aleksankina K, Becker W, Fennell P, Ferretti F, Holst N, Li S, Wu Q (2019) Why so many published sensitivity analyses are false: A systematic review of sensitivity analysis practices. Environmental Modelling and Software 114: 29-39

[2] Saltelli A, Bammer G, Bruno I, Charters E, Di Fiore M, Didier E, Espeland W, Kay J, Lo Piano S, Mayo D, Pielke R, Portaluri T, Porter T, Puy A, Rafols I, Ravetz J, Reinert E, Sarewitz D, Stark P, Stirling A, van der Sluijs J, Vineis P (2020) Five ways to make models serve society: a manifesto. Nature 582: 482-484

proportions in the overall catch and that setting ACLs for each species may be difficult and data limited. The setting of ACL levels will be determined in consultation with available data and the fishery and groups with indicator species should be considered.

SSC discussion centered around the need for this amendment which is primarily the Council's lack of full jurisdiction over the shallow water species included in the BMUS. These are species that are found primarily in territorial waters.

The SSC noted that the results of the five working groups' analyses were useful. An SSC member noted that some of the species nomenclature needed correction. An SSC member asked about the effective difference between "no impact," "negligible impact" and "slight impact" in the draft impact analysis tables, and received clarification that no impact indicates zero effect, negligible impact indicates small effects that are indistinguishable from no impact, and slight impact indicates impacts to a lesser degree or minor impact. An SSC member reported on the SSPC endorsement of the communities section of the component reports and its support for option 2. An SSC member noted the importance of properly assigning the depth ranges of species in the complex.

The SSC recommends that the Council support Option 2 and move forward with final action on the American Samoa BMUS Amendment process.

B. CNMI BMUS ABC Specification for 2024-2025 (Action Item)

Council staff provided a presentation on options for setting the acceptable biological catch (ABC) for the CNMI bottomfish fishery. The existing ACL for the fishery, which was set based on a 2019 benchmark stock assessment, is set to expire at the end of 2023. The SSC reviewed the previously accepted risk of overfishing to determine an ABC for fishing years 2024-2025 and looked at whether the ABC should be set at the current level of risk or the corresponding level of catch.

The SSC notes that the existing risk analyses from P* and SEEM analyses are still useful and recommends Option 3, retaining the existing risk of overfishing at 39 percent accounting for scientific uncertainty. The SSC sets the ABC for the CNMI bottomfish fishery for the fishing years 2024 and 2025 at 82,000 pounds, the catch level associated with this level of risk.

C. MHI Kona Crab ABC Specification for 2024-2026 (Action Item)

Council staff presented alternatives for specifying ABC for the MHI Kona crab fishery. The current ACL, set using the SSC-approved benchmark stock assessment in 2018, is set to expire at the end of the year. The SSC previously set an ABC of 30,802 lbs. at a 38% risk of overfishing, which took into account a 12% reduction from a 50% overfishing risk for scientific uncertainty. The SSC reviewed alternatives that would set the ABC based on the 2018 stock assessment at different risks of overfishing.

The SSC discussed the alternatives and considered that no new data are available. Without new information, the SSC agreed that the status quo was appropriate.

The SSC recommends Alternative 2 (status quo), to roll over the current ABC to the fishing years 2024-2026. Therefore, the SSC sets the ABC for the MHI Kona crab fishery for the fishing years 2024, 2025, and 2026 at 30,802 pounds, the catch level associated with a 38 percent risk of overfishing.

D. Uku Essential Fish Habitat Revision Options Paper (Action Item)

Thomas Remington, Lynker, presented options for revising essential fish habitat (EFH) for the Hawaii uku fishery. Previously, a level 1 model developed by Franklin (2021) and a level 2 model developed by Tanaka et al. (2022) were reviewed by the Western Pacific Stock Assessment Review (WPSAR) and determined by the SSC as BSIA.

The SSC requested clarifications regarding the methodology used to combine model output from level l and level 2 analyses with CPUE data for option 5. Kisei Tanaka, PIFSC, explained that level 1 & 2 model output and CPUE data were converted to percentiles, overlayed on a spatial grid, and averaged. The SSC discussed the approach for combining multi-model information in option 5 noting a preference for incorporating data inputs in a unified model with appropriate weighting for different data sources. The SSC also discussed the possibility of adding CPUE data as an input for level 1 analysis and including some measure of variability if the average-percentile approach is used.

The SSC discussed the fisheries independent data inputs for level 1 (presence/absence) and level 2 (abundance) regarding model output and comparisons to regions of high commercial uku catch, especially Penguin Bank. Penguin bank was only identified as uku habitat in the Level 1 model as the majority of habitat at Penguin Bank is deeper than 30 m and data inputs in the level 2 model were limited to 0-30 m depth range. The SSC discussed the utility of incorporating fishery dependent data, but there was not agreement among SSC members as to whether it was appropriate.

The SSC prefers the incorporation of Level 1 model for refining Uku EFH (Option 2) in the Hawaii FEP noting Level 1 model provides information on the full range of the stock, but suggests future approaches on the use of Level 2 model.

E. Public Comment

Sean Hanser, PIRO Habitat Conservation Division, addressed the proposed changes to the American Samoa BMUS list noting the change would result in almost all current shallow water BMUS becoming ECS. Hanser briefly described the role of BMUS in the consultation process with various agencies and noted that for them the role of ECS is less clear.

6. Protected Species

A. Hawaii Deep-set and American Samoa Longline Fishery Final Biological Opinions (BiOps)

1. Overview of the Final BiOps

Melissa Snover, PIRO Protected Resources Division (PRD), provided an overview of the final Hawaii deep-set longline (DSLL) fishery Biological Opinion (BiOp). The SSC reviewed the draft BiOp at the March meeting. The final BiOp concluded that the DSLL fishery is not likely to jeopardize the continued existence of species listed under the Endangered Species Act (ESA). PIRO modified the reasonable and prudent measure (RPM) that would have required mandatory observer coverage in the insular false killer whale (IFKW) overlap area; in the final BiOp, the RPM directs NMFS to determine the minimum level of observer coverage reliable for estimating IFKW interactions, and to provide observer coverage at this level within two years.

An SSC member asked whether increasing observer coverage would include electronic monitoring and what criteria would be used to determine whether coverage would be necessary. Snover clarified that the criteria would be determined by the analysis as part of the implementation, and that electronic monitoring could be used to meet necessary coverage.

The SSC thanked Snover for the informative presentation.

2. Implementation of Reasonable and Prudent Measures

David O'Brien, PIRO Sustainable Fisheries Division (SFD) provided an overview of the implementation process for the RPMs in the final DSLL and ASLL BiOps. Some of the RPMs, such as crew training and observer coverage for the overlap area, may require regulatory implementation through the Council process. PIRO SFD, PRD, Council staff and industry representatives are coordinating implementation.

The SSC thanked O'Brien for the informative presentation.

B. False Killer Whale Issues

1. New Approach for Insular False Killer Whale Abundance Estimates

Janelle Badger, PIFSC, presented the latest IFKW abundance estimate. The new approach incorporates telemetry and survey effort data into capture-recapture analyses to address spatiotemporal sampling bias using simulated data. Utilization distributions (UDs) computed from telemetry data were overlaid with UDs of survey efforts, providing an "effort x animal space use" overlap covariate for modeling detection in a Jolly-Seber open population model. Only one of the four social clusters had sufficient tag data to determine cluster space use. Using simulated data, the method resulted in more accurate and precise estimates of abundance than traditional capture-recapture models. The method was applied to a 16 year photo-identification capture-recapture dataset (n = 143 individuals) along with telemetry data (n = 44 deployments) collected from the MHI IFKW population.

The SSC had a number of questions pertaining to the methodological approach. An SSC member asked how the survey and animal presence "overlap" was deemed acceptable in contrast to the visual impression from the maps presented. Badger responded that the overlap index of 0.22 was

considered acceptable. An SSC member asked why the simulated tracks shown did not appear to be representative of any actual FKW tracks. Badger responded that these were example tracks and not the entire data set, and that there was no reason to believe the simulated tracks would cause any misleading results. An SSC member asked about the "proportion distinctive" and why there was a declining trend in this variable over the time series. Amanda Bradford, PIFSC, clarified this metric, which has to do with markings and notches on the dorsal fin among other characteristics, and pointed out that the decline was modest from ~0.8 to ~0.7. An SSC member asked about the average duration of tags. Badger showed a summary table of tag data. An SSC member asked if there was any evidence of cluster realignment. Badger responded that clusters are apparently very stable. An SSC member asked if the leeward bias in survey effort could result in missed cluster identification if windward clusters exist that are never seen. Badger responded that this could be possible but is deemed unlikely. An SSC member asked about the period of decline and alignment with when the overlap was calculated. Badger responded that this was accounted for.

A number of SSC questions were related to how the new assessment compared to the prior assessment by Bradford in 2018. An SSC member asked about this contrast, and what caused the declining trend versus earlier stability in numbers. Badger responded that the cause for any population decline was unknown, but that this finding was primarily due to adding more years of recent data. An SSC member noted that at least 3 things might be driving the contrasting results: 1) data source / which years, 2) distinctive individuals or population estimate, and 3) pseudo-spatial implementation. It remains unclear on the relative impacts of these changes, but it seems that adding more data is what is driving the signal. Badger agreed and noted that the pseudo-spatial use allows better precision and accuracy, but with generally similar trends over time. An SSC member pointed out key differences between the SSC briefing material and the contents of the presentation. Badger responded that there were some updates of data (e.g., 9 more tags) and newer findings available after internal review which caused fewer clusters to be considered in the final version. An SSC member asked about the probability of detection by different sources of data and if there were trends in detection probability that could relate to estimated abundance trends. Badger responded that these are available but are not in the presentation. It is important to note that it is impossible to diagnose population trends without knowing the trends in key demographic parameters such as survival and recruitment rates as well as the sampling issues related to detection rates.

An SSC member asked if the photo-ID database is publicly available. Erin Oleson, PIFSC, noted that all NOAA data is available online, as well as the satellite tag data, and the capture history data will soon be available.

Considering the uncertainty of what is driving the changes seen in the newer modeling results, the SSC recommends that the PIFSC prepare a clear set of IFKW model runs that start with the same approach used in the Bradford 2018 assessment with incremental additions of: 1) adding more recent Cascadia Research Collective data, 2) adding the other sightings data, 3) adding the pseudo-spatial correction, and 4) adding distinctive individuals; with the goal being to better understand the relative impacts of the methodological changes. The SSC further recommends that PIFSC provide the trends in the key demographic parameters necessary to diagnose the abundance, including survival rates, detection rates and recruitment rates.

The SSC also recommends that the PIFSC make information on the individual mark-recapture histories, satellite tagging, mark-recapture, and sightings data available to the public, and to clarify the procedure to obtain these data.

The SSC thanked Badger for the informative presentation.

2. Update on the New Assessment Approach for Hawaii Pelagic False Killer Whales

Erin Oleson, PIFSC, presented an update on the new assessment approach for Hawaii pelagic false killer whales (FKWs) that accounts for their occurrence and overlap with U.S. fisheries outside the U.S. EEZ. Following the March 2023 SSC meeting, PIFSC revised the 'management area' boundary for the assessment based on the recommendations from the Pacific Scientific Review Group (PSRG). The new management area is defined by the available biological data for pelagic FKWs. The resulting abundance estimate within the new management area is 5,528 (CV = 0.35). The potential biological removal (PBR) is computed using a recovery factor (Fr) of 0.4, reflecting significant uncertainty in total mortality and serious injury by foreign fleets outside of the U.S. EEZ, resulting in a PBR of 33 whales. The average annual mortality and serious injury (MSI) estimate from the DSLL fishery for the corresponding area for 2017-2021 is 47 whales.

The SSC asked a number of questions regarding the proposed management area boundary. In response to an SSC member inquiry whether the survey sightings to the southwest of the boundary were omitted from the management area because they were assumed to be eastern tropical Pacific (ETP) animals, Oleson clarified that the stock association of those sightings were unknown because they were not genetically confirmed, and the Marine Mammal Protection Act (MMPA) indicates that a tighter polygon is preferred to be more conservative. Another SSC member inquired why an area to the southwest of the boundary was not included in the management area, noting that the area has limited longline effort according to Global Fishing Watch (GFW) data, has high FKW abundance, but not likely to be part of the ETP stock. She clarified that there is no survey or sighting data to validate the spatial distribution model (SDM) prediction of high density areas to the southwest, there are no genetic data to allow finer resolution of stocks, and the only other sample to the west is from the Marianas.

In response to Oleson's clarification that cross validation of SDM was done for areas that had data but not for areas outside of the boundary, an SSC member suggested that spatial cross validation using nearest neighbor distance sampling could be used to test the SDM
Council staff asked about the draft boundary noting the presence of many genetic samples at the edge of the polygon, and that the 35 km buffer does not take into account the high mobility of individuals. Oleson clarified that while some individuals can travel extensively but until directed movement is better understood a larger default buffer is not scientifically defensible. In response to an SSC member question about FKW depredation data outside of the proposed boundary, Oleson clarified that depredation hotspots are within the polygon. An SSC member asked about FKW data for Johnston Atoll, and Oleson responded that the area was surveyed in 2005 and there were no sightings of FKWs. Council staff asked how to reconcile the fact that the available data is limited by anthropogenic boundaries such as the EEZ and fishing effort while Guidelines for Assessing Marine Mammal Stocks (GAMMS) indicates the geographic range of a management area should not be based on anthropogenic boundaries. Oleson responded that they have to balance scientific needs versus ship time and survey requirements.

The SSC also discussed the recovery factor parameter in the PBR calculation, and noted that the use of 0.4 instead of the default value of 0.5 represents a 20% change in the resulting PBR. An SSC member asked what efforts are underway to better understand foreign fishing. Oleson indicated that some effort has been made to look at GFW data as well as Western and Central Pacific Fisheries Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC) reports, but species-specific data on FKW interactions are lacking. The SSC member suggested that one approach to estimating foreign fishery bycatch would be to extrapolate from reported longline effort.

The SSC noted that there has been limited genetic sampling and tagging for the pelagic FKWs, and inquired about additional tagging plans. Oleson indicated that the Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS) in the Hawaii EEZ is starting in 2 weeks with 6 months of survey using 2 NOAA research vessels and will include tag deployments.

The SSC recommends the following concerns be addressed in the approach used to define the new management area boundary and the recovery factor used in the PBR calculation:

- **Provide a comprehensive explanation on what data were used and what data were excluded, and the justification of each decision (e.g., available information on observer reported interactions and depredation events; genetic data; survey data; satellite tag data; which spatial data points to include/exclude in the polygon). The SSC notes that available information on observer reported interactions and depredation events were not used in the new assessment approach.**
- **Explore alternative approaches to boundary delineation of the Hawaii pelagic FKW population including all known sources of information (including all bycatch and survey data) and present results in a decision table format. The SSC notes that the 35 km buffer is not consistent with the known behavior of FKWs, and other buffers should be explored. Areas south of the current proposed boundary should also be considered, noting that the SDM suggests a high abundance of FKWs in these areas where there is less longline fishing effort.**
- **Perform spatial cross validation to test the SDM in the areas where there are no survey or fishery data, as such exploration could provide an evaluation of whether those areas should be included in the boundary.**
- **Quantify interaction rates in foreign fleets to determine whether a reduction in recovery factor from 0.5 to 0.4 is warranted, which reduces the PBR by 20%. The SSC notes that the guidance for setting this value could be used to justify values greater than 0.5 (e.g., areas not considered in the analysis with high FKW abundance and low fishing effort).**

The SSC recommends that an independent peer review outside of the PSRG (e.g., Center for Independent Experts) be conducted on the new pelagic FKW assessment approach, including validation of the underlying SDM, consistent with the GAMMS tiered peer review process (Level 3).

The SSC thanked Oleson for the informative presentation.

3. False Killer Whale Take Reduction Team Meeting Report

Elena Duke, PIRO PRD provided the report of the False Killer Whale Take Reduction Team (TRT) meeting convened March 28-31, 2023. The TRT made several consensus recommendations including the use of Electronic Monitoring (EM) to improve data collection for FKW interactions, and crew training for marine mammal handling and release. However, the TRT did not come to consensus on measures that would reduce MSI to below PBR, and multiple sets of non-consensus recommendations were made by two primary caucuses of TRT members. One set of non-consensus recommendations (supported by Council representative to the TRT) focused on the use of a fighting line device combined with clear handling guidance and stronger leader material to reduce line breakage. Another set of non-consensus recommendations focused on effort reduction. Both sides made recommendations on analysis needed to evaluate the potential effectiveness of effort control measures as well as tradeoffs to such measures. NMFS is expected to develop proposed modifications to the False Killer Whale Take Reduction Plan based on TRT recommendations and all other relevant information.

An SSC member asked whether the TRT's recommendation on EM was intended as a measure to reduce MSI. Duke clarified that EM is intended to allow better characterization of interactions. An SSC member asked how many languages would be considered for crew training. Duke responded that there would be 2-3 languages with hands-on process including both written and oral.

The SSC commended the Hawaii longline industry on the innovative design of a fighting line device that enables it to hook onto the weight, which facilitates either straightening of the hook without flyback or cutting the leader close to the hook and removing the weight leaving minimal trailing gear.

The SSC thanked Duke for the informative presentation.

C. Public Comment

Eric Kingma, Hawaii Longline Association, commended PIRO for completion of the Biological Opinions and showed the fighting line devices to the SSC. HLA developed the fighting line device following the November 2022 TRT meeting when the MSI was one over PBR, and the new pelagic FKW boundary changed the outlook to 14 MSI over PBR going into the March 2023 TRT meeting. Kingma asked why the draft area does not include the entire fishery footprint nor the observer data on bait and catch depredation. Kingma proposed that a more thorough process that includes all sources of data would be preferred rather than a rushed timeline that generated the current result. Kingma noted that industry will use the fighting line device (150 ordered, for $20K) on every longline vessel which will minimize branchline breaking and will allow more hook straightening. The language issue will be a challenge, and HLA was hopeful that funding assistance for this initiative will materialize. Kingma has voiced HLA's frustration of the TRT and the proposed management area to high levels of NMFS and NOAA. For example, he noted that the EEZ based approach of stock estimation was not biologically appropriate, and that a more detailed reading of MMPA and the basis of PBR suggest that the current stock boundary is not consistent with federal guidelines.

Robin Baird, Cascadia Research Collective, noted an alternative means of quantifying the risk to the overlap area between the DSLL fishery and IFKW with a photo-ID database. Baird also noted that an in-press paper (circulated to SSC) suggests clusters are relatively static. Baird highlighted some key differences of the newer assessment to that of the Bradford approach, such as the use of 4 clusters instead of 3. The new cluster has different spatial use than the other 3 clusters, primarily in an area to the southwest of Lanai. The additional years of data, the added cluster, and the added identifications from photo-ID all contribute to the newer analysis.

7. Program Planning

A. Review of the National Standard 1 Draft Guidance on Biomass Proxies

Rick Methot, NMFS National Stock Assessment Director, presented the final draft on National Standard 1 technical guidance. The goal of achieving the "optimum yield" from fisheries is limited by the biologically feasible maximum sustainable yield (MSY). The use of MSY is mandated by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and forms the basis for fisheries management in the United States. Subgroup1: "Proxies" and "Reference Points"- evaluates what has been learned over the past 20 years regarding: (1) direct estimation of fishing mortality at MSY, F_{MSY} and biomass at MSY, B_{MSY}, (2) selection of appropriate proxies for them, and (3) additional considerations not explored in the previous technical guidance. A prevailing issue in this document is how to reconcile 'regime shifts' due to drivers such as fishing, environmental shifts, climate change, etc. This leads to 'non-stationarity' in stock assessments where population dynamic processes, and eventually reference points, change through time.

Methot suggested that spawning potential ratio (SPR) might be a viable proxy metric for F_{MSY} to use as a SDC for fishing mortality. He also pointed out that monitoring recruitment trends would also be helpful to determine appropriate SDC and reference points.

An SSC member asked how this reference point guidance can be implemented given limitations on catch data and life history information. The SPR calculations assumed asymptotic selectivity, whereas the SSC was concerned that dome shaped selectivity may occur in some reef fish stocks. Methot agreed that dome shaped selectivity could bias SPR calculations. He could not offer any alternatives to using asymptotic selectivity and noted that the document discusses the need to evaluate impact of various assumptions for all data-limited methods.

Council staff asked if NOAA presented the guidance to the Caribbean and South Atlantic Fishery Management Council SSCs and if he could provide their feedback. Methot advised they have not yet presented to the CFMC and SAFMC and recognized the challenges faced in the different regions.

The SSC formed a working group to provide a detailed review of the NS1 technical memorandum and provide recommendations on the use of the technical guidance, including the use of SPR based on the life history information available. The Working Group presented the findings to the SSC and recommended adoption of its review. **The SSC adopts the Working Group report (Appendix A) and supports the working group's comments and advice for the Council on accounting for NS1 guidelines.**

The SSC recommends that the Council consider the findings of the SSC working group report in its response to the NOAA NS 1 technical memorandum.

SSC thanked Methot for the informative presentation.

B. Review of National Standards 4, 8 and 9

Wendy Morrison, NMFS Office of Sustainable Fisheries (Headquarters), provided an overview of the Advanced Notice of Proposed Rulemaking (ANRP) published on May 15, 2023, regarding

potential future adjustments that NMFS may make to the implementing guidelines for National Standards 4 (Allocation), 8 (Communities), or 9 (Bycatch), of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). NMFS issued the ANRP because several ongoing fishery management challenges, including changes in environmental conditions, shifting distributions of fish stocks, and equity and environmental justice considerations that affect fishing communities that are currently or have been historically dependent on the resource, suggest a need to revisit the guidelines to ensure they remain appropriate for current U.S. fisheries management. The intent of this notice is to provide the public with background on some of the specific issues under consideration, seek specific input, and provide a general opportunity for comment. NMFS will take public comment into consideration when it decides whether or not to propose changes to the guidelines for National Standards 4, 8, or 9. The public comment period is open through September 12, 2023. If warranted, NMFS will begin drafting a proposed rule in Fall of 2023.

Morrison acknowledged that topics for which input is sought on the NS4 (allocation) is not likely to be of importance to the WPRFMC. On the other hand, NS9 (bycatch) would be of relevance to the WPRFMC and the NMFS-OSF invites input on how to: (1) minimize regional bycatch that is equitable across fisheries and gear types and (2) minimize waste.

The SSC noted that National Standard 4 is of importance to the WPRFMC.

An SSC member asked if there has been a discussion on NS8 about a community of practice and interest, which is a term now more commonly used internationally. Morrison stated that is the term they are meaning to use and good to know that is what is being used internationally.

An SSC member asked if any thought had been given the requirement to remove overfishing in regards to small communities (such as for the American Samoa BMUS). Morrison advised that NS1 overrides NS8. If overfishing and an overfished stock then they must address that over the needs of the community She further advised that if there was an identified environmental impact then they could account for it under NS1.

An SSC member suggested that a useful case study would be to assess any interaction between NS1 and NS8 for the American Samoa BMUS.

Craig Severance, Social Science Planning Committee chair, noted that SSPC sees the opportunity to recommend constructive changes, especially to NS8, and the SSPC will report to the Council.

SSC thanked Morrison for the informative presentation.

C. 2022 Annual SAFE Report and Recommendations

1. Archipelagic and Pelagic Report Highlights

Thomas Remington, Stock Assessment and Fishery Evaluation (SAFE) Report Coordinator, presented the highlights of the 2022 Archipelagic and Pelagic Annual SAFE Reports covering the fishery performance of Council managed fisheries modules, and the ecosystem considerations that potentially drive the fishery dynamics. The 2022 SAFE Report incorporated the fisher observations that provided the qualitative description of the fisheries and the fishery

environment from fisher points-of-view.

Protected species interactions such as for the olive ridley marine turtle and the black-footed albatross were lower in recent years in the Hawaii pelagic deep-set longline fishery — possibly attributable to changing macro-scale regional oceanographic conditions that drive ocean productivity.

The SAFE Report data are readily available at the Council data portal (wpcouncildata.org).

Severance reported that the SSPC recommended that the new Equity and Environmental Justice section of the SAFE report in future years focus on impacts of regulations, especially with respect to disproportionate burden and distributional justice issues associated with the higher impact on some fishers than others or favoring one sector more than another sector.

SSC thanked Remington for the informative presentation.

2. Archipelagic Report Recommendations

T. Todd Jones, Archipelagic Plan Team (APT) Chair, presented the APT report and recommendations on the 2022 Annual SAFE Report for Hawaii Archipelago, American Samoa Archipelago, Pacific Remote Island Areas, and the Mariana Archipelago.

Key recommendations included ongoing work with standardized bycatch reporting. The most important work item is to review the catch data for Guam in coordination with the Guam DAWR.

SSC thanked Jones for the informative presentation.

3. Pelagic Report Recommendations

Don Kobayashi, Pelagic Plan Team (PPT) Chair, presented the PPT report and recommendations on the 2022 Pacific Pelagic Annual SAFE Report.

An SSC member asked if there was an explicit set of skills to target for capacity building in the Territories. Kobayashi stated that the most important issue is salary that provides a fair wage.

SSC thanked Kobayashi for the informative presentation.

D. Review of Research Priorities

1. Cooperative Research

Marlowe Sabater, PIFSC, presented a new paradigm on how cooperative research could be conducted and provided an overview of research needs and priorities, including the role of the Councils and their SSCs on developing these priorities. The current guidance document for cooperative research activities covers the years 2020 to 2024.

The new paradigm is about “matching cooperative research with management needs.” The key is that research is identified by Councils to address specific management issues.

Bottomfish tagging was identified as the most important priority for inland fisheries. Pelagic Management Unit Species fishing mortality studies identified as the most important priority for pelagic fisheries. Estimation of depredation and post-hooking mortality rates was identified as the top priorities for protected species such as marine mammals.

SSC thanked Sabater and Council staff for the informative presentation.

2. Updating the Council's Pelagic Fisheries Research Plan

Council staff provided a review on the revisions of the Council's Pelagic Fisheries Research Plan. Unlike the 2018 plan, this plan linked priorities to specific management objectives and needs. Members of the SSC, Pelagic Plan Team, and PIFSC/PIRO staff will have contributed to the plan development. The pelagic fisheries research priorities include 1) impact of pelagic fisheries on sustaining community resiliency; 2) effects of spatial closures and large-scale marine protected areas, island communities, and population dynamics on target and non-target species; 3) understanding causality of fishery performance for Western Pacific Region pelagic fisheries, including incidentally caught species; 4) improving knowledge on life history, stock structure, distributions, and connectivity of pelagic management unit species throughout the US Pacific; 5) advancing ecosystem-based fisheries management; and 6) mitigation of shark depredation and development of deterrents to reduce depredation in US Pacific Island fisheries.

An SSC member asked how the draft priorities were developed, and what the real-world effects were of the ranking of the priorities. Council staff advised that research priorities were matched to management need priorities. However, SSC concerns were raised that the 6 priority areas are too broad and not as helpful as possible to support more focused management priorities.

The SSC recommends that a working group of SSC members, Council staff and agency staff be formed to address the six proposed research priorities for pelagic fisheries while providing management objectives and research priorities for other program areas (island fisheries, protected species, etc) and provide detailed descriptions of each of those research priorities. The SSC asks that this working group report progress to the SSC at its September 2023 meeting.

E. Public Comment

There was no public comment.

8. Pelagic and International Fisheries

A. Update on Proposed Sanctuaries in the Pacific Remote Island Areas & Northwest Hawaiian Islands

Council staff presented on a proposed national marine sanctuary for the Pacific Remote Island Areas (PRIA). PIRO is preparing a position statement for NMFS in the region regarding the proposed sanctuary in the PRIA, including keeping an objective of sustainable fisheries open in the sanctuary region. The SSC was provided current information on goals or objectives for the PRIA sanctuary and will be updated regularly. Jarad Makaiau, PIRO SFD Assistant Regional Administrator, was available to answer further questions. Makaiau noted that the letter with the proposed sanctuary goals and objectives from NOAA Office of National Marine Sanctuaries (ONMS) has not been received by the Council, but suggested that the memo from the Biden Administration may provide some insight into the type and scale of fishing that might or might not be allowed in the Sanctuary.

Council staff also presented a letter in response to the ONMS *Notice of Intent To Conduct Scoping and To Prepare a Draft Environmental Impact Statement (EIS) for the Proposed Designation of a National Marine Sanctuary for the Pacific Remote Islands*. The Council supports the conservation ideals behind the development of a national marine sanctuary and contends that fishing, including commercial fishing, should be compatible with proposed goals and objectives of the sanctuary. Commercial fishing in the Pacific Remote Islands is sustainable, a benefit to the underserved communities of the Territory of American Samoa. Maintaining commercial fishing in the PRI would assure compliance with recent Executive Orders, and it is necessary to strengthen the U.S. position for broader international conservation.

Craig Severance, SSC member and chair of the Council's Social Science Planning Committee (SSPC), shared a recommendation made by the SSPC at its recent meeting on this topic, which suggested that the social and economic impact analyses for the Pacific Remote Islands sanctuary consider the US purse seine and longline fisheries as "community of practice".

B. SPC Pre-Assessment Workshop

Graham Pilling, Pacific Community (SPC), presented on outcomes of the 2023 Pre-Assessment Workshop held April 24-28, 2023 in Noumea. Stock assessments for yellowfin tuna and bigeye tuna are expected to be presented to the WCPFC Science Committee in August 2023. The workshop examined stock assessment scenarios for the two species, including recruitment, area delineations, natural mortality, and tagging. The workshop also discussed data inputs such as catch, effort, and abundance estimates based on catch-per-unit effort.

One SSC member noted strong support for the consideration of effort creep in WCPO fisheries and the potential impacts on estimation of stock status and yields. Pilling noted the potential for a specific research project on this matter and the need to collate information on the uptake of new technology across fleets.

With respect to a question on future stock assessment platforms, Pilling noted that accommodating the nature and extent of fisheries data currently used to assess WCPO tuna stocks would be a key determinant of the best approaches to consider in the future.

Council staff asked if any further work had been undertaken on South Pacific albacore - specifically with respect to the estimated period of low recruitment. Pilling noted that the near-

term ‘dip’ in stock biomass did not impact on the choice/estimation of reference points, which are based upon long-term equilibrium considerations, but would impact on near-term stock status relative to a given reference point and potential management actions under a harvest strategy. Further, there was no single data set that was driving the pattern in recruitment and subsequent impacts on biomass.

Pilling further noted that the SPC intends, subject to available resources, to update the assessment with the addition of two years of extra data to the WCPFC Scientific Committee in August 2023.

The SSC thanked Pilling for an informative presentation.

C. South Pacific Albacore Inter-sessional Working Group

Alex Kahl, PIRO International Fisheries Division, presented on updates and future work of the WCPFC South Pacific Albacore Inter-sessional Working Group (IWG). At its last meeting held May 4, 2023, the IWG discussed candidate target reference points (TRP) and a workplan to develop harvest strategies for South Pacific albacore (SPA). The South Pacific Group (SPG) put forward a proposal that changes management objectives, away from maintaining biomass levels conducive to increasing CPUE of Pacific Island domestic fisheries. In the proposal, the rationale in the SPG proposal states "the proposal generally reflects a shift in objectives away from purely catch rates and guaranteed viability of every vessel or fleet to now also considering the economic benefits of distant-water or foreign fleet activity within EEZs and the need for catches to support this." Instead of a TRP with a higher biomass level, the proposal is to have a TRP of 49% unfished biomass, which would be a reference period of 2017-2019. During this period, fishing in Region 2 of the stock assessment region grid that includes American Samoa was higher than other regions and showed a gradual downward decline. This change in management goal of neighboring Pacific Island states is disconcerting to American Samoa. The current WCPFC Conservation and Management Measure (CMM) for South Pacific albacore does not extend over the full range of the stock, but applicable only to waters south of American Samoa.

Kahl indicated that the US would be interested in the opportunity to extend the northern boundary for the SPA CMM north of 20 S to the Equator, as significant fishing effort was currently occurring above this area. This was supported by several SSC members.

Kahl also noted that the SPA stock covered waters within the IATTC area and currently there were no IATTC management measures in place for albacore catches south of the equator. Pilling noted that any assessment of management measures for SPA would need to make assumptions about impacts on fishing activity in the IATTC area.

In response to an inquiry by an SSC member, Kahl noted that the CPUE from 2017–2019 was relatively higher for American Samoa compared to catch rates the following two years. However, catch rates were significantly higher in the early 2000’s.

The SSC thanked Kahl for an informative presentation.

D. 2nd WCPO Longline Management Workshop

Council staff presented on outcomes of the WCPO Tropical Tuna Longline Management Workshop. The workshop included 23 participants from 9 nations and leadership of the Parties

of the Nauru Agreement (PNA) and Pacific Island Forum Fisheries Agency (FFA). Workshop participants agreed that the tropical tuna stocks are in good shape and there is room for increases in longline fishing privileges. The case that well monitoring fishing is deserving of increased fishing privileges was acknowledged. In addition the need for enhanced monitoring, controls, and surveillance of longline fisheries on the high seas is overdue. Climate change should also be taken into considerations in any new or future management measures. Participants also shared views on zone-based management, managing the balance of catch and effort between national waters the high seas. The US presented its historical fishing days/sets with respect to catch, and separating them out among in zones (national jurisdiction) and the high seas. The workshop also agreed that the next official WCPFC workshop in June should focus on specific scientific requests to the SPC, which may include evaluating future levels of catch and effort for longline and purse seine fisheries.

E. WCPFC Tropical Tuna Scientific Requests

Council staff, as a follow-up to preceding presentations, discussed scientific requests typically made to inform management of tropical tunas. This included stock projections that entail future levels of fishing for longline and purse seine fisheries based on the upcoming 2023 stock assessment.

The SSC supports a request for updated stock assessment projections using the 2023 bigeye and yellowfin tuna stock assessments, evaluation of longline and purse seine scalars relative to previously analyzed management targets, with bigeye tuna being the priority. It was noted that these projections would be undertaken on agreed stock assessment models by the WCPFC Science Committee in August 2023 and would likely not be undertaken until after then.

F. IATTC Science Advisory Committee

Andre Boustany, Monterey Bay Aquarium, presented on the Inter-American Tropical Tuna Commission (IATTC) Science Advisory Committee (SAC) held May 15-19, 2023 and the U.S. Science Advisory Subcommittee (SAS) held June 15, 2023.

Boustany noted that IATTC implemented their management measure utilizing purse seine vessel-specific bigeye catch limits. The SAC recommended that IATTC staff evaluate the effectiveness of the measure. He noted that no vessels exceeded their limits. The SAC and SAS also recommended progress on the implementation of electronic monitoring to complement observer coverage.

The IATTC SAC discussed a Management Strategy Evaluations (MSE) for North Pacific albacore, which will inform a harvest control rule for which the SAC recommended. The 2017 increase in recruitment for North Pacific albacore was not realized fully in the fishery. The IATTC is also working with the SPC to explore an MSE for SPA. The IATTC does not have a management measure for SPA within its purview.

The SSC thanked Boustany for an informative presentation.

G. Public Comment

There was no public comment.

Appendix A

WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

SSC Working Group Report on NS1 Technical Guidance

Adopted by the SSC at its 148th Meeting
June 14-16, 2023

A working group of SSC members Martell, Camacho, and Chaloupka met with Council staff to discuss the National Standard1 (NS1) Technical Memorandum, *Technical Guidance for Estimating Status Determination Reference Points and their Proxies in Accordance with the National Standard 1 Guidelines.* Current NS1 guidance is summarized: *Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.* The goal of achieving the "optimum yield" from fisheries is limited by the biologically feasible maximum sustainable yield (MSY). The NS1 Technical Memorandum provides guidance on the use of spawning potential ratio (SPR) in lieu of other components used to develop biomass dynamic models which estimate MSY.

The SSC working group provided comments on the NS1 Technical Memorandum and advice for the Council on accounting for NS1 guidelines. The SSC working group noted that as non-stationary changes in stock productivity occur, estimable unfished biomass B_0 and B_{MSY} may increase or decrease, and that the relationship of B_{MSY}/B_0 may change. A decline in B_0 may not mean a reduction in fishing mortality is needed, or conversely if an increase in B_0 or B_{MSY} is observed. However, for Western Pacific fisheries, there may be a lag before scientists or managers can detect non-stationarity in the underlying stock production.

The SSC working group recommends that a first step for stock assessment authors in detecting or explaining possible non-stationarity effects would be to explore environmental time series data as potential covariates to stock assessment residuals. This can come in two ways: 1) searching for correlations between model residuals and environmental variables, or 2) standardizing the time series with a mean 0 and standard deviation of 1, and incorporating the time series index as a process error covariate in the stock assessment model proxies in standardization of data used in the model.

The SSC working group recommends that the Western Pacific Council coordinate with the South Atlantic and Caribbean Councils and to see how they are addressing non-stationarity in their data limited fisheries.

The SSC work group noted that SPR provides little insight on biomass scaling. The use of SPR seems slightly precarious when utilizing life history parameters from outside the region, given that life history inputs can drive the outcomes significantly. The assumption of dome-shaped selectivity may be a concern in absence of empirical evidence to support that assumption.

The SSC working group recommends that the SSC, NMFS, and Council staff explore and develop guidelines on the use of SPR and provide the Councils options to incorporate SPR into Fishery Ecosystem Plans (e.g. prioritizing American Samoa BMUS revisions). A good

case study to formulate these guidelines would be to compare management advice from a population dynamics model with management advice based on SPR.

The SSC working group asserts that fishery independent surveys (such as BFISH) and/or tagging studies designed to directly estimate abundance or fishing mortality, have been informative to scale biomass and help resolve parameter confounding, such, r and K relationships.

The SSC working group suggests that Council staff and the SSC explore modifications to the P-star process in order to be more adaptive to account for near-term directional shifts in productivity, including the use of proportional harvest threshold tables. This process may also need to be applicable to the use of SPR. By using information assumed to drive abundance or availability, managers can select overfishing risks based on measurable conditions into the future (i.e., previous year catch/effort, environmental conditions, economic conditions, etc.). This can help achieve guidelines under NS1 to optimize yields.