WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

152nd Meeting of the Scientific and Statistical Committee
June 11-13, 2024
Hybrid Meeting
Council Office, Honolulu HI

FINAL REPORT

4. Pacific Islands Fisheries Science Center Director Report

Charles Littnan provided the Pacific Islands Fisheries Science Center (PIFSC) Director's report. He highlighted the April-May 2024 Survey for Continued Observation of Pseudorca Extent (SCOPE) for pelagic false killer whales to fill data gaps; post-hooked loggerhead turtle telemetry in the Hawaii shallow-set longline fishery; leatherback turtle telemetry anchor attachment for fishery-based deployment; March-April 2024 bigeye tuna oceanography survey; external peer review of the 2023 International Scientific Committee for Tuna and Tuna-like Species (ISC) stock assessment for Western and Central North Pacific Ocean (WCNPO) striped marlin; Guam bottomfish fishery independent survey; and WCNPO striped marlin rebuilding analysis.

Littnan reported that the SCOPE survey had 12 false killer whale encounters during the 30-day survey, all of which were acoustically detected and five of which were also visually detected. The SCOPE survey also deployed three satellite tags and collected 3 biopsies within the existing management area. Nine eDNA water samples were collected. The SSC noted that certain NOAA weather buoys are known to attract false killer whales, and suggested such aggregations may provide an opportunity for researching the population. In response to an inquiry regarding the potential utility of eDNA, Littnan indicated that it is still uncertain, but has the potential to fill data gaps if successful.

In response to an inquiry on methods used for sexing sea turtles, the SSC received clarification from Littnan and T. Todd Jones, PIFSC, that laparoscopic and ultrasound were the common approaches in the past, but PIFSC is now investing in non-invasive hormonal assays. An SSC member noted the importance of sexing turtles in the future.

SSC thanks Littnan for the informative presentation.

5. Program Planning and Research

A. 2023 Annual SAFE Report and Recommendations

1. Archipelagic and Pelagic Report Highlights

Thomas Remington, Annual Stock Assessment and Fishery Evaluation (SAFE) Report Coordinator, provided the highlights of the 2023 Archipelagic and Pelagic annual reports developed by the Plan Teams. The reports present the fishery performance of Council managed fisheries modules, and the ecosystem considerations that potentially drive the fishery dynamics.

The SSC strongly encouraged the fisher initiated fisher observations to be continued. The data may be anecdotal and qualitative, but systematic examination of the clues in the data is needed. As importantly, fishers feel more engaged and valued, bridging the gap between fishers and scientists. The SSC also noted the need to encourage younger fishers to be more involved. The SSC noted that there is an enormous amount of data in the SAFE Reports, but noted there is not enough focus on the maximization of the potential of fishery resources compared to the information on stock assessments. A focus on maximizing fishery food production would be more in line with MSA mandates.

The SSC also expressed concern about declining fish prices and discussed possible reasons associated with high fuel prices, overall inflation, import substitutions, and changing market conditions. The SSC encouraged further exploration of reasons for declining revenues. Specific concern was expressed about how the Hawaii longline fishery continues to expand in number of boats and gear deployed while fuel prices remain high and ex-vessel revenues declined.

The SSC inquired about the accuracy over time of the information on bigeye tuna recruitment and catch rate forecast. This information should be brought to the SSC in the future.

The SSC recommends development of a brief executive summary by each region in the SAFE reports that highlight substantive information about fishery performance, with some interpretation of data put in the broader context. This would include the relative risk of overfishing at current catches for ABC control rule managed fisheries.

The SSC thanked Remington for the informative presentation.

2. Archipelagic Report Recommendations

T. Todd Jones, Archipelagic Plan Team Chair, presented the recommendations and work items for the 2023 Annual SAFE Reports, including Hawaii Archipelago, American Samoa Archipelago, Pacific Remote Island Areas, and the Mariana Archipelago.

The SSC endorsed the Archipelagic Plan Team Recommendation regarding inclusion of the territorial non-commercial module in the American Samoa and Mariana Archipelago Annual SAFE Report. The SSC endorsed the Joint Plan Team recommendation on continuing the longline fishery economic data collection, noting SSC preference for the trip costs survey to remain voluntary and that other mechanisms for delivery be examined in conjunction with the Hawaii Longline Association.

The SSC thanked Jones for his presentation.

3. Pelagic Report Recommendations

Emily Crigler, Pelagic Plan Team Chair, presented the report and work items on the 2023 Pacific Pelagic Annual SAFE Report.

The SSC thanked Crigler for her presentation.

B. MSRA 5-year Research Priorities 2025-2029

Council staff presented the MSRA 5-year Research Priorities 2025-2029 on Pelagic Fisheries, Island Fisheries, Protected Species, and Human Communities. Priorities are centered around Council Program Plan themes including climate change resiliency, electronic technologies in fisheries, advancing competitiveness of Council-managed fisheries, equity and environmental justice, capacity building and fishery development. Priorities were first discussed at the November 2023 SSC meeting, then a PIFSC-Council workshop was convened in February 2024. Draft priorities were reviewed at the March 2024 SSC meeting, Pelagic Plan Team, and Social Science Planning Committee. The SSC was provided updated priorities for final endorsement.

The SSC recognized the amount of work and the process in-place for the development of the research priorities. The SSC requested that sharks in general, along with cookie-cutter shark catch mutilation, be included in estimates of total fishery-wide depredation and economic loss.

The SSC supported the importance of ranking within each program area. SSC members suggested proposing rankings annually, no later than the December SSC meeting. The SSC was informed that these priorities also would be ranked in the annual meeting between staff and PIFSC and PIRO.

The SSC endorsed the MSRA 5-year Research Priorities 2025-2029 with minor edits.

C. National SSC Meeting Preparations

Council staff provided an overview of the Eighth Scientific Coordination Subcommittee national workshop (SCS8), which will be hosted by the New England Council in Boston, August 26-28, 2024. The SCS8 theme is "Applying ABC Control Rules in a Changing Environment", and the three sub-themes are:

1. Advances in ecosystem science and assessment to inform ABC control rules in dynamic environment
2. Application of social science to achieve management goals under dynamic conditions
3. Adaptation of reference points, control rules, and rebuilding plans to changing environment

Each Council will be represented by 4 SSC members and 1 Council staff. The WP Council's SSC delegation will present a case study under the social science sub-theme on the SEEM process and Fishermen's Observation efforts, which are unique processes to this region. It will also present the use of social science information in our region. The regional P* process will also be described.

The SSC reviewed the sub-themes and provided the following input to the WP delegation on the breakout group discussion questions and topics to highlight for the round robin presentations:

- Sub-theme 1
    - Significant uncertainty in between assessments (large changes in assessments) which may be larger than any climate related changes may be observed
    - Flexibility for unique regional context considering data poor assessments, and suggestion for using the American Samoa bottomfish assessment as an example/case study in the round robin
    - P* process gives flexibility in evaluating modifiers that should be applied, but given expectation in non-stationarity, if there is anomaly around trends as a result of climate change for some of those stocks, where in the P* would that information come in?
    - Most of this region's fisheries are data limited and there are consequent issues of data quality, but impact of stock status has high impact on communities
- Sub-theme 2
    - The case study presentation provides an opportunity to share the region's unique and diverse peoples and culture and to highlight the difficulties in the multicultural aspects of management
    - Consideration for yield that is not being harvested to address MSA mandate of maximizing production
    - Note that social and economic factors in SEEM have often been scored zero to prevent additional reduction because of high cultural value of the species involved and cultural importance such as fish flow

An SSC member noted that the Council's Social Science Planning Committee recognized issues with SEEM and formed a working group to assess gaps in the process, including consideration of the ecological dimension of SEEM, and providing more information on the stock assessment to fishers at the SEEM meetings.

The SSC requested that the WP delegation share the draft presentation to the SSC to provide additional opportunity to comment on the round robins and case studies to be presented on the SSC's behalf.

D. Public Comment

There was no public comment.

6. Island Fisheries

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

1. P* and SEEM Working Group Report

Jason Helyer, SSC member and chair of the P* and SEEM working groups, provided a report on the working group meetings convened in person at the Council office on May 7, 2024. The working groups included at least one fishery participant from each county in Hawaii as well as representatives from PIFSC, PIRO, and Hawaii Divisions of Aquatic Resources. The group reviewed the information in the 2024 benchmark assessment for the main Hawaiian Islands (MHI) Deep 7 bottomfish fishery and quantified scores for the four scientific uncertainty dimensions: 1) assessment information; 2) uncertainty characterizations; 3) stock status; and 4) productivity-susceptibility. For assessment information, the group concluded that uncertainty about non-commercial/unreported catch, the aggregation of species into a complex, depredation, and lack of tagging merited a reduction score. Because the overall assessment was deemed to be a "perfect" assessment, this dimension score was scaled to a reduction of 0.7 percent. The uncertainty dimension was given a 5.0 percent reduction because retrospective bias was not carried into model projections on future harvest. There was no reduction score for stock status, as the Deep 7 complex was not overfished nor experiencing overfishing. The scores for productivity and susceptibility were updated based on new life history information and resulted in a 4.4 percent reduction. Adding scores from all four P* dimensions resulted in an overall reduction of 10 percent from the 50 percent risk of overfishing (overfishing limit).

The SEEM working group utilized the standardized SEEM dimensions and criteria. There was no reduction scored for the first three dimensions (Social, Ecological, Economic). Regarding management uncertainty (M*), the working group noted "compliance" with mandatory trip reporting is high, but there are issues with sales through non-traditional markets such as social media sales that are not reported to the state. Since the 2018 assessment, the working group recognized the state re-opened all of the BRFAs (bottomfish restricted fishing areas) but were skeptical on the use of Hawaii Marine Recreational Fishing Survey data and the lack of addressing shark depredation in the fishery. The management uncertainty score was given a 1 percent reduction.

Overall, the group had good engagement and discourse, and discussed various issues of the fisheries. The group noted that future P* scoring sessions could benefit from a pre-meeting briefing on the stock assessment for either new participants in the P*/SEEM process or participants that were not involved in data workshops leading up to new assessments.

The SSC discussed the low risk of overfishing associated with recent Deep 7 commercial catch levels and whether the current P* process was needed. The P* process was developed by the council and therefore it can be amended. The group noted that reducing the risk of overfishing through the P* process, when the probability of overfishing associated with exploitation levels is already very low, may have little practical benefit. Adding a step to the P* process to evaluate current harvest levels with respect to overfishing limits prior to creating a P* working group could make the process more efficient. The SSC also raised concern about the relevance of factors that must be considered in the current P* process when some of those factors might not be applicable to the fish stock/complex being considered, such as lack of tagging data.

An SSC member noted the Social Science Planning Committee recently formed a working group

to review the SEEM process. Council staff mentioned early-stage discussions on re-evaluating the P* process. The upcoming National SSC meeting in August will explore acceptable biological catch (ABC) control rules used by each of the fishery management council's. The case studies which will be presented by each of the regions will be useful for informing future review of P* and SEEM processes.

The SSC also highlighted the merits of engaging the fishing community in the process of recommending harvest control limits as well as ongoing efforts by PIFSC to include the fishing community in data reviews prior to the stock assessment process. The group noted that efforts to revise the P* process should not compromise progress made to include the fishing community in the process to set harvest control limits.

The SSC endorsed the P* report.

The SSC recommends the Council review its ACL specification framework, including the P* and SEEM process, to potentially provide revisions and updates as needed.

2. Setting Acceptable Biological Catch for 2024-2025 to 2026-2027 (Action Item)

Council staff presented options for setting the ABCs for the MHI Deep 7 bottomfish fishery for fishing years 2024-2025 to 2026-2027. The best scientific information available is considered to be the 2024 benchmark assessment with catch projections to 2029. The P* and SEEM working groups evaluated the scientific uncertainty and quantified risks levels for the SSC to consider. The options presented were: 1) No action; 2) Status quo, specify ABCs of 508,000 lbs based on the 2021 assessment; 3) Set ABCs based on the results of the 2024 P* analysis and benchmark assessment at 40% risk of overfishing at 498,000 lbs for fishing years 2024 to 2027; or 4) Set ABCs lower than the results of the 2024 P* analysis.

The SSC discussed the low risk of overfishing associated with recent commercial harvest in the Deep 7 fishery and implications on the four options for setting the ABC.

The SSC sets the Acceptable Biological Catch for the Main Hawaiian Islands Deep 7 Bottomfish for fishing years 2024 to 2027 at a 40% probability of overfishing which corresponds to 498,000 lbs. per year.

B. MHI Small Boat Fisheries Project Update

Roy Morioka, Council contractor, provided an update on a project to engage the Hawaii small-boat fishing community. Small-boat fisheries in Hawaii include fishers that use non-longline gears to target uku, bottomfish, Kona crab, deepwater shrimp, and pelagic species. With funding from NMFS PIFSC, the Council coordinated a small-boat working group to secure commitments from fishery managers, scientists, enforcement and fishing organizations to engage Hawaii's small-boat fishing community to establish relationships, trust, and dialogue between fishers, managers, and scientists. Eight meetings were held with open-house informational booths, presentations, and discussions on jointly managed species and the importance of data collection. Morioka provided the results of the discussions with the community and potential issues for the SSC and Council to discuss. The outreach was important as it reconnected with the small-boat fishing community after COVID-19 social restrictions.

The SSC noted the benefits of communication between the fishers and groups that monitor, manage, and enforce small boat fisheries. The SSC commended PIFSC for funding this outreach effort and Morioka for facilitating the communications with fishing communities.

The SSC thanked Morioka for the informative presentation and for his dedication and efforts over the years to improve the science being conducted on Hawaii small boat fisheries and to ensure the views of the fishing community are heard.

C. Review of Uku Update Assessment WPSAR Terms of Reference

Felipe Carvalho, PIFSC, reviewed the Terms of Reference for the 2024 Western Pacific Stock Assessment Review (WPSAR) of the MHI uku stock assessment update. The WPSAR review will be conducted in Fall 2024 after the completion of the draft assessment and will focus on whether the updated model utilizes the same methodology as the 2020 benchmark stock assessment.

The SSC noted that four years had passed since the benchmark assessment and asked whether the update would include any changes to the base assessment model. Carvalho indicated that any modification to the update assessment will be clearly explained to the review panel.

An SSC member asked for clarification on the timing of the review. Council staff clarified that the review is currently scheduled for September 9-10, 2024, prior to the September SSC meeting.

The SSC endorsed the seven Terms of Reference.

The SSC nominated Erik Franklin as Chair of the WPSAR and Milani Chaloupka and Jason Helyer as WPSAR panelists.

D. Updates on the Guam Bottomfish Rebuilding Plan

Council staff provided an update on the Guam bottomfish rebuilding plan. At its 198th meeting, the Council received a presentation on the 2024 Guam bottomfish management unit species (BMUS) stock assessment update that found that the fishery was not overfished but not rebuilt. The Council endorsed the SSC's recommendation that the 2024 stock assessment was the best scientific information available and requested that the NMFS provide a status review of the rebuilding plan and catch projections that would rebuild the Guam BMUS stock by 2031. In its letter to the Council on April 12 and 14, 2024, the Pacific Island Regional Office and the Pacific Island Fisheries Science Center (PIFSC) said they would provide a review of the rebuilding plan and catch projections by June 2024, respectively.

E. Public Comment

There was no public comment.

7. Protected Species

A. SSLL Turtle Trip Limit Review Report

Council staff and Rob Ahrens, PIFSC, provided a report of the Pelagic Plan Team Working Group tasked with conducting a detailed review of fishery performance under the loggerhead and leatherback turtle trip interaction limits in the Hawaii shallow-set longline fishery (SSLL). Amendment 10 was developed in response to the higher number of loggerhead turtle interactions in the shallow-set fishery observed since 2017, to provide managers and fishery participants with the necessary tools to respond to and mitigate fluctuations in loggerhead and leatherback turtle interactions, and to ensure a continued supply of fresh swordfish to U.S. markets, consistent with the conservation needs of these sea turtles. The Working Group reviewed data through 2023, which includes three years of data since the limits were implemented in September 2020. The measure has been successful in maintaining a year-round supply of swordfish given that the fishery has been able to operate without a closure. There have been a few cases of vessels reaching the loggerhead or leatherback trip limit. Available data for loggerhead and leatherback turtle interactions in the fishery since the trip limit implementation are limited, and comparisons of pre- and post-measure implementation data are also confounded by the short seasons in the two years preceding the trip limit measure as well as the higher loggerhead turtle interaction rates starting around 2017 that limit the pre-measure comparison to the three years prior to implementation. The working group found that additional years of monitoring is warranted before the Council considers any revisions to the trip limits.

An SSC member was interested in the outcomes of interactions, specifically the animals' fate, their condition upon release, and the impact of non-lethal interactions. It was noted that approximately 98-99% of turtles are released alive with <10% post-release mortality, given handling protocol requirements and efforts to minimize trailing gear. The SSC requested that future updates on turtle interaction rates include information on the condition of released animals since it could provide insights into population-level impacts when evaluating trip limits. It was noted that observed interactions are documented in the annual SAFE reports, and PIFSC technical memoranda provide post-release mortality estimates.

An SSC member asked about the status and availability of turtle population modeling and data. The most recent model was developed in 2018 with data through 2015 and is documented in multiple PIFSC Technical Memoranda. PIFSC staff are currently engaged with colleagues in Japan to provide updated data.

The SSC inquired about the data gaps mentioned in the presentation, which was attributed to shallow-set fishery closures in 2018 and 2019 that made it challenging to compare annual data accurately and affects our ability to evaluate policy impacts. The SSC also inquired if habitat compression for turtles was built into the Protected Species Ensemble Random Forest (PSERF) model. The presenter noted that modifications were underway, but it was unlikely to see significant differences in oceanographic covariates. A recent publication confirms higher interaction rates with compression of the frontal area.

The SSC inquired about the timeline for the next assessment given that the last assessment was conducted nine years ago and the ability to estimate effort within higher risk habitat areas to ensure the removal of the hard cap does not lead to a shift in fishing effort that could impact loggerhead populations. There is uncertainty regarding the timing for the next loggerhead status review and next population viability analysis (PVA) update is under development, but requires

updated population data. Regarding effort within the TurtleWatch band, an updated analysis through 2023 could be explored, but a recent analysis was run with data through 2021 that found no significant difference in fishing behavior.

Given overall declining levels of observer coverage, the SSC questioned the tradeoffs associated with changes in observer coverage between shallow-set and deep-set fisheries.

The SSC concurs with the Pelagic Plan Team Working Group's finding that revisions to the trip limits are not warranted at this time, and endorses the Pelagic Plan Team recommendation to conduct the next review of the trip limit measure in 2-3 years, pending update of the loggerhead turtle population model. The SSC notes the importance of maintaining 100% coverage in the shallow-set fishery to allow for that evaluation.

B. DSLL BiOp Implementation Working Group Report on Insular False Killer Whale Overlap Area Monitoring Requirement

David O'Brien, PIRO, and Rob Ahrens, PIFSC, provided the report of the Biological Opinion (BiOp) Reasonable and Prudent Measure (RPM) Implementation Working Group. The Council established the BiOp RPM Working Group at its 197th meeting in December 2023 to facilitate coordination for implementing the RPM Terms and Conditions (T&C) from the Hawaii deep-set longline (DSLL) BiOp, issued in May 2023. The BiOp requires that NMFS, within one year of the BiOp publication, determine the minimum level of observer coverage reliable for estimating the main Hawaiian Islands (MHI) insular false killer whale (IFKW) interactions with the Hawaii DSLL vessels. If the current level of observer coverage is below this level, the T&C requires that within two years (after the first evaluation period) NMFS provide observer coverage at the level determined reliable. The stated purpose of this T&C is to improve NMFS' understanding of and estimates of interactions with MHI IFKW in the overlap area. The BiOp RPM Working Group determined that 90% observer coverage would be needed to reliably estimate MHI IFKW interactions in the overlap area with a CV >30%, which is below the current coverage rate. The Working Group considered potential pathways for increasing observer coverage either through human observers or electronic monitoring, as well as additional considerations for research needs and spatial management.

SSC members discussed the reliability of electronic monitoring to support species identification given concerns of image quality and the impact of camera positioning on observations. A suggestion was made to consider equipping observers with higher-resolution cameras for clearer imagery.

An SSC member requested that the number of trips occurring in the overlap area be reflected in the table alongside the number of observed sets and number of sets as reported through logbooks in the overlap area. Ahrens completed this task during the meeting and the number of trips will be included in the presentation to the Council.

The SSC acknowledges that the ongoing reduction of human observer coverage poses significant concerns for comprehensive fishery monitoring and recommends the Council consider the potential impact of increasing human observer coverage in the overlap area on the overall precision of protected species capture estimates in DSLL fishery.

The SSC thanked David O'Brien and Rob Ahrens for the informative presentation.

C. Public Comment

Robin Baird, Cascadia Research Collective (CRC), shared that CRC has compiled a photo identification catalog for false killer whales in the islands, which includes nearly all individuals for IFKW, and a growing catalog of pelagic animals. CRC has reviewed observer photos of false killer whales through 2022 to compare to the catalog, resulting in 80 different identifications. However, 57% of these images were of too poor quality photos to make identification. Of the 33 identifications, they were graded on a four-point scale (poor, fair, good, and excellent quality). Only 8 photos were of fair quality, and the rest were lower quality. Despite this, they found two individuals that matched with pelagic stock.

8. Pelagic and International Fisheries

A. Electronic Monitoring Pre-Implementation Program Plan Review and Timeline

Council staff and the Electronic Technologies Steering Committee (ETSC) Chair Lesley Hawn (PIRO) presented updates on the pre-implementation of electronic monitoring (EM) in Hawaii longline fisheries. Delays in the first phase have arisen due to funding shortfalls and delays. The first phase initially was to review the 20 vessels with EM systems in the first year and to begin July 2024. However, that phase may change based on resources and a reduction in human observer coverage starting in 2024 from 20% to 13%. Further reductions are imminent and thus EM could be used potentially to fulfill some monitoring obligations of human observers. The ETSC also reviewed sampling efforts of observers and compared that to what EM can fulfill. In order for EM to be used to monitor statutory requirements while it is phased in and while it is a voluntary program, the SSC was asked to provide guidance on technical aspects and determine whether a working group of members can help guide efforts on phasing in EM and glean potential impacts on the fishery.

EM has been proposed as useful for determining post-interaction mortality of marine turtle species and cetacean injury determination but just how valid such estimates might be is yet to be determined. Costs of implementing EM are also under review and yet to be fully determined, though estimates would total to be at least $2.4 million a year for full implementation of cameras in all vessels.

An SSC member asked about the cost of the human observer program. Hawn responded the cost has been $8.2 million as a maximum with recent costs being $7 to $7.5 million annually, and noted that EM is apparently substantially cheaper. The SSC noted some data collection is superior with human observers such as being able to move around on deck for a better view and biological sampling.

A comment was made that perhaps having EM onboard might have some implications for vessel skipper behavior compared to having a human observer onboard instead. Another comment was made about the logistical challenge of the massive amount of video footage that will accumulate. Council staff clarified that video footage would need to be sampled through a robust design. An SSC member noted the availability of four PIFSC Technical Memos, one of which explored the pros and cons of EM and human observers included in briefing materials.

A SSC member pointed out the many facets of EM and asked what the priorities are. Council staff responded that protected species monitoring is a primary priority with bycatch data collection as a secondary priority. There was SSC discussion about an SSC working group to consider EM issues, terms of reference of such a group, and expectations/timelines. An SSC member asked about the initial target coverage rate of EM and noted that aspiration of 100% coverage in the long term is desirable. An SSC member inquired about the human dimension aspect of EM acceptance in the fleet, suggesting that it is important to consider fisher voices during this process.

The SSC recommends that the Council include two SSC members in the Electronic Technologies Steering Committee to support consideration of relevant aspects of the operating model for EM for the Hawaii longline fishery. The purpose of their inclusion would be to contribute to consideration of matters such as (1) statistically robust sampling

designs, (2) data collection standardization, and (3) understanding any potential unintended data/science consequences of EM monitoring.

The SSC thanks Hawn and Council staff for the informative presentation.

B. Characterizing Impacts of Cookie Cutter Shark Interactions in Hawaii Longline Fishery

Don Kobayashi, Justin Suca and Michel Chan (PIFSC) presented on how cookie cutter sharks have affected marketability of pelagic management unit species. The analysis was conducted in response to a Council recommendation at the 196th meeting in September 2023, which originated from the Council's Fishing Industry Advisory Committee. The economic impacts of depredation have been estimated to be about $142,000 annually in the Hawaii longline fishery. PIFSC provided maps and analyses on what oceanographic and ecosystem variables have affected cookie cutter shark depredation.

There is an apparent uptick in daily incidence of cookie cutter shark bites since 2011 on fishes being sold at the Honolulu fish auction. Statistical modeling showed that the probability of a cookie cutter bite on fish hooked in the deep-set longline fishery (DSLL) and shallow-set longline fishery (SSLL) was spatially dependent and highest north of the Archipelago. Key predictors were fishing permit number (vessel-specific effect), fish count on the set, lunar cycle especially for the SSLL fishery (higher bite probability on the new moon), and importantly the soak time at night. In the DSLL, end-of-haul time has increased substantially since the mid-1990s and, importantly, hooks per set have increased substantially since 1990.

The study found that cookie cutter shark damage (> 4 bites) negatively impacted the per pound pricing at the Honolulu fish auction by 14% for bigeye tuna and 16% for yellowfin tuna. Revenue loss was estimated to have been the highest in 2023 for cookie cutter damage to bigeye and yellowfin.

More fishing effort (more hooks per set) and longer night-time soak leads to higher probability of cookie cutter shark damage with negative consequences for fish price at the auction. The PIFSC team may pivot towards analyzing the occurrence of "sashi", which are liquid-filled voids in the fish flesh caused by a microorganism. This is similarly a serious concern in industry due to the large negative impact on the sales price of "sashi" affected fish.

A SSC member noted that cookie cutter shark damage could also be important for the small-boat, night-time handline fishery (*ika shibi*) as well.

The SSC recommends that the Council, PIFSC, and PIRO explore approaches for continuation of data collection for cookie cutter shark damage and other fish price issues such as "sashi", noting that the observer program no longer collects data on cookie cutter shark damage and noting uncertainties of whether "sashi" data collection exists or is adequate for analysis.

The SSC thanks Kobayashi and Suca for the informative presentation.

C. SPC Climate Science for Ensuring Pacific Tuna Access

Simon Nicol, SPC, presented on climate change initiatives that the SPC is engaged in with respect to tuna fisheries. The 'Climate Science for Ensuring Pacific Tuna Access' program will support the region's efforts to manage its valuable tuna resources in the face of climate change related challenges. Tuna is a crucial source of income and food for many Pacific Island countries and territories. Ensuring the current sustainable levels of fishing continue is essential to the region's economic and social well-being. Impacts of climate change, such as rising sea temperatures and changing ocean currents, are affecting tuna populations and the communities that depend on them. This project will work to improve our understanding of future climate impacts on tuna and support decision making to ensure the ongoing sustainability of the region's tuna fisheries.

Climate impact projections are at the basin scale for skipjack, yellowfin, bigeye and the South Pacific albacore tuna. The skipjack is considered the most vulnerable of the 4 tuna species to climate change dynamics and the South Pacific albacore the least vulnerable at the basin scale. Future efforts intend to focus on (1) scaling projections from the basin scale to the national EEZ scale of resolution, which is more applicable for management and modeling, (2) assess climate impacts at a higher spatial resolution and (3) include fleet dynamics in the SEAPODYM tuna population dynamics at that higher spatial resolution.

An SSC member inquired about future fleet dynamics with regard to spatial patterns. Nicol responded that Pacific Island Forum Fisheries Agency (FFA) colleagues are using economic-driven modeling approaches and suggested that there is much uncertainty in long-term projections. An SSC member brought up the similar IRA CEFI (Inflation Reduction Act; Climate, Ecosystems, and Fisheries Initiative) at PIFSC, and suggested that it would be constructive for liaison between CEFI lead in the region and SPC. There was much SSC discussion about the partnering, scope, and directions of these important scenario planning activities.

The SSC recommends that the Council liaise with SPC, PIFSC, and territorial agencies to foster complementarity between regional initiatives such as the CEFI and IRA projects involving climate change scenario planning and the Climate Science for Ensuring Pacific Tuna Access projects.

The SSC thanks Nicol for the informative presentation.

D. International Fisheries

1. SPC Pre-Assessment Workshop

Paul Hamer, SPC, presented on outcomes of the SPC Pre-Assessment Workshop held March 25-28, 2024. A south Pacific albacore stock assessment will be developed for Western and Central Pacific Fisheries Commission (WCPFC) Science Committee (SC) review in August 2024. The meeting focused mostly on inputs for this assessment which had previously demonstrated a strong retrospective bias. A 2024 assessment model will utilize a simpler catch conditioning model assuming two regions with limited movement between regions and so reducing overparameterization from previous assessments. The workshop also included analyses provided by China and Chinese Taipei to inform catch per unit effort (CPUE) indices, although this

information was not used in the assessment. Growth is also to be internally estimated in the stock assessment model. An anticipated Western and Central Pacific silky shark assessment was discussed, including discussion of indices of abundance and catch. Catch of silky sharks in longline fisheries have declined significantly while purse seine interactions and CPUE have increased in both FAD sets and unassociated sets. Increase in size composition and reduction in catch in longline fisheries may be indicative that current mitigation measures are having a positive impact on the stock. The integrated stock assessment of silky sharks will be compared with less data-dependent risk assessment methods such as EASI-Fish and eSAFE. The workshop also reviewed preparation of an oceanic whitetip stock assessment, expected in 2025, with discussion centered on data inputs.

An SSC member asked about how the improvements in computational efficiency allow exploration of multiple sensitivities and priors. Council staff asked about "Big Dip" and retrospective bias discussed at a recent SC, and the effect of parameter reduction. Hamer responded that the model is performing better but dip is still apparent as well as large increases at other times. An SSC member asked about data gaps for the 2 shark stock assessments, and whether increased observer coverage or EM would solve these challenges. Hamer responded that data limitations such as unidentified sharks being cut off, with unknown disposition, continue to hinder stock assessments and that both EM and increased observer coverage could help in this regard but noted that identifying sharks not brought aboard the vessel remain problematic.

The SSC thanks Hamer for the informative presentation.

2. Outcomes from the Stakeholder Workshop for the North Pacific Striped Marlin Rebuilding Analysis

Emily Crigler (PIFSC) provided outcomes of a U.S. stakeholder workshop on North Pacific striped marlin held virtually on April 8, 2024. Several stakeholders emphasized the importance of scenarios that account for unreported discards and disparities in bycatch reporting among WCPFC members. Concerns were raised regarding the effectiveness of managing the stock solely through a total allowable catch level, with calls for consideration of complementary measures such as circle hooks, size limits, and modifications to longline gear. Additionally, participants highlighted the need for greater equity in catch reporting, monitoring, and observer coverage across member states. Phased approaches to reducing catches through the rebuilding period were favored, which coincide with a stock assessment schedule. The rebuilding analysis is expected to be reviewed by the ISC in June 2024 and the WCPFC SC in August 2024. The WCPFC will then consider a revision to the conservation and management measure, CMM 2010-01, in December 2024 based on the rebuilding analysis results.

An SSC member asked about the basis for the rebuilding plan time frame. Crigler indicated the time frame was the outcome of negotiations between WCPFC members.

The SSC thanks Crigler for the informative presentation.

E. Public Comment

There were no public comments.

9. Other Business

Council staff drew the SSC's attention to a new best scientific information available (BSIA) memo on "Determination of Best Scientific Information Available for the Western and Central North Pacific Ocean (WCNPO) striped marlin (*Kajikia audax*)". The memo states that this stock is no longer overfished and likely experiencing overfishing per status determination criteria under the Pelagics Fishery Ecosystem Plan. Within the WCPFC, the stock is still considered both overfished and experiencing overfishing. A PIFSC SSC member clarified that the briefing memo was a standard informational document prepared by science centers to regional offices. Council Executive Director asked for a more detailed explanation of the BSIA briefing memo. A PIFSC SSC member further clarified that the memo is formal justification for using the scientific information in management decision-making. The Council will discuss the BSIA memo at its 199th Meeting.