PACIFIC SCIENTIFIC REVIEW GROUP

A Regional Advisory Group to the National Marine Fisheries Service

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30 July 2014

Dear Ms. Sobeck,

We would like to provide you with the minutes and recommendations from the most recent meeting of the Pacific Scientific Review Group held 1-3 April 2014.

The SRG has strongly urged that the NMFS give higher priority for ship time to conduct surveys of marine mammal populations and commends its efforts to develop a national scheme to regularly survey all regions. The SRG also commends the increasing collaboration between the State of Hawai'i and the NMFS in marine mammal research and sharing fisheries information.

Once again, the SRG compliments your NMFS staff for their excellent presentations, outstanding research, and support of the SRG. We particularly wish to express our gratitude to the Pacific Islands Regional Office and the Pacific Islands Fisheries Science Center for hosting our meeting in their new facilities.

Sincerely,

Michael Scott

Michael Scott
Chairman, Pacific Scientific Review Group

cc: Shannon Bettridge

Minutes for the Pacific Scientific Review Group Meeting
Pier 38 NOAA Office, Honolulu, Hawai'i
1-3 April 2014

The 24th meeting of the Pacific Scientific Review Group (SRG) was held at NOAA's Pier 38 Honolulu Service Center in Honolulu, Hawaii from 1-3 April 2014. All SRG members except Robin Brown (who participated via phone), Steve Jeffries, and Chuck Janisse were present. Karin Forney served as rapporteur. Michael Scott served as chairman of the SRG. The attending SRG members and other participants are listed in Appendix 1, review documents are listed in Appendix 2, and the agenda of the meeting is in Appendix 3.

Terms of Reference *(Document PSRG-2014-B01)*
Michael Scott introduced the Terms of References (TOR) and gave a brief summary of the background on the TOR. Shannon Bettridge thanked the SRG members for their many years of service providing peer-review to NMFS and emphasized that the TOR were not developed because of any problems with the SRG. They were needed to comply with an existing departmental directive, to be more transparent about membership and responsibilities, and to meet Data Quality Act requirements. In particular, NMFS must recruit membership widely, have written guidelines on who and how members are appointed, provide guidelines for the decision-making process and development of a written record of activities, and specify a code of conduct. The departmental directive further specifies staggered terms, such that at least 1/3 of the membership is reviewed or replaced annually.

The SRG questioned how it was decided to have NMFS write the TOR rather than the SRGs. Bettridge answered that the NMFS drafted the TOR and then solicited comments (although not all could be incorporated while still complying with legal requirements). It was emphasized that SRG meetings are a science review, not a forum for stakeholder positions. The point was made that the SRG membership should achieve good coverage of scientific expertise, not a 'balance' implying representation by different sides of an argument. The SRG also questioned whether a departmental memo can trump the MMPA's language on appointment and reappointment.

Bettridge reviewed the sections of the TOR. Section 4 describes how new members are nominated and specifies a 3-yr term of service for Chair and members. Members may be renewed for up to 3 consecutive terms, after which a 1-year hiatus would be required before potential reappointment. Bettridge indicated that the first review would be within 6 months of the current SRG meeting, and that implementation details are still to be worked out in consultation with the SRG Chairs and Liaisons. Although most current SRG members have already served longer than 9 years, Bettridge thought it would be most likely that the first third of the SRG (4 members) will be considered to have completed one term and their membership will be reviewed. Svein Fougner inquired whether this meant that there would be four solicitations for nomination. Bettridge clarified that the TOR does not require that a third of the membership will be replaced, only that membership and expertise will be reviewed. A Federal Register notice would announce any resulting vacancies. Nominees would need to describe how they could contribute to the SRG.

The TOR also specify NMFS responsibilities, which include trying to support one in-person meeting per year, as well as any necessary conference calls/webinars. Meeting minutes must be

circulated to the SRG within 2 months, and recommendations should go to the Assistant Administrator who is required to provide a response within 2 months. Minutes, recommendations, and responses are posted on a website. Section 7 specifies that the TOR will be reviewed within 2 years, and then every 5 years. The practicality of the review timing was questioned given that Appendix A will change more frequently than every 5 years. Bettridge responded that NMFS would prefer to have a web link for the information in Appendix A, rather than a list, given that things change more frequently. She also noted that a few minor corrections will be made to the current draft to clarify language and correct typos/mistakes.

Appendix B describes the information the agency is expected to provide to the SRG, and outlines the SRG's review responsibilities, referring to the Guidelines for Assessing Marine Mammal Stocks (GAMMS). The intent of this Appendix is to make it clear to the public (and to potential new SRG members) what the SRG provides to the agency. Appendix B also clarifies that SRG review of draft SARs and any other documents comprises peer-review and meets Data Quality Act (DQA) requirements. The agencies will provide SARs and other documents three weeks in advance of SRG meetings. Chris Boggs inquired whether there is a need for the agency to review documents and pursuant to the DQA before documents are provided to the SRG. Bettridge noted that most of the documents have gone through internal review, but they can also be presented as preliminary information, with the expectation that any preliminary information is not considered final until it has been fully reviewed.

Appendix C specifies the required expertise of SRG members. The SRG found the last sentence of this section problematic; as currently stated "federal employees or contractors" are prohibited from serving on the SRGs. Many current members of all the SRGs have accepted federal research contracts currently or in the past and some have been working for non-NOAA federal agencies. Bettridge explained that this was not the intent of the sentence; it was intended to apply only to full-time contractors and federal employees of DOC and DOI to ensure members are from outside the agencies involved in managing marine mammals. The TOR will be corrected to reflect this more accurately, perhaps along the lines of "Employees of DOC or DOI, or full-time contractors to the federal government." John Calambokidis requested that it be revised to state "contractors to DOC or DOI" as well, since he also has contracts with other federal agencies.

There was some discussion about the types of conflict of interest that would prevent someone from becoming a member. For example, a fisherman may have relevant expertise but also may have a clear and direct financial interest. Kathy Ralls noted that the National Academy of Science has found it cannot rule out everyone with a potential conflict of interest because there would be no reviewers left, but instead they require a clear statement of such conflicts. It was agreed that disclosure is an essential part of the process, given that most of the people who have relevant expertise, almost by definition, have the potential for a conflict of interest. Terry Wright requested that corrections in the TOR include a reference to "commercial and tribal treaty fishing," and Hannah Bernard noted that subsistence fisheries should also be included.

The SRG questioned how this version can be considered to be a final version when so many changes are required without distorting the meaning of "final." Despite the expected corrections to the TOR, NMFS considers the distributed version to be final and will initiate the first membership review within 6 months of this SRG meeting.

California/Oregon/Washington Research

Ship time and planned West Coast surveys

Lisa Ballance provided an overview of survey plans, reviewing the nationwide survey proposal shown last year. As part of a nationwide survey proposal NMFS is planning to request ship time for major cetacean and ecosystem surveys and emerging needs in the Western Pacific, US East and West Coasts, and Gulf of Mexico. Current (FY14-15) plans for ship time include a West Coast survey (CalCurCEAS) to be conducted 27 July–5 December on the new R/V *Rueben Lasker*. Based on the proposal, NMFS will try to repeat this survey in calendar year 2015 to provide back-to-back surveys. Sam Pooley pointed out that the agency is increasingly bound by line-item integrity (such that funding cannot be reprogrammed, *e.g*. from fish to mammals), and there are significant pressures for groundfish surveys and other activities. Given that the budget ultimately comes from Congress, we need to be aware of this. The SRG has frequently pointed out that fisheries are the main constituents and they are the ones threatened by adverse consequences if there are not PBRs because surveys have not been conducted.

US West Coast Serious Injury Determinations (PSRG-2014-09)

Jim Carretta reviewed the types of injuries and species involved. Injuries to a variety of pinnipeds, whales, and dolphins are caused by entanglements, ship strikes, shootings, and in recent years, research takes. There was one case with a special circumstance: a gray whale with a constricting wrap and with an unknown outcome. This was determined to be a serious injury, and NMFS received a public comment that it should be prorated because of the uncertainties. However, the 2012 serious injury policy specifies that a constricting wrap is a serious injury, so it will remain unchanged.

CA/OR driftnet and CA setnet fishery bycatch (PSRG-2014-10)

Jim Carretta provided an update on bycatch in West Coast drift net and setnet fisheries. In 2012, about a third of the driftnet effort was unobservable. Under emergency regulations that closed areas deeper than 2000m, one previously 'unobservable' vessel was allowed to carry an observer so it could fish in deeper waters. Carretta presented an analysis of estimation problems related to rare bycatch events, and how the extent of pooling data from multiple years affects the bias and precision in the estimates for a fishery with limited observer coverage. In some cases, a simulated observation program with 20% observer can go 20 years without observing rare events that are indeed happening twice per year on average. The 5-yr average estimate of bycatch exhibits great variability, while 10- or 20-year averages are much better. The drift gillnet fishery is an example where the fishery has been stable enough to average more years in terms of other management regulations, fishing behavior and distribution. Carretta pointed out that the low frequency of sperm whale and pilot whale bycatch in the drift gillnet fishery has been particularly problematic, with the estimated mortalities of these stocks swinging from zero to above PBR and back again with the occasional observations of only one or two bycatches. Jeff Moore further clarified that this is mainly an issue for species where observed bycatch is less than a few (*e.g*., 0-2) animals per year. It was discussed that there is a trade-off between cost (of increasing observer coverage), bias (which can be introduced if too many years are averaged and conditions have changed, *e.g.,* abundance, habitat use, or fishing distribution), and precision (which is poor when only 5 years are averaged but improves markedly with 10 or more years). For example, in one of the simulations presented by Carretta, the probability of observing zero bycatch when events are rare was 67% for a single year of observer coverage, but only 1.6% across 10 years. The SRG noted that adequately dealing with rare takes of marine mammals has been discussed regularly since the SRG's first meetings. The SRG supported the inclusion of more than five years for averaging bycatch to increase precision for rare species, as long as there

have been no major changes to the fishery or other factors that would be expected to cause bias in the estimate.

Estimating the fraction of cetacean carcass recovery ashore in California: coastal bottlenose dolphins as a baseline (PSRG-2014-11)
Jim Carretta presented an investigation of cryptic anthropogenic mortality of cetaceans. In past studies, very low rates of carcass recovery have been observed, ranging from 0% - 18%. The highest rate, 1/3, was documented by Randy Wells for Sarasota bottlenose dolphins, which inhabit a relatively enclosed bay system. The Carretta *et al*. study also focused on bottlenose dolphins, because they are found very close to shore, abundance is well-known, and they have a well-known life history and range. Therefore, they should represent the best-case carcass recovery scenario. He estimated the number of expected carcasses available to strand as Carcasses = N * mortality rates; calculated separately for calves and non-calves and adjusted for the proportion of time animals spend off Mexico, south of US waters, and accounting for the fact that current mark-recapture abundance estimates are only based on marked animals (65%). About 440 animals are expected to be in US waters at a given time; yielding ~22 non-calf carcasses and 11 calf carcasses to be available to strand. Of these, 24% were in fact recovered with representative proportions of calves (1/3) and non-calves (2/3).

There was some discussion of potential effects of the range expansion, potential biases for fishery-caught *vs*. natural deaths, differentiation of coastal and offshore bottlenose dolphins, and whether the proportion of calves in this population is in line with other populations, given the high pollutant loads observed in southern California bottlenose dolphins. Carretta confirmed that these factors should not cause any marked bias, and that the proportion of calves was consistent with other studies. The SRG commended Carretta for completing this study so quickly in response to last year's recommendation by the SRG. It was noted that the core range for coastal bottlenose dolphins is adjacent to dense human populations, making it more likely that carcasses would be detected. Dennis Heinemann (via phone) responded to an inquiry about the planned Marine Mammal Commission workshop on cryptic anthropogenic mortality. He explained that there are different methods for estimating such mortality, including the one presented by Carretta and another method used for seabirds and sea otters, which models the process of loss of carcasses from point of death until they are detected. The purpose of the workshop is to coordinate across regions to examine published methods, evaluate which methods are best for different types of stocks, and provide guidelines for estimating such cryptic mortality and applying those estimates to stock assessments.

New estimates of g(0) developed by Jay Barlow (PSRG-2014-12)
Karin Forney presented this study on behalf of Jay Barlow, who conducted an analysis of the probability of detecting marine mammals on the survey trackline (g(0)) in different Beaufort sea state conditions. His study used the apparent density differences when estimating abundance for specific sea states (taking into account geographic variation), to develop sea-state specific estimate of g(0). For all species with a sufficient sample size to be included in the analysis, the probability of detecting animals drops off as the Beaufort sea state level increases. (This effect is greatest for cryptic species, such as beaked whales, porpoises, and rough-toothed dolphins, and least for large whales. But for all species, past estimates of abundance are likely underestimated. The results of this study (currently in review) offer a way to correct for this bias in the future. It is expected that future estimates will incorporate the updated g(0) estimates.

Sperm whale trends (PSRG-2014-13)
Jeff Moore summarized new trend information for sperm whales, taking into account the new detection probabilities estimated by Barlow and using Bayesian methods previously applied to fin whales and beaked whales. The abundance estimates for 1991-2008 are imprecise but more stable than previous values published in the SARs. Imprecision in the trend parameter precludes any conclusion about whether the population is increasing or decreasing. The method used tends to draw individual point estimates towards the estimated trend line if the year-specific data are weak/sparse. SRG members and audience participants discussed methodological considerations and whether the assumptions of the model could mask detection of a true decline/increase that might have occurred only recently (for example, if the previous low abundance estimate for 2008 reflected a real change). Moore acknowledged this as a possibility, but the available data are not informative enough to allow for robust detection of such short-term changes in any case, while the method used allows more power at least to detect a long-term average trend. Bob Brownell suggested examining independent estimates for females and males, to account for whaling catches. Coastal whaling indicates there were higher catches of females during El Niño, and there have been multiple recent El Niño years, so more females would be expected in survey area. The SRG expressed support for the Bayesian trend analysis noting that it takes advantage of all available data and not just the few most-recent data points.

Fin whale population structure
John Calambokidis summarized tagging information on fin whales in the Southern California Bight on behalf of Greg Schorr and Erin Falcone of Cascadia Research. There is a seasonal shift offshore in spring/summer and onshore in fall/winter, and tagging data indicate site fidelity with occasional uncoordinated movements as far north as Monterey Bay and south to Punta Eugenia, Baja California. In comparison, several animals tagged off the Washington coast moved more extensively between British Columbia and Baja California, and an animal tagged in the ETP in 2003 was recorded in British Columbia in 2010. Photo-ID data show 340 unique animals in the Bight, with high resighting rates compared to other areas. Falcone is looking at ways to deal with distinct/indistinct animals to develop a mark-recapture estimate. Current estimates yield a lower abundance than the known number of animals, indicating heterogeneity in the use of different areas. Calambokidis indicated that, originally, calves were rarely seen, but more calves have been seen in recent years, in part because of increased effort. Calambokidis noted that the animals are feeding in the area; Ari Friedlander has a publication on krill targeted by blue and fin whales within an area of overlap, with fin whales tending to be a bit farther offshore.

West Coast and National Management
Monica DeAngelis (via phone) summarized recent changes and staff organization following the merger of the Southwest and Northwest Regional Offices into a single West Coast Regional Office (WCRO). Funding for 2015 and beyond will likely be reduced for the WCRO. Ongoing issues are whale-vessel collisions, increasing pinniped populations, unusual die-offs, use of drones, and the blue whale recovery plan. Recent Endangered Species Act (ESA) activities include the delisting of eastern Steller sea lions, and the receipt of petitions to include the captive killer whale Lolita as part of the Southern Resident Killer Whale stock and to expand critical habitat for southern resident killer whales on the outer coast of Washington to California.

Lynne Barre reviewed the Puget Sound Ecosystem Monitoring Program. DeAngelis also reported on developments in the Pacific Offshore Cetacean Take Reduction Team (TRT), including the emergency rule that went in place to help reduce the risk of sperm whale bycatch for the 2013/2014 large mesh drift gillnet fishery. Bettridge provided updates on the humpback

whale delisting petitions. In April 2013, NOAA Fisheries received a petition from the Hawaii Fishermen's Alliance for Conservation and Tradition, Inc. to classify the North Pacific humpback whale population as a distinct population segment (DPS) and to delist it under the ESA. NOAA Fisheries found that the petitioned action may be warranted and appointed a Biological Review Team (BRT) to conduct a status review of the entire humpback whale global species and prepare a report. The agency is now reviewing the BRT's draft status review report and will make a finding on the petition soon. In February 2014, the State of Alaska's Department of Fish and Game submitted a petition to designate the Central North Pacific stock of the humpback whale as a DPS and to delist it under the ESA.

List of Fisheries (PSRG-2014-08)
Nancy Young provided an overview of the current List of Fisheries (LOF), including the final 2013 LOF, the proposed and final 2014 LOF, and the proposed 2015 LOF that is currently under development and will hopefully be released by June or July so the final rule can be published and in effect by January of 2015. The 2015 LOF will still be based on 2013 SARs, so it will probably be similar to the 2014 LOF. Additionally, NMFS is developing descriptions and "fact sheets" for Category III fisheries, which will be made available with the 2015 LOF. Young indicated that new information in the draft 2014 SARs could be used in the 2015 LOF if the draft SARs are published on time. Kristy Long indicated that it was possible that the SARs and LOF could be released together for public comment, but this year there are some timing constraints. Tina Fahy (via phone) added that a workshop was held in Portland in November 2013 to examine risk of entanglement by large whales (gray, fin, humpback whales) in pot/trap/setnet fisheries. Habitat-based density models, fishery effort, and other information were considered to evaluate these risks by fisheries.

CA/OR/WA SARs
Southern resident killer whale SAR (*PSRG-2014-04*)
The SRG reviewed the southern resident killer whale SAR. The SRG noted that 1) a direct count is not an estimate, and 2) a new section on the new Serious Injury guidelines is included in this SAR, but not in some others. Karin Forney clarified that the same section was supposed to be in all SARs that used the new guidelines. A suggestion was made to move a statement on use of new guidelines to the preface (generically saying which years use the new ones and which the old) once the transition to the new guidelines has been completed in a year or two.

US West Coast cetacean SARs (PSRG-2014-03)
Sperm whale: As noted above, the SRG supports the adoption of the Bayesian trend analysis to take advantage of all available data and the inclusion of more than five years for averaging bycatch for fisheries that have not had changes in operations or management to increase precision for rarely caught species. The SRG suggested that a figure showing the trend analysis be included in the sperm whale SAR.

Eastern North Pacific (ENP) gray whale: The SRG commented once again that there is too much repetitive detail in the SAR (*e.g.*, Tables 1-2 – this information should be in the serious injury report, without all the details repeated in SAR). Monica DeAngelis noted that a better description of the column in Table 1 indicating Pacific Coast Feeding Group (PCFG) range overlap would be helpful, as it is often not known where entanglements took place. Jim Carretta provided an overview of the public comments received on the previous SAR. The SRG had recommended that a separate PBR be calculated for a segment of the ENP gray whale stock, the PCFG, for informational purposes only as the evidence was not persuasive enough at that time

for the SRG to recommend that it be considered a separate stock. The recovery factor chosen for this calculation was 0.5 because of the uncertainty about stock structure and status. Based on the public comments, Carretta suggested a potential change to this PCFG gray whale recovery factor from the default of 0.5 to 0.75. The rationale for the proposed change to 0.75 included the apparent lack of demographic independence between PCFG and ENP gray whales reported in Weller *et al*. (2013; PSRG-2014-B03) and the fact that a recovery factor of 1.0 is used for ENP gray whales. Carretta noted that uncertainties regarding the population dynamics of the PCFG whales (such as whether internal or external recruitment into the PCFG is more important) suggest that the recovery factor could be a value between the default of 0.5 (if the stock structure is uncertain) and 1.0 (if it is assumed that the PCFG, like the rest of the ENP stock, is at carrying capacity).

The SRG discussed whether a PBR should even be calculated for the PCFG since it is not a separate stock, whether it was appropriate to set a precedent for an "informational PBR," and whether it was premature to make this decision in advance of upcoming IWC workshops that will review and model Pacific-wide stock structure hypotheses. The SRG did not support a recovery factor of 0.75 at this time, and instead suggested that a sentence could provide a range of PBRs based on different values of F_r such as the following: "If an F_r of 0.5 is chosen based on uncertainty in stock structure, then the PBR would be 2.7; if an F_r of 1.0 is chosen based on the assumption that the PCFG is at carrying capacity, then the PBR would be 5.4; if a compromise value of 0.75 is chosen, then the PBR would be 4.0."

Western North Pacific (WNP) gray whale: This is a new SAR, and there were broad discussions on gray whale biology, movements, breeding, and genetics, and evaluated inference regarding gray whale population structure. David Weller and Aimee Lang provided responses and clarifications by phone. There is a clear haplotype-frequency difference between eastern and western gray whales, despite overlapping migratory movements. The mean date of conception is early December and the mean birth date is January. Weller noted that, given a 13-month gestation, conception has to occur during migration when WNP gray whales would still be well west of ENP whales; for this stock the Baja lagoons may serve strictly as birthing grounds and not mating grounds. Weller stated that this new SAR is based on the weight of evidence that supports a separate stock, although some individuals have been observed to migrate through the U.S. EEZ. Jonathan Scordino (via phone) inquired whether it is an appropriate time to present a new WNP SAR given the upcoming IWC review in the following week. Carretta responded that the best available science (PSRG-2014-B03) supports the designation of a WNP stock. The SRG made a few minor suggestions, including the removal of language on IUCN status, which is not usually provided in SARs. Bob Brownell confirmed that there was no overlap with Russian takes of gray whales and this stock.

Pinniped SARs: For the California sea lion SAR, the SRG suggested shortening the section on anthropogenic sound and harmful algal blooms, and noted that the subspecies language was not relevant. There were no comments on the California harbor seal SAR. Kathy Ralls requested that the biological information in the elephant seal SAR be made more current. Figure 2 does not appear consistent with the growth rates reported in text (there is no inflection point).

Hawaiian Monk Seals

Hawaiian monk seal research

Charles Littnan provided an update on monk seal research and recovery actions for the past year. The Programmatic EIS for the MMPA/ESA permit is in the final stages of completion, and the

permit requests new management and research actions as well as previously permitted ones. A Main Hawaiian Islands (MHI) management plan is also underway. The largest effort has been a CritterCam project in the MHI, engaging the community and high school students to address questions of interest and dispel myths about monk seals. NMFS has also worked on developing a partnership with Niihau, and completed the first census there during Sep 2013. A minimum of 19 pups were counted (compared to 21 pups in all the rest of the MHI). Only 3 previously known individuals were seen at Niihau, suggesting site fidelity. Veterinary planning and support has been added to the program (Michelle Barbieri), and the new Ford Island facility has a rehabilitation tank. The Marine Mammal Center's (TMMC) monk seal hospital is also nearing completion, allowing rehabilitation of malnourished or compromised animals. Plans for 2014 include a full June-September field season, with special projects in captive care, unmanned aerial vehicle surveys, Niihau census, translocations, and shark predation mitigation at French Frigate Shoals. There was some discussion of the shark removal program, including how many animals are removed and whether there is evidence it makes a difference. Removal effort is only in very shallow waters, and so far only two have been caught. Lastly, ship time is of concern for monk seals because of the size and remoteness of the study area. NOAA ships provide capability to do work most cost-effectively, otherwise the costs would be $1.3M.

Hawaiian monk seal SAR (*PSRG-2014-02*
Jason Baker (via phone) provided a summary of monk seal SAR edits. Abundance estimates have degraded over time as funding was lost, so the abundance and trend information in the SAR is currently less certain. During the upcoming field season remote cameras at Nihoa, deployed last year, will be recovered and the recorded images examined. Hopefully, these remote camera systems will prove valuable for better assessing remote sites, such as Necker and Nihoa, where surveillance has been inadequate. The SAR also contains a new table, comparable to the fisheries interaction table, which more succinctly summarizes information on intentional (or potentially intentional) killing of monk seals.

Pacific Islands Research

Pacific Islands serious injury determinations (PSRG-2014-14)
Amanda Bradford reviewed injuries documented as part of the Response Network. The SRG had a few clarification questions, but there were no specific comments for any changes.

MHI false killer whale fishery interactions (PSRG-2014-15)
Robin Baird (via phone) provided information and photographs of false killer whales with evidence of fishery interactions, including an individual that stranded in November 2013 with multiple hooks in its stomach. The types of injuries that are consistent with fishery interactions include cuts/injuries to the leading edge of the dorsal fin, broken teeth, and scars around the mouth. Other types of marks from non-fishery sources may include propeller marks, con-specific rake marks, and cookie cutter or other shark bites. Photographs of known false killer whale individuals were examined independently by seven scientists with experience with anthropogenic interactions and scored for consistency with fishery interactions. Scores for consistency with fishery interaction were defined as 3=consistent, 2=possibly consistent, 1=not consistent. Using an average score of >2.5 to indicate evidence of fishery interactions, 4.5% of individual false killer whales were found to have such evidence, although this varied by stock. The fishery-related injury rate was greater for Main Hawaiian Islands (MHI) false killer whales than for those in the pelagic or NWHI stocks. Within the MHI stock, rates also varied by social cluster, with Cluster 1 having lower than expected rates and Cluster 3 greater than expected. Originally, Baird expected that more males would be involved in fishery interactions, but all

seven known-sex animals with evidence of fishery interactions were females, possibly suggesting that depredation behavior is learned in social groups. A female bias may have a greater effect on the population. Additional research is needed to 1) identify mouth-line or other injuries that may be indicative of fishery interactions, 2) obtain more photos and biopsies to evaluate sex ratios, and 3) assess the likelihood of ingesting hooks from free-swimming fish. Meeting participants with commercial fishing experience noted that it is rare to catch fish with hooks embedded.

The SRG suggested that a statistical analysis be done to choose a threshold and that this may be a good data set for Bayesian methods. Paul Dalzell questioned the use of injuries to implicate a specific fishery, and Baird noted that these types of injuries have been observed in animals known to have interacted with fisheries (*e.g.*, the Kogia recently hooked in the longline fishery). It was noted that the stranded false killer whale had survived for some time after ingesting 5 hooks. This has implications for the assumption that ingested hooks are always a serious injury; on the one hand, the animal had survived for some time with the hooks, but on the other, it ultimately died. The cause of death has not yet been established for this whale; Asuka Ishizaki indicated that Kristi West (Hawaii Pacific University) is waiting on a number of results, but some preliminary histopathology results suggest heart disease potentially related to old age, rather than injuries related to ingestion of the hooks. Svein Fougner asked whether it is possible to estimate the time of the interactions based on the scar. Robin responded that false killer whale scars return to black pigmentation within a few years, making it difficult to assess age, but some animals were observed with more recent (white) scarring. Additional photographic sampling would help resolve these issues.

New data on false killer whale distribution and how they may inform redrawing stock boundaries. Erin Oleson provided an overview of new telemetry and sighting information for all three Hawaii false killer whale stocks that will be relevant for the 2015 SAR. At this time, Oleson is soliciting feedback on how to analyze and incorporate the new information for any needed revisions next year. The NWHI stock has been found to range as far east as Oahu. New data on the Pelagic stock were obtained during the PACES 2013 cruise, and additional telemetry data for pelagic animals tagged about 14 km from Big Island show they range widely offshore and throughout the NWHI. For the MHI insular stock, sample sizes have increased, but there are still no tagged animals from Cluster 2. High-use areas differ somewhat for Cluster 1 (more near the Big Island) and 3 (more near Maui). Discovery rates appear to have leveled off for Cluster 1 and Cluster 3, but are still rising for Cluster 2, which has not been encountered since 2011. Data limitations make the analysis more difficult for Pelagic and NWHI stocks but the discovery rates show no indication of a leveling off. Other data limitations include limited survey effort on the windward side of the MHI and incomplete seasonal information. However, the new information indicates that stock boundaries need to be revised and bycatch estimation may need to change. Oleson suggested that the following provisional changes seem warranted: 1) shrinking of the windward portion of the MHI insular stock boundary (although Cluster 2 and winter/spring are not well-sampled); 2) extending the NWHI stock boundary to include Oahu, and 3) a pelagic stock range that overlaps more fully with both other stocks. Oleson solicited input on types of analyses to conduct and suggestions for different approaches to stock delineation and bycatch estimation/proration.

The SRG noted that the leeward/windward differences in distribution and oceanography would support a change and that oceanographic features could be brought into the boundary determination. The SRG also suggested that boundaries could incorporate interactions with

recreational fisheries and effort data (Hawaii State fisheries data were presented later by Elia Herman). Chris Boggs suggested developing EEZ-wide probabilities (within simple boundaries), rather than a detailed probability surface that may be more complicated than warranted by the data. The SRG agreed that it would be preferable to use a simpler approach, because the information needs to be understandable to others, including the general public. Jim Carretta pointed out that GAMMS allows the designation of stock areas based on fishery or other threats, so this might be a starting point. Boggs cautioned however that knowledge about fisheries may be even more uncertain.

Oleson inquired whether there was any input regarding the unknown movements of part of the MHI population (especially Cluster 2, which has been sighted off all islands except Kauai, but never been tagged). Ralls suggested that, given the unknowns about Cluster 2, the approach should be conservative. Building on the comments by Carretta and Boggs, Forney suggested one could consider using the MHI exclusion zone, the Monument boundary and an 'other EEZ' areas to try to estimate probabilities of occurrence for each stock based on all available data (perhaps in a permutation test or Bayesian framework). These are the key areas for which management information is currently needed, so it would be a simpler approach that could avoid all the tiny overlap areas. Ishizaki asked about any new biopsy samples that may inform whether stock structure as a whole may need to be evaluated. Oleson provided details on the available samples, and Karen Martien confirmed that her paper in press provides the genetic evidence that strongly supports all three stocks. Terry Wright was concerned about trying to be too precise about stock affinity of individual animals and suggested defining some acceptable level of error in the assessment (analogous to type-I and type-II errors).

Mariana Islands genetics research
Karen Martien reviewed genetic information from the Mariana Islands. The samples include five bottlenose dolphins that have Fraser's dolphin haplotypes. This was not an identification error, and Genbank also includes two bottlenose/Fraser's hybrids from the Western Pacific, so it appears this is a more common phenomenon. Martien plans to investigate this further with mtDNA and microsatellite data, using as many samples as possible and examining whether there is also introgression of the nuclear genome. This will also allow an update of the previous bottlenose dolphin population structure study. Spinner dolphins (with the greatest samples sizes) show no evidence of population structure within the islands. Short-finned pilot whale sequences show shared haplotypes with the Indian, Atlantic, and S. Pacific Oceans, and appear intermediate between Japanese northern and southern forms (perhaps a purported 3rd morphotype). Samples are being genotyped for 80 SNP (single-nucleotide polymorphism) loci and a subset will have whole genome sequenced.

Other Pacific Islands cetacean research
Erin Oleson provided an update on additional Pacific Islands research efforts, involving nine other staff members at PIFSC. In 2013, they conducted the PACES (Papahanaumokuakea Associated Cetacean Survey) ship-based survey, a Guam/Marianas small-boat study, and several acoustic projects. Amanda Bradford led PACES, which collected data on abundance, stock structure, and habitat of cetaceans in the Northwestern Hawaiian Islands during 28 days in spring and yielded 91 sightings of 14 species, as well as more than 2800 photos, 23 biopsies from six species, and acoustic data. The most common large whale sighted was the sperm whale, the most common small whale was the pilot whale, while beaked whales were seen seven times. The false killer whale group size estimation protocol was implemented to varying success, and two false killer whales were satellite tagged. Genetic analysis of collected biopsy samples

indicate the tagged individuals are from the Pelagic stock. Their movements were quite different from HICEAS 2010 telemetry tracks of false killer whales from the Northwestern Hawaiian Islands stock.

Several small boat surveys to conduct biopsy and photo-identification sampling have been conducted between Saipan and Guam between winter 2010 (when weather was terrible) and June-July 2013. Spinner dolphins are primarily found nearshore and on offshore banks, where habitat is very different with rough seas and eddy confluences. Other species distributions are as expected. The photo data are currently being processed, beginning with spinner dolphins, bottlenose dolphins, and pilot whales. All show matches among islands. Four false killer whales (from 2 groups) with pelagic haplotypes were tagged and exhibited broad movements. Tagged pilot whales followed the island chain, with a concentration of positions around the banks south of Guam. Two bottlenose dolphins and one rough-toothed dolphin were tracked around Tinian and Saipan. Plans in this area for 2014 include 15 survey days in April and then May 15-June 3 on the NOAA Ship *Sette* [as of June 2014, the May cruise has been cancelled], and June 6– July 20 using small-boat surveys. The ship-based survey will be multi-disciplinary and include turtles, archaeology, and acoustics. Efforts on the U.S. Navy bombing range Farallon de Medinilla (FDM) will require coordination with Navy.

Ongoing acoustics projects include false killer whale stock differentiation, acoustic monitoring of longline fishing operations, long-term passive acoustic monitoring across the central-western Pacific, and development of a tetrahedral array. False killer whale whistles were collected during PIFSC, SWFSC, and Cascadia Research acoustic efforts. An analysis led by Yvonne Barkley has included selecting several groups per stock, 30 whistles per group, and measuring 54 variables to classify whistles to stock using the software program *ROCCA*. Preliminary results were promising for classification of animals to pelagic and MHI insular stocks (<80-96% correct), but NWHI have poorer classification (28% correct).

The longline recording study included research and development help from fisherman. Acoustic recorders were deployed on 97 sets during 8 trips. Ali Bayless is reviewing acoustic data manually, classifying whistles using *ROCCA* and comparing the timing of calling bouts to fishing activity and the occurrence of depredation. Cetacean sounds were heard during 52% of the sets; 58% of those classified were false killer whales. Whistle classification was consistent with click classification, but detection distances are greater, up to a few miles. Most sets with cetaceans do not show evidence of bait or catch depredation (although bait removal would not be classified as depredation). Sets with depredation included 7 of 18 sets with false killer whales present, and 1 of 13 sets with 'other' cetaceans present. Most detections are during the hauling of gear, suggesting that fishing reel hydraulics may be a cue. Two sets had detections on multiple recorders, and the whale was heard closer to the vessel at the beginning of the haul. Adam Bailey pointed out that hydraulics are on during setting too, but there would be less strain. Chris Boggs pointed out that setting and hauling sounds are quite different. Chuck Daxboeck noted that hauling is not an accurate word for line retrieval, because there is little strain. Boggs pointed out that strain is greater for deep sets than shallow sets, and that the term 'haul' is used by captains and the observer program. Bailey wondered whether there are any sounds attributable to gear itself, and Bayless responded that although there are some sounds, the most apparent pattern is the detection of animals during the haul. Svein Fougner wondered whether movement of vessels could be an attractant, but this information is not systematically collected. Bradford inquired whether detections associated with depredation were also more common during hauling, and Bayless responded that it was probably similar but analyses are still ongoing.

The long-term passive acoustic monitoring network includes HARPs (High-frequency Acoustic Recording Packages) deployed since 2005. Karlina Merkens (who joined PIFSC in January) has gone through the data to identify sperm whales. Kona and Kauai have low, year-round presence, while Pearl and Hermes Reef, Ladd Seamount, and Wake Island have seasonal occurrence patterns with higher daily detection rates. Sperm whales were also detected at Saipan and Tinian. Simone Baumann-Pickering is working on automatic detection of beaked whales and characterization of anthropogenic noise. Oleson has received NOAA funding to convert the Kona site to very high frequency sampling (up to 320kHz) to allow sampling of beaked whales and *Kogia*. Yvonne Barkley and Jay Barlow are developing and testing a tetrahedral array and Shannon Rankin's in-line array with two sets of hydrophones separated by 30m, which will improve the determination whether animals are left or right of the survey vessel.

A survey of the windward side of Molokai is planned for Aug-Sep 2014, staging out of Kalaupapa (the former leper colony on the north side of Molokai) to target areas used by false killer whales. This is a partnership with the National Marine Sanctuary, National Park Service, and NMFS Office of Science & Technology.

The SRG noted that since the PIFSC split off from the SWFSC there has been remarkable progress in the last few years from one person doing heroic work to a real program doing remarkable work.

Hawaii State Updates *(PSRG-2014-07)*
Alton Miyasaka provided an overview of the Department of Lands and Natural Resources (DLNR) program and Hawaii State fisheries (including methods, reporting, forms, and data definitions). William Aila is the Chair of DLNR, which includes nine divisions, plus the National Marine Sanctuary and National Monument. The Division of Aquatic Resources (DAR) under DLNR manages aquatic animals. DAR issues many licenses, including commercial marine licenses issued to individuals who catch fish and sell at least one fish, and other fishing/aquaculture licenses. Licenses are not specific to a fishery, but fishery information is captured on reporting forms. Miyasaka summarized gear types and fishery definitions.

Hybrid gear comprises multiple fishing types (assorted tuna handline methods targeting different depths and target species: palu-ahi, ika-shibi, pole-and-line for surface fish, casting, danglers) that are used at the same time by people (with separate licenses) at different stations on the same vessel on the same trip. Vessel lengths are ~30-40 ft long. A single fishing trip may be longer than one day. Captains submit a catch report covering all people on vessel (individuals do not submit separate reports), and this is considered one license for purposes of this report. For the last five years (2009 -2013), an average of 8 licenses per year reported spending 32 days per year using this gear.

Kaka lines include horizontal branchlines with multiple hooks near the bottom or in shallow mid-water. Fishing is conducted nearshore, generally inside of the 40-fathom line (or about 100 yards from the shore of the Big Island, farther around some other islands). For the last five years, an average of 22 licenses per year reported spending an average of 3 fishing days per year using this gear.

Short-line gear has a horizontal branchline, supported by floats at surface, and fishing is conducted offshore to target bigeye, yellowfin, mahi. There have been, on average, 12 licenses per year over the last 5 years, with about 26 days fished per license.

Vertical lines are suspended from a surface float using a terminal weight, and target offshore bigeye, yellowfin, and monchong (which is fished deep, ~1000ft). Over the last five years, an average of 9 licenses per year reported spending an average of 35 days fishing per year.

Trolling and Casting are gear types that are considered different but presented together. Trolling is conducted from moving vessel with rod and reel or drag lines, either nearshore or offshore, and targets tunas, mahi, ono, aki, and marlin. There are about 1,680 licensees with an average of 35,018 active fishing days. Casting is conducted from a stationary vessel or form shore, using rod and reel and targeting variety of nearshore or small offshore species. There are 215 casting licensees, fishing an average of 1,565 total days over the last five years. Trolling is more likely to encounter cetacean interactions than shorecasting. Erin Oleson noted that Robin Baird has identified >100 boats trolling near or through spotted dolphins off Kona, and a mark-recapture estimate of the number of boats involved was >300. Baird differentiated vessels trolling through dolphin herds from vessels casting with rapid re-positioning with lines on board to the front of dolphin herd, although some vessels do both. Phil Fernandez pointed out that this includes recreational fishing, so it is difficult to put into context. Chris Boggs also noted that this illustrates a mismatch between the data we have and what is happening out on the water; there are a lot of variation and unknowns. Recreational surveys show much higher volumes than commercial data, by an order of magnitude. Fernandez indicated that he does operations involving repositioning, but only a few other boats do. Most vessels are trollers, using two types of methods: traditional trolling and 'greenstick dangling' with a float that dangles bait. There is a lot of variation in how long the boats stay with dolphins (10 minutes to complete 2 passes up to 2 hours). Baird indicated his protocols have been evolving as he learns more about the fishing practices.

Charter fishing is currently viewed differently by the State than by NOAA, and it must report the gear type used. License holders submit fishing reports monthly, with all fishing activity and indicating which trips are chartered. There are about 200 vessels that offer charters for hire, and it is considered a subset of commercial fishing.

Fishing reports are required monthly or by trip, and reported data include gear, effort, total catch, location and depredation. Captains report their passengers' (license holders) data. Penalties have increased compliance from 33% to 95%. It was asked how compliance is evaluated. There are seven different report forms, most submitted monthly. The General Report Form (kaka, shortline, trolling, charter or not), MHI Deep7 (may include trolling, submitted within 5 days of end of trip) and Tuna Handline Report form (hybrid, shortline, trolling) are of interest for marine mammals. Although the forms do not include any specific information on marine mammal interactions, there is space for comments. Boggs noted that the longline fishery did not yield any marine mammal data when it was state-run, and the only way to get such data was through the observer program.

Miyasaka noted numerous reporting limitations: most commercial fisherman are part-time; catch may have been under-reported (fishermen previously reported what they sold and not what they caught); the area fished is based on a coarse grid; fishing gear definitions were not standardized until 2002 and on-line reporting did not start until 2010; differences in gear definitions between

the State and NOAA; and marine mammals and other species depredation was not well documented and was only added in 2002. There was some uncertainty whether charter vessels carrying non-fishing clients (and no fishing passengers) that troll on the way out must still have commercial licenses. Miyasaka indicated that if someone is fishing bottomfish on site but trolling on the way out, then they would use the bottomfish form, but if they were just trolling, then they would use the general form. This may create some confusion on how to report.

In summary, there are a lot of data that are shared with NOAA and these data can be looked at to answer a range of questions, but the data are time-consuming to analyze. Budgets for the State are also shrinking and resources are limited. Elia Herman clarified that the overview is intended to give a sense of data and data limitations, and to identify which fisheries might be of interest. Many licensees fish very few days, and changing forms may not actually yield more accurate reporting. The potential for observer coverage was discussed. Shortline vessels may be large enough (8 vessels), but Ishizaki cautioned that placing observers in a statistically sound way will be difficult, because vessels fish from different ports and may decide the same day or the night before on when to fish and what to fish for.

Elia Herman provided an overview of State of Hawaii Section 6 ESA activities and the Sanctuary Management plan review. A few staff members have focused on Section 6 efforts to increase the use of barbless hooks to reduce injuries to monk seals. In coordination with NOAA, they have handed out > 60,000 barbless circle hooks. This has resulted in about ¾ of participants in tournaments using barbless hooks (compared to none in 2007). This effort is relevant to monk seals and false killer whales. DAR/NOAA have a marine mammal response team to address injured/hooked animals, and to raise awareness about hookings and the need to report quickly so injuries can be mitigated. They have completed a public service announcement about keeping proper distance to seals to avoid harassing them. DAR also applied for a grant to address false killer whale conservation issues in collaboration with Cascadia Research and Hawaii Pacific University, and although it was competitive they did not receive the award. They intend to reapply in 2014. The project includes four elements: 1) filling in spatial and temporal data gaps and obtaining data on poorly-sampled social clusters via tagging, photo-identification, and examination of mouth-line photos; 2) examining overlap between false killer whales and state fishery effort; 3) responding to strandings; and 4) continuing efforts to build credibility and raise awareness of safe fishing practices for false killer whales. The Hawaiian Islands Humpback Whale National Marine Sanctuary co-management has 20 staff, including two from the State (Elia Herman, Shannon Lyday). The Sanctuary Advisory Council is actively involved in shaping the sanctuary management plan and future activities. The management plan review process also includes scoping meetings, public comment, identifying key recommendations, engaging the community, evaluating ecosystem *vs*. whale sanctuary designation, and identifying research questions. The plan is currently being drafted, and will hopefully be released in September 2014.

Chris Boggs explained that his group has access to State data, but they are difficult to work with and may not yield high-quality information. Data collection has been improved for fisheries with management issues, where information on the species taken was needed. In the past, NOAA implemented the federal longline observer program because the State data were inadequate. For the bottomfish fishery, the data were better but it was still a very involved process to use the information. None of the other fisheries have been examined, and this would be a time-consuming task. Boggs noted that staff time and funding are the limiting factor, but that other entities (*e.g.*, wind farm development) also have an interest in knowing where fishing takes place and might be a source of funding. Fernandez suggested working with fisherman to

understand the gear types and how they are used, and whether and how often interactions occur. Michael Scott noted that Hawaii is unusual in the complexity of fishing activities and reporting, and that observer programs would be expensive and, in the case of many of these small fisheries, logistically difficult. The current process for managing fisheries that interact with marine mammals are to a) observe vessels to monitor mortality, b) estimate abundance, and, if the mortality exceeds PBR, c) set up a Take Reduction Team, and d) adopt mitigation measures. As a cheaper alternative to this process for difficult-to-monitor fisheries such as these, the Alaska and Pacific SRGs have recommended that one might simply adopt the mitigation measures at the outset. Scott suggested that moving forward with appropriate mitigation measures (*e.g.*, barbless hooks pingers, closures), combined with small-scale fishing vessel monitoring (such as the work being done by Robin Baird), and fisherman outreach, may reduce the costs and logistical difficulties of monitoring and managing these fisheries. He expressed the gratitude of the SRG for the State's presentations and for the rapid progress DLNR has made since re-invigorating its marine mammal program just a few years ago.

John Calambokidis pointed out that it has become clear during the last 5-10 years that these fisheries need to be paid attention to and that it would be valuable to coordinate with the fishing community. The difficulties in obtaining data should not prevent us from making progress on other fronts. Boggs noted that his group is trying to get a better handle on the data issues. He also mentioned that there was a fishery in the late 1970s with depredation problems of a sufficient magnitude to result in a study being funded to evaluate deterrents. Those data may be a helpful starting point, if they were summarized. Terry Wright pointed out that there is a gap between anecdotal information indicating a problem and quantitative data to indicate whether or not it is indeed taking place and its magnitude. The SRG suggested that a current review of the depredation problem would be a valuable first step.

Pacific Islands Management

Lisa Van Atta reviewed monk seal recovery actions, including ESA-MMPA permit application and a programmatic EIS for continued recovery efforts, shark mitigation permit, and Main Hawaiian Islands (MHI) monk seal management plan. They are working on establishing a revised Recovery Team led by Tim Ragen to focus on recovery plan implementation especially in the MHI. A new captive care facility has been established in Kona, and there are monk seal tanks at the new Ford Island facility allowing rehabilitation of injured animals. The new ESA-MMPA permit is out for public comment through April 15, 2014, and a draft MHI management plan that includes input from stakeholders is expected to be completed by summer 2014. A critical habitat petition was received in 2008, and the proposed rule published in 2011 received a lot of criticism about missing information. Based on new research, NMFS is now looking to refine definitions of essential features and conduct an updated economic analysis.

ESA status updates for the endangered MHI false killer include ongoing efforts to designate critical habitat and to develop a recovery plan. Initial efforts include identifying and obtaining information needed for the recovery plan and establishment of a recovery team. NMFS is currently consulting with other federal agencies to identify how federal activities and the deep-set longline fishery will affect the stock. Nancy Young provided updates on the false killer whale TRT and Take Reduction Plan (TRP). All regulations were effective by Feb 27, 2013 following finalization of the take reduction plan. There have been no takes in the shallow-set longline fishery since TRP implementation, but during 2013 four false killer whales were observed caught in the deep-set longline fishery (including one after Feb 27), one of which occurred within the EEZ around Hawaii. The interaction occurring within the EEZ was

determined to be a serious injury and thus counted towards the 2013 trigger for the Southern Exclusion Zone closure (the trigger is two observed mortalities or serious injuries of Hawaii pelagic false killer whales in the deep-set fishery inside the EEZ around Hawaii). However, no additional serious injuries or deaths were observed in the fishery within the EEZ during 2013 so there was no closure. During 2014, through the date of the PSRG meeting, there have been observed three false killer whales caught in the deep-set fishery (none in the shallow-set fishery), including one serious injury within the EEZ. This serious injury counted toward the closure trigger for 2014, and a TRT conference call to discuss the interaction is scheduled for April. The other two interactions in 2014 so far were during a single set on the high seas. The TRT continues to evaluate monitoring and research plans. No in-person TRT meetings are planned for 2014, but one is tentatively planned for 2015. Hannah Bernard commended PIRO on the progress made.

Van Atta summarized the marine mammal response program, which conducted over 40 responses, including 14 monk seal interventions / dehookings. There were also hundreds of haulout responses to check on and document seals, and 25 cetacean strandings of 11 species. The 2013-14 humpback whale season is underway, and so far there were 9 ship strikes and 9 entanglement events. PIRO continues to increase its capacity for stranding response at other islands (Guam and Saipan), and with the new NOAA facilities on Ford Island they are continuing surveillance of emerging diseases in cetaceans (*e.g.*, brucella, morbillivirus). Calambokidis inquired whether Prescott funding was also reduced and if funding is a problem. Van Atta responded that funding has been cut, but things were manageable this year. The future is uncertain and response partners depend on that funding to a great extent.

Laura McCue reported on spinner dolphin management. PIRO is working on a rulemaking to regulate human disturbance, and is continuing the Dolphin SMART program, which involves outreach and education. Jamie Marchetti presented an update for the longline fisheries observer program. Coverage was 20% in the deep-set fishery for 2013, and 2014 so far has 15% coverage but will make up the difference by end of year. Species taken in the deep-set fishery in 2013 and 2014 include false killer whale, bottlenose dolphin, rough-toothed dolphin, pygmy killer whale, short-finned pilot whale, one unidentified *Kogia*, and several unidentified cetaceans. The shallow-set fishery remains at 100% coverage, and the species taken in 2013 and 2014 include false killer whale, Risso's dolphin, bottlenose dolphin, rough-toothed dolphin, unidentified beaked whale, and Northern elephant seal. Some vessels fish en route to California. The American Samoa longline fishery had low observer coverage, and interactions with one false killer whale and one rough-toothed dolphin were observed during 2013 (none in 2014 to date).

Pacific Islands SARs *(PSRG-2014-01)*
Erin Oleson presented the Draft 2014 SARs. The false killer whale SAR includes updated fishery information, abundance estimates for the Pelagic and NWHI stocks based on the Bradford et al. (2014) paper, and an updated N_{min} for MHI false killer whales based on the minimum number of individuals from photo-identification. During the pre-SRG conference call in February 2014, Oleson had provided alternate options for prorating bycatch based on takes within the 2-way and 3-way stock overlap zones. Based on feedback from the SRG, counting all takes for each stock was rejected. A second option was based on McCracken's previous approach that used a logistic decay function to estimate stock-specific takes for the Pelagic and MHI stocks, and then double-counts the MHI takes to the NWHI stock. A third option, the most complex, used the McCracken approach but apportioned takes based on the number of hooks set in each 'zone' (*i.e.*, single-stock zones, 2-way overlap zones, and a 3-way overlap zone), and

further prorated take to each stock based on the relative density of each stock within that zone. This third approach was considered the best approach and was incorporated into the SAR, resulting in strategic stock status for Pelagic and MHI false killer whales, but not the NWHI stock, which is below PBR. Jeff Moore noted that the choice of approach did not qualitatively affect the results. Svein Fougner inquired whether information on the call-in meeting was open to participation by others. Shannon Bettridge, Karin Forney, and Erin Oleson commented that the call included only the SRG to receive focused and efficient feedback for preparing the SARs, which are now being reviewed at the SRG meeting. Fougner requested that such information or a summary be made available sooner so others could be informed prior to the SRG meeting. The SRG made minor comments on text in the SAR and made some suggestions for clarification/corrections. Charles Daxboeck inquired about the dorsal fin disfigurement information and Oleson clarified that it was taken from Baird's study. Ishizaki noted that the SRG requested additional statistical analyses on the disfigurement study presented in the PSRG document cited in the SAR, and wondered whether the paper should be revised and re-reviewed before it is referenced in the SAR. Robin Baird noted that he plans to revise the paper and submit it for peer-review quickly, possibly before the draft SARs are finalized.

The 2013 spotted dolphin SAR was previously revised to include multiple stocks, but there were no stock-specific abundance estimates. A public comment suggested that we estimate a range of possible abundance estimates, so the draft 2014 SAR includes these for review and SRG input. The ranges of published spotted dolphin densities resulted in abundance estimates of 11–542 for the Oahu stock; 22–1117 for the Four-Islands stock, and 83-4,201 for the Hawaii Island stock. The lower end of these ranges is less than the observed school sizes, so Oleson defined a lower bound based on group size information and encounter rates around all HI Islands (Baird *et al*. 2013). One could use the average, average + 1 SD, or maximum group size to rule out unrealistic estimates. There was some discussion of the pros and cons of providing a range of plausible abundance estimates, and whether these would have any management implications. There was also concern that including the information could be misleading. Another approach suggested is to look at the maximum group size observed within a given stock range and use that as the N_{min}. Baird reported that maximum group sizes were 170 for Oahu, 190 for 4-island, and 350 for the Big Island.

General Research Topics

NMFS Protected Resources Science Investment and Planning Process

Lisa Ballance provided an overview of NMFS mission and legal mandates, and constraints in recent years, including declining funding and ship time for protected species research. NMFS has been developing a process for combining resources which is designed to be scalable to other taxa/protected species. The process will include annual regional review, compiling science needs every 3 years, and coordinating with other federal partners every 3-5 years. The plan also includes improving messaging and performance assessment. There will be a formalized engagement with consumers of protected species science, incorporating their needs, streamlining processes, and considering economics. Benefits include improved communication, increased transparency, and enhanced collaboration. Since this process started about 18 months ago, there have been tighter linkages between the Office of Protected Resources, the Office of Science and Technology, the Regional Offices, and the Science Centers. There is also an increased recognition that NMFS and external federal partners have common protected species science needs, highlighting the importance of leveraging funds and infrastructure across agencies for protected species research.

The SRG discussed funding, prioritization, collaborations, and how to find the most effective way to approach science needs and how the SRG would fit into this planning process. The PBR approach was predicated on surveys at regular intervals and if PBRs cannot be calculated because data are too old, there currently does not appear to be the consequence that was intended in the MMPA. Ishizaki inquired about council activities, and Lisa emphasized that councils and fishing groups are important user groups.

Stock Delineation Guidelines Initiative (PSRG-2014-06)
Karen Martien provided an overview of this initiative. Many types of data can be used for stock delineation (e.g., genetics, distribution, movements, acoustics, morphology, life history, contaminants, parasite loads, and habitat differences). There is a national need to use all available data types more broadly and consistently. One of the GAMMS III recommendations was a workshop to develop a consistent approach for defining stocks. The workshop will be held in the fall, and Martien presented preliminary ideas on how to move forward, including three phases. Phase 1 is to have science and management teams hold meetings on science and implementation. In phase 2 these two aspects would be integrated, and in phase 3 headquarters would develop a process for creating formal policy.

The SRG noted that this proposed workshop does not have the focus recommended by the SRG (see Previous Research and Management Recommendations) and asked why this more-involved process was thought to be better than a simple science-based stock delineation workshop that focuses on management decisions. Ballance and Martien clarified that the intent is to ensure that the science document would be useful for the implementation of a formal, national policy on how we delineate stocks. Martien noted that the process in the document has not changed substantively, with a three-part Science Team Plan involving Journal Club, Background Documents, and Science Meetings to develop guidelines for using multiple lines of evidence. Each Journal Club will focus on a specific line of evidence (acoustics, diet, movements, distribution and habitat differences, trends, morphology, life history, social structure), and include presentations by experts in that field. Participants will examine strengths and weaknesses, and how the evidence applies to different taxa. The background documents will include a review of stock definition under the MMPA, a 'genetics for dummies' document, a review of utility of different lines of evidence for delineating stocks, reviews of past cases where multiple lines of evidence have been used, and summaries of case studies. The Science Meetings will review case studies, finalize guidelines, and produce a workshop report. So the overall process is much expanded from the original proposal.

There was discussion of stocks under the MMPA and whether or not PBR is conservative if stocks are not correctly defined. Mark Fraker inquired about the concept of a stock relative to management and/or biology. Martien agreed this was an important question, and clarified the difference between stock definition and delineation. Stock definition indicates what constitutes a stock under the MMPA, with our current operational definition being that stocks are demographically independent populations. Stock delineation, on the other hand, is the process of identifying groups of individuals that meet that definition of stocks. The goal is to develop guidelines for delineating stocks that are consistent with the existing definition of stocks.

New estimates of R_{max} for cetaceans
Jeff Moore presented a recent analysis re-evaluating default values of R_{max} in the PBR equation. The study evaluated support for existing default values of R_{max} and developed new estimates. Moore is requesting input from SRG on whether these new defaults should be used in future

assessments. The method builds on the theory that R_{max} * generation time (T) is a constant a. This relationship has been examined for birds and mammals and the regression yields a constant a=1. Log (R_{max}) ≈ log(a) – log (T). R_{max} was calculated in two ways: using allometric and life-history table approaches, and a joint distribution was obtained. The allometric approach is based on the observation that adult survival, age at first reproduction, and the allometric constant are related to body size. Thus, given a range in reproduction and survival, R_{max} can be estimated from this relationship. The life-history approach can yield different results. The averaged distribution eliminates/reduces unreasonably high/low estimates. Moore obtained parameter estimates from the literature when available, and made a set of assumptions for others, based on data-derived relationships between body size and survival or age at first reproduction. Uncertainty is carried through in a Monte Carlo approach. For mysticetes, the average R_{max} was 0.055, ranging from 0.02 for bowheads to 0.08 for minke whales. For odontocetes, R_{max} averaged 0.047 (with 0.04 for sperm whales, 0.04 for 'blackfish,' 0.04 for small dolphins, 0.06 for river dolphins, and 0.07 for porpoises). Michael Scott pointed out that the new estimates of R_{max} could be used in each species' SAR, and there is not necessarily a need to change the defaults (which would require a GAMMS revision). Mark Fraker pointed out that there are additional killer whale data for northern residents and AK residents. Asuka Ishizaki wondered about the effect of depletion, which happened for mysticetes but not for odontocetes. Moore confirmed that the odontocetes are not likely growing at this rate, although we don't necessarily know depletion status for many populations. Moore currently has a paper in review showing methodology, which will be followed by a paper providing new values. He is still working on the pinniped analysis. The SRG commended this new approach and looks forward to seeing new potential R_{max} values next year.

Topics, timing, and location of next meeting

John Calambokidis offered to host the next meeting in Olympia, WA in March-April 2015.

Potential topics include:

1) Gray whale stock structure
2) NW pinniped updates
3) R_{max} updates
4) Preliminary report from west coast cetacean surveys
5) Update on g(0) corrections
6) Harbor seal abundance updates
7) Harbor porpoise abundance updates

Previous research and management recommendations
Pacific Scientific Review Group Meeting, 2-4 April, 2013

The SRG recommends that the NMFS cooperate with the State of Hawaii to collect more information about Hawaiian near-shore fisheries. Published observations have documented small-scale fishery takes of marine mammals, but it still must be determined whether these fishery takes are significant and how they can be reduced or avoided. The PIFSC/PIRO Fishery Monitoring Branch should include marine mammal data on its forms for Hawaiian fisheries, and data from the State of Hawaii should be included in SARs.

Fishery information from the State of Hawaii and NMFS were collected and presented at meeting.

The SRG recommends that the NMFS Permit Office consider excluding the area off the NW side of the Island of Hawaii and the Alenuihaha Channel for mid-frequency sonar use. This area has been identified as a Biologically Important Area as it includes the ranges of resident groups of melon-headed, Cuvier's, and Blainville's beaked whales. Such sonar has been implicated in mortalities in these species.

The NMFS is considering this issue and will provide updates to the SRG.

The SRG recommends that harbor porpoise assessment surveys be conducted in Washington inland waters in light of 1) the long interval since the last surveys (2002-2003), 2) the evidence for recent ecosystem changes and changes in distribution of harbor porpoise in Puget Sound, and 3) the increased strandings in these waters in 2012. This is particularly important given that PBRs can no longer be calculated because abundance estimates are greater than 8 years old.

A Puget Sound survey (NWTR) has been completed and analyses are ongoing. Information for Juan de Fuca and other inland waterways are still needed.

The SRG recommends that new surveys be conducted for harbor seal stocks in Oregon and Washington. There are no current abundance estimates, and thus no PBRs, for these stocks.

NMFS and Steve Jeffries have conducted some surveys, but the surveys are incomplete, so it is not clear whether they are sufficient. The NMFS Science and Technology Program is in the process of funding harbor seal surveys in the NW.

The Pacific SRG has previously urged NMFS to conduct shipboard surveys to obtain new abundance estimates for marine mammal populations. The SRG is very concerned that NMFS is giving a low priority to marine mammal research when allocating ship time. The US West Coast survey has been postponed until 2014, uncertainties have increased regarding whether funding will be available to support field work to monitor the Hawaiian monk seal population and mitigate human impacts, PBRs cannot be calculated for new Hawaii pantropical spotted dolphin stocks, and the lack of data puts populations at risk. When PBRs cannot be calculated, either for lack of abundance estimates or abundance estimates more than 8 years old, a negligible impact determination cannot be made for ESA-listed species and managed fisheries cannot achieve required MMPA standards. Either outcome places an inappropriate burden on managed fisheries. A multi-year allocation of ship time for marine mammal surveys should be rapidly

developed, and the priority and funding for such surveys should be increased to conduct abundance estimates and other research required for management.

A West Coast Survey is being planned and shiptime has been allocated for fall 2014.

The SRG recommends that Regional Offices and Science Centers be consulted prior to NMFS issuing permits for activities such as seismic surveys. We note that these activities often involve uncertain consequences and opportunities for assessing impacts to marine mammal species, and therefore recommend that an appropriate monitoring/research effort before, during, and after the large-scale activities be required to gain information on impacts.

There was a coordination call between F/PR, WCRO, SWFSC, and PR1 regarding these concerns and NMFS is working on improving communication and coordination for such permits.

The SRG recommends that NMFS develop methods to estimate the total human-related mortality of marine mammals (*e.g.*, from ship strikes or unobserved fisheries), based on strandings and other reports of injury or death. The SRG believes the Southern California area would be a good place to begin a feasibility study.

Jim Carretta presented a preliminary analysis and plans to expand on this study to produce a publication.

The SRG recommends that NMFS, in collaboration with the Fish and Wildlife Service, the Marine Mammal Commission, the SRGs, and outside experts, conduct a systematic review on defining marine mammal population structure. The SRG recommends that the NMFS focus on how genetics can complement more traditional information such as morphology and distribution in determining marine mammal stock structure and in defining the terms 'stock' and 'population.' The workshop should provide guidance and consistency for deciding how much genetic differentiation in what type of genetic markers justifies defining a stock. It should also examine how to best integrate the different, and sometimes conflicting, types of information: morphology, distribution, genetics, and contaminant and parasite loads. The SRG would like to have the following questions be addressed: How do we mesh the MMPA's goal of maintaining a population as a functioning part of the ecosystem (that emphasizes the replaceability of the populations) with the statute's definition of a stock (that emphasizes breeding interchange)? In a continuum of levels of genetic exchange (for example, the continuum in killer whale populations from matriline, to subpod, to pod, to clan, to population), where does one draw the line between what is a stock and what is not? How do we balance the conservation concerns resulting from stocks being defined very broadly *vs.* the costs and practical management concerns resulting from stocks being defined very narrowly?

Planning is underway and the SRG was updated on the progress.

Research and management recommendations
Pacific Scientific Review Group Meeting, 1-3 April, 2014

The SRG recommends that the NMFS collaborate with the State of Hawaii to produce two reviews that can aid in future management:

1) Expand upon the information presented at the SRG meeting on the fisheries that operate in Hawaiian nearshore waters (such as the troll, handline, shortline, and other fisheries). In addition to the information that is currently collected from fishermen through self-reports, data should be collected on catch amounts, season, location, and types of gear used, including regional variations in gear used. The collaborative research proposed by the Hawaii Department of Land and Natural Resources, with its emphasis on scientific research and outreach to the fishing community and public should be a useful part of this review.

2) Depredation of fish catches by cetaceans is recognized as a serious problem for both fishermen and cetaceans in Hawai'i. To better understand the dimensions and dynamics of this cetacean-fishery interaction, a review and problem analysis for each of the applicable fisheries could provide both a historical perspective and a current assessment of the problem.

The SRG recommends that harbor porpoise assessment surveys be conducted in Washington inland waters in light of 1) the long interval since the last surveys (2002-2003), 2) the evidence for recent ecosystem changes and changes in distribution of harbor porpoise in Puget Sound, and 3) the increased strandings in these waters in 2012. This is particularly important given that PBRs can no longer be calculated because abundance estimates are greater than 8 years old.

The SRG recommends that surveys be completed for harbor seal stocks in Oregon and Washington. There are no current abundance estimates, and thus no PBRs, for these stocks.

The SRG recommends that NMFS rapidly develop a multi-year allocation of ship time for marine mammal surveys and increase the priority and funding for these surveys necessary to obtain the abundance estimates required to calculate PBR and thus enable fisheries to meet the standards required by the MMPA. We have repeatedly urged NMFS to conduct shipboard surveys to obtain new abundance estimates for marine mammal populations and remain extremely concerned that the agency continues to give a low priority to marine mammal research when allocating ship time. In the Pacific area, the US West Coast survey has been postponed until 2014, uncertainties have increased regarding whether funding will be available to support field work to monitor the Hawaiian monk seal population and mitigate human impacts, and PBRs cannot be calculated for new Hawaii pantropical spotted dolphin stocks. When PBRs cannot be calculated, either for lack of abundance estimates or abundance estimates more than 8 years old, a negligible impact determination cannot be made for ESA-listed species and managed fisheries cannot achieve required MMPA standards. Either outcome places an inappropriate burden on managed fisheries, and the lack of data puts populations at risk.

There is currently marine mammal bycatch during trawls by NOAA research vessels, but samples and carcasses cannot be collected because there is no NOAA permit issued to do so. The SRG recommends that NMFS rapidly cut through the bureaucratic obstacles that hinder the collection of biological samples from the marine mammals incidentally killed during NOAA research activities.

The SRG recommends continued funding for studies of movements and genetics of false killer whales and other cetaceans around Hawaii and in the Central Pacific to better understand stock structure. Much has been learned from these studies, but more information is required; for example, movement data from all the social clusters of false killer whales around the Hawaiian Islands are needed to understand stock structure, ecology, distribution, and fishery interactions.

Appendix 1

Attendees - Pacific SRG Meeting, 1-3 April 2014 (Honolulu, HI)

Scientific Review Group - Pacific Region:

Hannah Bernard	Hawai'i Wildlife Fund
Robin Brown (via phone)	Oregon Department of Fish and Wildlife
John Calambokidis	Cascadia Research
Mark Fraker	Terramar Environmental Research Ltd.
Doyle Hanan	Hanan & Associates, Inc.
Jim Harvey	Moss Landing Marine Laboratories
Katherine Ralls	Smithsonian Institution
Michael Scott	Inter-American Tropical Tuna Commission
Terry Wright	Northwest Indian Fisheries Commission

Invited Participants and Observers:

USFWS
Lilian Carswell (via phone)

NMFS Southwest Fisheries Science Center
Lisa Ballance
Bob Brownell
Jim Carretta
Karin Forney
Karen Martien
Jeff Moore

NMFS West Coast Regional Office
Monica DeAngelis (via phone)
Tina Fahy (via phone)
Lynne Barre (via phone)

NMFS Pacific Islands Fisheries Science Center
Jason Baker (via phone)
Ali Bayliss
Chris Boggs
Amanda Bradford
Siri Hakala
Charles Littnan
Marti McCracken
Karlina Merkens
Erin Oleson
Frank Parrish
Sam Pooley
Mike Seki
Matthew Vandersande

NMFS Pacific Islands Region
Adam Bailey
Jamie Marchetti
Laura McCue
Lisa Van Atta
Nancy Young

NMFS Office of Science and Technology
Mridula Srinivasan

NMFS Office of Protected Resources
Shannon Bettridge
Nicole LeBoeuf
Kristy Long
Donna Wieting

Marine Mammal Commission
Dennis Heinemann (via phone)

HI Dept. of Land and Natural Resources
Elia Herman
Shannon Lyday
Frazer McGilvray
Earl Miyamoto
Alton Miyasaka

Makah tribe
Brian Gruber
Jonathon Scordino

Western Pacific Fisheries Management Council
Paul Dalzell
Chuck Daxboeck
Asuka Ishizaki

Hawaii Longline Association
Svein Fougner

Hawaii Fishermen's Alliance for Conservation and Tradition
Phil Fernandez

Cascadia Research
Robin Baird
Sabre Mahaffy

Portland State University
Sarah Courbis

Appendix 2

Document List
Pacific SRG Meeting April 1-3, 2014 (Honolulu, HI)
Last revised: 03/31/2014

Document No.	Title/Topic	Contributor(s)	Distribution Date
Documents for Pacific SRG review			
PSRG-2014-01	Pacific Islands Cetacean SARs	Oleson/Bradford	3/18/2014
PSRG-2014-02	Monk Seal SAR	Baker	3/11/2014
PSRG-2014-03	West Coast Cetacean and Pinniped SARs	Carretta	3/11/2014
PSRG-2014-04	Southern Resident Killer Whale SAR	Hanson	3/11/2014
PSRG-2014-05	Southern Sea Otter - Final 2013 SAR	Carswell	3/11/2014
PSRG-2014-06	Stock Delineation Guidelines Initiative Overview	Martien	3/11/2014
PSRG-2014-07	Hawaii State Fishery Information from DAR	Herman	3/18/2014
PSRG-2014-08	List of Fisheries (2014 proposed)	DeAngelis	3/11/2014
PSRG-2014-09	US west coast Serious Injury Report (updates through 2012)	Carretta	3/11/2014
PSRG-2014-10	Bycatch estimates for CA gillnet fisheries (2012)	Carretta	3/11/2014
PSRG-2014-11	Estimating the fraction of cetacean carcass recovery ashore in California: coastal bottlenose dolphins as a baseline	Carretta	3/11/2014
PSRG-2014-12	Inferring trackline detection probabilities (g(0)) for cetaceans from apparent densities in different survey conditions	Barlow	3/11/2014
PSRG-2014-13	Sperm whale abundance and trends	Moore & Barlow	3/11/2014
PSRG-2014-14	Hawaii Response Network Injury Determinations	Bradford	3/18/2014
PSRG-2014-15	Evidence for high rates of fisheries interactions for main Hawaiian Islands insular false killer whales	Baird	3/18/2014
Background Papers - FYI only		**Submitted by**	
PSRG-2014-B01	Final SRG Terms of Reference	Bettridge	3/18/2014
PSRG-2014-B02	McCracken - Interactions with Marine Mammals in the Hawaii Longline Fisheries from 2008 through 20121	McCracken	3/11/2014
PSRG-2014-B03	Gray whale stock structure workshop report (same as PSRG-2013-B03 last year)	Weller et al.	3/11/2014
PSRG-2014-B04	Accounting for Subgroup Structure in Line-Transect Abundance Estimates of False Killer Whales (*Pseudorca crassidens*) in Hawaiian Waters	Bradford et al.	3/11/2014
PSRG-2014-B05	Baker et al. 2013 GeneSPLASH (humpback whale genetics)	Barlow	3/11/2014
PSRG-2014-B06	CA/OR/WA humpback whale Final 2013 SAR	Barlow/Carretta	3/11/2014
PSRG-2014-B07	Benefits Derived from Opportunistic Survival-Enhancing Interventions for the Hawaiian Monk Seal	Harting/Littnan	3/11/2014
PSRG-2014-B08	Makah background documents on gray whales	Gruber	3/11/2014
PSRG-2014-B09	Background information on HI State Fisheries	Boggs/Oleson	3/18/2014
(Documents are posted at: http://swfsc.noaa.gov/srg.aspx)			

Appendix 3

Pacific SRG Meeting
1-3 April 2014, Honolulu, HI (Pier 38 NOAA Office)
Agenda

TUESDAY, 1 APRIL 2014

Welcome & Introductions - *M. Scott, Pacific SRG Chair*

SRG Terms of Reference – *Scott/Bettridge* *PSRG-2014-B01*

CA/OR/WA Research

- Ship time and planned West Coast surveys – *Ballance*
- US West Coast Serious Injury Determinations – *Carretta* *PSRG-2014-09*
- CA/OR driftnet and CA setnet fishery bycatch – *Carretta* *PSRG-2014-10*
- Estimating the fraction of cetacean carcass recovery ashore in California: coastal bottlenose dolphins as a baseline – *Carretta* *PSRG-2014-11*
- New estimates of g(0) developed by Jay Barlow – *Forney* *PSRG-2014-12*
- Sperm whale trends – *Moore* *PSRG-2014-13*
- Fin whale population structure – *Calambokidis*

West Coast and National Management Updates

- Regional Office Management Updates – *DeAngelis and Barre (by phone)*
- Pacific Offshore TRT Reports – *DeAngelis (by phone)*/*TRT Members*
- Humpback whale delisting petition updates – *Bettridge*
- List of Fisheries – *DeAngelis/Young* *PSRG-2014-08*

CA/OR/WA SARs

- Southern resident killer whale SAR – *Hanson (by phone)* *PSRG-2014-04*
- US West Coast cetacean SARs – *Carretta* *PSRG-2014-03*

Hawaiian Monk Seals

- Hawaiian monk seal research – *Littnan*
- Hawaiian monk seal SAR – *Baker (by phone)* *PSRG-2014-02*

Review recommendations

Adjourn

WEDNESDAY, 2 APRIL 2014

Pacific Islands Research

- Pacific Islands serious injury determinations – *Bradford* *PSRG-2014-14*
- MHI false killer whale fishery interactions – *Baird (by phone)* *PSRG-2014-15*
- New data on false killer whale distribution and how they may inform redrawing stock boundaries – *Oleson*
- Mariana Islands genetics research – *Martien*
- Other Pacific Islands cetacean research – *Oleson*

Hawaii State Updates *PSRG-2014-07*

- HI State fisheries - reporting, definitions, effort – *Miyasaka / Herman*
- Monk seals and fisheries (Section 6 Grant) – *Herman*
- Understanding/Mitigating false killer whale interactions with state fisheries – *Herman*
- Sanctuary's Management Plan Review process – *Herman*

Pacific Islands Management/Fishery updates

- Pacific Islands Management updates – *Van Atta/Young*
- 2013 Observer Program Summary – *Marchetti*

Pacific Islands SARs *PSRG-2014-01*

- False killer whale SAR – *Oleson*
- Spotted dolphin SARs – *Oleson*

Review recommendations

Adjourn

THURSDAY, 3 APRIL 2014

General Research Topics

- NMFS Protected Resources Science Investment and Planning Process – *Ballance*
- Stock Delineation Guidelines Initiative (SDGI) – *Martien* *PSRG-2014-06*
- New estimates of R_{max} for cetaceans – *Moore*

Discuss recommendations

Topics, timing, and location of next meeting

Adjourn meeting