Minutes from the 2019 Meeting of the Alaska Scientific Review Group

26 - 27 February 2019, Seattle, WA

This report summarizes the 2019 meeting of the Alaska Scientific Review Group (SRG). This document is intended to summarize the main points of discussion and does not attempt to record everything that was said during the meeting.

Welcoming Introduction

John Bengtson welcomed the Alaska SRG (AKSRG) to the Alaska Fisheries Science Center (AFSC) and spoke a few words of remembrance for former Alaska SRG member Lloyd Lowry. A moment of silence was then observed.

Meeting Called to Order and Adoption of Agenda

Greg O'Corry-Crowe, the SRG Co-Chair, called the AKSRG meeting to order and adopted the agenda. All participants introduced themselves, their roles, and their background.

AKSRG Members Present: Greg O'Corry-Crowe (SRG Co-Chair), Megan Peterson (SRG Co-Chair)*, John Citta, Lorrie Rea, Eric Regehr, Beth Concepcion, Thomas Doniol-Valcroze, and Mike Miller.

Observers and Invited Participants: Shannon Bettridge (NMFS HQ/PR2), Lisa Lierheimer (NMFS HQ/PR2), Mridula Srinivasan (NMFS HQ/S&T), Matthew Lettrich (NMFS HQ/S&T)*, Sam Simmons (MMC), Suzie Teerlink (NMFS ARO), Jeremy Rusin (AFSC), John Bengtson (AFSC), Robyn Angliss (AFSC), LTJG Blair Delean (AFSC), Marcia Muto (AFSC), Kimberly Murray (NEFSC), Ben Hou (AFSC), Peter Boveng (AFSC), Josh London (AFSC), Cynthia Christman (AFSC), Alex Zerbini (AFSC), Nancy Friday (AFSC), Tonya Zeppelin (AFSC), Jeremy Sterling (AFSC), Tom Gelatt (AFSC), Rolf Ream (AFSC), Mike Cameron (AFSC), Devin Johnson (AFSC), Katie Sweeney (AFSC), Rod Towell (AFSC), Heather Ziel (AFSC), Erin Richmond (AFSC), Erin Moreland (AFSC), Kim Shelden (AFSC), Brian Brost (AFSC), Brian Fadely (AFSC), Stacie Hardy (AFSC), John Jansen (AFSC), Katie Luxa (AFSC), Aimee Lang (SWFSC)

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*Participated by phone/webinar.

Minutes from Previous AKSRG Meeting

Blair Delean took the minutes at the 2018 AKSRG meeting, and a draft was circulated in April 2018. Feedback from some AKSRG members and other meeting attendees has been incorporated into the minutes. The minutes will be considered final unless he receives additional comments.

2018 AKSRG Meeting Recommendations

Megan Peterson provided a review of the 2018 AKSRG meeting recommendations and National Marine Fisheries Service (NMFS) responses:

N_{MIN} for Partial Stock Ranges

(1) *The SRG recommends that guidelines be developed for when, and how, the minimum population estimate (N_{MIN}) should be calculated from data when only a subset of the stock's range is available. When such guidelines are developed, we also recommend that in cases where these guidelines are not followed, clear justification be given in Stock Assessment Reports (SARs) justifying why the guidelines were not appropriate in that specific case.*

NMFS responded by saying that Section 117 of the Marine Mammal Protection Act (MMPA) requires that stock assessment reports provide a minimum population estimate, and "minimum population estimate" is defined in the MMPA as an estimate that "provides reasonable assurance that the stock size is equal to or greater than the estimate". To meet the statutory requirement of providing a minimum population estimate, it is the agency's practice to include N_{MIN} in all SARs even if the estimate is derived from surveys of only a portion of a stock's range, as that meets the statutory definition. In these cases, we note in the body of the report that the estimate is likely biased low and do not provide the N_{MIN} in the summary table. While this approach is not specifically spelled out in the Guidelines for Assessing Marine Mammal Stocks (NMFS 2016), we intend to include it in the next revision of the guidelines.

Shannon Bettridge added that NMFS has not yet revised or updated the Guidelines for Assessing Marine Mammal Stocks (GAMMS). Peterson said that the AKSRG should ask to see an update next year if possible. Bettridge said that the agency's approach to providing N_{MIN} should be incorporated in the next version of the GAMMS, which is not ready yet.

Estimating Mortality and Serious Injury (M&SI) Related to Small-boat and Shore Fisheries

(2) The SRG supports observer programs and development of other innovative approaches for estimating M&SI in small-boat and shore fisheries that have no, incomplete, or extremely outdated, estimates.

NMFS responded by saying that many Alaska federally-managed commercial fisheries are observed routinely by the North Pacific Observer Program, which is administered by the Alaska Fisheries Science Center (AFSC). The Alaska Marine Mammal Observer Program (AMMOP), focused on understanding marine mammal bycatch in state-managed fisheries, had been administered by the NMFS Alaska Regional Office (AKR) for many years, but it has lacked funding since 2013. In 2018, the AKR and AFSC formally agreed that the AFSC would take the lead on future observer programs directed at marine mammal bycatch in Alaska. Combining AMMOP with other fishery observer programs should result in administrative efficiencies, which we hope will make the program more viable and sustainable over time. A process for prioritizing fisheries and stocks for further data collection is underway, and an update will be reported at the next Alaska SRG meeting. Both traditional and non-traditional methods for collecting data on marine mammal stock abundance and bycatch will be considered during this process.

Robyn Angliss said the AFSC is excited to take the lead on this program, but there are currently no funds available. It will be a multi-year process to determine how the AFSC can compete at a national level for funds for observer programs. Peterson asked if an SRG recommendation would help secure funding. Bettridge said it would be good for the agency to hear from the SRG that this is needed and a priority.

Precision for Mortality and Serious Injury Estimates

(3) The SRG recommends that procedures for estimating M&SI be improved, include associated precision estimates, and that guidelines for the use of the estimated precision when comparing M&SI with Potential Biological Removal level (PBR) be developed.

NMFS responded by saying that the precision of the mortality and serious injury estimate for a particular stock varies depending on many factors, including whether there are observer programs for commercial fisheries that incur M&SI of a stock, the observer coverage of particular fisheries, and whether the level of M&SI for a stock is assessed using opportunistic data either in whole or in part. However, because the PBR process was designed to automatically account for poor precision in both the abundance and M&SI

rates, comparing M&SI rate with poor precision to a PBR level should only rarely result in inaccurately assessing whether a stock is strategic under the MMPA (Wade, 1998). This point is fundamental to the PBR process, and we will offer a briefing on this topic to the SRG at their next meeting. In addition, we will consider using new approaches for estimating precision of M&SI as they become available.

Angliss said the best person to give this briefing is Paul Wade, who is unavailable due to a competing International Whaling Commission (IWC) meeting; however, we are happy to offer this briefing at a later date by phone. This is a very important topic for the SRG to understand. Wade is also the lead on the Cook Inlet beluga whale projects. Angliss said she would also like Wade to provide a Cook Inlet beluga whale briefing to the SRG at a later date. Thomas Doniol-Valcroze said the SRG wasn't worried that the PBR would not be robust enough. The concern was with consistency. Treating both components in the process the same way should be the focus. Angliss said the coefficient of variation (CV) calculations for all of the M&SI estimates that come from the observer program are made in roughly the same way, which includes combining different data types. Figuring out how to estimate precision with multiple different data types is challenging. It would be helpful if the SRG could highlight specific questions during the meeting.

Complete Data for Abundance Surveys

(4) The SRG recommends that in future surveys, if at all possible, data for all essential components of a survey necessary for producing unbiased estimates (and measures of precision) be collected. If it is not feasible to collect all relevant data, we recommend that the limited utility of the resulting estimates be considered before proceeding with the survey.

NMFS responded by saying that NOAA Fisheries uses the best data available to estimate the abundance of a marine mammal population for the purposes of the stock assessment reports. In some cases, this means that population estimates include only a portion of the range of the stock, or are lacking important information on behavioral factors, such as the tendency for some species to be attracted to vessels. NOAA Fisheries balances the expected benefits of improving survey precision by collecting additional information about a stock with the expected cost of that additional data collection. In some cases, it is clear that additional data collection is critical for management purposes (e.g., the collection of stock structure information for Southeast Alaska (SEAK) harbor porpoise). In other cases, we feel it is appropriate to use information from other studies to improve our estimates. For instance, in the 2019 SARs we will propose the use of a g(0) estimate for harbor porpoise line-transect surveys from a study outside Alaska. We look forward to an ongoing dialog with the SRG on how we can best improve abundance estimates for marine mammals in a resource-limited environment.

Evaluation of PBR When No Estimate of N_{MIN} Exists

(5) The SRG supports back-calculation of how small the population must be for PBR to exceed the known M&SI. Furthermore, we suggest that the terminology used to describe these back-calculations be formalized and that guidelines for when these procedures are appropriate be created.

NMFS responded by saying that we agree that the back-calculation approach is helpful for understanding whether a PBR level is likely being exceeded. NMFS will consider under what circumstances this type of approach is appropriate and include it in a future revision of the GAMMS. We will solicit input from the 3 SRGs on this topic.

Improved Estimates of Subsistence Harvest

(6) The SRG recommends a survey design be constructed for estimating subsistence harvest of marine mammals (specifically ice seals), in consultation with local communities, and designed with greater sampling effort in high harvest communities such as Utqiaġvik.

NMFS responded by saying that their approach for estimating subsistence harvest of marine mammals has been to collaborate with our Alaska Native co-management partners to balance our need for such data against both the costs of conducting comprehensive surveys and the challenges of obtaining reliable data from surveys. In some cases, such as for beluga whales and bowhead whales, co-management organizations have been very successful at obtaining comprehensive information from hunters about harvested and struck-and-lost animals. For northern fur seals, harvests are well-monitored and we have similarly good data. For other species, such as ice seals, Steller sea lions (SSL), and harbor seals, household surveys are the best technique to obtain subsistence harvest data, but the harvests are widely dispersed and conducting a comprehensive survey would be both logistically complex and extremely expensive. NMFS does not currently have funding for a community-based survey program, but at various times we have provided grant funds to Alaska Native co-management organizations to conduct targeted surveys in a limited number of communities. Some survey programs have struggled with obtaining reliable community participation, which is essential for success. We will continue to work with our co-management partners to pursue opportunities to conduct household surveys as funds are available.

John Citta said the issue is that the harvest information is just being reported in the SAR, and it's not being treated as a sampling process. Zeros listed in the SAR do not accurately reflect the true number of harvested animals because there is no survey process. There is a lot of uncertainty.

Steller Sea Lion Stock Boundaries

(7) The SRG recommends that the stock structure for SSL in the northeastern Pacific be re-evaluated to consider whether moving stock boundaries or creating an additional stock are warranted.

NMFS responded by saying that extensive demographic and movement data on SSLs has been collected since the current stock boundary designation, which followed the 1997 Endangered Species Act (ESA) listing of the western and eastern populations as separate Distinct Population Segments (DPS). The greatest proportion of this work has involved the analysis of movement data based on observation of marked animals conducted by the Alaska Department of Fish and Game (ADF&G). An analysis of all of the available information could be beneficial for the reasons noted by the SRG and would be a necessary precursor to considering a change in stock boundary. In the interim, NMFS must use the best information available when determining whether and how to apportion serious injuries and mortalities, and we would welcome further suggestions from the SRG on how to handle this issue.

Northern Fur Seal Population Estimates

(8) The SRG recommends that a new expansion factor be developed for northern fur seals that reflect current population dynamics and that has an associated precision measure such that precision can be calculated for the population estimate. Similarly, a new expansion factor could be developed for SSL, whose N_{MIN} is based on the observed animals rather than total population size.

NMFS responded by saying that we are currently developing new methodology for estimating total population abundance of SSL that should also be applicable to estimating northern fur seal abundance after some minor modifications. The new approach would use both aerial survey data of pups and capture-recapture data from pups and non-pups to predict the number of non-pups still alive in the current year. Thus, we get total abundance by adding the number of non-pups still alive with the number of pups in the aerial survey. The Alaska Ecosystem Program (AEP) at the AFSC presented the draft method at a workshop in 2017. We have been refining the method in 2018, and we can present an update on the methodology at the next SRG meeting in February 2019.

Sperm Whale Stock Structure

(9) The SRG recommends that NMFS reexamine the stock structure for sperm whales in the North Pacific Ocean, with special consideration of the unique demographics (male-dominated) of the stock and the possibility of developing sub-stock estimates of N_{MIN} or PBR for males interacting with commercial fisheries.

NMFS agrees that it is worth developing an estimate of abundance for male sperm whales in Southeast Alaska and will pursue this as funds are available. It is unlikely that we can re-examine North Pacific sperm whale stock structure given the lack of any new data.

Harbor Porpoise Stock Structure

(10) The Alaska SRG supports continuation/expansion of the ongoing environmental DNA (eDNA) (and other genetics) projects to gather data on harbor porpoises and the use of these data in revising harbor porpoise stocks in Alaska. In addition the SRG recommends that once stocks are revised, necessary abundance and mortality data be collected for harbor porpoise stocks, prioritizing those where fishery-related mortality is known or suspected to occur.

NMFS agrees with the recommendations regarding harbor porpoise stock structure; the AFSC is attempting to obtain new eDNA samples in FY2018 to address this question. Conducting an abundance survey remains a high priority and will be pursued as resources are available.

Peterson asked if more data were collected in 2018. Angliss said that some eDNA data were collected last year from SEAK, but it was not as much as was hoped for. However, a harbor porpoise vessel survey is very likely to occur this year and it will be used to gain data on abundance and to sample all of SEAK and the outside waters nearshore.

Humpback Whale Stock Structure

(11) The SRG urges NMFS to complete the review of humpback whale stock designations under MMPA, taking into account the humpback whale DPS under ESA, as soon as possible and revise the humpback whale SARs accordingly.

NMFS is currently in the process of reviewing stock structure under the MMPA for all humpback whales in U.S. waters, following the change in ESA listing for the species in 2016, to determine whether we can align the stocks with the DPSs under the ESA. We agree that revising the stock structure for humpback whales is a high priority; however, the process of reviewing stock structure under the MMPA has taken longer than anticipated. Until such time that the humpback whale stock structure under the MMPA with

respect to the ESA listing has been completed, we are retaining the current stock delineations. Any changes in stock delineation or MMPA section 117 elements (such as PBR or strategic status) will be reflected in future stock assessment reports.

NMFS Headquarters (HQ) Updates and SRG Membership Reviews

Bettridge reviewed the SRG Terms of Reference. The priority areas of expertise that were identified as needs for this selection cycle included expertise on the Alaska commercial fishing industry and commercial fishery methods and gear, particularly in fisheries that have marine mammal bycatch and interactions. Other areas of desired expertise included population dynamics, modeling, and statistics; abundance estimation; and knowledge of the MMPA and processing of marine mammal stock assessments. This year we have two new appointees, Beth Concepcion and Eric Regehr. Concepcion works with the catcher processor fleet in the Bering Sea and Aleutian Islands. Regehr's experience is focused on population dynamics. Regehr hopes to bring some background in demography to the SRG, especially on the quantitative side.

Bettridge said she can't give much of an update on the budget. We are now operating under a continuing resolution until the end of the fiscal year. The partial government shutdown impacted almost everyone who works on the SARs, which has had an impact on the SAR schedule. NMFS is in the process of reviewing the 2019 SARs, while also finalizing the 2018 SARs. The SARs for all of the regions must be released together, and there will be a delay this year in the release because one of the SRG meetings will not take place until May 2019. NMFS is doing everything it can to get back on schedule. Bettridge said NMFS would like to have a webinar with all three SRGs to discuss the process of authorizing commercial fishery operations following an interaction between a fishery and an ESA listed species. This process includes the criteria for making a negligible impact determination. These criteria were originally set out in 1999, but recent revisions have been made which will go out for public comment. The older criteria are internally inconsistent, which leads to problems with authorizing fishery operations once they have interacted with an ESA-listed species. NMFS is also working on an internal policy for identifying and designating marine mammal stocks, but there has been a delay. NMFS is also working on guidelines for developing non-lethal marine mammal deterrence, which NMFS hopes to have available in draft form this fall.

NMFS Marine Mammal Laboratory (MML) Updates

John Bengtson provided an overview of the Marine Mammal Laboratory (MML) organizational structure, which includes four different field programs. MML has about 100 staff, about half of which are permanent employees. Most of MML's work is done in Alaska and supports the Alaska Regional Office (ARO), but some work is also done on the west coast which supports the West Coast Regional Office. Research priorities are determined by the AFSC using a rating process that considers information needs and resources across all departments. Activity Plans are used to describe all aspects of proposed projects, which are then reviewed by the Center. The Center Director gets the final word on the scoring process. The ARO is the Center's number one client. MML's science is funded internally with NOAA money and by partners such as the Bureau of Ocean Energy Management (BOEM). In a flat budget landscape, costs are always escalating. Some of those costs can be mitigated by incorporating new technology to include more reliance on imagery. The Center is trying to increase efficiencies by focusing on priorities. When mitigation is not enough, we lose staff and have a reduced mission scope. We are doing less with less in order to ensure sustained quality of our outputs. Abundance and trend studies rank high on our priority list, and both pinniped and cetacean studies have been getting good support. Bowhead whale, Cook Inlet beluga whale (a Species in the Spotlight), and various pinniped studies, among other projects, are planned for this summer. There are many important projects that we would

like to conduct this year, such as research on North Pacific right whales and killer whale studies, but we currently don't have the funding. It's likely that we will see additional funding cuts in the future. Our staff has been doing a great job of seeking out new funding partnerships and maintaining current ones. We have a more recent goal of obtaining an abundance and trend estimation at least every 8 years for any stock harvested by Alaska Natives.

O'Corry-Crowe asked if financial partnerships extend beyond other federal agencies. Is MML limited in how far they can reach to form a partnership? Bengtson said there is no limitation, aside from legality. Staff resources, in addition to money, are also a major consideration when deciding which projects will be a priority. Concepcion asked if the community could be used to help collect data. Bengtson said it's a possibility and mentioned Citizen Scientists, online crowd sourcing, and people with ships; but sampling can be a challenge. O'Corry-Crowe asked if publications and their associated external funding are a factor in the prioritization and project support process. Bengtson said publications, especially in peer reviewed journals, help contribute to our scientific reputation and our competiveness in some circumstances, but most of our funding is direct and applied to a specific need. Lorrie Rea asked how closely MML works with the Northwest Fisheries Science Center (NWFSC) to balance research priorities. Bengtson said the NWFSC is primarily involved in Southern Resident killer whale studies, which MML is not, so the work that goes unfunded at MML is not likely to be picked up by the NWFSC. Regehr asked about the motivation for obtaining abundance and trend estimates every 8 years for subsistence harvested species. Bengtson said we think it's very important to know what's out there. There are many marine mammal stocks without good abundance estimates. Some marine mammal species that NMFS manages in Alaska don't have subsistence quotas or abundance estimates. We are trying to get good information when we can, but there are many challenges. Doniol-Valcroze asked about the legal requirements for updating stocks every 8 years and how that relates to data availability. Bettridge said we are working on alternative ways to derive N_{MIN} for stocks without a recent abundance estimate, which we are hoping to incorporate into the GAMMS. This concept would allow for a depreciation over time versus the 8-year data cutoff. The updated GAMMS should be available in the next 1-2 years.

Marine Mammal Laboratory Research Updates

Harbor Seal Research Update

Peter Boveng said there was a big push to update the harbor seal data and analyses. Previous survey data for harbor seals were from 2011. There is a lot of image processing that is associated with harbor seal surveys, which takes time. The most recent results incorporate all data through 2018 for the Aleutian Islands, Pribilof Islands, and Cook Inlet stocks. The other stocks have been updated through 2017 for seals that haul out on shore and through 2015 or 2016 for seals that use glacial ice for haul outs. Glacial sites are more challenging to monitor, so the data are not as current as for the land based sites. Aggregation has been used in some instances when data are not as abundant. A Bayesian hierarchical structure is used for modeling purposes. Abundance at each site is modeled as a time series. Previously two models were used. In this analysis, however, the models were combined, which prevents a single estimate from exceeding the maximum count for a given site. In general, most stocks are stable or increasing based on data from 1996 to 2018. The CVs for the most recent abundance estimates would all fall in the 5-20% range, which is quite respectable.

Doniol-Valcroze asked about survey effort and the number of repeated surveys for each stock and how that affects the CV. Boveng said survey efforts vary based on statistical and conservation concerns. The frequency of repeat surveys varies greatly across the state. Doniol-Valcroze said some studies have found that repeating survey efforts at primary sites is more beneficial than trying to spread the same

survey effort out over many smaller sites. Boveng said we used to try for five replicates at every site, but that was inefficient. We are now doing fewer replicates within years, but we are still trying to get replicates at the bigger sites. Overall, using our new method of allocating effort, we are getting new estimates (with better CVs) annually for the entire state for the same amount of money or less than we used to spend. This has actually involved a reduction in the number of replicates at the smaller sites. Citta commented that it appears that population trends seem to be driven to some degree by data collection efforts, especially at the smaller sites. Boveng agreed and said that the process of choosing the sites to survey is a juggling act. Josh London clarified that survey efforts in general are geared toward surveying the largest number of seals in the population (65-70% total) based on expectations of density, rather than looking at the total area covered or proportion of sites surveyed.

Ice Seal Harvests and Potential Biological Removals (PBRs)

Boveng said there has been a long standing recognition that the subsistence harvest data for ice associated seals has been spotty and very incomplete. We know there have been significant removals of these species, but the numbers have not been accurately quantified. The ADF&G has been working with the Ice Seal Committee (ISC) to compile historical community harvest data via household community surveys in order to demonstrate that the subsistence harvest of ice associated seals in Alaska is sustainable. They compared estimated removals to the PBR numbers in the SARs. Two scenarios were analyzed; the average per capita harvest rate in a given community and the maximum per capita harvest rate. Struck and lost numbers were also incorporated. When assumptions were made they generally leaned towards overestimating removals or underestimating abundance in order to bias towards the "worst case scenario." The paper describing this analysis is currently in review and, thus, the results were not included in the draft 2019 SARs; however, they should be incorporated in the 2020 SAR revisions.

Northern Fur Seal Research Update

Gelatt said we have not received a lot of funding for northern fur seal projects in recent years, which has resulted in some projects being incomplete or put on hold. We completed an abundance survey this past summer using our traditional mark-recapture method for pups only. Surveys are conducted every 2 years in the Pribilof Islands. There has been a 50% decline in the population in the Pribilof Islands since 1998. St. Paul Island has a much larger population (currently ~75,000 pups) than St. George Island (currently ~35,000 pups). Pups started showing up on Bogoslof Island in the early 1980s, and we have seen a strong increase in pup abundance there since then. The last abundance survey on Bogoslof was conducted in 2015, at which time there were just under 28,000 pups. The Pribilof Islands now account for less than half of the global northern fur seal population, with recent increases being seen in the Commander Islands and on Bogoslof Island. Flipper tags on northern fur seals have been used since 2007 to better understand survival and movement. Securing funding for re-sight teams has been a challenge. Tagging results at St. Paul and St. George islands, and population modeling, suggest that estimated survival rates are lower than would be needed to match the observed trajectories in pup production. This could be due to issues with tag retention or emigration from the target rookeries that bias survival estimates. It could also be due to inadequacies in our understanding of the age-specific survival schedule for northern fur seals, which is primarily based on decades-old data from pelagic collections in the 1950s and 1960s. A better understanding of these issues is expected as more age-specific data are gathered from fur seals tagged as pups, and by better modeling approaches to incorporate multiple data sources.

Gelatt gave an overview of northern fur seal migration patterns and said that seasonal migration of northern fur seals appears to depend on sex rather than on body size, which is new information. The feeding areas (and the associated prey species) of northern fur seals are largely dependent on where they live, which is reflected in diet analysis (prey remains in scat and spew). Bogoslof is a volcanic island with a relatively active history, which has significantly affected the morphology of the island in recent years; however, various species of animals (including the northern fur seal) have remained on the island throughout the eruption period. The usefulness of unmanned aerial systems (UAS) in assisting with population counts is being investigated, but there are some challenges unique to northern fur seals such as their dark color on the black volcanic rock. Using infrared imaging technology might be the answer. Doniol-Valcroze asked if northern fur seal pregnancy rates have been studied. Gelatt said that pregnancy rates from year-to-year are not known; however, it does appear that rates are higher in the fall. In general there have been no indicators that pregnancy rates are falling. Concepcion asked if the Pribilofs are still an important area for northern fur seals given that the population appears to be moving. Gelatt said St. Paul is still the largest rookery for northern fur seals. There are a lot of unknowns surrounding changes in population densities. Peterson asked about the extent of cooperation between scientists and the local community on the Pribilof Islands. Gelatt said we work with the community, and they have assisted with fieldwork in the past. There is more involvement on St. Paul in recent years due to the reduction in the Native population on St. George. The community on St. Paul, especially the Ecosystem Conservation Office (ECO) group, has helped with sampling.

Steller Sea Lion Counts in 2018

Katie Sweeney said that Steller sea lion (SSL) abundance surveys are conducted annually using both aerial and ship based resources. In even numbered years, the focus is on the Aleutian Islands and in odd numbered years the focus is on the Gulf of Alaska (GOA). The western DPS reached its lowest abundance (non-pups) in 2002. As a whole, from 2002 to 2018, the SSL population in the western DPS has been increasing by approximately 2.5% per year for non-pups and by 1.5% per year for pups. In general, populations are declining in the western Aleutians (pups and non-pups), stable (non-pups) and declining (pups) in the central Aleutians, and increasing (pups and non-pups) in the eastern Aleutians. Kimberly Murray asked if pup abundance numbers are based on estimations. Sweeney said that pup counts are conducted during an optimal survey window in which 95% of pups are born but are not yet in the water, thus, the numbers are considered a census.

Alaska Bearded Seal SAR Review

Citta said that in general this SAR is really well written. We know that the bearded seal harvest is much higher than what is reported in Table 2 and in the SAR. It's a major challenge to gather and incorporate complete harvest data into the SARs. Should we just take the reported data at face value, or should we work with the Ice Seal Committee to gather more complete data? This issue will likely come up in all the SARs that have Native harvests. The issues with sampling are much clearer when it comes to subsistence harvest. We might report that approximately 550 seals are being harvested each year, when in actuality we know the number may be ten times greater. This same issue is being seen with bycatch data. There are challenges associated with obtaining complete harvest data, but Table 2 should not report zeros for subsistence harvest when we know that it's not an accurate reflection of reality. Ice conditions are changing really fast. In response to Citta's question about population estimates, Boveng said that the population estimate that is currently in the SAR is from a small survey area in the Bering Sea from 2012 to 2013. Boveng said a more recent survey has been conducted and the new population numbers will be quite a bit lower. Boveng said there is also a 2016 survey of the Chukchi Sea that is in the process of being analyzed. Surveys are flown during April and May. Citta asked about plans for handling population estimates in the future given the changing/reduced ice conditions. Boveng said we can simply add the

survey numbers from the 2012-2013 Bering Sea and 2016 Chukchi Sea surveys. Moving forward, we will likely be faced with survey ice conditions similar to those in 2018, which is going to raise a lot of questions and uncertainties.

Mike Miller said he had the same concern about Table 2. Harvest survey data is very important to reflect accurately. Are we better off only listing the available data? If so, it's important to indicate that the data is only a snapshot and does not reflect the entire picture. Boveng said these are good points (incomplete harvest and/or bycatch information), and they have come up again and again. We have incorporated text into the SAR to acknowledge these deficiencies, but it can be very misleading to just look at the table. It might be possible to incorporate the ADF&G sustainable harvest analysis (when available) into this SAR to provide a better picture. Miller added that under the "Habitat Concerns" section there is a really good paragraph on ocean acidification, which does not appear to be written as well in other SARs. Boveng said, as a SAR author, he is torn on these subjects. These SARs are not comprehensive species status reviews. Rather, they are reports of MMPA stock status which have a fairly prescribed set of components. These SARs could easily blossom into 100 pages per stock. Finding the correct balance of information incorporation has been a challenge for the SAR authors. Angliss said that the discussion of ocean acidification in some of the SARs is stronger because the authors felt that ocean acidification was a real threat and primary problem for that particular species. There are differences between SARs when talking about threats due to the author's informed opinion about how serious a problem is for a species or stock. Marcia Muto said the ocean acidification paragraph from the bearded seal SAR was circulated to the other SAR authors last year for consideration for their SAR(s). Regehr said it's very beneficial in the SARs when the authors clearly state the deficiencies and uncertainties, which allows for a more informed perspective. Regehr asked if there is a more structured or thorough way to present the number of possible sampling units in relation to the total number sampled. Is there a middle ground that can be reached? It might not be possible to obtain a complete sample, but could the SAR describe how many samples were obtained in comparison to the total possible sample size in order to get a better sense of coverage. O'Corry-Crowe said it would be beneficial to the reader to provide an explanation for why you're not using Equation 1 in the "Minimum Population Estimate" section. Boveng said we can find some plain language to incorporate. Doniol-Valcroze said the population size has been corrected in the SAR by a few thousand seals, which seems to be a large change without any new data listed. Mike Cameron said the change in the number is the result of a corrected analysis.

Harbor Seals SAR Review

Rea said she was impressed with this SAR and with the incorporation/analysis of new survey data. Are haul-out factors, which appear to be uniformly applied, comparable for the entire range of the species? Boveng said that there is variation in the factors that affect seal behaviors, especially when considering glacial and terrestrial sites. Previously when data have been lumped together, it has not been for glacial and terrestrial sites due to the significant differences. There are regional differences in haul-out spots. There are a lot of similarities among Alaska phocid species; however, each species should be considered differently when considering behavioral factors and population estimates. Rea said that in the "Habitat Concerns" section, cruise ship visitation to glacial fjords is listed as a threat to harbor seals. Are there other threats? Boveng said we are not aware of any other critical threats. Miller asked if surveys are done consistently each year and before the pups disperse? Boveng said we have a long time series for molt season (for most of Alaska), which has been consistent. There are some areas with a fair bit of movement between the breeding and molt season. Ideally, if we could go back 20 years, we would have started conducting surveys during the breeding season. We are in the process of figuring out how to make a transition without abandoning the older time series, and we have started in selected areas. The

long-term goal is to survey during the breeding season when pups can be identified and counted separately, which would add a lot of power to our model.

Miller asked about the listing of illegally shot harbor seals. What constitutes an illegal shooting? Suzie Teerlink said it's likely that the authorities consider the shooting area and timing of the shooting to determine if it was the result of a struck and lost animal in the subsistence hunt versus a fishery associated shooting, which would be illegal. O'Corry-Crowe said the work on trend and abundance is impressive and is a huge contribution. Is the annual change in counts a real phenomenon? How confident are you that the annual estimates of abundance represent real fluctuations. Is that really what's happening? Boveng said, as always, you have to look at point estimates, credibility intervals, and trends together. Many plausible lines can be drawn. London said, in general, the goal of the survey process is to capture the bigger 8-year trend picture, versus year to year variations. This raises the question about why 8 years is used in the SARs. Citta said that if there are distinctly different harbor seal stocks, they should be treated differently and individually when considering population numbers. Areas of higher data collection are going to have a more significant influence when used to model the population. London said that we can be clearer in the SAR about which parameters are shared between stocks. Doniol-Valcroze suggested adding text to describe the parameters that contribute to the time-series model.

Peterson asked about the listed historical data for the Pribilof Islands harbor seal population. London said a trend estimate was not included for the Pribilof Islands population because efforts have only recently begun to explore what is happening on the islands, using new technology in order to gain comprehensive results. The older historical data can be difficult to analyze and compare to current trends and other stocks, which is why there is currently no trend information in the SARs for the Pribilof Islands stock. However, in talking to the community, there is a sense that the population has remained relatively the same over the past decade.

Alaska Ringed Seal SAR Review

Regehr liked the instrument-based surveys in the Bering and Chukchi seas. He asked if the first paragraph in the "Population Size" section, which has a lot of good historical information, could be shortened into a sentence or two with some citations. He also asked if indices of population trend other than abundance could be used in the SAR sections about current population trends. As an example, survival and reproductive rates as well as body and nutritional condition are often related to population trends. When considering wildlife in general, there are many populations that are managed with little information on abundance. In Table 1, the CV for the mean estimated annual mortality is 0.01 and it might be better to use a standard error instead. Adding a concise summary about the ESA legal challenge would also be beneficial. Angliss said we are open to using other indices to inform population trend information, but we are finding it difficult just to obtain abundance estimates. Angliss requested that the SRG flag areas in other SARs in which abundance estimates are lacking and where other indices could be useful; however, she noted that using other indices of abundance can be a challenge.

Concepcion said there is a statement in the "Population Size" section that says the actual population numbers are likely much higher by a factor of two or more. How do you know? There doesn't seem to be anything else in the paragraph that would relay that information. In Table 1, all of the fisheries are crossed out except for the Bearing Sea/Aleutian Islands flatfish trawl fishery. Was this the only relevant fishery? Also, why is the percent observer coverage listed as 99% and not 100% for the Bering Sea/Aleutian Islands flatfish trawl fishery when there are observers on every ship in the fleet? Angliss responded that even if there are two observers on every ship there is a very small amount of catch that

is unobserved under various circumstances. The observer coverage is based on percent catch observed. O'Corry-Crowe said presumably the other fisheries were crossed out because there isn't any recent bycatch data. Muto said that is correct, there was not any bycatch in the crossed out fisheries during the relevant time frame. Concepcion said Table 3 should be moved to the end of the section where it would read better. Doniol-Valcroze said that he gets the sense that the CV listed in Table 1 is based on the percent observer coverage, but it does not convey the fact that there is inter-annual variability, which would be important to convey.

Cook Inlet Beluga Whale SAR Review

Doniol-Valcroze said not much has changed in this SAR in recent years. There is high confidence in the numbers listed in the SAR. There was a survey completed in June 2018, but the results are not included in this SAR. The correction factor is not given in the "Population Size" section, which is fine, but it should be explained why it is omitted for the sake of consistency. The last two sentences in the "Status of Stock" section about PBR seem to be contradictory and should be clarified. The "Subsistence Harvest" section should be updated to include information about current harvest levels. O'Corry-Crowe said the minimum abundance estimate is 327 whales, which the rest of the SAR is based on; however, a recent estimate based on an integrated population model estimates abundance at 436, which would potentially change the entire SAR. The SRG should be aware of this new study and find out more information if possible. The study also indicates that there is evidence of a population increase since 2000. Kim Sheldon said the results of this study were presented at the most recent Alaska Marine Science Symposium. The new model incorporates aerial survey, photo-ID, and hunt data and projects from the 1900s forward. There are various models presented in the paper, but the model that O'Corry-Crowe referenced does show a slight increase in trend and a different abundance estimate. The hunt data are anchoring this model, but the numbers might be under-reported. Stranding data were not included in this model. This paper is still in the review process, but it's something to be aware of. O'Corry-Crowe said the new model numbers are potentially significant because if the population were to exceed 350 animals it could be opened back up to subsistence hunting, which would carry large implications. Citta asked why Yakutat beluga whales are still a part of the Cook Inlet beluga whale stock. Angliss said it was part of the MMPA decision to incorporate the two. O'Corry-Crowe asked, regarding mortality in Table 1, if we know what types of trauma lead to mortality. Were they physical impacts?

Western Arctic Bowhead Whale SAR Review

Regehr said the term "lower bound" is used but is not defined; what is a lower bound? The term "error range" should be clarified. Why does this SAR, for the purpose of PBR, default to the cetacean maximum theoretical net productivity rate rather than using an estimated rate? This SAR does not mention any struck and lost data from Russia. Citta explained that the results of an aerial photographic study conducted near Point Barrow concurrently with the ice-based census in 2011, were not used by the IWC because the CV of the study was too low, which could be mentioned in the SAR. A new study is proposed for 2019. Two bowhead whales taken in the Alaska Native subsistence hunt in 2017 were entangled in suspected, but not confirmed, Bering Sea pot fishery gear. Citta said that even though the gear was not confirmed to be pot gear, the injuries should be included in Table 3. These cases should be documented in the SAR. Muto said this is a special case in which whales taken in a subsistence hunt were seriously injured by fishery gear. The current policy is to count such cases only once, as either a subsistence take or a serious injury, but not both. In this case, the whales were considered to be takes in the subsistence hunt and the serious injuries were mentioned in the SAR text but were not included in Table 3. Citta said the Alaska Natives are very concerned about this issue; that two whales were found seriously entangled in the same year. Angliss said that we don't want to double count an event as both a subsistence harvest and a fishery serious injury. Muto said that's why these cases are mentioned in the

SAR text but not in the table. Citta said that he understands, but there should be a way to include these cases in the SAR table, even if they are not counted towards the fishery. Angliss said that this was a tough case, which will be revisited; however, we want to be sure that the two whales are not double counted.

Citta said it might be worth noting that the rate of scarring increases for older whales, which is thought to be due to the fact that younger whales don't survive entanglements. Teerlink said there has been a fisheries shift from longline gear to pot gear, which means more vertical lines in the water. This shift could potentially increase the risk for entanglements, especially when considering over-wintering gear. NMFS is anticipating some internal consultations to evaluate this concern. Citta said it's believed that most bowhead whale entanglements are the result of lost or ghost gear. The last paragraph about ocean acidification implies that the occurrence of fish in the diet of bowhead whales is increasing because of ocean acidification. One belief is that this occurrence is not the result of ocean acidification but rather just a coincidence that bowhead whales are accidently ingesting fish when feeding on zooplankton. Ocean acidification is a concern for copepods, but there is no evidence yet that bowhead whales are having issues finding prey. Doniol-Valcroze emphasized that it's important to be clear in the SAR when explaining why only one of the two data series are being used. If not, it could appear as if data are being cherry picked. Table 2 has a very different format in that it does not give a minimum estimate or a CV, it just gives a range which could be anything. The caption for Figure 2 does not identify the trend line. It would be worth explaining because these data could be used for management purposes.

Western U.S. Steller Sea Lion SAR Review

O'Corry-Crowe said, as a general comment, there are a lot of interchangeable terms used in this SAR to describe the SSL populations. The reader might want to know what is meant by "DPS" and how that differs from "stock." The issue of what is a stock and what is a stock boundary is the crux of the problem with this species. The SAR text should indicate that there is additional structure to the western SSL stock. If counts are being used for an estimate of N_{MIN}, is that more appropriate to use as an index of abundance? Citta said theoretically it is an index. This is a very complicated issue, but it's unclear in this paragraph exactly why a multiplier can't be estimated. Maybe minimum counts are good enough in this case. Doniol-Valcroze said that he does not have a problem with counts being used as an N_{MIN}. The concern is more with consistency. The "Population Size" section states that the counts are modeled and later in the SAR it is stated that counts are estimated, which indicates there is error surrounding the count. There should be consistency and a statement explaining why certain numbers are being used. The uncertainty surrounding the estimated counts should be mentioned. Regehr said there is a big difference between using N_{MIN} and using a different number, which is some type of estimate, as N_{MIN}. It's very important to distinguish between these two and to clarify what is being used here for N_{MIN}. Citta said the SAR is very clear about what is being used as N_{MIN}, it just lacks being multiplied by some sort of correction factor. Concepcion asked if historical methods of estimating population are the same as the current methods. Brian Fadely said that the original counts were somewhat comparable but not the same. Concepcion said that sentences in the "Current Population Trend" section suggest a link between fishing and SSL trends that is stronger than is known. Fishing in the western Aleutian Islands is different than what is characterized in the SAR, the fishery management area in the western Aleutian Islands does not match the boundaries of trend information in the SAR, and the statement that fishing has largely re-opened in the area is not accurate.

Eastern U.S. Steller Sea Lion SAR Review

Rea said this SAR is well written and up-to-date. There are no estimates for the maximum net productivity rate (R_{MAX}) for eastern Steller sea lions (ESSL). What data are needed for that information?

Fadely said the default rate for pinnipeds is being used, which is half of the species-specific population growth rate. Gelatt said there is not enough information available at this time to change from using the default rate. Rea asked if any interaction information is coming in from state-managed fisheries in addition to the federally-managed commercial fisheries mentioned in the SAR. Does the state report bycatch? Angliss said no, but we do get a lot of good entanglement information from the state. Rea asked for some clarification for Table 2 and how the estimated mortality rates are being calculated. Muto said the west coast fishery mortality data in Table 2 are from a report by the NWFSC and data for some of the fisheries are modeled numbers. Rea asked if there is a plan to begin getting subsistence harvest data for some of these species. Some of the older data from 2005-2012 have fairly low harvest numbers but larger numbers for struck and lost animals. There seems to be an obvious lack of information. Muto was not certain. Miller said part of the issue is that the previous co-management agency is no longer acting. There has been an increase in the subsistence harvest in recent years. More sea lion skins are entering into commerce. The intention is not to put a burden on the majority of Alaska Natives who are harvesting for meat; but, if there is a harvest that is being driven by the market for sea lion hides, that should be addressed. The number is not huge, but it could be missed in the subsistence harvest survey. We are also seeing an increase in sea lion skins with the increase in the sea otter harvest. No one is sure how to handle this information. Rea asked for some clarification on the primary purpose of the SARs. Is it for informing fishery management decisions? Bettridge said the SARs are used to inform management decisions. Rea said that it's important to consider stock sustainability when reviewing the SARs, especially when considering all sources of take, including the subsistence harvest. It's important to ensure that there is enough flexibility in the stock to handle all of the sources of take. Bettridge said that is a great point. The SARs are used to inform much more than just fisheries management decisions. It's very important to review all sources of take and human-caused mortality and serious injury and to look at commercial fisheries in the context of all sources.

O'Corry-Crowe asked what takes are considered when a stock is under review for strategic status. Bettridge said all sources of take are considered, not just commercial fisheries. Miller said many folks are worried that harvest data will affect their ability to harvest, but it's important that leadership has the most accurate data in order to make the best management decisions. Peterson said the North Pacific Fisheries Management Council is also starting to prioritize the incorporation of subsistence harvest information into the federal fisheries management process, so it's apparent that the SRG's concerns with the incorporation of accurate subsistence harvest data is in line with the council. As a result, there may be ways to aggregate efforts in the collection of subsistence harvest data in the future. Citta commented that many people believe that the PBR concept applies to commercial fisheries and should not incorporate the subsistence harvest. How do you draw the lines, and who gets preference when PBR is exceeded? These are all big issues. When PBR is exceeded there are conservation concerns which need to be addressed, but it's unclear how subsistence harvest fits into the SARs. Bettridge said this issue has been debated in great length and has caused some legal issues. From a statutory perspective, PBR is in reference to human-caused mortality. Regehr said this is a central issue. When considering work on polar bears, the continued opportunity for subsistence use is a priority, which becomes a challenge when trying to balance it with a falling carrying capacity. PBR is conservative to the point of not being useful for polar bears, which makes trying to evaluate a safe and reasonable way to harvest polar bears a constant struggle. The level of risk built into PBR, at least for polar bears, is very low. O'Corry-Crowe said, at its inception, PBR is risk averse. It's very different than a maximum sustainable rate. Doniol-Valcroze said PBR is supposed to take you to a maximum sustainable rate. PBR has a built in recovery factor and population target, and it's very clear and transparent. It's very effective at reaching the designated population objectives. Ideally, subsistence harvest would be presented as a probability of risk, and it's balanced with PBR. Population objectives are built into PBR; they can't be changed.

Bettridge said it's important to first know what the subsistence numbers are so that we have the ability to accurately manage what we can in order to meet the objectives. Regehr said the underlying model that informs PBR often makes conservative assumptions. Density dependence for large mammals varies, and there are aspects in the life history of these mammals that make them much more resilient and able to compensate for issues like human-caused mortality, which the PBR formula does not take into account. This a demographic consideration. Bettridge said there are examples in which PBR is greatly exceeded, but the population is still doing well. Doniol-Valcroze provided an example of harp seals in Canada in which it was thought that the population would crash if PBR was exceeded. However, the harp seal population exploded despite exceeding PBR. A later analysis concluded that this was possibly due to inaccurate assumptions about density dependence for harp seals. However, this does not contradict the usefulness of PBR when information is lacking and you want to ensure that you reach population targets. O'Corry-Crowe said we tend to focus on stocks that are in trouble and a lot of the rules don't apply to them. Density dependence is not working the way that it should, and being risk averse is necessary. Doniol-Valcroze said in the "Current Population Trend" section the type of data displayed in Figure 3 is unclear. Which parts are raw data, which are estimated counts, and what vales are used for N_{MIN}? A clear explanation of the data being used would be useful.

Marine Mammal Laboratory Research Updates

Northern Fur Seal Research

Jeremy Sterling gave an overview of studies built around addressing some of the northern fur seal conservation action narrative items. Saildrones, which are used to map prey landscapes, were deployed in 2016 and 2017 but not in 2018. However, cameras and accelerometers were deployed on northern fur seals in 2018 in order to document prey capture events. There was about twice as much effort in 2016 compared to 2017. A Saildrone is an autonomous sailboat which is equipped with a fish echo sounder, giving it the ability to map a prey field where animals are feeding. The study has shown that northern fur seals spend more time in areas that have more pollock, which are one of the main prey species for northern fur seals. Diving data going back to 1992 show inter-annual variability in the dive depth of northern fur seals, which tends to align with the age structure of pollock for fur seals feeding on the shelf. The information from the current project is validating what northern fur seals might be doing in the water column and, unlike the historical dive data, is also providing information on foraging efficiency. This study has shown that certain prey are harder or easier for northern fur seals to catch, which has been a huge step forward for our research. The overall goal is to link these behavioral changes with foraging and reproductive success. The hope is to conduct fieldwork in the summer of 2019, involving about 10 fur seals and 45 days of Saildrone time. O'Corry-Crowe asked if the Saildrone can collect other data. Sterling said the Saildrone is equipped with a suite of sensors which collect various types of information such as oceanographic and wind data. Currently the Saildrone is not directly linked to a northern fur seal; but it has the ability to follow the fur seal via real-time user guidance, which is based on real-time fur seal position. Doniol-Valcroze asked about the lag time between the Saildrone and the fur seals. Sterling said it can be as close as 2 hours.

Sterling described a second study that began 1 year ago which uses bioenergetics and spatial data to quantify how northern fur seals interact with prey fisheries and climate. The goal is to combine a spatially explicit northern fur seal bioenergetics model with ecosystem and stock assessment models. Several studies have predicted that pollock recruitment is going to significantly decline in the future. The bioenergetics model has essentially been built and the parameters are being updated as available. A simulation approach, which looks at the entire season and all age and sex classes, has been taken to determine how much energy a fur seal needs. This study has a lot of information to draw from. Mother-

pup pairs were monitored from birth to migration, and various types of data, such as diet composition, dive, and metabolic rates, were collected. Some of the data being used in the bioenergetics model have shown inter-annual and island variability in northern fur seal diet. Of all the studied variables, season has the greatest impact on the field metabolic rate of northern fur seals. Concepcion said the pollock stock appears to be decreasing and heading into the northern Bering Sea. How do you think that will affect northern fur seal distribution? Sterling said that northern fur seal pups on the Pribilof Islands would lose weight if the mothers had to travel to the northern Bering Sea to forge. If the fur seals stay on St. Paul and a large portion of the pollock population moves into the northern Bering Sea, it's going to be a big problem unless another prey species takes its place. Peterson asked if pup production rates mirror the metabolic information based on rookery. Devin Johnson said no, the trends don't cluster in the same way. The trends are more closely clustered on an island-wide basis in terms of pup production.

Recent Work to Estimate Abundance in Steller Sea Lions and Northern Fur Seals

Johnson described the capture-recapture methodology for estimating northern fur seal pup production, which is design-based and has some issues with detection variability. A new model-based population estimate approach, which considers numerous variables, has recently been investigated. The new model-based approach yielded roughly the same numbers as the traditional method for estimating abundance. Overall there is not a huge difference between the two approaches on an island-wide scale, but there is a difference when considering pup production on specific rookeries.

Johnson said an older SSL abundance study found that the ratio of pups to the total abundance was approximately 4.5, which has been used as the multiplier for the true abundance estimate ever since. Attempts are being made to adjust the multiplier to be more dynamic. The issue with the estimates are the non-pups, which can be estimated for every age class using survival information and pup counts, which is what the new model is based on. The survival component, which has been a major focus recently, is key to the model. The new model seems to be producing sensible results. This new model approach could potentially be applied to northern fur seals as well. Regehr asked how this new model approach compares to combining everything together in a multi-state type model based on life history. Would the results be the same, or is there a fundamental difference between the two methods? Johnson said the primary fundamental difference is that the new model approach is a lot easier and can be done on a regular yearly basis without additional work. This new model-based approach has not yet been added to the SAR, largely because current data are limited to the previous 18 years of capture-recapture studies, which do not encapsulate the entire life span of both male and female SSLs. Regehr asked if there is a sense, based on current conditions, that the original 4.5 multiplier is no longer useful. Johnson said yes, because the 4.5 multiplier depends on zero growth stable age distribution, which is no longer the case after a big decline in abundance. Gelatt added that when considering the range of SSLs, the multiplier is likely different in a lot of those areas.

Johnson said that the aggregation trend model projects pup production at each individual SSL site, which produces a model estimate in a particular year for a particular site. All sites could then be added up to get an estimated pup count. The reason SSL abundance is an estimated count is because some sites are not counted every year. The reported sum for the stock as a whole is derived from both the modeled site counts and the actual pup counts from visited sites for a given year. Johnson provided an overview of the population information presented in the SAR. Doniol-Valcroze said the legend in the SAR figure that displays population trend information does not clearly explain what information is being used to inform trend lines and he asked what values are being used for N_{MIN}. Johnson said the raw counts are used for N_{MIN}. Citta asked if there will be a mix of approaches for a while. Johnson said yes, for a little while in the data poor regions. Doniol-Valcroze said in the ESSL SAR, Figure 3 shows the estimated

counts for non-pups. Is there any risk that the actual number of animals is lower than the modeled count? The counts should be lower than the true abundance. Johnson said yes, there is a slim chance, which would be based on the actual counts reflecting a very high percentage of the existing population. Doniol-Valcroze asked if this model approach fits the requirements for N_{MIN}.

NMFS Alaska Regional Office Updates

Teerlink reported the Gulf of Alaska (GOA) and Bering Sea pollock trawl fleet is going to be testing electronic monitoring (EM) this season for the first time. Observers will not yet be replaced by EM, but this is one of the first steps in this process. Discussions are taking place to determine how EM will differ from observers when considering marine mammal bycatch data. Concepcion asked if fishing fleets in the GOA are currently using EM. Teerlink said yes, some longline fisheries use EM, but this will be the first trawl fishery to use EM. Concepcion asked how EM will impact the SAR tables that discuss commercial fisheries marine mammal bycatch and observer coverage. Angliss said that we are just starting to get a handle on this very fast moving development (the implementation of EM). It's necessary to understand the gains and losses from implementing EM, which could be significant. There are a lot of uncertainties and concerns about how this will impact the marine mammal bycatch data in the SARs. This will likely lead to a reduction in our certainty. Concepcion said having observers is expensive and takes up bunk space and that fishermen are willing to help out when they can. Teerlink said it's important that fishermen understand that the requirement to report marine mammal bycatch incidents exists even if there is an observer onboard. Currently, we are not seeing good self-reported data.

Teerlink said a new negligible impact statement is being drafted for Alaska fisheries, which authorizes the take of ESA listed species for 3 years. The GOA sablefish longline fishery has been elevated from Category III to Category II in the List of fisheries (LOF), due in large part to a lack of a PBR for sperm whales. There has never been a Category I fishery in Alaska, but there are several Category II fisheries. Concepcion said she understands that the sablefish longline fleet is now a sablefish pot fishery because they have switched gear, which is also true for some of the halibut longline fishery. The switch is due to sperm whale interactions. Teerlink said that the numbers indicate that few vessels actually made the switch in 2018 because it's very costly. Peterson confirmed that a very small number of vessels have switched to pot gear in the GOA; there are expectations that a complete switch will eventually take place, but it will take time. Miller said the small boats are not big enough to make the switch. Angliss said this is also an issue for killer whales. Is this gear switch attributed more to sperm whale or killer whale interactions? Peterson said that killer whales are not as big an issue in the eastern GOA; but, if they do become an issue, there will likely be a much quicker shift in fishing gear. Teerlink said there is a concern for an increased number of humpback whale entanglements in cod pot fishery gear due to an increase in fishing in state waters where humpbacks tend to reside. Also, aquaculture demands are increasing, which poses an entanglement concern, particularly for humpback whales. The humpback whale SPLISH project will not continue this summer, but NMFS has 3 years of great data which show dramatic changes in attendance in places such as Glacier Bay. The big question is whether these are shifts in distribution or a mortality issue. There have also been reports of very low calf numbers and skinny whales, which we are keeping an eye on. Hawaii is reporting normal humpback whale numbers this year.

Eastern Pacific Northern Fur Seal SAR Review

Rea asked if this SAR still relies on an expansion factor for which there is no CV. Johnson said yes. O'Corry-Crowe asked about the actual overall population trend for the Eastern Pacific stock. Gelatt said

an overall population trend for the entire stock is not in the SAR. O'Corry-Crowe recommended adding an overall rate for the entire stock. The issue of estimating minimum take for commercial fisheries was re-emphasized. The "Habitat Concerns" section seems to imply a connection between differing diet and differing trends. Is that the intention? Rolf Ream said that trend and ecological information is being recorded at different locations and there is a lot going on. It would be a stretch to make a direct link. Sterling said the bioenergetics model essentially shows that animals are acquiring the same amount of energy at the various population sites. The issue is the availability of energy resources. The females on Bogoslof Island have to acquire more resources in a shorter period of time, which is different than what is occurring on St. Paul Island. O'Corry-Crowe said a sentence in the SAR to explain the bioenergetics work being done would be helpful.

AT-1 Transient Killer Whale SAR Review

Peterson said there is not much to say about this stock. She suggested a sentence be added explaining why this stock is not listed under the ESA. Regehr asked if it's normal practice to use a default R_{MAX} for a species rather than having a stock specific R_{MAX}. Angliss said there is a default number for pinnipeds and cetaceans, which is what is used unless there is a very strong justification to use a different R_{MAX}. The ability to change R_{MAX} does exist. Doniol-Valcroze said in theory the R_{MAX} should be applied to the species, unless there is a good reason to use a different number for a population. The R_{MAX} for a specific population could be very different than what is being used for the species. PBR says that R_{MAX} should be the maximum for a population that is very far from carrying capacity. Regehr said with polar bears, which are very well studied, there is a lot of variation in the intrinsic growth rate across their range. There are more productive areas and less productive areas even in the absence of crowding effects. Looking into the future and considering climate change, there is a lot of potential for stocks or animals to experience positive or negative changes to their R_{MAX} across their range. Doniol-Valcroze said in the case of the AT1 killer whale, there is uncertainly that any member of the population can still reproduce, but it seems that they cannot. It might be worth reiterating that the R_{MAX} for this population could be zero.

Northern Resident Killer Whale SAR Review

Doniol-Valcroze said there has been a change to Canada's method of releasing information about this population. Every year a science response document (or a short SAR) will be released, which will provide an update to the population number and will include a minimum, best, and maximum number. This is a census, but there is always a small amount of uncertainty. There is a slight mischaracterization of the methods in this SAR surrounding the census window, which will be clarified with some provided text. In the "R_{MAX}" paragraph, 2.9% is being used for the maximum net productivity rate, which might not be appropriate. The maximum observed growth rate for this population may not be the most appropriate rate to use for realized growth. O'Corry-Crowe said this seems to be a reoccurring issue. He suggested it would be beneficial to develop some clearer arguments which could then be used to develop a policy or guidelines to be used in the SARs in the future. Doniol-Valcroze said there is not a clear cut answer, but a better method could be developed. It all comes down to being more consistent with the use of R_{MAX}. A statement clarifying the use of R_{MAX} would be beneficial for internal consistency. Doniol-Valcroze said in the "Fisheries Information" section there is a statement saying that all Canadian trawl and longline fisheries are monitored by observers, which is no longer correct. All of the Canadian groundfish and longline fisheries are observed but not all of the trawl fisheries. Peterson said the first population census in 1974 does not provide a CV and a sentence describing why would be beneficial. The dependency of this population on Chinook salmon creates a vulnerability. Is the use of a standard recovery factor appropriate for this population, or is it possible to get more refined given how much is known about this

population? Muto said Paul Wade did not think it was appropriate to change the recovery factor given the listing status of this population in Canada without discussion from the SRG. Doniol-Valcroze asked who makes the decision. Angliss said there are guidelines for assigning the recovery factor, which will be revisited to ensure that the current value is appropriate. Peterson said the "Habitat Concerns" section should mention contaminants in the marine environment, which is a significant consideration for killer whales.

Southeast Alaska Harbor Porpoise SAR Review

Concepcion said an inset of the described area (Southeast Alaska) in Figure 1 would be helpful. The SAR says that NMFS is considering separating the Southeast Alaska harbor porpoise stock into two separate stocks based on two environmental DNA (eDNA) samples, which seems like a big jump. Angliss said this stock has not been separated because there is not enough information to do so at this time; however, there are more than just two samples. It does appear that the dynamics are different across the distribution, which could suggest different groups in the same area. Kim Parsons' eDNA work is only one aspect factoring into the stock discussion; there is other evidence. Alex Zerbini added that Parsons' work includes multiple samples from two different concentrated areas. Angliss said prospective stocks are sometimes identified in the SAR if the evidence leading in that direction is strong. However, there are no specific guidelines for mentioning a prospective stock; it's an informal process. Concepcion said it would be helpful to add a sentence in the "Population Size" section explaining why g(0) is typically violated for harbor porpoise and why the g(0) provided is derived from surveys on the east coast. Peterson said the N_{MIN} provided in the SAR is from the 2010-2012 estimates, and it only covers a portion of the range. There is real concern about this stock. Even with limited data, and regardless of whether or not this stock is split, it's probable that PBR is being exceeded. This could be a case to consider using a back calculation, such as in the sperm whale SAR. Teerlink said this is a Category II fishery, and the interactions are a known concern. There are plans to get updated abundance estimates for this stock, which is a realistic goal. The use of a back calculation should not be abused and it should not replace going out into the field. Angliss said MML agrees that this is a concern and it has brought in funds for eDNA fieldwork from NMFS HQ. A Category I fishery with a take level that is higher than PBR would trigger a Take Reduction Team. The burden of proof to take that step is high, which would require spectacular population data. Doing a back calculation for this stock when the fishery is already a Category II, and when we are in the process of collecting additional population information, would not be beneficial.

Gulf of Alaska Harbor Porpoise SAR Review

Regehr said, when considering commercial fisheries takes, it would be helpful if the SAR mentioned the total number of relevant fisheries for perspective. There is no PBR for this stock, but it's conceivable that this stock is approaching PBR. It might be beneficial to define "strategic" and to state the overall status of this stock more clearly. Citta agreed that more clarification about the status of the stock would be beneficial. There are not a lot of data and many of the numbers are old, but the SAR seems to indicate that there is concern for the population and could use additional explanation as to why. Miller said that fishery gear interactions are a concern for harbor porpoise because dead animals do not typically float, so take numbers could be significantly higher than what is known. Regehr suggested adding some additional information to the SAR to justify the implied concern for this population given that a PBR is not provided. Citta asked if SRG recommendations, such as the one made last year about the concerns for the status of this stock, are useful in helping to gain support and funds for research. Angliss responded by saying absolutely, the SRG recommendations are important and effective. Zerbini said stock structure is a very important factor. The Gulf of Alaska is a very large area, but some of the populations could be very small, and bycatch could be destroying these populations. Doniol-Valcroze

said stock structure affects N_{MIN}, and there is a very clear rational for understanding stock structure. Miller added that fisheries gear type could change if the GOA harbor porpoise stock is redefined or segmented into smaller stocks.

Bering Sea Harbor Porpoise SAR Review

Peterson said this SAR has many limitations, including outdated survey data and uncertainty about stock structure. This SAR states that if a PBR existed, it would likely be exceeded, and there should be some language added to explain why and how to the extent possible. It would be nice if a correction factor, if available, could be applied to this stock or if a correction factor from another survey could be used, as in the Southeast Alaska harbor porpoise SAR. Zerbini said that using a g(0) from another survey was done for the Southeast Alaska harbor porpoise stock, but the intention was not to send a message that this is appropriate for most situations. Zerbini cautioned against using a g(0) from another survey. Rea said we need more information and that there is no subsistence harvest information in any of the harbor porpoise SARs. How concerned should we be from a conservation perspective? Regehr asked if there is guidance on when to use the best available information versus when not to use it in order to motivate future work. Teerlink said this is a good point and an increasing problem. There is a danger with plugging in numbers. O'Corry-Crowe said practically speaking, people don't think about the biology as much as the risk to the population. It's possible that longer-lived animals can ride out problems but take a longer time to recover. Sam Simmons said that the 8-year threshold outlined in the GAMMS has not been effective in providing motivation for additional funding. Ideas on how to move away from the 8-year threshold are being developed. Doniol-Valcroze said it's a good idea to display the impact of increasing uncertainty and to show that increased funding results in higher confidence and a less conservative PBR, which is better for management needs.

North Pacific Sperm Whale SAR Review

Concepcion said this is still an outdated and limited SAR. O'Corry-Crowe said an N_{MIN} is estimated despite limitations on abundance estimates. The same issue exists with PBR. How useful is this information? Is this just an exercise that could be misinterpreted? Angliss said the guidelines say that if an abundance estimate exists, it must be used, even if it's only for a portion of the range. Citta said it would be nice if the level of concern for sperm whales could somehow be conveyed despite data limitations. Peterson said there was some discussion last year about applying a PBR to a subset of the population. It would be a big step in a different direction but an interesting notion, especially in cases when you know there is an ongoing issue.

Western North Pacific Humpback Whale SAR Review

Concepcion said Kate Stafford did not make any comments on this SAR because the stock structure is currently under review. Are there any updates? Teerlink said that there has not been substantial progress lately because NMFS HQ is evaluating the larger policy question of how/whether to align MMPA stocks and ESA DPSs. Angliss asked the SRG for guidance on how to handle the humpback whale SARs while decisions from NMFS HQ about stock structure are pending. Peterson said the SRG can make a recommendation to address how to deal with the humpback whale SARs while the stock structure questions are being resolved by HQ. Teerlink said it would be nice if the ESA and MMPA used the same language to describe the humpback whale population structure. One proposal is to make the stock structure mirror the DPS structure. Concepcion said it would be worth considering the impact of Japan's commercial whaling on the stocks. There was an unauthorized take of a humpback whale by Alaska Natives in 2016, which is not mentioned in the SAR. Miller said it's mentioned but not properly. The take is not listed in the SAR as a subsistence take. When considering habitat concerns, as conditions change and the whales progressively move north, it's more likely that Alaska Native harvests will occur. Angliss

said subsistence takes should be listed the same across the board for all species, and as Alaska Natives start to change their behavior it should be incorporated in the SAR. Subsistence takes, which are legal for Alaska Natives, belong in the "Alaska Native Subsistence/Harvest" section. Miller said this take is not authorized under the IWC. Citta said it's currently stated that there were no reported takes by the Alaska Native subsistence harvest. The SAR could state that there was a single unauthorized subsistence take. Miller said harmful algae blooms are a concern for humpback whales, and it should be emphasized in the "Habitat Concerns" section.

Central North Pacific Humpback Whale SAR Review
Concepcion said this SAR is quite lengthy and she recommended simplifying it. The "Habitat Concerns" section focuses on the whale-watching industry but does not include a discussion about ecological concerns. O'Corry-Crowe said the SAR has many of the same issues as the Western North Pacific humpback whale SAR.

Northeast Pacific Fin Whale SAR Review
Doniol-Valcroze said there is a lot uncertainty surrounding stock structure. There are too many details in the SAR about locations of fin whale acoustic recordings. There are two surveys referenced in the SAR that are used to estimate population abundance. A large portion of the range of this stock encompasses British Columbia waters, which were recently surveyed in a multi-species survey. There should be new population estimates derived from the BC survey for various species, to include fin whales, in the near future. Angliss said there is hope to do a major survey cruise in FY2020 or FY2021, which will help improve the understanding of cetacean abundance in the Gulf of Alaska.

West Coast Transient Killer Whale SAR
Peterson commented that the West Coast Transient killer whale SAR has not been updated in a very long time. Is there new information available for this stock? Angliss and Nancy Friday said they are not aware of anything. Peterson asked if it is NMFS policy for the SARs of non-strategic stocks to remain unreviewed indefinitely if there is no new information. Angliss replied that it is NMFS policy to review (but not necessarily revise) the SARs of non-strategic stocks every 3 years or when there is new information.

Eastern North Pacific Right Whale SAR Review
Citta said that the first section of the SAR is long and could be summarized to be more direct. A map of all the sightings and a summary of what we think we know would be helpful. It would also be helpful to mention which fisheries have observer coverage and to list the observer coverage rates. The summary of key uncertainties was nicely written. Doniol-Valcroze said there is a lot of repetition of sightings in the "Population Size" section. There are two population estimates and only one is used in the "Minimum Population Estimate" section, which appears to be because it is the most recent, but that is not explained in the SAR. A sentence explaining why one is used over the other would be helpful. There are a few instances in which whales in the Gulf of Alaska are described as being part of the Gulf of Alaska population, which could be misleading. In general the SAR is a little wordy. Peterson asked if this stock has any large data gaps. Angliss said there are numerous data gaps and that we know very little about this species. Citta asked if there is significant bycatch or entanglements that are being missed. Angliss said this is a concern due to the North Pacific right whale's overlap with pot fisheries and Navy operations. The data need is very broad, but there is not a lot of research support to put towards North Pacific right whales due to other needs at the AFSC. If funding was available, the processing of previously

recorded acoustic data would be the first priority, followed by deploying acoustic monitors in the Gulf of Alaska.

SRG Meeting Conclusion

Bettridge discussed the SRG membership process, which includes assessing the current SRG composition and identifying key expertise gaps and needs. The process typically starts in May and concludes in December. Meeting attendees discussed the location and timing of the next SRG meeting. The usefulness of having species experts and SAR authors present in the room during the SRG meeting was emphasized. A meeting site for the 2020 Alaska SRG meeting was not finalized. The meeting was adjourned.