WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

146th Meeting of the Scientific and Statistical Committee
November 29-30, 2022
Web Conference

FINAL REPORT

4. Pacific Islands Fisheries Science Center Director Report

Michael Seki provided the Pacific Islands Fisheries Science Center (PIFSC) Director's report, highlighting several PIFSC program initiatives. The Life History Program recently completed the summer Marianas bottomfish research cruise and is currently engaged in domestic and international partnerships to resolve swordfish, striped marlin, and blue marlin life history. Additionally, Stock Assessment Program staff are currently participating in a meeting of the International Scientific Committee (ISC) Billfish Working group, which is focused on finalizing the Western and Central Pacific Ocean striped marlin stock assessment and preparing data for the WCPO swordfish assessment. The Bottomfish Fishery Independent Survey of Hawaii (BFISH) is now 99.5% complete and should be finalized by the end of November.

Seki provided updates on several protected species projects, including NOAA-funded leatherback conservation efforts in Indonesia, an analysis of trends in whale abundance utilizing data from the winter 2020 Hawaiian Islands Cetacean Ecosystem Assessment Survey, and monk seal survey results from the summer 2022 Papahanaumokuakea Marine National Monument field season. Seki also updated the SSC on several ecosystem-based initiatives, including an upcoming report on the ecosystem status of the Hawaiian Islands, conducted in partnership with the State of Hawaii. Additionally, PIFSC recently conducted stakeholder engagement in the territories as part of the NMFS Equity and Environmental Justice Strategy. Seki also informed the SSC of the recent passing of Dr. William T. "Bill" Hogarth, who was a former administrator of NMFS and an advocate for the fisheries of the Western Pacific. Finally, Seki informed the SSC that he will be retiring as PIFSC Director at the end of the month. PIFSC Deputy Director Tia Brown will be serving as interim director of PIFSC upon his retirement.

An SSC member asked for assistance in fulfilling a request from the CNMI Division of Fish and Wildlife to acquire CNMI reef fish life history samples from the PIFSC LHP. T. Todd Jones, PIFSC Fisheries Research and Monitoring Division, provided an update indicating that the data are expected to be provided to CNMI DFW by the end of December, pending approval from NOAA General Counsel Pacific Islands Section (GCPI) due to Magnuson-Stevens Fishery Conservation and Management Act (MSA) confidentiality requirements.

The SSC congratulates Dr. Seki on his retirement and thanks him for his service and contributions to the Western Pacific region.

5. Program Planning and Research

A. Update on Alternatives for Fishing Regulations in the NWHI Monument Expansion Area (Action Item)

Council staff presented an update on the development of fishing regulations for the Monument Expansion Area (MEA) in the Northwestern Hawaiian Islands (NWHI). The SSC, at its last meeting, discussed subsistence fishing and provided potential definitions to the Council. The Council then directed staff to gather more information from the community on subsistence fishing. Staff presented the results of public meetings and input from the community on potential fishing regulations and management issues, including federal permitting and reporting and limits on species, gears, and catch.

SSC discussion focused on customary exchange and subsistence fishing definitions as developed by the 145th SSC ad hoc working group and highlighted National Standard 8 considerations and the diverse social, cultural, and traditional benefits fish provide to underserved populations and broader island communities. One SSC member supported a separate subsistence fishing permit for Native Hawaiians and suggested against permitting shortline gear because it is not a traditional fishing method. The SSC recognized that gear types must be in compliance with law and applicable policies and regulations. SSC members emphasized the importance of data collection associated with any future fishing activity in the MEA, regardless of permit type. However, some SSC members expressed apprehension about wading into policy decisions in the context of the question of catch disposition or gear allowances for any potential fishing permits.

In general, SSC members were in support of affording some level of fishing access to the MEA through federal fishing permits that align with the goals, objectives, and language of the MEA Proclamation. SSC members noted that permitting and reporting would provide scientific information about the condition of the resources in the MEA and any potential impacts of permitted fishing activities.

The SSC recommends that any potential federal fishing permits involve data collection, reporting, and monitoring in line with Federal Fishery Ecosystem Plan (FEP) requirements. Further any fishery should have limits that are managed with annual catch limits based on stock assessments or other science based information.

B. Report of the Ecosystem-based Fisheries Management Workshop

Council, PIFSC and PIRO staff met on October 4, 2022 for an EBFM workshop. The goal of this workshop was for staff from the three offices to work collaboratively to highlight the topics, issues and needs of the Western Pacific region as fisheries management is steered towards an ecosystem approach to fisheries management. This workshop provided a venue for staff to highlight EBFM priorities from each office and outline the next steps to identify a process geared towards actionable EBFM items. Post workshop, working groups from the Council, PIFSC and PIRO will convene quarterly to outline the path forward.

The SSC commends this collaborative effort between PIRO, PIFSC and the Council. An SSC member suggested climate change impacts and potential redistribution of pelagic species be added as a priority research area. Council staff noted that the working group will convene to highlight the priorities and process moving forward, and will come back to the SSC for further review once a plan has been defined.

C. Filling Gaps in Data for Priority Coral Reef Species-Nenue Biosampling in Hawaii

John Wiley, Poseidon Fisheries Research (PFR), presented a Council-supported Coral Reef Conservation Program grant project collecting life history information from Nenue (Kyphosidae). PFR worked with fishermen and fish markets to collect length, weight, otoliths, and gonads from over 400 samples from 4 species of nenue. They provided the results of their project which included growth parameters, histology, size at maturity, spawning seasonality, and aging. The results of the project will be provided to the State of Hawaii for their management consideration.

An SSC member suggested reaching out to local/regional scientists regarding juvenile nenue to fill in data gaps as opposed to using data from other regions i.e., the Atlantic. Also, an SSC member suggested spearfishing at night under a full moon as a way to obtain additional samples. Moreover, concerns were raised about whether targeted sampling might bias mortality estimates.

The SSC thanks the researchers for an informative presentation and looks forward to additional results.

D. Review of Paper Inferring Spillover Benefits of the Papahanaumokuakea Marine National Monument

Ray Hilborn, University of Washington and SSC member, presented critique and a framework as a response to the "Spillover Benefits from the World's Largest Fully Protected MPA" paper in the journal *Science*[1] that makes causal inferences about the effects of expanding the Papahānaumokuākea Marine National Monument in 2016 on pelagic stocks. The paper infers spillover effects by a gradient of catch-per-unit-effort (CPUE) increases on the margins of the monument expansion area, gradually declining with distance, based on an analysis of observer data. Medhoff et al. report they conducted a similar analysis with logbook data and the results were consistent with the results of the observer data. Hilborn stated that the Medoff conclusions were inconsistent with his findings which used nearly 100% logbook records of the deep-set longline fishery. Latitude also has a strong impact on CPUE. Hilborn stated that even if the abundance of species is higher inside the Monument because of the closed area, it does not mean there is a higher total abundance or benefits to the fishery. The population of yellowfin tuna in the Hawaii region has been driven by environmental conditions and is totally unaffected by the Monument. Hilborn also described an analytical framework to the SSC to refute the paper's claims. Hilborn summarized two responses: 1) a letter with John Hampton (Pacific Community) explaining how the Monument expansion yielded implausible benefits to the scale the paper infers with such low catch biomass being 'protected' by historical fishing and 2) a suggested letter demonstrating how the Monument expansion yielded marginal perceived 'benefits' to bigeye tuna, which are likely due in actuality to stock abundance increases and environmental conditions. The letter with Hampton was not accepted for publication.

The *Science* paper claimed that CPUE closer to the Monument boundary rose after 2016 from the baseline and suggested that increased abundance inside the Monument caused spillover. Hilborn showed that the amount of pre-closure yellowfin was actually small inside the Monument and that CPUE rose faster than that which would be expected from yellowfin biology and population dynamics. Reanalysis using deep-set longline logbook data (with 1 degree

[1] Medoff, S., Lynham, J., & Raynor, J. 2022. Spillover benefits from the world's largest fully protected MPA. *Science*, *378*(6617), 313-316.

resolution and nearly 100% fleet coverage) indicated that CPUE increased everywhere for yellowfin, increased more in areas farther from the Monument, and confirmed the strong latitudinal pattern in CPUE.

Milani Chaloupka, SSC member, presented a brief summary of a conditional inference tree regarding the changes in CPUE for yellowfin tuna, as an example of other methods (e.g. machine learning, non-linear, permutation methods) and inferential models that can be used to analyze the data in a more statistically robust framework. The analysis suggested that there are differences between pre- and post-2016 for yellowfin CPUE, but the breakpoint for the post-2016 yellowfin CPUE was at a distance of 550 km from the Monument boundary, indicating that the higher CPUE was not occurring in the area immediately outside of the Monument as suggested by the *Science* paper and that changes in CPUE based on distance from shore was more related to latitudinal patterns. These other methods can provide much more nuance to the data interpretation, and indicate that any differences in CPUE are not a Monument effect but perhaps more about environmental drivers.

An SSC member inquired about the two peaks in Chaloupka's density figure, particularly the peak near zero km. Chaloupka responded that the bimodal pattern in that figure reflects the data density in those distance bins, not a reflection of changes in CPUE at those distances. Chaloupka also clarified that the figures from the machine learning analyses showed the pre- and post-2016 split in yellowfin CPUE, and suggested that these changes were likely due to environmental changes. Furthermore, the distance bins in the *Science* paper were arbitrary, and by using the larger logbook dataset of unbinned distances, the data indicate that the increase in CPUE was 500-550 km from the Monument boundary.

SSC noted that the importance of spatial recruitment patterns was not taken into account in the paper. An SSC member also emphasized the range of movement of yellowfin and how such potential spatial dispersal could not be affected by a static MPA of this size. An SSC member indicated that the authors' disregard for the "home range" of these highly migratory species negates findings of this paper.

Council staff also emphasized that around the 2016 expansion period there were increases in spawning biomass and recruitment stockwide. There were only small changes in catch around the MPA and these did not really impact the fishery and therefore overestimated the MPA impact. Council staff stated there were omissions in the *Science* paper's analyses, including impacts inside and outside of the U.S. EEZ around the main Hawaiian Islands, where catches have been higher.

The SSC thanked Hilborn and Chaloupka for their informative presentations.

E. CCC Area-Based Management Subcommittee Report

Council staff gave a briefing on updates of the Council Coordination Committee (CCC) Area-Based Management (ABM) Subcommittee, which was formed to address the America the Beautiful initiative. The CCC ABM subcommittee has been indexing and evaluating existing Fishery Management Council actions throughout the US in a draft manuscript. Committee defined "conservation area" due to current lack of a formal definition, and included area-based conservation measures based on the International Union for Conservation of Nature's (IUCN) "Other effective area-based conservation measures" (OECMs) Guidance. In terms of the types of

restrictions on fishing activity, bottom trawling and/or dredging is prohibited in 75% of the EEZ, all bottom tending gear (including trawls, dredges, bottom longlines, and pots) in 57% of the EEZ, and 55% of the EEZ has prohibitions on pelagic fishing gear (pelagic longlines, pelagic gillnets rod and reel, and spears). Thus, a majority of the U.S. EEZ is conserved relative to environmentally adverse fishing activities.

The CCC ABM subcommittee also contracted a GIS expert to develop an atlas, which will be shared by the May 2023 CCC meeting. The Western Pacific is the largest marine managed area with 61% following America the Beautiful criteria, comprising 29% of federal marine managed areas. Council staff also presented the next steps with a manuscript anticipated no later than the May 2023 CCC meeting. NOAA is announcing the establishment of a new Marine and Coastal Area-based Management Advisory Committee, which can include SSC members, Council members, scientists, fishers, and other experts.

F. NS1 Subgroup on Biomass Proxies Draft Report

Rick Methot, NMFS Senior Scientist for Stock Assessments, presented progress on developing technical guidelines on MSA National Standard 1 ("Optimum Yield"). 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 MSA and forms the basis for fisheries management in the United States. Current guidelines define the following reference points: maximum fishing mortality threshold (MFMT), overfishing limit (OFL), and minimum stock size threshold (MSST). These reference points are based on fishing rates, catch levels, and spawning biomass (SSB) levels associated with MSY or MSY proxies (e.g., FMSY, BMSY or their proxies), and are used to determine the status of a stock.

A subgroup of a NMFS and Council staff working group (Subgroup 1) is developing a draft National Standard 1 Technical Guidance memo on biomass and stock status proxies. The draft document evaluates what has been learned over the past 20 years regarding: (1) direct estimation of FMSY and BMSY, (2) selection of appropriate proxies for them, and (3) additional considerations not explored in the previous technical guidance. Spawning potential ratio (SPR) is a key concept underpinning these methods. A prevailing issue is how to reconcile 'regime shifts' due to drivers such as fishing, environmental shifts, and climate change. This leads to 'non-stationarity' in stock assessments where population dynamic processes, and eventually reference points, change through time.

An SSC member pointed out that the stock assessment issues raised are not independent from the SPR calculation. In addition, the following questions were asked of Methot: What are appropriate time horizons for stock assessments and projections? How do scientists and managers infer the appropriate mean population age for a stock? How do we manage a fishery with non-stationary environmental conditions? Methot responded that there is a need to have the ability to project stock status, the trailing average is the best approach at the moment, but the goal is to develop "climate ready" fisheries that can incorporate environmental aspects.

The SSC thanked Methot for an informative presentation.

G. American Samoa BMUS Stock Assessment WPSAR Terms of Reference

Felipe Carvalho, PIFSC, provided a brief background on the American Samoa bottomfish stock assessment, given the different approach from the 2019 assessment. The 2019 assessment was

catch data focused. This next stock assessment uses catch, but also length and life history information. 11 species will be analyzed separately in this next stock assessment in the Stock Synthesis modeling framework. Carvalho highlighted the American Samoa Bottomfish Stock Assessment Improvement Plan. The new assessment also takes into account a series of workshops and outreach to garner better understanding of the fisheries throughout time. Discussions with fishermen and local DMWR staff helped the assessment team get a better understanding of the data through descriptive analyses that fed into a data workshop prior to the data analyses.

Council staff followed up with a presentation on the Terms of Reference for a WPSAR of the American Samoa bottomfish stock assessment. The WPSAR Steering Committee noted in its report that the scientific information can still be best available, but not able to infer a SDC and render an 'unknown' stock status. The Western Pacific Stock Assessment Review (WPSAR) for the American Samoa BMUS stock assessment is planned for February 16-23, 2023, with the plan to deliver to the SSC for review in June 2023. Independent review will take place in American Samoa.

Carvalho noted that individual species stock assessments will be accomplished using all available data for a complete model: catch, CPUE, size, and explicit life history information from American Samoa and across the Pacific.

An SSC member asked about indicator/proxy assessments and how many assessments would be for individual species or representing multiple species. PIFSC staff Carvalho stated that, for example, there is not enough information for distinguishing *Etelis carbunculus* from the newly described species *E. boweni* in the fisheries catch data. These species will not have a separate SDC.

An SSC member asked what approach will be used for those species that were deemed overfished in the previous assessment but turn out to have limited information for SDC criteria in the new assessment. The American Samoa FEP and Terms of Reference state an indicator species can be used to inform management in that situation. If a suitable indicator is not available, the previous stock assessment may be used or the stock may be declared unknown. Model complexity is moderate and is similar to uku, *Aprion virescens,* with time series of CPUE and size frequency included.

The SSC recommends that the Council endorse the Terms of Reference. Erik Franklin (lead) and Steve Martell (backup) have volunteered to be Chair of the WPSAR committee.

The SSC thanked Carvalho for an informative presentation.

H. Public Comment

Manny Duenas, Guam Fishermen's Cooperative Association, provided public comment on program planning items. He said that Guam's rudderfish are caught with different gears and in shallower waters than Hawaii so he expected the results of the biosampling presented would be different if conducted in Guam. Duenas also commented on the efficacy of Marine Protected Areas and the need for the issue to be resolved with respect to highly migratory species. Tunas tagged in the Marshall Islands and Japan were caught in Guam and that the foreign fishing effort around the Pacific Remote Island Areas shows that these species should be treated differently.

Lastly, he commented that PIFSC needs to be sure to review the data being used for assessments prior to any WPSAR reviews. The WPSAR reviewers can only deal with the information provided and not on the data used.

6. Protected Species

A. False Killer Whale Take Reduction Team Meeting Report

Elena Duke, PIRO Protected Resources Division (PRD), provided a report on the False Killer Whale Take Reduction Team (TRT) in-person meeting held November 7-10, 2022. The TRT met to review and consider implications of latest data and studies related to false killer whale interactions, assess effectiveness of current False Killer Whale Take Reduction Plan (FKWTRP) and brainstorm potential management and other measures, and identify additional data and analysis needed to support follow-up TRT discussions in 2023. The average mortality and serious injury (M&SI) is currently 17, which is above the potential biological removal (PBR) of 16 for pelagic stock, so the focus of the TRT is to consider various risk mitigation approaches to reduce the M&SI below PBR for this stock.

Potential changes discussed include modification of the weak hook measure (strengthening branch line and/or using weaker hook), development of a combined fighting line and cutter device to improve potential for straightening weak hooks and associated handling, improvements to handling guidelines and training, modification of the Southern Exclusion Zone, consideration of dynamic closure zones, development of depredation deterrents, effort controls, and implementation of electronic monitoring. Six working teams were formed to further explore measures that may reduce the level of mortality and serious injuries to below the potential biological removal, a short-term goal specified under the Marine Mammal Protection Act. The TRT is expected to meet again in late March 2023, after the March SSC meeting.

Asuka Ishizaki, Council's TRT representative, provided the staff perspectives from the meeting. There was positive reception by TRT members on industry's idea to develop a combined fighting line/cutter device and associated potential for improving handling guidance. Among the new information presented to the TRT were three observer videos from recent false killer whale interactions, one of which showed an animal hooked in the corner of the mouth and surfacing next to the vessel multiple times. The line eventually broke and the animal swam off with trailing gear, which prompted TRT discussion about clarifying handling guidance on when crew should cut the line. Under Marine Mammal Protection Act guidelines, a false killer whale released with trailing gear is typically classified as serious injury, whereas an animal hooked only in the lip and released without trailing gear could be considered non-serious injury. PIFSC also announced that they will conduct the next EEZ-wide cetacean survey in 2023. Staff will keep SSC members informed on the TRT work team progress, and the SSC is expected to provide further input on the Council's position for future modification of FKWTRP at the March 2023 meeting.

The SSC thanked Duke for the informative presentation.

B. Cross-taxa Impacts of Longline Management Measures (Draft Infographic Review)

The SSC at the 145th meeting in September 2022 recommended the development of 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 deep-set longline (DSLL) fishery. The recommendation resulted from a discussion on 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. Staff presented a preliminary compilation of information in the form of a color-coded gear-specific impact matrix based on the information in

Gilman et al (2019)[2] and invited further SSC input.

The SSC noted that the amount of information presented in the draft matrix demonstrates the amount of measures that are in place for the fishery, and an SSC member pointed out the need for reviewing some of the technical details to be included, such as whether prohibition on light sticks serves as a turtle mitigation measure.

The SSC recommends developing a simple version of the infographic to help readability in addition to the more detailed tabular form presenting technical information for use by SSC and managers.

The SSC thanked Council staff for the informative presentation and draft infographic.

C. ESA Section 7 Consultations

1. Final Supplemental Biological Opinions for the Hawaii Deep-set and American Samoa Longline Fishery Draft Biological Opinions

Melissa Snover, PIRO Protected Resources Division (PRD), presented an overview of the final Supplemental Biological Opinions (BiOp) for the Hawaii deep-set longline fishery (DSLL) and American Samoa longline fishery (ASLL). These supplemental BiOps cover oceanic whitetip sharks and giant manta rays. NMFS issued the Supplemental DSLL BiOp on September 28, 2022, and the Supplemental ASLL BiOp on October 27, 2022. NMFS concluded that the DSLL and ASLL fisheries are not likely to jeopardize the continued existence of these two species, and included reasonable and prudent measures that require release of animals caught alive in a manner that minimizes injury and ensures sufficient monitoring and reporting program to confirm that the extent of take is not exceeded.

The SSC found that analysis of oceanic whitetip sharks and giant manta rays in the Supplemental BiOps to be robust and concurs with the findings.

The SSC thanked Snover for the informative presentation.

2. Status of the Full Hawaii Deep-set and American Samoa Longline Fishery Draft Biological Opinions

Melissa Snover, PIRO PRD, provided a status update on the full DSLL and ASLL BiOps. Spring 2023 is the expected completion date of the DSLL BiOp, which will cover sea turtles, giant manta ray, scalloped hammerhead shark, oceanic whitetip shark, sperm whale, and the main Hawaiian Islands insular false killer whales. Spring 2023 is also the expected completion date of the ASLL BiOp, which will cover sea turtles, scalloped hammerhead sharks, oceanic whitetip shark, and giant manta ray.

The SSC awaits the draft full BiOp, which will include all other ESA-listed species.

The SSC thanked Snover for the informative presentation.

[2] Gilman, E., Chaloupka, M., Dagorn, L., Hall, M., Hobday, A., Musyl, M., Pitcher, T., Poisson, F., Restrepo, V. and 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(1), pp.93-123.

D. Public Comment

There was no public comment.