



**134th Meeting of the Scientific and Statistical Committee
October 15 to 17, 2019
Council Office Conference Room
Honolulu, HI**

FINAL REPORT

Members present: Jim Lynch, Steve Martell, Dave Itano, Kurt Schaefer, Graham Pilling, Justin Hospital, Milani Chaloupka, Michael Seki, Craig Severance, Shane Abeare, Debra Cabrera, Frank Camacho, Erik Franklin, Ryan Okano, Don Kobayashi, Domingo Ochavillo

Members excused: Ray Hilborn and Shelton Harley

4. Report from the Pacific Islands Fisheries Science Center Director

Michael Seki, PIFSC, reported on the recent highlights and activities conducted by PIFSC in the third quarter of 2019. He thanked staff for organizing the Pacific Insular Fisheries Monitoring, Assessment and Planning Summit (PIFMAPS). Seki detailed staffing changes, highlighting numerous hires and one departure from PIFSC. He also reported on the vessel activities of the NOAA ships Oscar Elton Sette and Rainer. Unfortunately, habitat mapping by Rainer was not conducted. Research on monk seals reveals a count of 143 total pups, 44 interventions, 2 rehabilitated seals returned, and 4 malnourished pups were identified and returned to the Ke Kai Ola monk seal hospital. Seki also reported on the Main Hawaiian Islands (MHI) life history research cruise bottomfish life history research, a collaborative un-manned aircraft system project with the University of Hawaii examining the health of dolphin groups and individuals in Hawaiian waters, and ongoing nearshore assessment field work within the Mariana Islands. PIFSC economists conducted a survey in 2017 to collect cost-earnings data and performed a cost-earnings analysis using both primary and secondary sources of data on fleet operations in 2016. The recent study shows, on average, that 2016 fishing operations had positive cash returns to vessel owners. Seki also reported that current predictions generated by NOAA's Coral Reef Watch suggest that between September and November 2019 there is a greater than 90% chance of coral reefs around the MHI suffering mass bleaching with likely mass mortality.

SSC discussed possible management strategies to address coral bleaching situations. Strategies may include monitoring and managing certain species that impact corals, monitoring temperature levels, and understanding spatial aspects of coral bleaching.

SSC thanked Seki for his report.

5. Program Planning and Research

A. Fishing Community Perceptions on of the MPA Siting Process and its Implications

David Loomis, East Carolina University, presented on a Council- and PIRO-funded study through the Pacific Islands Fisheries Research Program on the perceptions of the fishing communities on Hawaii, American Samoa and the Marianas on the selection process of marine protected areas (MPAs). The study concluded that fishermen in Hawaii perceive the process used to determine the locations of MPAs as somewhat unfair compared to fishermen from island areas. Though not extreme in intensity, this perception by fishermen is broad and consistent across all elements of procedural justice. The concept of procedural justice suggests that fishermen sense some lack of respect or standing, and that their “voice” might not matter to those who manage the resources on their behalf. It would be reasonable to expect that these fishermen might not be as fully supportive of the rules and regulations associated with these MPAs. Moving towards a more supportive and informed population of fishermen could be accomplished through closer adherence with the principles presented in procedural justice. The study results suggest some reasonable attention to the justice components and rules would be of value in future decisions and would lead to greater support for management rules and regulations.

SSC members discussed factors that might influence the relatively moderate fisher responses, including that many of the fishers who were initially displaced are no longer active in any fishery hence not targeted for participation in the survey. Members additionally noted that the study covered a variety of MPAs of different sizes and regulations. Members questioned how MPAs were defined and if respondents were asked whether they considered MPAs to be an acceptable fishery management practice. Members also asked whether fisher responses in the CNMI were influenced by Super Typhoon Yutu, which hit the CNMI during the survey data collection phase. It was noted that responses may be dependent on the primary type of fishing done by respondents, but the survey sample may be too small for meaningful analyses. The data may have also been impacted by the specific data collection method, where cultural factors may have biased responses, and also by the number and type of regulations in the area.

The SSC recommends that comments raised by SSC members be conveyed to the authors for consideration. The SSC also recommends that the report be considered as part of the NEPA process for fishery management actions.

The SSC thanked Loomis for his informative presentation.

B. Report on SSC Working Group on NS1 Technical Guidance on Phase-Ins and Carry-Over

Deb Lambert, NMFS S&T, and Dan Holland, NWFSC, presented on the draft technical guidance on phase-in and carry-over provisions from a large team effort with representatives from Science Centers and Councils. One provision allowed the unused portion of an ACL to be carried over to the following year. A second provision allowed changes in catch limits to be phased in over a period of time not to exceed three years. This added flexibility may have a number of benefits including increasing safety, enhancing economic performance, and reducing social disruptions by creating stability in harvests over time. However, policies that allow acceptable biological catch (ABC) to be set closer to the overfishing limit (OFL) also have the

potential to increase biological risk and should be analyzed and adopted with caution. This technical memo is meant to support the implementation of the carry-over and phase-in provisions as described within the NS1 guidelines. It provides examples of how carry-over and phase-in provisions have been implemented in fisheries, describes acceptable approaches to design and implement carry-over and phase-in provisions, and identifies characteristics of fish stocks, fisheries, and management approaches that may impact the benefits and risks of applying carry-over and phase-in provisions.

Frank Camacho, University of Guam and SSC member, presented on the discussions of the SSC Working Group on National Standard 1 Technical Guidance on Phase-Ins and Carry-Overs in fisheries management. Revisions to the National Standard 1 (NS1) guidelines published in 2016 included two provisions that added flexibility in the process of specifying annual catch limits (ACLs). The subgroup determined that these provisions are applicable to Tier 1 and Tier 2 stocks and stock complexes in the Western Pacific, although these schemes should be applied cautiously to Territorial bottomfish stock complex. Carry-over and phase-in schemes should also be incorporated in the Council's harvest control rule measures, which would require an amendment to all Fishery Ecosystem Plans.

An SSC member asked about similarly applying carry-over provisions to prohibited species bycatch. A Council staff member asked about using phase-in for a scenario such as territorial bottomfish where a stock assessment dramatically changes the OFL.

The SSC recognizes the potential use of the phase-in and carry-over approaches for the fisheries in the Pacific Islands. The SSC endorses the SSC Working Group report and recommends the Council direct staff to draft the comment letter based on the recommendations from the report for transmittal prior to the January 15, 2020 deadline. Further, the SSC recommends the Council explore the potential use of the phase-in approach for the Territory bottomfish fishery in light of the new stock assessment.

C. Report on the Pacific Insular Fisheries Monitoring Assessment Planning Summit

Stefanie Dukes, PIFSC FRMD, presented highlights from the Pacific Island Fisheries Monitoring Assessment Planning Summit held on August 19 to 23, 2019, to evaluate whether the data collection systems in place in the territories are meeting both federal and territory management needs. A panel of reviewers (Steve Turner, Jenny Suter, and Robert Ryznar) conducted an evaluation of information presented by the territorial and federal agencies. Issues with current data collection systems were summarized, along with goals and objectives of the summit, mechanisms for the summit, as well as key discussion highlights and panelist recommendations. The first day of the meeting was a general overview of current data collection systems and issues. The second day focused on the creel survey programs in each of the territories in more detail. Day three presentation and discussion were centered on commercial receipt book and vendor data streams, while day four focused on the biosampling program in each of the territories. The final day of the summit was comprised of discussion on federal and territory needs as well as potential solutions in line with the recommendations offered by the panelists. Recommendations included removing duplication and striving for a unified territory approach, engaging with MRIP, implementing mandatory reporting while prioritizing Note, duplicity means lying not duplication! bottom-fishers, implementing e-reporting for all

commercial vendor receipts, updating the biosampling framework, and promoting outreach regarding the importance of reporting accurate fishery data.

An SSC member asked if there were specific proposals in the report to facilitate the capture of the large amount of unrecorded catch. Comprehensive permits/reporting systems, camera systems are some of the measures which will be explored by the working group. It was noted that there is extensive Council history on the issue of improved data collection which finally appears to be coming to fruition. There are ongoing discussions on the usefulness of analyzing aggregated data on the Marianas archipelago or separating Guam and the CNMI.

The SSC recommends the Council work with NMFS-PIFSC in the implementation of the reviewer recommendations particularly supporting the mandatory license and reporting using the electronic reporting platform. Further, the SSC recommends the Council direct staff to work with the Territory fishery agencies to ensure coordinated monitoring of fisheries in the territorial and federal waters.

D. Updates to the Spatial Management Workshop Planning

Council staff presented an update on the planning process for the SSC's Spatial Management Workshop in 2020. The Council initiated the communication with FAO regarding holding the workshop prior to or following the 2020 Brussels Seafood Expo in late-April 2020. The FAO expressed interest in hosting the workshop in Rome, supporting the workshop's objectives, and is seeking further clarification on workshop participation and applicability. A list of potential participants is being generated. In the near-term, there is an FAO Science-Policy Nexus Workshop in Rome (18-21 November 2019), with a scoping session for the Spatial Management Workshop to immediately follow.

E. Report to Congress on Section 201 of Modernizing Recreational Fisheries Act

Council staff presented the SSC's report to Congress on the Section 201 of the Modernizing Recreational Fisheries Act to facilitate greater incorporation of non-governmental sources of information in federal fisheries management. The SSC completed the process paper through efforts of the SSC subgroup and it was submitted to NMFS in July 2019. The NMFS Office of Science and Technology has developed a draft Report to Congress as required in Section 201 of the Modernizing Recreational Fisheries Management Act of 2018 addressing improvements in data collection by state and nongovernmental organizations to facilitate greater incorporation of that data. The Report draws on many existing guidance documents, including the Stock Assessment Improvement Plan, National Standard 2 Guidelines, and Marine Recreational Information Program Procedural Directives which provide guidance on best scientific information and data collection and analysis. Council staff requested SSC members to provide comments to staff by November 15, 2019.

The SSC recommends the Council direct staff to draft the comments to the Report to Congress on Section 201 of MRFA and provide the comments and process paper to NMFS prior to the December 31, 2019 deadline.

F. Report on the 2019 Annual Climate Change Collaborative Workshop

Phoebe Woodworth-Jefcoats, PIFSC ESD, presented on the discussions and outcomes of the 3rd Annual Climate Change Collaborative Workshop held at the IRC on September 11-12, 2019. The goal of the workshop is to create a set of recommendations to be considered by PIFSC leadership when drafting the FY2021 Annual Guidance Memo (AGM) and science plan. These recommended projects should stem from the priorities identified at the 2nd annual workshop, the data needs and products listed at the 1st workshop, and the action items listed in the PIRAP. The participants received 3 to 4 presentations on current climate related projects per theme (protected species, EFH and corals, pelagic fisheries and island fisheries). The managers interacted with the scientists on the details of the project. The group conducted a voting exercise on whether the project aligns with the management objectives. Once ranked the projects would be recommended for the FY2021 AGM.

SSC members inquired as to how scientists project costs associated with climate change. Trip cost estimation models may assist with this. It was also noted that the relatively lower scores for the dynamic pelagic habitat project were largely due to the preliminary nature of this suite of projects not necessarily concern about its relevance/importance.

G. Public Comment

No public comment.

6. Island Fisheries

A. Report on the WPSAR of the Territorial Bottomfish Benchmark Stock Assessment

Steve Martell, SSC member and Western Pacific Stock Assessment Review (WPSAR) Chair, presented highlights and findings of the peer-review of the benchmark stock assessment of the bottomfish management unit species (BMUS) complex in American Samoa, Guam, and the CNMI. The WPSAR review for the benchmark assessment was conducted April 15-18, 2019. The review panel included two Center for Independent Experts (CIE) reviewers, Joseph Powers (US) and John Neilson (Canada), and was chaired by an SSC member. Several changes to previous BMUS assessments in Guam, CNMI, and American Samoa were incorporated into the 2019 benchmarks, including the use of new species lists, calculating the percentage of catch reported at the family or species-group level and believed to contain BMUS, filtering CPUE based on gear, standardizing the CPUE for covariates that may affect the catch rate, removing independently-estimated maximum sustainable yield values from the model fitting process, and including a Pella-Tomlinson production model parameterization. Overall, the WPSAR panel found the 2019 benchmark stock assessment to be useful for management purposes.

The SSC commended recent PIFSC assessments for their detailed treatment of uncertainty, documentation, and consistency in approaches.

The SSC thanked Martell for the informative presentation.

B. Benchmark Stock Assessment of the Bottomfish Management Unit Species Complex in American Samoa, Guam and the Commonwealth of Northern Mariana Islands

Brian Langseth and John Syslo, PIFSC Stock Assessment Program, presented the peer-reviewed benchmark stock assessment for the territory bottomfish MUS complex. The assessments used a state-space Bayesian surplus production model within the modeling framework Just Another Bayesian Biomass Assessment (JABBA). Estimates of harvest rate (H), annual biomass (B), the harvest rate associated with overfishing as determined by the harvest control rule (HCR), maximum sustainable yield (MSY), and the biomass at maximum sustainable yield (BMSY) allowed for determination of stock status relative to reference points determining overfishing ($H/HCR > 1$) and overfished ($B < 0.7 \times BMSY$) status. Stock projections were conducted for 2020 through 2025 for a range of hypothetical six-year catches, and the corresponding risk of overfishing was calculated. BMUS stock status varied by territory. The current benchmark assessments determined that in 2017, Guam BMUS were in an overfished state but not undergoing overfishing, CNMI BMUS were not overfished nor were undergoing overfishing, and American Samoa BMUS were determined to be both undergoing overfishing and in an overfished state.

The SSC appreciates PIFSC's efforts in pursuing improvements to the Territory Bottomfish Benchmark Stock Assessment. From a technical standpoint, the SSC concurs with the WPSAR Panel that these assessments (Langseth et al. 2019) are an improvement compared to the previous assessments (Yau et al. 2016). The SSC commended PIFSC scientists for the quality of the analysis, documentation, and provision of model code.

The SSC expresses concerns regarding the appropriateness of the current species composition and mix of shallow and deep water species groups with different targeting that make up the BMUS catch. The SSC also expressed concern regarding the subjective definition of a bottomfishing trip and how effort is assigned in the different segments of the fishery. **The SSC recommends that a SSC member knowledgeable with the given fishery be included in the data workshop with the affected communities regarding these uncertainties.**

While the composition of the BMUS complex is beyond PIFSC's purview, **the SSC recommends the Council direct staff to develop an options paper for the revision of the BMUS complexes as soon as possible. The SSC also recommends that the new grouping be prioritized using the Stock Assessment Prioritization process and a new benchmark assessment be developed after the Council takes final action on the BMUS revision amendment package.**

In general, the SSC maintains its concerns regarding the data collected in the Territories and its representativeness of the fisheries. Specific to the CNMI, SSC members expressed concern related to the high degree of uncertainty associated with the catch estimates and model estimates. **The SSC recommends the Council implement the data collection improvement recommendations from the Pacific Insular Fisheries Monitoring & Assessment Planning Summit (PIFMAPS) data summit.**

The SSC reiterates its previous recommendation that a data preparation workshop be incorporated in the stock assessment development and review process. This would enhance the transparency of the assessment development process and facilitate better collaboration with stakeholders and understanding of the assessment process. **The SSC recommends the Council, PIFSC, and PIRO incorporate a data preparation phase prior to future benchmark assessments in consideration of the WPSAR schedule. For the Territory bottomfish, the data preparation workshop should explore changes in targeting between the shallow and deep complexes over time. Findings from the data workshops could improve CPUE standardization in future assessments.**

In order to support improved future assessments, the SSC recommends the Council request NMFS to implement fishery independent survey methods (e.g. camera system, e-DNA, and tag recapture data) for American Samoa and the Marianas given the documented uncertainties in the CPUE and catch expansions from the creel surveys. This could validate the index of abundance generated from the creel survey-based CPUE.

The SSC noted a number of technical approaches that would improve the analysis (e.g. Bayesian Stacking, Hurdle-Poisson or Hurdle-NB, and "transform-then-summarize" predicted distribution).

The SSC accepts the 2019 benchmark assessment as best scientific information available in setting harvest limits for fishing year 2020, 2021, and 2022. The SSC noted uncertainties with the data. The SSC reiterates that a new benchmark assessment should be developed once the BMUS revision amendment package is subject to final action. 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 Territory BMUS for American Samoa and Guam. Regarding CNMI, the SSC recommends using the Tier 5 ABC control rule to determine the ABC and ACL.

The SSC recommends PIFSC conduct timely outreach in the Marianas regarding the results of the benchmark stock assessment.

The SSC thanked Langseth and Syslo for the informative presentation.

C. Guam Reef Fish Stock Assessment

Marc Nadon, PIFSC, presented the Guam coral reef fish stock assessment, which contained single-species assessments of 12 reef-associated fish stocks around the island of Guam using data from various sources for 2013 through 2017. Previous management actions have set overfishing limits (OFL) at the family level using either a percentile of historical catches or a catch-MSY approach. The assessment used life history data, fishery-independent and -dependent size composition and abundance data, and total catch estimates to calculate current fishing mortality rates (F), spawning potential ratios (SPR), and SPR-based sustainable fishing rates (F₃₀: F resulting in SPR = 30 percent). The assessment used the growth-type-group length-based spawning potential ratio model (GTG LBSPR) to obtain both current mortality rates and various stock status metrics. A meta-analytical data-poor approach was used to estimate life history parameters for six species with inadequate growth and maturity studies. Monte Carlo simulations were used to incorporate all sources of uncertainty (i.e. life history parameters, size structure, abundance, and catch).

Of the 12 assessed species, four had median F/F₃₀ ratios greater than 1 and therefore median SPR values below the minimum overfishing limit of 30 percent. Another three species were close to this limit (30 percent ≤ SPR ≤ 35 percent). This suggests that four assessed species may be experiencing overfishing and three others may be close to experiencing overfishing (e.g., 48 percent risk of overfishing for *Monotaxis grandoculis*). Typically, species with low SPR values were the ones with longer lifespans (e.g., *Naso unicornis*, *Scarus rubroviolaceus*, and emperors) and/or commonly reported (e.g., *Caranx melampygus*). Finally, for five species for which catch and/or biomass data were deemed of sufficient reliability, catch levels corresponding to F₃₀ (C₃₀) were calculated by combining F₃₀ estimates with current population biomass estimates derived directly from diver surveys or indirectly from the total catch. The overfishing limit was calculated as the median of the C₃₀ distribution, and overfishing probability distributions for a range of catch limits were generated.

The SSC thanked Nadon for the informative presentation.

D. Review of the Terms of Reference for the Main Hawaiian Islands *Aprion virescens* (uku) Benchmark Stock Assessment

Brett Schumacher, PIRO SFD, provided an overview of the Terms of Reference (TOR) for the WPSAR of the benchmark assessment of the main Hawaiian Islands uku (*Aprion virescens*). The WPSAR review is scheduled for February 2020.

The SSC recommends the Council request PIFSC, in collaboration with Council staff, to organize a meeting with the *Aprion virescens* (uku) fishermen in Hawaii to solicit local knowledge of this fishery to inform the assessment. The SSC endorses the terms of reference for the MHI uku benchmark assessment and appoints David Itano as the WPSAR Chair.

Further, the SSC recommends that future assessment development should incorporate the “data call out” to comply with the requirements of the Modernizing Recreational Fisheries Act.

The SSC thanked Schumacher for the informative presentation.

E. Public Comment

No public comments.

7. Protected Species

A. False Killer Whale Abundance Estimates

Amanda Bradford, PIFSC Protected Species Division, presented on the progress of the false killer whale abundance estimates for the pelagic stock of false killer whales. The estimates utilize data collected during the 2017 Hawaiian Islands Cetacean Ecosystem Assessment Survey (HICEAS), which took place during the period of July-December 2017. Bradford provided an overview of the integrated approach utilizing the design-based line transect estimation and a habitat model, and comparison of methods with two previous surveys conducted in 2002 and 2010. The line transect estimates incorporates systematic sightings data in the EEZ-wide surveys conducted in the 2002, 2010, and 2017, and utilizes detection function and subgroup size. The habitat model uses survey data from on-effort sightings in the Central Pacific from 1997 to 2017, and involves compiling environmental data, and developing GAMs habitat models. The integrated approach allows estimation of abundance for both inside and outside the EEZ where fishery interactions are observed. Bradford presented the progress of the integrated estimation approach, involving extensive data preparation, setting up the framework for the two approaches, and evaluating consistency of the two approaches. After the report is finalized the model will be reviewed through external review and Pacific Scientific Review Group review in March 2020.

An SSC member enquired on the habitat information being included within that component of the integrated model. Bradford noted that factors including distance from shore and oceanographic variables such as salinity were included, and a more complete list could be provided.

The SSC discussed the process for review of the analysis to ensure the rigor of the science. **To this end, the SSC recommends the PIFSC to provide early access to the draft final document for review and input and looks forward to reviewing the updated line transect-based false killer whale abundance estimates at the March 2020 SSC meeting.**

The SSC thanked Bradford for her informative presentation.

B. Updates on Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) Actions

Lesley Hawn, PIRO Protected Resources Division, presented updates on ESA and MMPA actions of relevance to fishery management actions, including the status of ESA Section 7 consultations, response to the ESA listing petition on cauliflower coral; leatherback turtle status review; critical habitat designation status for humpback whales and coral; recovery plan development for insular false killer whales and giant manta ray; sea turtle recovery actions, False Killer Whale Take Reduction Plan; and the MMPA proposed 2020 List of Fisheries. The Hawaii deep-set and American Samoa longline fisheries consultations are expected to be completed by the end of November 2019, but these timelines may shift once the loggerhead and leatherback take models are received and considered.

The SSC thanked Hawn for her informative presentation.

C. Public Comment

Eric Kingma, Hawaii Longline Association (HLA), commented on the take model, and noted that the model results indicate that the fishery is having little to no impact on the population. He noted that the consultation analysis often happens in a black box, so the model ensures that best available scientific information is incorporated. Noting the timeline of the Hawaii deep-set longline consultation and no rush for completing the consultation, Kingma recommended that best available science be incorporated in the deep-set longline consultation through the consideration of the take model, as well as for the shallow-set longline fishery action rulemaking in progress addressing the biological opinion completed in June 2019. Kingma noted the second year of Southern Exclusion Zone (SEZ) closure which leaves only 17% of the EEZ around Hawaii accessible to the Hawaii deep-set longline fishery, and supported expeditious completion and review of the false killer whale abundance estimates to reevaluate the potentially arbitrary SEZ measure.

8. Pelagic Fisheries

A. American Samoa Longline Fishery Report

Keith Bigelow, PIFSC, provided the 2019 semi-annual report for the American Samoa longline fishery. The report covered fishery statistics including participation, effort, and catch.

The SSC recommends the Council request NMFS to compile and evaluate the catches of albacore from Chinese flagged longline vessels operating in the southwest Pacific and compare to the catches and performance of the American Samoa longline fleet.

The SSC thanked Bigelow for his presentation.

B. Hawaii Longline Report Fishery Report

Russell Ito, PIFSC, provided the 2019 semi-annual report for the Hawaii longline fishery (deep-set and shallow-set components). The report covered fishery statistics including participation, effort, and catch.

The SSC inquired about the current status of the distribution and utilization of the electronic log books for the longline fisheries. Ito reported electronic logbook use is slowly increasing, although slower than expected, as there are still some captains who are not currently interested in participating for various reasons.

The SSC inquired about the recent record numbers of marlin being landed, and the very low price because of the surplus of marlin in catches. It was discussed how a considerable amount of marlin is now being smoked and sold.

The SSC discussed how skipjack and marlin products were utilized, and inquired about the record catches of skipjack tuna being landed by the longline fishery. Ito reported that the size of most of those skipjacks are quite large at around 10 kg. It was noted that the retention of skipjack may be higher compared to earlier years as they have found a market for locally dried product and may be retained and stored in bait freezers for later sale. The SSC noted skipjack catches were especially high and should continue to be monitored.

The SSC inquired about the abundance of lancetfish in the longline fisheries, noting the apparent relationship with abundance of bigeye tuna, and asked whether they are commonly reported in the logbooks. Ito reported that lancet fish are not commonly recorded in logbooks, as they are normally not retained.

The SSC thanked Ito for his presentation.

C. Oceanic Whitetip Shark Assessment and Projections

Felipe Carvalho, PIFSC, provided a summary of the 2019 oceanic whitetip stock assessment. In 2017, oceanic whitetip was listed as threatened under the Endangered Species Act (ESA). The stock is currently overfished and experiencing overfishing at a rate that exceeds a mortality rate that can lead to imminent extirpation. The assessment included new information on

post-release mortality. Catch rate appeared to increase follow a Western and Central Pacific Fisheries Commission (WCPFC) measure that prohibits the retention of oceanic whitetip sharks. Given these changes, it was recommended at the 15th Science Committee of the WCPFC that projections be carried out to determine the potential future impacts of the 2011 measure and if the stock is expected to rebuild.

Council staff inquired about the observed WCPO longline CPUE increase in oceanic whitetip sharks and the problem with lack of fit in the most recent period of the assessment model. Carvalho confirmed that the lack of fit of those data existed in the assessment model due to constraints on recruitment and that more years of data and greater flexibility in recruitment settings (which did not provide reasonable fits within the current model) would be needed to better fit that CPUE increase. He stated that such problems are not uncommon in other shark assessment models.

The SSC thanked Carvalho for his presentation.

D. Pelagic Fisheries Research Plan Updates

Council staff presented on updates to the Council's Pelagic Fisheries Research Plan. These include priorities such as bigeye tuna research on connectivity and stock structure, a project to develop indicators for ancillary pelagic fish stocks caught in Hawaii's longline fisheries, Council support of an ahi tagging study, a counterfactual analysis of spatial closures, and other projects were discussed. The analysis of Hawaii small boat fisheries (troll and handline) was suggested to evaluate their performance under existing FEPs.

The SSC commented on the long overdue necessity to increase the monitoring of small boat fisheries around Hawaii, and inquired about some of the mechanisms for improving catch data. Council staff reported that they will encourage small boat fisherman to start using apps on smart phones for reporting catches.

The SSC commented on the importance of small boats to pelagic fisheries as a whole in Hawaii pelagic catches. Additionally, it was commented that there is a need to distinguish further among fishing sectors. The idea of supply of fish product, or 'fish flow', is of social importance to Hawaii.

E. Update on Electronic Reporting in the Hawaii Longline Fisheries

Bigelow presented an update on the implementation of an electronic reporting (ER) logbook system in the Hawaii longline fishery. Electronic reporting was developed in the Hawaii longline fishery for the purpose of improving the timeliness of data dissemination. Bigelow provided an overview of the ER logbook system, and reported that 50 vessels are currently participating, with 300 completed trips received to date. PIFSC is working with a new vendor, SkyMate, to ensure compatibility with the vessel monitoring systems (VMS) used in the fishery. Other ongoing work include creating an online data portal for permit holder access, completing the ER implementation plan, and continuing one-on-one training and tablet deployment. Date for implementing mandatory ER will also need to be determined. Bigelow also provided an update on the Electronic Monitoring (EM) in the Hawaii longline fishery, the steering committee formed

at the 178th Council meeting to address ER implementation issues, and considerations for implementing mandatory ER.

The SSC inquired about the cost associated with the electronic logbooks. Bigelow reported it is about \$1,100 per vessel. The SSC also inquired about the proposed use of machine learning and artificial intelligence for evaluating electronic monitoring (EM) video from longline trips. Bigelow reported that methodology is being explored by NMFS as it would make the processing of the video faster and more efficient. The SSC also inquired about how the real-time reporting of interactions with protected species such as turtles will be handled when using EM. Bigelow stated that is an issue for which they are exploring potential options.

The SSC thanked Bigelow for the informative presentation.

F. Assessing Population Level Impacts of Marine Turtle Interactions in the Hawaii and American Samoa Longline Fisheries

T. Todd Jones and Summer Martin, PIFSC, and Zachary Siders, University of Florida, provided a presentation on assessing population level impacts of loggerhead and leatherback turtle interactions in the Hawaii shallow-set longline fishery. PIFSC developed a take model for the shallow-set longline fishery based on the population vulnerability assessment conducted in 2018 for the Biological Opinion (BiOp) and presented to the SSC at the 130th meeting in October 2018. The modeling framework involves (A) data imputations for monthly nest counts (leatherback turtle data only); (B) trend analysis of nest count data to estimate population growth rates and current abundance; (C) population viability analysis including future projections of population size and assessment of the impacts of anticipated take levels on the projections. The imputation for leatherback monthly nest count was improved, which updated the population growth rate to - 6.1%. Anticipated turtle takes were incorporated into the model by applying individual attributes of take (demographic parameters and mortality estimate based on past interaction data) to estimate adult nester equivalence for each take. Model results indicate that take has no discernable difference on the loggerhead turtle population projection, and a slight difference between the no-take and take scenarios for leatherback turtle population projection with the population projected to go extinct approximately 5 years earlier with take compared to the no-take scenario over the 100 year projection period. The model also considered the past take on the historical population trend, which indicated that the take has no discernable difference on the trend. The model is considered to be conservative because the take is only applied to the index beaches (approximately 52% of the North Pacific loggerhead population and 75% of the Western Pacific leatherback population). External peer-review of the model indicated that the model approach was appropriate and adequate given the limited data available.

The SSC commended the authors for an excellent job considering constraints in the request by PIRO and data limitations. The SSC emphasized that the takes by the Hawaii based shallow-set longline fishery on loggerheads and leatherbacks are trivial and have no impact on their population levels.

The SSC noted that developing demographic models for loggerheads and leatherbacks would provide a complimentary model for consideration along with current population assessments being done. However, it appears required biological data are lacking including

surveys to support such an approach. The SSC noted that the model did not include an evaluation to determine what level of take would have a substantial impact on the populations. The SSC discussed the raw take data for loggerhead and leatherback interactions in the shallow-set fishery, and whether the interaction rates have changed over time. The authors described how increased interaction rates with loggerheads may be related to increases in population levels based on some exploratory analyses recently undertaken.

The SSC endorses the take model developed for the SSSL fishery as best scientific information available for evaluating the impacts of the fishery on loggerhead and leatherback turtle populations. The SSC recommends that PIFSC apply the model to the Hawaii deep-set longline fishery and the American Samoa longline fishery take data to provide a robust scientific assessment to be considered in the ongoing ESA consultations. The SSC encourages the model to be published as a NOAA tech memo or other accessible and citable format.

The SSC further recommends that the Council direct staff to work with PIFSC on the development of a cost-benefit analysis to evaluate the impact of any management actions for reducing turtle interactions on the economic performance and socioeconomic effects of the shallow-set and deep-set longline fishery. The SSC further encourages consideration of transferred effects of the US fishery longline fishery closure on target species as well as protected species.

The SSC reiterates that the 25 percent reduction goal in the Reasonable and Prudent Measures (RPM) in the shallow-set longline fishery BiOp completed in June 2019 as aspirational, overly conservative, and not supported by the scientific information presented in the final BiOp, especially in light of the results of the new take model. The SSC recommends that Council reevaluate its position on the RPMs in the shallow-set longline fishery BiOp completed in June 2019 in light of the model results.

The SSC thanked Jones, Martin and Siders for their informative presentation.

G. Evaluating Additional Mitigation Measures under the Hawaii Shallow-set Longline Fishery Biological Opinion Reasonable and Prudent Measures

Joshua Lee, PIRO, provided an overview of a work plan developed to address all Reasonable and Prudent Measures (RPMs) in a BiOp of the Hawaii shallow-set longline fishery. The work plan addresses the six RPMs included in the BiOp issued June 26, 2019, which NMFS deemed necessary and appropriate to minimize the impacts of the incidental take. PIRO Sustainable Fisheries Division (SFD) proposes to establish a BiOp action team to address RPMs that require evaluation and consideration of additional mitigation measures for loggerhead and leatherback turtles, as well as oceanic whitetip sharks and giant manta rays. The team membership will include PIRO, PIFSC, Council staff and others as appropriate.

Notwithstanding the recommendation made under item 8.F., the SSC discussed its involvement in the implementation of the RPMs and noted that any recommendation from the BiOp action team will be brought back to Council advisory bodies including the SSC. The SSC also encouraged working with the industry to develop industry-led or collaborative approaches to

developing mitigation measures, which has been successful in other regions.

The SSC thanked Lee for the informative presentation.

H. International Fisheries Meetings

1. IATTC Annual Meeting

Council staff presented on outcomes of the 2019 Inter-American Tropical Tuna Commission Meeting held July 22-26, 2019. A notable topic included issues with the expansion of floating fish-aggregating devices (FADs) used in the tropical purse seine fishery in the eastern Pacific. No conservation measures for tropical tunas were discussed at the Commission meeting.

2. 19th ISC Plenary Outcomes

Mike Seki, PIFSC, presented the outcomes of the 19th Session of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC19) held July 11-17, 2019. Conservation advice and stock statuses were presented for all the pelagic stocks under ISC purview. A new stock assessment on North Pacific striped marlin was presented at ISC19 and the stock remains overfished and experiencing overfishing. Other issues include catch corrections and a management strategy evaluation (MSE) for the North Pacific albacore stock, updates to Pacific bluefin tuna Close-Kin analyses, and MSE for Pacific Bluefin tuna.

The SSC noted that the recent North Pacific albacore assessment indicated that the stock is not overfished, but inquired why the first MSE is being undertaken on albacore. Seki reported that although some would have liked it to have been on Pacific bluefin tuna, there were political reasons why the first MSE is being undertaken on albacore.

The SSC inquired about the split in the CPUE time series at about 1990 in the recent ISC striped marlin assessment. Carvalho responded that all ISC assessments using Japanese time series data use that same break point in the time series data. The SSC further commented on concerns in the retrospective bias in the assessment and other apparent conflicts in the assessment model.

The SSC inquired whether the PIFSC was considering undertaking biological studies on blue marlin to provide useful life history information for future blue marlin stock assessments. Seki replied that PIFSC will not likely undertake such work, as their primary focus on tuna life history will be on bigeye tuna in the northern central Pacific.

The SSC thanked Seki for the informative presentation.

3. 15th WCPFC Science Committee

Council staff presented on outcomes of the 15th Science Committee of the WCPFC (SC15) held August 12-20, 2019. New stock assessments on Western and Central Pacific skipjack tuna, Southwest Pacific striped marlin, and oceanic whitetip were presented at SC15, and the SC made conservation advice and recommendations for these stocks as well as the North

Pacific striped marlin stock. Other notable topics included improving observer coverage in longline fisheries, FADs, bycatch issues (seabirds), and harvest strategies for tropical tunas.

SSC members commented that a newly derived maturity schedule was used in the recent WCPFC skipjack stock assessment undertaken by the SPC, which showed a shift to larger sizes and older ages at maturity compared to the maturity schedule used in the previous skipjack stock assessment. SSC members also commented that this inclusion of new maturity information influenced model outputs, and the target reference point may need to be reevaluated.

SSC members discussed the ‘double counting’ of albacore by some fleets, including China, and noted that charter arrangements may complicate data reporting by a fishing nation and the charter nation.

4. WCPFC Technical and Compliance Committee

Emily Crigler, PIRO, presented on the WCPFC 15th Technical and Compliance Committee meeting held September 25 to October 1, 2019. A current Compliance Monitoring Scheme (CMS) was adopted for 2019 only, including a process to review reporting requirements, audit obligations under CMS, and improving compliance case file system. For 2019 and 2020, there will be development of a risk-based assessment framework to inform compliance assessments. For 2020-2021, the TCC should develop corrective actions to encourage and incentivize compliance. Panama, a cooperating non-member, has been non-compliant and may face punitive action. FADs (fish aggregating devices) were also discussed at TCC15, including the definition of ‘small garbage’ that may or may not be considered a FAD and a FFA request for analyses of US arrangements.

Council Executive Director inquired about providing transparency to all interested parties during the TCC through an open meeting. Crigler reported that each year the US delegation requests that the TCC meeting be open to all parties but other countries continue to disagree.

The SSC thanked Crigler for the informative presentation.

5. WCPFC Permanent Advisory Committee

Crigler presented on the WCPFC Permanent Advisory Committee convened on October 10-11, 2019. Recommendations were made regarding extending SIDS privileges to purse seiners operating out of American Samoa. Recommendations regarding striped marlin included using long-term recruitment as a basis of a rebuilding plan until the ISC reconciles recruitment uncertainty and for future assessments to consider alternative stock structure delineations. Recommendations were made pertinent to South Pacific albacore to reach a target reference point sooner than 20 years, to include CPUE increases as a target, and for an allocation scheme to be implemented.

The SSC inquired about the North Pacific striped marlin assessment specifically the recruitment time series used and the amount of recruitment variability found within the model. Carvalho reported that there was considerable amount of work done to look at the existing recruitment variability within the assessment model.

The SSC recommends the Council to request that PIFSC contribute to improve life history research, specifically on growth and maturity on North Pacific striped marlin. This work should be undertaken prior to future stock assessments.

The SSC thanked Crigler for the informative presentation.

6. WCPFC Northern Committee

Tom Graham, PIRO, presented on the WCPFC 15th Northern Committee (NC15) meeting held September 2-6, 2019. Notable topics included a US proposal for a rebuilding plan for North Pacific striped marlin, limit reference points for swordfish, management strategy evaluation of the North Pacific albacore stock, and harvest strategies of bluefin tuna. There was not a quorum present at the NC15.

The Executive Director asked what Chinese Taipei received in exchange for the transfer of 300 tons of Pacific Bluefin tuna to Japan.

SSC members inquired on the efficacy of a rebuilding plan for the North Pacific striped marlin stock (striped marlin is a non-target species) and if there is disproportionate burden on the Hawaii-based fishery due to reporting and observer coverage. NMFS is considering ways to adopt a rebuilding plan, and will further examine the impacts of a rebuilding plan on the stock and on US fisheries.

The SSC thanked Graham for the informative presentation.

I. Public Comment

Eric Kingma, HLA, noted some increased production as presented in the Hawaii longline report, and explained the importance of having a mixture of shallow-set and deep-set fishing effort throughout the year. Kingma also explained industry concerns over the cost of implementing mandatory electronic reporting, and noted that the bandwidth already purchased through VMS could be utilized for electronic reporting. Kingma also commented that costs for implementing electronic monitoring should be covered by NMFS, since the primary objective of the electronic monitoring program will be for monitoring protected species. Kingma also commented that it was extremely unfortunate and counterproductive that the PIFSC take model for sea turtles was not requested and available to PIRO a year ago while the shallow-set longline BiOp was under development, and commended PIFSC for undertaking the model at this time. Kingma also expressed concern and frustration over the lack of compliance by many CCMs in WCPFC fisheries in contrast to the US that takes an active role in monitoring and enforcement of its fisheries, as seen at the TCC meeting. Kingma was asked about a possible rebuilding plan for striped marlin and responded that there is concern over the assessment and the possibility of extraneous burden on the Hawaii fishery.