WESTERN PACIFIC REGIONAL FISHERY MANAGEMENT COUNCIL

Report of the
Third Meeting of the Protected Species Advisory Committee
Council Office
April 7-8, 2016

1. Welcome and Introductions

David Hyrenbach, interim Chair, welcomed members of the Protected Species Advisory Committee (PSAC) and other meeting participants. Members attending in person were George Balazs, Milani Chaloupka, David Hyrenbach, Sam Kahng, Carl Meyer and Erin Oleson. Jim Lynch participated via teleconference and Lyn McNutt was excused. Other meeting participants included Ariel Jacobs, Dawn Golden, Mary Wunderlich, Ryan Steen, Beth Flint, Pat Opay and Eric Gilman.

2. Approval of Agenda

The agenda was approved without any changes. Rapporteur assignments were made for the Annual Report Review sections of the agenda.

3. Status of the Second Protected Species Advisory Committee Meeting Recommendations

Asuka Ishizaki, Council staff, reviewed the status of recommendations from the May 27-28, 2015 PSAC meeting. Ishizaki noted that recommendations regarding research priorities were incorporated into revisions provided to the Council, and all other recommendations were adopted by the Council and are being addressed.

4. Fisheries and Protected Species Management Updates
A. Recent Council Actions
i. Pelagic fisheries actions

Eric Kingma, Council staff, provided an update on Council actions related to pelagic fisheries. These included the 2016 Territory bigeye catch limit specification, North Pacific Eastern Pacific Ocean (EPO) swordfish action, and the American Samoa large vessel prohibited area (LVPA). Kingma also reported that the Council will consider reduction in Hawaii shallow-set longline observer coverage levels at its June 2016 meeting.

A PSAC member sought clarification on the Territory bigeye action as to whether there are other nations fishing in the same area as the Hawaii longline fishery when U.S. quota is reached and fishery is closed. Kingma responded in the affirmative and further explained that the only fishery that is required to close in-season when reaching its quota is the U.S. longline fishery. Another

PSAC member asked whether the quota is assigned to each vessel or nation and Kingma explained that the quotas are flag-based.

PSAC members discussed the potential reduction in observer coverage for the shallow-set fishery and commented that methods for extrapolating interactions to the full fleet should be discussed as part of the Council consideration on this matter. Council staff commented that the Council will be looking to the Pacific Islands Fisheries Science Center (PIFSC) to provide guidance on this issue and also noted that the need to extrapolate interactions will add a challenge to real-time monitoring of sea turtle hard cap measure. A PSAC member asked whether fishermen self-report protected species interactions when there is no observer on-board, and whether they bring back carcasses. Kingma responded that there is a logbook data field for protected species interactions, but that longline vessels without observers do not have permits to bring back carcasses. A PSAC member also asked whether cost-benefit analysis will be conducted, to which Council staff responded in the affirmative.

ii. Insular fisheries actions

Josh DeMello, Council staff, provided an update on Council actions related to insular fisheries. These included specification of Annual Catch Limits (ACLs) for 2015-2018, removal of restrictions on large vessels in the Commonwealth of the Northern Mariana Islands (CNMI) bottomfish fishery, a Community Development Program (CDP) longline permit exemption and FEP review. DeMello presented the new protected species objectives resulting from the FEP review process.

A PSAC member sought clarification on the CDP permit exemption. Ishizaki clarified that the applicants are seeking an exemption to the Hawaii longline limited entry permit, but would other fish under all requirements for the Hawaii longline fishery such as gear and area restrictions.

B. Council Protected Species Activities Update

Ishizaki provided an update on Council's protected species activities since the 2015 PSAC meeting. Main activities included the development of the protected species module for the FEP annual reports, implementation of PSAC recommendations adopted by the Council, and improving coordination on Endangered Species Act (ESA) consultations. Completed projects over the past year included the genetic analysis of North Pacific loggerhead turtles, development of a tier system for potential biological removal (PBR) in the context of marine mammal interactions in fisheries, Hawaii green turtle data analysis and publication of a Protected Species Monograph.

A PSAC member commented on Council staff contribution in facilitating the loggerhead genetic analysis project among the Japanese and U.S. partners.

C. Endangered Species Act Updates

i. Section 7 ESA consultations for pelagic and insular fisheries

Mary Wunderlich, PIRO Sustainable Fisheries Division (SFD), provided an update of ESA Section 7 consultations conducted for pelagic and insular fisheries since the 2015 PSAC meeting. These include the Biological Opinion (BiOp) for the American Samoa pelagic longline fishery (completed October 2015), informal consultation on fin whale and Hawaiian monk seal critical habitat for the Hawaii longline fishery (completed September 2015), informal consultations for the special coral reef ecosystem fishing permit to Kampachi Farms (completed December 2015 and January 2016), informal consultation on Hawaiian monk seal critical habitat for Hawaii FEP fisheries (completed March 2016) and reconsultation for green, loggerhead and olive ridley turtles in the Hawaii deep-set longline fishery (in progress).

A PSAC member asked whether cumulative impacts from other consultations such as for harbor dredging are taken into consideration in fisheries consultations. Wunderlich responded in the affirmative.

ii. ESA listing and other related actions

Pat Opay, PIRO Protected Resources Division (PRD), provided an update of ESA and Marine Mammal Protection Act (MMPA) actions, including coral post-listing activities, green sea turtle listing and critical habitat, humpback whale listing revision, scalloped hammerhead shark critical habitat, shark and manta ray petitions and List of Fisheries (LOF). Opay provided details on the final rule to list 11 distinct population segments (DPSs) of green turtles as threatened or endangered, which published on April 6, 2016. He explained that the Central North Pacific DPS (including Hawaii) will be listed as threatened, while the Central West Pacific DPS (including the Mariana Archipelago) and the Central South Pacific DPS (including American Samoa) will be listed as endangered. Opay indicated that take prohibitions will remain in place for all DPSs, so level of protection will remain the same. The rule will go into effect with a 30-day delay on May 6, 2016. NMFS is also working on a green turtle critical habitat proposed rule.

PSAC discussed the need for more research on shark species of concern. A PSAC member noted the limited available data upon which ESA listing decisions are made for shark species and that more research on ecology and biology of shark species would allow NMFS to make decisions based on good scientific information. Opay clarified that NMFS is often forced to make a decision due to petitions driving the listing process. PSAC members noted that prioritization may be useful, given that populations of concern from a fishery perspective would depend on not only the amount of bycatch but also mortality from bycatch. Another PSAC member disagreed with the idea that more research would result in better decisions, citing the green turtle example in which there are long-term data on ecology and biology.

A PSAC member also sought further clarification on the listing decision basis for the Hawaii green turtle population, noting that it is unprecedented that species listing decision is made when the population is increasing. Opay encouraged PSAC members to read the Federal Register notice, and clarified that the listing rule acknowledges that the nesting population is doing well but threats remain and conservation benefits are insufficient to reduce all threats. Further

clarification was sought on how the extinction risk modeling showing no risk of extinction in foreseeable matched up with the threats assessment. Opay responded that the population viability analysis (PVA) was not done for all populations, and the listing determination was not based on the PVA results due to their limitations and caveats.

5. Fishery Ecosystem Plans (FEP) Annual Report Review Part I

A. Overview of the Report Structure and Process

Ishizaki provided a brief overview of the structure and process for the new FEP Annual Reports. The Annual Report is intended to monitor performance of fisheries managed under the FEPs while also meeting the National Standard 2 requirements for Stock Assessment and Fisheries Evaluation (SAFE) reports. The draft Annual Reports will be generated primarily by the FEP Plan Teams and reviewed by several committees including PSAC, Plan Teams and the Council. The review process will identify information gaps and potential management recommendations, which would feed back in to the Annual Report and Council decision-making processes.

A PSAC member noted that Alaska's ecosystem SAFE report uses a red-light/green-light type of system to summarize the information presented in the report. Ishizaki explained that the fishery data section is developing a "dashboard" approach similar to the Alaska approach.

B. Overview of the Ecosystem Module

Ishizaki provided a brief overview of the other sections in the ecosystem chapter of the FEP Annual Reports. These include climate, ecosystems and biological section, habitat section, human dimensions section and marine planning section. The Annual Report will also include a data integration chapter, which is currently in development.

A PSAC member commented that it would be useful to look at certain sections of the high seas to calculate indicators and metrics more specifically for those areas in order to understand bycatch and interactions. It was noted that high areas of interactions, such as those with albatrosses, may be predicted by environmental data.

C. Longline Fishery Sections

i. Summary of relevant fishery data

Russell Ito, PIFSC, provided a summary of the 2015 longline logbook data for Hawaii and American Samoa.

Hawaii longline participation has been stable for a number of years with the exception of the last few years, which saw a few additional vessels. Number of hooks set for the Hawaii longline fishery has been increasing over time, with majority of the increase in effort occurring in the high seas. Bigeye tuna catch has increase over the last several years, with catch per unit effort (CPUE) above average for the last six quarters. Swordfish catch has remained consistent since the fishery reopening in 2004, while CPUE is showing a slow decline. Ito explained that there has been a reduced interest in shallow-set longline fishing, with fishermen indicating that oceanography is different and it has been difficult to find fish as well as to find good quality fish.

Target catch in the American Samoa longline fishery represents species marketable to the canneries. Number of vessels participating in the fishery increased in the early 2000s as a result of the alias entering the fishery but has since declined due to the alias leaving the fishery. Albacore CPUE has been declining over time, consistent the albacore spawning stock biomass decline across the South Pacific.

PSAC discussion focused on additional clarifications for the Hawaii longline fishery. One PSAC member asked whether bigeye tuna quality was affected in 2015 as it was for swordfish. Ito indicated that the quality of bigeye was leaner in later part of 2015 when in typical years the water cools down and fattier fish come in. It was noted that bigeye CPUE was also higher across the core tropical zone in the Pacific, the reason for which is still undetermined but may be related to oceanographic changes. Another PSAC member asked whether fishermen changed behavior in response to last year's oceanographic conditions. Ito responded that the good fishing conditions in the west meant that they did not need to go into the EPO until the quota was reached, but in general it did not appear that the vessels were fishing beyond the typical range. PSAC members also indicated interest in seeing spatial depiction of effort compared to historical effort, to which Ito indicated that PIFSC will work on producing maps for the next annual logbook report.

One PSAC member asked whether the permit for the longline vessel grandfathered in to fish within the longline exclusion zone could be used for the CDP longline exemption. Ito responded that the exemption was different from a regular permit in that the conditions for being grandfathered in were restrictive (e.g., need catch history) and had limited transfer options.

ii. Protected species section

PSAC reviewed the Hawaii and American Samoa longline portions of the draft Annual Report protected species section. Interaction trends were stable for most species of sea turtles, marine mammals, and seabirds, as well as the scalloped hammerhead shark, with interaction levels below applicable incidental take statements (ITS) and potential biological removal (PBR) in most cases. Several trends were highlighted for additional discussion, including leatherback turtle and albatross interactions in the Hawaii deep-set longline fishery.

PSAC discussion for this section is summarized under "iv. Discussion and synthesis."

iii. Data analysis and related meetings

a. Leatherback interactions in the Hawaii deep-set longline fishery

Ishizaki provided a presentation on leatherback turtle interaction trends and patterns in the Hawaii deep-set longline fishery. This addresses a PSAC recommendation that was adopted by the Council. Following the 163rd Council Meeting in June 2015, Council staff conducted a preliminary descriptive analysis of leatherback turtle interactions in the fishery, which provided a basis for discussion for the informal working group convened by PIRO SFD. Descriptive analysis of available observer data considered potential factors that may have contributed to the higher observed interactions in 2014. Informal working group discussions identified two follow-up statistical analyses to determine whether 2014 was an anomaly and to evaluate patterns of

interactions. PIFSC presented the first analysis to the SSC at its March 2016 meeting, which indicated that 2014 was significantly different than historical years. Council at its March 2016 meeting recommended continued monitoring of interactions as well as an analysis to further evaluate interaction patterns.

PSAC members commented that further analysis could also consider mitigation approaches and ecosystem factors. PSAC also discussed whether observer coverage provides sufficient spatial and temporal representation of the full effort, and noted that an analysis to evaluate extent of sampling bias may be warranted.

b. Seabird interactions in the Hawaii deep-set longline fishery

Eric Gilman, Hawaii Pacific University, presented preliminary analysis results on risk factors for seabird bycatch in the Hawaii deep-set longline fishery. Seabird bycatch in numbers has increased over time, with nominal catch rates and hooks set per year also increasing over the same period. The purpose of the present study was to examine why the nominal catch rates have been increasing since 2004. The analysis fit observer data to spatio-temporal generalized additive mixed model and the results showed albatross density, month, annual average multivariate El Nino-Southern Oscillation Index (MEI) value, side setting and blue-dyed bait were significant covariates. Seabird catch rate significantly increased as annual mean MEI values increased and number of albatrosses attending vessels increased, both likely linked to decreasing ocean productivity that is contributing to nominal seabird catch rate. Blue-dyed bait and side setting had significantly lower seabird catch rates than untreated and stern setting, with side setting having a greater effect on seabird bycatch rates than blue-dyed bait.

A PSAC member asked whether there were differences in interactions rates by vessels. Gilman responded that vessel effect was included in the model but specific details have not been examined. It was noted that there was no significant changes in mitigation methods used over the study period.

c. Rare events bycatch workshop plan

Ishizaki provided a brief update on plans to convene a rare events bycatch workshop to address a recommendation from the PSAC adopted by the Council. The workshop is intended to review methods used in past ESA consultations for estimating the anticipated level of interactions from a proposed action and to consider alternative methods.

iv. Discussion and synthesis

Discussions stemming from the review of the longline portions of the draft Annual Report protected species section included the following:

- Annual numbers of protected species interactions were tallied based on vessel arrival dates to be consistent with the Observer Program's reports. PSAC members expressed concern that tallies based on vessel arrival dates is problematic if there is a lag between capture date and vessel arrival date. Council staff clarified that interactions are tallied based on vessel arrival dates due to the observer sampling scheme and expansions done

by quarters. PSAC noted that tallying method is of particular concern for the shallow-set fishery, for which hard caps are monitored by capture date. It was suggested that the Annual Report protected species section include a summary of the observer sampling method and explanation of why interactions are tallied based on vessel arrival date.

- Black-footed albatross interactions that occurred on vessels departing American Samoa and fishing in the North Pacific were reported in the American Samoa Observer Program report for 2015. It was noted that this was an anomalous case, but highlighted the need to have an understanding of where protected species interactions are attributed based on permit and fishing area.
- Anomalous catch rates of multiple species in recent years (e.g., bigeye tuna, albatrosses, leatherback) point to the need for understanding environmental and ecological drivers for species distribution and aggregation. PSAC members suggested using remote sensing data and other finer-scale environmental data, and considering spatial and temporal synchrony of keystone species in relation to environmental drivers affecting ocean productivity.
- The draft report presents all interaction data in tabular form. PSAC members discussed the utility of figures and other visual representation of data. Additional figures may be useful in highlighting anomalies in the summary or may be included as an appendix, but may not be needed for all available data.

PSAC also provided the following suggestions for improving the Annual Report content and format:

- Include mention that the higher ITS in the shallow-set fishery is due to higher effort analyzed in the 2012 BiOp (to be considered for 2015 report)
- Include definitions of unidentified cetaceans, pinnipeds and whales (to be considered for 2015 report)
- Include explanation of observer sampling method and difference between counting by vessel arrival date vs. capture date (to be considered for 2015 report)
- Verify that the marine mammal expansions for the deep-set longline fishery are estimated for each species and do not include unidentified blackfish (to be considered for 2015 report)
- Develop a simple way of illustrating spatial longline effort over time (PIFSC to make this high for next year's report)
- Consider expressing interaction rates as number per million hooks rather than per 1,000 hooks
- Consider inclusion of maps for take locations for certain interaction trends (e.g., pinniped takes in SSLL) to the extent possible under confidentiality data rules

6. Public Comment

There were no public comments.

7. Fishery Ecosystem Plans (FEP) Annual Report Review Part II

A. Pelagic Non-longline Fishery Sections

i. Summary of relevant fishery data — Paul Dalzell

Paul Dalzell, Council staff, provided fishing effort and participation data summaries for the pelagic non-longline fisheries. Overall, there has been no major increase in effort in the troll and handline fisheries in Hawaii, American Samoa, CNMI and Guam. Hawaii data are based on logbooks, whereas other areas are based on surveys. Main Hawaiian Island (MHI) troll fishing effort in terms of number of days fished has declined after 2013. Similarly, MHI handline fishing effort in days fished increased through 2012 but declined in 2013-2015. Hawaii offshore handline is a dynamic but small fishery that showed increase in days fished between 2010-2013 but has since declined. Dalzell noted that fishermen turn-over in this fishery is high and calculating CPUE in this fishery is difficult due to multiple gears used and targeting different fish at different times of the day.

American Samoa troll fishing effort has declined since the late 1990s after the longline fishery developed and outcompeted the small troll vessels. The 2009 tsunami also impacted this fishery but has recovered slightly since then. CNMI troll fishing effort has declined since the early 2000s, but landings have not declined in a similar manner due to the highliners targeting skipjack. Guam troll effort has been variable but generally stable over the last decade.

A PSAC member commented that higher fuel prices in recent years and storms in 2015 likely contributed to the reduced effort in Hawaii.

ii. Protected species section — Asuka Ishizaki

PSAC reviewed the pelagic non-longline portion of the draft Annual Report protected species section. Impacts to protected species in these fisheries are considered minimal based on ESA consultations and MMPA LOF classifications. There is an ITS of four green turtle mortalities per year from vessel collisions for the Western Pacific troll and handline fisheries, but there has been no reported or observed collisions attributed to these fisheries. Fishing effort and gear characteristics will be used as a proxy for monitoring changes in potential protected species interactions. Fishery data provided in the previous presentation indicated that there has been no major increase in troll and handline fisheries in recent years.

A PSAC member asked why ITS is only issued for green turtles. Council staff responded that this was based on the analysis done in the Biological Opinion, which considered the fishing area and possible overlap with listed species.

iii. Discussion and synthesis

Discussions stemming from the review of the pelagic non-longline portions of the draft Annual Report protected species section included the following:

- PSAC discussed whether criteria should be established to trigger further assessments when fishing effort and other characteristics change. Members agreed that a PSAC

review on a case-by-case basis through the draft report review and annual meeting discussions would be sufficient.
- Additional information such as studies on dorsal fin and mouthline scarring are available, which could be discussed in the report. One member emphasized the need to clarify uncertainties associated with such information, but noted that documenting trends over time may be useful.

PSAC also discussed and provided the following suggestions for improving the Annual Report content in future editions:

- Spatial representation of fishing effort would be useful as shift in effort distribution may trigger the need to further assess potential impacts to protected species. There are ongoing efforts by PIFSC to develop a GIS application to generate spatial summaries of Hawaii fishery data, which may aid in this task.
- Include "new research/information" section to summarize published reports (e.g., NOAA Tech Memos and peer-reviewed publications) relating to protected species interactions to inform emerging issues.

B. Insular Fishery Sections

i. Summary of relevant fishery data **Josh DeMello**

Josh DeMello, Council staff, provided preliminary data on insular fisheries. Data for insular fisheries in American Samoa, Guam and CNMI are derived from boat-based and shore-based creel surveys and dealer reports, and those for Hawaii are derived from commercial marine license (CML) data and the Hawaii Marine Recreational Fishing Survey (HMRFS)/Marine Recreational Information Program (MRIP). Data presented included catch composition by species and gear, as well as participation by gear type. Insular fisheries participation has been generally stable or declining in recent years. Both commercial and non-commercial data are available, but numbers from HMRFS data have been variable, highlighting concerns with this data source.

PSAC members expressed concern over possible misinterpretation of non-commercial data. The Hawaii non-commercial HMRFS data exhibit a decline in the early portion of the time series, which is reflective of the survey methodologies but could be misinterpreted as a decline in fish stocks. Council staff pointed out that the Council recommended against using HMRFS data for management purposes due to these data issues. Council staff also noted the need to determine scale of non-commercial fisheries in comparison to commercial fisheries. One PSAC member asked whether the Annual Report could be used to recommend changes in data collection forms, given that the existing data field for depredation in the Hawaii data forms suggest depredation from marine mammals are occurring. Another PSAC member cautioned against using data forms to collect such data due to the issue of self-incrimination. It was noted that other approaches to data collection, such as cooperative research, may be more appropriate.

ii. Protected species section **Asuka Ishizaki**

PSAC reviewed the insular fishery portion of the draft Annual Report protected species section. Similar to the pelagic non-longline fisheries, impacts to protected species in insular fisheries are

considered minimal based on ESA consultations and MMPA LOF classifications. Insular fisheries have not had observer coverage with the exception of the NWHI component of the bottomfish fishery had coverage between 2003 and 2005. There is an ITS of two green turtle mortalities per year from vessel collisions for the MHI bottomfish fisheries, but there has been no reported or observed collisions attributed to these fisheries. Fishing effort and gear characteristics will be used as a proxy for monitoring changes in potential protected species interactions. Fishery data provided in the previous presentation indicated that there has been no major increase in insular fisheries in recent years.

iii. Discussion and synthesis

Discussions stemming from the review of the insular fishery portions of the draft Annual Report protected species section included the following:

- Improvements in non-commercial fishery data reporting and quality are needed, with particular focus on catch composition and comparison with commercial data.
- Existing HMRFS data presentation could be improved by summarizing data by longer-term averages rather than annual data and showing confidence intervals to account for variability and uncertainty in data.
- Protected species interactions have been reported from shoreline fisheries but the extent of interactions is unknown. Issue of self-incrimination is a barrier to gathering information through self-reporting methods. Information from other sources such as the PIFSC stranding report is available. Approaches such as quantification of proportion of sea turtles with fishing gear may provide a proxy metric.

PSAC also suggested clarifying that the insular fisheries portion of this year's Annual Report protected species is limited to portions of the fishery that is considered federal to be consistent with ESA consultations.

C. Discussion on Monitoring Protected Species Interactions under the FEP Annual Reports

PSAC discussed the utility of a dashboard approach to summarize protected species interactions in the FEP Annual Report. A simple red-light/green-light approach would be useful to a lay person and would provide a quick summary of the information contained in the report. Non-longline fisheries do not have observer data, so development of a dashboard approach may be more complex for those fisheries. It was suggested that uncertainty could be highlighted by a specific symbol in the dashboard.

D. Discussion on Data Gaps and Research Needs

PSAC identified research, data and assessment needs for pelagic and insular fisheries through their review of the draft report. These lists, along with any additional needs identified by the Plan Team and other applicable Council advisory bodies, will be incorporated into the final Annual Report.

Identification of research, data and assessment needs for pelagic section:

- Research on at-sea foraging behavior of albatross species to improve understanding of interaction rates in the Hawaii longline fisheries.
- Identify zones to develop a regional look at environmental and oceanographic factors for area outside of the EEZ that may focus on areas of high-interactions. Develop metrics to characterize environmental data, effort, and bycatch rates at these regional scales (e.g. leatherback, albatrosses).
- Ecosystem-considerations on catch and bycatch in the DSLL fishery (e.g., bigeye tuna, albatross, leatherback turtle) as they relate to the environmental and ecological drivers of changing species distribution and aggregation.
- Evaluation of spatial and temporal representation of observer coverage compared to the non-observed effort. While vessel behavior may be motivated by various factors, an assessment of sampling bias may be warranted.

Identification of research, data and assessment needs for insular section:
- Improve the precision of non-commercial fisheries data to improve understanding of potential protected species impacts.
- Develop innovative approaches to derive robust estimates of protected species interactions in insular fisheries.
- Update analysis of fishing-gear related strandings of Hawaii green turtles.

8. Council's Research Priorities

A. Five-year Research Priorities **Asuka Ishizaki**

Ishizaki reminded PSAC members of their input on the Council's 5-year Research Priority document over the last two meetings. The priorities are revised every five years with minor updates in interim years. PSAC agreed that no changes are necessary this year to the protected species research priorities.

B. Cooperative Research Priorities **Council Staff**

Ishizaki reported that the cooperative research priority recommended by the PSAC at the 2015 meeting has been incorporated into the document. Research on marine mammal and other protected species depredation in the non-longline fisheries was identified through PSAC discussions as a potential priority for cooperative research.

8. Public Comment

There were no public comments.

9. Committee Discussion and Recommendations

PSAC made the following recommendations by consensus:

Regarding Albatross Interactions in the Hawaii longline fishery:
PSAC recommended continued monitoring of interactions to detect any future changes in albatross interactions that may be attributed to fishing operations. PSAC noted current seabird

measures implemented in the HILL fishery are effective and recent increase in seabird captures are driven by non-fishery factors at this time.

PSAC recommended research on at-sea foraging behavior of albatross species to improve understanding of interaction rates in the Hawaii longline fisheries.

Regarding the Annual Report Protected Species Section:
PSAC recommended that other approaches beside a tabular presentation be explored to present the annual marine turtle and seabird bycatch data for the Hawaii-based shallow- and deep-set longline fisheries. Graphical outputs would be informative for anomalous events (e.g., high effort, high bycatch). The current tabular presentation form used to summarize (1) marine mammal take (bycatch) in the Hawaii longline fisheries and (2) American Samoa longline fishery marine turtle, marine mammal and seabird take is sufficient for the Annual Report at this time.

PSAC recommended that the actual date of capture should be used in the annual shallow-set longline fisheries reports, rather than the vessel arrival date used by the PIRO Observer Program, for consistency with how interactions are counted toward the loggerhead and leatherback hard caps.

PSAC recommended development of an illustrative look-up table of catch and bycatch attribution based on permit(s) and fishing locations.

Regarding Shark Species of Concern:
PSAC recommended biological and ecological research of shark species of concern to facilitate sound decision making regarding ESA listing and related actions. Specifically, focus on oceanic white-tip shark is warranted due to known declines in population and bycatch in fisheries.

Further, PSAC recommended the Council work with appropriate partners to prioritize shark and other species of concern in terms of fisheries management in the Western Pacific region.

Regarding the Green Turtle Final Listing Rule:
PSAC recalled its recommendation from the 2015 meeting and expressed its disappointment in the final rule listing of the Central North Pacific DPS as threatened. PSAC recommended robust scientific research to be conducted to evaluate threats to the population identified in the final rule, such as impacts of sea level rise on French Frigate Shoals, so that such information can be considered in future 5-year status reviews of the population. PSAC further recommended continuation of the long-term nesting activity monitoring at French Frigate Shoals as part of the evaluation to determine impacts of climate change on the population.

Regarding the Shallow-set Longline Fishery Observer Coverage:
PSAC supported the reduction in shallow-set observer coverage and shifting the coverage level to the deep-set fishery, given that the deep-set fishery comprises most of the fishing effort. PSAC recommended that the Council consider the implications of decreasing shallow-set observer coverage on the implementation of the hard cap management measure.

Regarding Cooperative Research Priorities:
PSAC recommended the Council include a priority to improve understanding of the extent of marine mammal and other protected species depredation in the non-longline fisheries.

Regarding Research, Data and Assessment Needs Identified Through the Annual Report:
PSAC adopted the following identified lists as formal research recommendations:

- Pelagic Fisheries:
  - Research on at-sea foraging behavior of albatross species to improve understanding of interaction rates in the Hawaii longline fisheries.
  - Identify zones to develop a regional look at environmental and oceanographic factors for area outside of the EEZ that may focus on areas of high-interactions. Develop metrics to characterize environmental data, effort, and bycatch rates at these regional scales (e.g. leatherback, albatrosses).
  - Ecosystem-considerations on catch and bycatch in the DSLL fishery (e.g., bigeye tuna, albatross, leatherback turtle) as they relate to the environmental and ecological drivers of changing species distribution and aggregation.
  - Evaluation of spatial and temporal representation of observer coverage compared to the non-observed effort. While vessel behavior may be motivated by various factors, an assessment of sampling bias may be warranted.
- Insular Fisheries:
  - Improve the precision of non-commercial fisheries data to improve understanding of potential protected species impacts.
  - Develop innovative approaches to derive robust estimates of protected species interactions in insular fisheries.
  - Update analysis of fishing-gear related strandings of Hawaii green turtles.

10. Other Business & Next Meeting

No other business was discussed. The next in-person meeting is anticipated in 2017, timed with the review of the draft Annual Report.