

## Minutes from the 2018 Meeting of the Alaska Scientific Review Group

### 27-28 February 2018, Seattle, WA

This report summarizes the 2018 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.

### Meeting Called to Order and Adoption of Agenda

Grey Pendleton, the SRG Chair, called the Alaska SRG (AKSRG) meeting to order and adopted the agenda. All participants introduced themselves, their roles, and their background.

*AKSRG Members Present:* Grey Pendleton (Chair), John Citta, Thomas Doniol-Valcroze, Greg O’Corry-Crowe\*, Megan Peterson, Lorrie Rea, and Kate Stafford

*Observers and Invited Participants:* Shannon Bettridge (NMFS HQ/PR2), Kristy Long (NMFS HQ/PR2), Mridula Srinivasan (NMFS HQ/S&T), Lisa Lierheimer (NMFS HQ/PR2)\*, Jon Kurland (NMFS ARO), Suzie Teerlink (NMFS ARO), John Bengtson (AFSC), Robyn Angliss (AFSC), Van Helker (AFSC), LTJG Blair Delean (AFSC), Marcia Muto (AFSC), Peter Boveng (AFSC), Kim Parsons (AFSC), Alex Zerbini (AFSC), Phil Clapham (AFSC), Jeremy Sterling (AFSC), Tom Gelatt (AFSC), Paul Wade (AFSC), Ben Riedesel (AFSC), Rolf Ream (AFSC), Katie Sweeney (AFSC), Carey Kuhn (AFSC), Janice Waite (AFSC), Shawn Dahle (AFSC), Catherine Berchok (AFSC), Dana Wright (JISAO), Jessica Crance (AFSC), Heather Ziel (AFSC), Erin Moreland (AFSC), Kim Shelden (AFSC), Brian Brost (AFSC), Brain Fadely (AFSC), Megan Ferguson (AFSC), Rob Hobbs (AFSC retired), Patrick Lemons (USFWS)\*, Nathan Hostetter (USGS)\*, Sam Simmons (MMC), Vicki Cornish (MMC)\*, and Jenna Malek (MMC)\*

### John Bengtson Welcomed the AKSRG to the Alaska Fisheries Science Center (AFSC)

John Bengtson said he is glad that those traveling to the meeting from out of town could make the trip. The work of the AKSRG is very important, and NMFS appreciates it. Robyn Angliss said the Marine Mammal Laboratory (MML) has a change to their team. Van Helker, who has been providing great support to the AKSRG, has taken another position. Blair Delean will be taking the minutes for this meeting. Grey Pendleton asked if everyone had a copy of the agenda and if anyone had any changes that need to be made. Pendleton said attempts would be made to stick to the agenda, but flexibility may be necessary to allow for discussions that need to continue.

### Minutes from Previous AKSRG Meeting

Helker took the minutes at the 2017 AKSRG meeting, and a draft was circulated in April 2017. Helker received feedback from some of the AKSRG members and others, which has been incorporated into the minutes. Helker said to please provide notification if there are additional comments on last year’s minutes, otherwise the minutes will remain as is.

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\*Participated by phone/webinar.

## Travel and Administration

Marcia Muto provided a reminder that those traveling on travel orders need to turn in their travel itinerary and reimbursable expenses with original receipts within 5 days in order to get their travel vouchers started.

## 2016 AKSRG Meeting Recommendations

Pendleton provided a summary of the 2016 AKSRG meeting *recommendations* and responses:

- ***NMFS should conduct a review of the status of eastern stock Steller sea lions with respect to their Optimum Sustainable Population (OPS).*** Pendleton said NMFS responded by showing support for conducting an OSP determination. Pendleton said he did not think that there has been any progress made on this recommendation.
- ***AFSC should move forward with updating killer whale and humpback whale stock structure and Stock Assessment Reports (SARs).*** Pendleton said NMFS responded by saying that AFSC staff intended to submit a draft manuscript with additional analysis of killer whale stock structure to the AKSRG for review prior to the 2017 meeting, but the AFSC had no progress to report on updating killer whale stock structure. Pendleton said the humpback whale stock structure was supposed to be reviewed before the 2018 AKSRG meeting and possibly revised.
- ***We recommend again that each SAR clearly indicate the number of fisheries that potentially interact with a marine mammal stock and the number of those fisheries that are monitored.*** Pendleton said NMFS responded by indicating that Suzie Teerlink drafted proposed text to address this AKSRG recommendation. Pendleton said there have been some attempts at accomplishing this recommendation, but there is still a ways to go. Muto said text has been incorporated into a couple of SARs this year. Pendleton said that to some degree this was true.
- ***AFSC and the Alaska Regional Office (ARO) should implement changes to the existing process for extrapolating serious injury and mortality from observer records to reduce errors and bias, and use the updated methods in the 2017 SARs.*** Pendleton said NMFS responded by saying that AFSC staff intended to present an alternative approach and results at the 2017 AKSRG meeting; however, the AFSC had no progress to report on implementing changes to bycatch estimates, and the existing bycatch estimation methods are still being used. Pendleton said it was not clear if this has been changed or not. Muto said the same procedure is still being used because MML is in the process of passing on the bycatch analysis to another staff member.
- ***AFSC and the ARO should consider the recommendations and proposals made at the Joint SRG meeting by Jim Carretta and Jeff Moore (SWFSC) regarding alternative approaches for bycatch estimate calculations.*** Pendleton said NMFS responded by indicating that the AFSC and the ARO reviewed Carretta and Moore's bycatch estimation processes, and Paul Wade has had discussions with Moore regarding modifying these models for use with Alaska bycatch data. Pendleton believes there have been some discussions about this recommendation but did not think that this has been moved on. Pendleton said that concluded a review of the recommendations and responses from 2016.

## 2017 AKSRG Meeting Recommendations

Pendleton provided a summary of the 2017 AKSRG meeting *recommendations* and responses:

- ***Southeast Alaska Harbor Porpoise: Currently, the estimated fishery-related mortality for the Southeast Alaska harbor porpoise stock is close to its Potential Biological Removal (PBR) level. The AKSRG recommends NMFS prioritize defining the genetic structure of the Southeast Alaska harbor porpoise stock, a key to assessing stock abundance and the true impact of fishery-related mortality. Specifically the AKSRG encourages enhanced collection of genetic material from harbor porpoise throughout Southeast Alaska, including outer coast populations, via environmental DNA (eDNA) sampling and tissue sampling of stranded/bycatch porpoises. The AKSRG also encourages NMFS to develop alternate means of monitoring harbor porpoise mortality in Southeast Alaska and cooperate with coastal fisherman to reduce/mitigate fishery-related mortality.*** Pendleton said NMFS responded, in summary, by acknowledging the importance of defining the genetic structure of the Southeast Alaska harbor porpoise stock. There are not adequate funds to develop survey programs for protecting harbor porpoise. In addition, there is not enough money to operate observer programs for mortality estimation. New outreach flyers have been developed to encourage permit holders to self-report marine mammal interactions. NMFS also receives reports of dead marine mammals via the Alaska Marine Mammal Stranding Network, which includes information on harbor porpoise. Pendleton said we would hear more about the eDNA work later in the meeting.
- ***North Pacific Right Whale: The North Pacific right whale is in danger of extinction; research on this population should be a NMFS priority. One AKSRG recommendation for reducing prohibitive survey costs is to use gliders to search for and locate right whale calls. When calls are detected, the glider can signal the survey ship or aircraft, allowing for efficient location of right whales for subsequent approach and observation to document and photo-ID the number of individuals, obtain biopsies to determine the sex of animals (at present the sampled population is highly skewed towards males), and deploy satellite tags to better understand habitat use and wintering locations.*** Pendleton said NMFS responded by indicating that there are no funds available to do vessel or aerial based right whale surveys. There is cooperation occurring between MML, the International Whaling Commission (IWC), and the government of Japan, who conducted surveys in the central Bering Sea last summer. There are also plans to survey this summer and possibly in 2019.
- ***Bowhead whale: There is a long and valuable time series of 12 abundance estimates for Western Arctic bowhead whales, starting in 1978. Current PBR is calculated from the 2011 abundance estimate only. Although the stock has been increasing steadily and is not in danger, performing population modeling and analysis of this time series would be valuable as it would provide rare information on large whale population dynamics (e.g., intrinsic growth rate, density-dependence) and would likely allow better estimation of historical abundance and carrying capacity. It would also allow for estimating recent abundance based on all the information contained in the data rather than using only a single survey, and would increase confidence in the PBR. Short-term projections of this model would provide information on population trend and may reduce the need for frequent expensive surveys.*** Pendleton said NMFS is going to discuss this recommendation with the North Slope Borough (NSB), the Alaska Eskimo Whaling Commission (AEWC), and with other stakeholders regarding the utility of integrated population models in preparation for the IWC Scientific Committee meetings, at which discussions will focus on setting a new 6-year harvest catch limit for subsistence whaling. There is also a plan for a new aerial

survey in 2019.

- ***Pacific Marine Assessment Program for Protected Species (PacMAPPS): At this meeting, NOAA staff briefed the AKSRG on planning efforts related to the upcoming Pacific Marine Assessment Program for Protected Species (PacMAPPS). These ship-based surveys will assess marine mammals and oceanographic conditions in several broad regions in the Pacific Ocean. The AKSRG wholeheartedly supports PacMAPPS and dedicated shipboard surveys in the Gulf of Alaska and Bering Sea that focus on estimating the abundance of all cetaceans, with priorities on harbor porpoise and North Pacific right whales.*** Pendleton said NMFS responded by showing appreciation for the AKSRG's support of this program, but it's driven, to some extent, by the Navy's and the Bureau of Ocean Energy Management's (BOEM's) needs. Even if the program moves forward it will be localized, probably in the Bering Sea oil and gas lease areas and in the Gulf of Alaska.

### **NMFS Headquarters (HQ) Update and SRG Membership Reviews**

Shannon Bettridge discussed the Terms of Reference for the SRGs. NMFS did not have terms of reference until 2014. Term limits were instituted for SRG members following the implementation of the Terms of Reference. Terms are 3 years and SRG members may be reappointed for up to three consecutive terms. The AKSRG has had some natural turnover, which has led to position openings. There are some new faces on the AKSRG. Every year, NMFS conducts a review of each SRG, which is broken into thirds so that all members are not evaluated at the same time. The review process involves an evaluation of the current expertise on the SRG, the identification of SRG expertise needs, as well as a request for new members via the Federal Register. Last year, due to natural turnover, NMFS did not have any AKSRG members to review. NMFS received a number of very good nominations, which were assessed with the AKSRG Chair, the U.S. Fish and Wildlife Service (USFWS), and internal NMFS staff. AKSRG members who have recently stepped down include Bob Small, Karl Haflinger, and Kate Wynne, who was the AKSRG Chair. The AKSRG now has nine members. Mike Miller, Grey Pendleton, and Kate Stafford are up for review this year. The Atlantic SRG has one new member this year. The Pacific SRG has had a number of long-term members step down all at once and currently has six members. Thomas Doniol-Valcroze asked if NMFS has a list that identifies areas of SRG expertise. Bettridge said NMFS asks SRG members to self-identify areas of expertise.

Bettridge continued with NMFS HQ updates. There is a new administration that has been in place for over a year, which has led to political appointments, including many positions in NOAA. The Department of Commerce (DOC) now has most, if not all of their political appointees in place. Bettridge reviewed the current DOC political appointees. Career personnel are acting in any open political appointee positions. In general, political appointees share the same philosophy as this administration. Bettridge reviewed high level staffing changes, to include the retiring of the AFSC director, which will take place in the next few months. At HQ, the Office of Protected Resources (OPR) has a number of vacancies, which affects the work of the SRG. There are numerous vacancies, and NMFS is doing their best to staff them.

Pendleton asked, for those who don't know the connection, how the Science Centers relate to the SRG. Bettridge responded by saying that the Stock Assessment Reports (SARs) for each region are written by the Science Center staff, which is the AFSC for the AKSRG. SARs are reviewed by the NMFS Regional Offices as well as by NMFS HQ. Pendleton said the AKSRG tends to work with personnel at MML/AFSC.

Bettridge said a little over a year ago the agency came out with a rulemaking that reclassified the listing of humpback whales, which identified 14 Distinct Population Segments (DPSs). About 10 of the humpback whale stocks were not listed under the Endangered Species Act (ESA), and the remaining

have been listed as either endangered or threatened. The new DPS do not align with North Pacific stocks, so NMFS is looking to align the stocks. NMFS does not have a clear process for designating stocks internally. NMFS is not moving forward with new SARs for humpback whales until the stock designation process is clear. Doniol-Valcroze asked if the SRG always reviews SARs. Are there other types of documents, such as stock structure documents or methodologies, that are not necessarily specific to one stock or species that are reviewed by the SRG? Bettridge responded that it depends on the SRG and the region. Science Centers will request an SRG review if there is a new methodology that will be used in the SAR. New stock structures would also be reviewed by the SRG. Bettridge said NMFS has provided overviews of the budget in the past, which has been more difficult in recent years due to the continuing resolutions. The government is currently under a continuing resolution until March 2018, and it will be difficult to give an update until the budget is passed.

### **NMFS Marine Mammal Laboratory (MML) Updates**

Bengtson said funding for the AFSC is limited, and budgets drive everything we do. The AKSRG looks at what MML has done, identifies management needs and gaps in the science, and makes recommendations. We really appreciate those recommendations. They help identify existing gaps, and we are aware of those gaps, but there is not enough money to do what we know we need to do. Costs escalate over time (labor, administrative, living, operating costs, etc.). Some of the rising costs can be mitigated with advances in technology, by being more efficient, and by focusing efforts on the priorities that we can afford to do. In FY18 MML will only have enough funding to complete about 20 of our 60 proposed projects. We are continuing to look for partnerships as an additional funding source. When there is not enough mitigation, staff levels drop, which reduces mission scope. The AFSC's budget is largely (70%) federal labor costs. Labor in FY18 is expected to rise over 1 million dollars for the AFSC, which will take money out of the operations budget. The facilities cost at the AFSC has also gone up by about 1 million dollars recently. As a result, there are fewer positions at the AFSC. There were 380 AFSC staff 7 years ago and now staffing is down to 315. We are now doing less with less. FY18 started in October of 2017, and we still don't have a budget. Strategic principles for the AFSC include trying to control labor costs by not backfilling permanent positions. The AFSC uses a priority based resourcing system, using activity plan proposals to allocate project money. Bengtson discussed activity plans, scoring criteria, and the ranking system that is used to determine how money is allocated and which projects are funded. MML put in 48 activity plans for FY18, a third of which will be funded. In general, the consensus is that the budget is going to continue to decline over time.

Bengtson detailed spending by species and species group over time. Most of MML's cetacean work has been supported by BOEM. The *Species in the Spotlight* program has shifted funds from pinniped research to Cook Inlet beluga whale research. In summary, operational funds at the AFSC have declined from roughly 7 million to 5 million dollars, and we are expecting that to continue to come down. About a third of the 2018 projects that MML would like to conduct are likely to occur, another third are unlikely to receive funding, and another third are likely to not have funds. Looking beyond FY18, budgets and plans are uncertain; there is not enough money. Partnerships continue to be very important, including partnerships with BOEM and the Navy. MML would like to ensure that abundance and trend data are updated at least every 8 years for species with subsistence harvests, which can be accomplished by moving money around. MML is expecting permanent staffing levels to decline about 10% over the next 4 to 5 years, which is also the target for the entire AFSC. The expected decline will shift money to contract work, which ends up being more costly.

Pendleton asked if the SARs will continue to be updated if there is no new information due to a lack of research. Angliss said the Marine Mammal Protection Act (MMPA) states that SARs should be reviewed annually for strategic stocks, and every 3 years for non-strategic stocks, and updated if necessary. Certain aspects of SARs can be updated, such as the mortality and serious injury sections, even if there is no field research occurring. Bengtson said these are important projects, but there is not enough money to do the work that we know needs to be done. MML works very closely with the ARO when prioritizing funding. It's a very active dialogue.

Doniol-Valcroze asked how much weight the SRG recommendations have on the list of priorities. Bengtson said the SRG recommendations are taken into account and are very important. Doniol-Valcroze asked if the recommendations help. Can the recommendations be leveraged to obtain funding? Bengtson said the recommendations from the SRG or from the Marine Mammal Commission (MMC) can help when bidding for new money or when making a proposal. The recommendations are not as helpful when trying to prioritize a fixed list of projects. Bettridge said the regional SRG recommendations go to the head of NOAA Fisheries. Bengtson said SRG recommendations can help defend current levels of funding. The *Species in the Spotlight* program reallocates money, but does not generate new money, which helps some projects while hurting others. Bengtson said the work of the AKSRG is very important and it's taken into account at the NMFS HQ level, by the AFSC director, by the ARO, and by the MMC. Pendleton said the AKSRG needs to continue to make recommendations, even if they know there is not funding available. Pendleton also highlighted the importance of continuing ongoing projects that are not mentioned in the recommendations. Doniol-Valcroze agreed and said SRG recommendations identify gaps, but it's important that they don't derail other areas of focus.

#### **NMFS Alaska Regional Office (ARO) Updates**

Teerlink provided an overview of the *List of Fisheries* and their categories, which is a process that is outlined in the MMPA. Under section 118, fisherman have an exemption which provides authorization for incidental takes (to commercial fishing operations) of marine mammals. As part of the exemption, each fishery must be classified in order to keep track of the incidental takes that are occurring. There are three categories, and most Alaska fisheries fall under Category III (remote or no likelihood of incidental serious injury or mortality to marine mammals). Category II fisheries have occasional incidental mortality and serious injury. Category I fisheries have frequent takes of marine mammals. Alaska does not have, and has never had, a Category I fishery. Category II fisheries have a higher likelihood of observation, and they are required to have a certificate on board which is provided by the ARO. Frequency of interaction is based on incidental mortality and compared to PBR for each stock. A two-tiered process is used to determine the category for each fishery. A marine mammal stock must have greater than 10% of its PBR attributed to incidental fishing mortality in order to qualify for the Tier 2 analysis.

Teerlink said the *List of Fisheries* analysis is done each year using data from the SARs. Lack of a PBR was an issue for completing the *List of Fisheries* analysis for sperm whales. In a Tier 2 analysis, in order for the Gulf of Alaska (GOA) sablefish longline fishery to remain a Category III fishery, there would need to be greater than 110,000 sperm whales in the stock. Teerlink mentioned that there have been a number of serious injuries to the North Pacific sperm whale stock in the GOA sablefish longline fishery over the last 5 years, which has been examined by the most recent *List of Fisheries*. The examination has shown, based on available abundance information, that >1% of PBR is being exceeded. Therefore, the GOA sablefish longline fishery was elevated to a Category II fishery. Teerlink said that not many changes to the fishery are anticipated as a result of this action. Observer coverage is already in place, and a Take

Reduction Team is unlikely to be initiated. Pendleton said a Take Reduction Team has never been implemented in Alaska. Kate Stafford asked if observers make injury determinations. Kristy Long said observers do not make injury determinations. Helker discussed observer data, which includes log books and deck logs. Helker reviews observer data when evaluating fishery interactions. Megan Peterson said the observer program recently began monitoring longline vessels that are <60 ft (beginning in 2013), which is why these serious injuries are now being observed in this fishery. Wade agreed and said fishery interactions may have been missed in the past due to a lack of observer coverage on smaller boats. Peterson asked if the approach of back calculating a minimum population has been used in other regions. Bettridge said the sperm whale case in Alaska is the first time this approach has been used, and the Alaska Region is the only region using this approach. Teerlink said the sperm whale classification will help to highlight the issues of depredation and the potential for entanglement and to set priorities to help the fishery mitigate this problem.

### **Humpback Whale SPLISH Project**

Teerlink said the SPLISH project is a much smaller counterpart to the humpback whale Structure of Populations, Levels of Abundance, and Status of Humpback Whales (SPLASH) study. The goal of the SPLISH project, which began in 2016 and is likely to continue into 2018, is to conduct a rapid assessment of humpback whales. The SPLISH project, which is part of a post-delisting monitoring program associated with the delisting of the Hawaiian humpback whale DPS, is designed to ensure that recovery goals are met. Ninety-four percent of humpback whales that occur in Southeast Alaska (SE AK) belong to the Hawaii DPS, which is no longer listed under the ESA. The survey, which is supported by ARO discretionary funding, occurs during a 2-week window every August, thus creating a good snapshot of northern SE AK. A total of 210 survey hours resulted in >500 whales sighted in 2016. Low calf numbers were observed, as were low numbers of whales in general, which is thought to be the result of a shift in distribution. There were high numbers of whales with low health indices (abnormally thin, parasites, etc.). The results from the 2017 survey have yet to be summarized. Phil Clapham asked if there were any patterns to the animals with low health indices. Teerlink indicated that patterns have not yet been determined. Pendleton asked how the ARO prioritized spending funds on post-delisting monitoring plans versus spending money on other higher priority issues. Jon Kurland said the MMPA requires monitoring for 5 years following a delisting. Doniol-Valcroze asked how many seasons are included in the SPLISH study and if any trends are being observed. Sightings in British Columbia have grown much faster than can be explained by population growth. Teerlink said the SPLISH study has included two seasons. The preliminary results from SPLISH do not necessarily indicate a trend, but there does seem to be a shift in distribution. John Moran thought that most of the whales in SE AK are using offshore waters or perhaps British Columbia waters. Clapham said there are some concerns with the SPLISH findings, notably the low population numbers, which merits continued SPLISH surveys. Peterson said there may be climate change implications involved in the shift in distribution. Wade said humpbacks could also be meeting their carrying capacity. Teerlink said this observation is backed up by low calf numbers.

### **Marine Mammal Laboratory Research Updates**

#### **Comparison of Manned and Unmanned Aircraft Systems (UAS) Surveys for Bowhead Whales**

Angliss said MML developed a project to compare long-range UAS to traditional manned aircraft surveys of whales in the Arctic. The project aimed to answer the question of whether or not UAS can be used to collect data to estimate whale abundance better/faster/cheaper than manned aircraft. The object of the study was to conduct a three-way comparison among people on manned aircraft, digital photographs

collected on manned aircraft, and digital photographs collected by UAS. The project was conducted north of Barrow, AK. Outreach was a very important aspect of the project. The project worked with local communities and local pilots to ensure that everyone knew when and where flights would take place. Manned and unmanned aircraft, which flew roughly the same amount of hours, collected a total of 44,000 images in transect and 77,000 images overall. Angliss said manual imaging processing was a challenge, taking over 300 hours to process the images due to image overlap. Every third image was processed. Humans observed a lot more whales in manned flights in comparison to photo analysis from manned and UAS flights. Transects were not broken by manned aircraft to identify whales if species ID was in question.

The analysis revealed that humans can see farther from aircraft than the view that images provide, which was not a surprise. It would be necessary to fly about twice as much with UAS to achieve a comparable CV to the manned aircraft survey. Weather was also a challenge during the project. In order to make data processing more efficient, an automated image detection software was investigated. The system is about 85% effective. Data processing using the automated detection software will make analysis 10x faster than by hand. UAS surveys for this project were about 10x more expensive than comparable manned surveys. When all costs associated with the project are taken into account, to include ship time, transport of equipment, and the salary of data analysts, the UAS project cost roughly 2 million dollars versus \$200,000.00 for the manned survey. Angliss is confident that UAS costs will eventually be reduced, but UAS is not cheaper at this time. Survey estimates from the UAS flights were similar to the manned aircraft flights, but not identical. UAS has a smaller field of view and covers a smaller area, thus increasing the CV, which will require an adjustment in survey design to compensate. Manual UAS image analysis takes a lot of time, but automated image detection software will speed up the analysis process.

### **Southeast Alaska Harbor Porpoise Genetics**

Kim Parsons said harbor porpoise are a near shore cetacean and are often in conflict with fisheries and anthropogenic activities due to their distribution and habitat requirements. There is a lot of uncertainty regarding stock structure. Trends in abundance are variable over time in SE AK, and they have not all responded the same, suggesting that there may be multiple biological populations within the SE AK stock. Population genetic data can be used to help determine the existence of multiple biological populations. Sources of genetic samples include carcasses from strandings or bycaught animals, skin and blubber from remote biopsy samples, and feces. It's very difficult to collect contemporary genetic samples from harbor porpoise. Most harbor porpoise samples to date have been collected from strandings and bycatch.

Parsons said utilizing harbor porpoise samples that were already on-hand was the first tactic used to determine population genetic structure. Approximately 100 harbor porpoise samples were collected over 30 years throughout Alaska. The sample size varied over different areas, and samples were collected opportunistically over a long time period. Parsons said this analysis is still underway, and it's part of a larger harbor porpoise population genetic structure project spanning the eastern North Pacific (Alaska to California). Parsons said we do have some evidence to suggest significant genetic differentiation between some of the regions. The next step is to look at nuclear genetic data in order to provide a better understanding of contemporary estimates of gene flow between the regions, which is work that has been underway for a few years. A large data set encompassing over 400 harbor porpoise samples, representing the entire eastern North Pacific coastal waters, has been genotyped. Some

samples are dropping out due to sample quality. Data analysis is currently underway using nuclear single nucleotide polymorphism (SNP) data, and some areas are showing significant genetic differentiation using both mitochondrial markers and nuclear SNP markers. Parsons said efforts are being made to mine additional data from the genome sequences that have already been generated in order to try and rescue regions with low sample size, and SE AK is the region of interest. Samples in SE AK are heavily dominated by samples in the northern region, which limits the ability to detect genetic differentiation. Stranding samples in SE AK are not sufficient to generate robust genetic estimates of population differentiation. Environmental DNA (eDNA), which is the genetic material that all organisms shed to their environment (air, soil, water) at all times, may provide a way to fill data gaps. eDNA sources could include cells from skin, fecal matter, mucus, hair, etc. The eDNA field has been growing rapidly, and seems to be a good platform for collecting samples from species that are more difficult to sample, such as the harbor porpoise.

A pilot study in SE AK was initiated in 2015, which involved collecting water samples around harbor porpoise in order to determine if DNA could be amplified from surface sea water samples. Various approaches were used in the study. Samples that were collected nearest to harbor porpoise yielded the best results. The study progressed forward with more broad scale sampling in 2016. Sea water samples were collected in the fluke prints of individual harbor porpoise. During sample processing, 3 liters of water were filtered at a time. The study was able to extract total DNA using extraction methods, after which mtDNA was amplified. The regions that were amplified were those that were found to be useful from analysis of the SNP library. A set of standards were generated using harbor porpoise tissue DNA quantifications, which allowed for comparison against the eDNA quantifications. In total, 118 samples were analyzed, 11 of which failed to amplify harbor porpoise DNA.

Parsons said the eDNA samples yielded a much lower concentration of DNA material in comparison to tissue DNA. Factors that may have impacted the eDNA samples include the time elapsed between sampling and filtration, the distance between the sampling skiff and the fluke print, and the number of porpoise in the area; however, the study revealed no significant correlation between these variables and the quantity of eDNA. There are a number of different factors that will affect the amount of genetic material in an eDNA sample, which include water temperature, porpoise activity prior to sample collection, and defecation. Harbor porpoise sequenced data is the ultimate goal, which can then be incorporated into a population genetic framework from eDNA samples. Harbor porpoise mtDNA sequences were generated from 30 of 37 fluke print samples. Nine unique haplotypes were identified, seven of which were already known in harbor porpoise in Alaska. Two new haplotypes were identified, and 27 of the eDNA samples had only a single mitochondrial haplotype. The study suggests that it's possible to generate mitochondrial haplotype data from eDNA samples. Parsons said one of the benefits of eDNA is that samples are being collected in real time from a known place and time, which will hopefully be useful in developing a population genetic structure. Although eDNA will not replace all genetic sampling, it has great potential as an additional tool, especially in the case of harbor porpoise.

### **North Pacific Right Whales in the Bering Sea**

Dana Wright said the North Pacific right whale population is near 30 animals. Almost all sightings have occurred in the Bering Sea resulting in a federal designation of Right Whale Critical habitat in 2007. Wright said there is still a lot that we don't know about this species. Researchers are using passive acoustic monitoring on the Bering shelf to better understand population location. Nine stationary recorders have been deployed on the Bering shelf by MML since 2007. The recorders have a 15-nm

range and collect data on a duty cycle for 1 year. All analyses are done by MML personnel, which is very labor intensive. The acoustic data is broken down into 3-minute blocks and presented in a spectrogram form for review by acousticians. Wright presented monthly presence of right whale gunshot calls in the Bering Sea from 2012 to 2016. Assumptions during the study include that right whales do not occur in heavy sea ice or when bowhead whales are calling. The spatial ranges varied between years, even for the same months. This observation may be due to oceanographic conditions in the Bering Sea, which affect the whales' prey base. The sampled area represents only a slice of the North Pacific right whale's habitat.

Jessica Crance discussed a 60-day North Pacific right whale visual line-transect and passive acoustic survey that occurred in the Bering Sea in 2017 during the International Whaling Commission (IWC) Pacific Ocean Whale and Ecosystem Research (POWER) survey. The acoustic portion of the survey used sonobuoys, which allowed for real-time monitoring and directional capability. All sightings occurred in the southeastern portion of the Bering Sea. There were nine sightings of 15 different individuals. Crance discussed each unique sighting. Twelve of the 15 individuals were photographed, and 8 of the 12 photographed animals were matched to the MML North Pacific Right Whale Catalogue. Biopsy samples were obtained from some of the animals that were encountered. A new animal, thought to be a juvenile, was also encountered and biopsied. It is thought that the juvenile might be 1.5 to 4 years old; however, this has not yet been confirmed with aging techniques. If this is a juvenile, it would be the first non-adult seen since 2004. There are currently 24 definite unique animals in the MML catalogue, and there are plans to survey the central Bering Sea in either the summer of 2018 or 2019.

#### **Cook Inlet Beluga Whale *Species in the Spotlight* Research**

Wade said Cook Inlet beluga whale aerial surveys have been conducted for some time, with the most recent survey occurring in 2016. The 2016 aerial survey generated an abundance estimate of 326 animals, which is in line with the previous decade. Wade summarized new and expanded Cook Inlet beluga whale research, including hexacopter photogrammetry, biopsy sampling, genetics projects, passive acoustics, and modeling projects. Wade said recorders are being placed in new areas that have previously not been monitored, to include high tidal areas. Manolo Castellote has identified a specific sound detectable by passive acoustics that indicates whether an animal is actively feeding. The biopsy sampling program, which was initiated in 2016, has obtained 18 biopsy samples over the last 2 years. Six of the samples were processed and these consisted of one male and five females. One of the females (non-pregnant) had elevated stress hormones, and two of the females were pregnant. Biopsy sample contaminant work is planned, as is genotyping for the genetic ID of individuals and aging techniques.

Wade said hexacopter-based Cook Inlet beluga whale photogrammetry began in 2017. Beluga whale hexacopter-based photogrammetry objectives include estimating the length from the blowhole to the start of the dorsal ridge, using paired measurements from other datasets to estimate total length, and the creation of a calf index. Sixty-seven hexacopter flights were conducted (11 hours of flight time) over a period of 10 days in August 2017, resulting in 11 encounters with beluga whales. Photos from the 2017 fieldwork are being reviewed, and currently 7 of 11 encounters have been processed. A total of 348 identifications have been made from the seven analyzed encounters, which includes duplicate sightings. Evidence of disease and injury have been identified on some of the beluga whales photographed by the hexacopter.

### **Northern Fur Seal Research**

Jeremy Sterling said Eastern North Pacific northern fur seals are designated as depleted under the MMPA. St. Paul Island has experienced an ongoing decline. St. George Island's decline has stabilized and numbers are beginning to increase, and the numbers on Bogoslof Island are increasing at the last count. Eruptions at Bogoslof in 2017, including three significant eruptions, occurred in the midst of peak pup presence. The impact of the eruptions on population numbers could be significant, but is not yet known. Over 800 fur seals have been tracked, revealing seasonally variable foraging behavior between the different island populations (St. Paul, St. George, and Bogoslof). There is foraging segregation during the summer and mixing during the winter. The foraging segregation in the summer is an area of focus. Sterling said pups at Bogoslof grow at a faster rate than at St. Paul. Mother fur seals at Bogoslof have a higher transfer efficiency in comparison to St. Paul, which translates to a higher pup growth rate. Foraging efficiency studies are underway to understand the difference in pup growth rate. An unmanned surface vehicle powered by wind, a Saildrone, equipped with an eco-sounder was used to examine fine-scale relationships between fur seals and prey in 2016 and 2017. The Saildrone is able to survey and detect fur seal prey using acoustics in the same areas where satellite-tagged northern fur seals forage. Fur seals were equipped with cameras to record prey-capture events in 2017. Other projects underway include fur seal bioenergetics to determine summer fur seal energy requirements in the Bering Sea. One of the goals is to get fur seals into a multi-species stock assessment model and a Bering Sea bioenergetics model to better estimate age-specific mortality. A few papers have shown a future decline in the available number of pollock under current climate scenarios. A goal of this project is to address the potential impact of declining pollock on northern fur seals.

### **Research and Development on Phocid Seal Survey Methods and Data Analysis**

Peter Boveng said instrument-based surveys have been relied upon by the MML Polar Ecosystems Program (PEP) for obtaining fundamental stock assessment data for ice-associated seals in recent years. Infrared (IR) hot spots are detected with an aerial based IR camera, and then a corresponding high-resolution color image can be reviewed for species identification. Boveng said there are many advantages to using instrument based surveys for ice seals over traditional observer surveys, and steps are being taken to improve the efficiency of the automated detection process. The process, which is currently semi-automated, involves computer detection of IR hot spots on images. Achieving a high detection rate coincides with a high false positive rate, which requires a significant amount of human labor to sort through potential targets. The current process is labor intensive and expensive. Steps are being taken through Kaggle competitions and machine learning to automate the processing of IR and color photograph data. Other approaches that may help improve ice seal surveys include the incorporation of currently used IR and color image sensors onto UAS and incorporating new sensors (beyond IR and color cameras) that can detect specific types of seal habitat onto aircraft.

PEP is also working on improving polar bear detection, which can also be used to detect seals. There are some fundamental issues surrounding polar bear detection using the current system that need to be worked out. The leading hypothesis is that resting bears are not giving much of a heat signal. Boveng also discussed developing seal-specific flipper-mounted satellite tags to capture long-term movement and haul-out data, which are critical for assessment. Other prospects include lair-sensing tags for ringed seals. Life history transmitter (LHX) tags, which were originally developed and applied for use on Steller sea lions, were used on harbor seals in the western Aleutian Islands in 2016. LHX tags are surgically implanted and act as temperature loggers that sit inside the abdominal cavity of individuals. The tags log

core temperature, potentially for many years. The tags float to the surface once liberated from the animals' body following death, sense light, and then transmit temperature log data through the Argos system. The data includes an approximate time and location of mortality, as well as a record of core temperature. A slow rate of cooling indicates a potentially natural death or entanglement, whereas, a rapid cooling event would likely be associated with predation. LHX tags can also indicate the number of parturitions in an animal's life. Boveng believes these tags are possibly one of the only practical methods available for directly quantifying vital rates, survival, and reproduction in species that don't congregate in dense colonies, such as ice-associated seal species. MML has recruited modeling expertise over the last decade, which has helped improve assessment capabilities, and this is reflected in recent and pending publications. There is a new MML initiative to develop approaches for combining various types of survey, telemetry, acoustic, and platform-of-opportunity data to estimate spatio-temporal distributions, especially for poorly documented species, which has recently been proposed to the NMFS Office of Science and Technology.

### **Western U.S. Steller Sea Lion SAR Review**

Pendleton provided a review of the Western U.S. Steller sea lion SAR. On page 2, the overlap between the two stocks near the stock boundary trivializes the overlap of the eastern and the western stocks at Graves Rock and White Sisters. It may be worth redefining the stock boundary since things have changed. Pendleton asked if it's appropriate, in the "Minimum Population Estimate" section, to include pups in the minimum population estimate ( $N_{MIN}$ ). Survival of sea lion pups is roughly 50%-60%. Pendleton said this is the only stock that includes pup counts in the  $N_{MIN}$  calculation, and it might be better to look at animals that are >1 year in age. There was general agreement that  $N_{MIN}$  for other stocks included young-of-the-year animals. Doniol-Valcroze said this could be an issue if pup counts comprised the majority of the population. It's helpful when the  $N_{MIN}$  breaks down the proportion of animals that are pups. Pendleton said, in the PBR calculation, a recovery factor of 0.1 was used. Other listed endangered species use a larger recovery factor if the population is increasing. Is there a good rationale for using 0.1 rather than 0.5 for a recovery factor? There may be justification for using 0.5 due to the population's size and increasing trend. Bettridge said the SRG should be consulted if a non-standard recovery factor is being used. Pendleton said on page 6, in the "Annual Human-Caused Mortality and Serious Injury" section, "several" fisheries with the potential to interact are listed as unobserved; a better adjective would be "most" or "few" or "none". Pendleton said the change describing potentially interacting fisheries was good. Pendleton said, in the discussion of key uncertainties, it's important to state that the known mortality is quite an understatement.

Lorrie Rea said the SAR indicates that Steller sea lions breeding in Asia are included in the western DPS. Rea asked if the same pattern is applied to other species, and how does that impact PBR and  $N_{MIN}$  calculations? Pendleton said the population estimates are only supposed to include U.S. waters. The SAR describes the range of the stock, but does not include the Asian animals in other calculations. Rea said there are a couple of studies that show a higher reliance on squid in the diet of animals west of Samalga Pass. Does this information affect the fisheries that are monitored? Teerlink said there was not a squid fishery in Alaska, so this was not an issue. Pendleton added that a documented mortality within the 5-year window is the only justification for the inclusion of a fishery in a SAR. Doniol-Valcroze said it was challenging to look at Table 1 because it includes the abundance for each area, but it's unclear what the magnitude of the changes are. Could the SAR benefit from a population trajectory plot? One or two plots by region would be helpful to allow for better visualization of trends. Also, the SAR could benefit

from an explanation of how the stock regions are determined. Peterson said on page 5, under “Current Population Trend”, there is language that examines the relationship between fishery closures and openings in the western Aleutians. This paragraph suggests that the link between fisheries and sea lions is stronger than what is actually known or being stated; therefore, the wording might need to be reconsidered.

#### **Eastern Pacific Northern Fur Seal SAR Review**

Doniol-Valcroze said this is a data rich SAR, with a long time series and frequent updates. This is a solid stock assessment. The expansion factor that is applied to pup production is from a 1981 publication. Is there enough information to try and update this? Tom Gelatt said we are getting closer to being able to update the expansion factor. With a new life table, it may be possible to generate an updated expansion factor soon. Doniol-Valcroze asked if this factor was expected to vary much. There is a lot of interannual variation with pinniped populations on the east coast. Does the reproductive rate of northern fur seals vary much? Gelatt said the number of animals on the beach varies, and we’ve been using the actual pup numbers on the beach. Rolf Ream said the reproductive rates have not varied from historic numbers, but there are fluctuations from year to year. To minimize variability in reproductive rates, a 3-year average of the last three pup counts is used when multiplying with the expansion factor. Doniol-Valcroze said technically the pup counts could be lower in a given year, but the population could still be stable. Table 1 should clarify that a mark-recapture method was used, rather than a count. Doniol-Valcroze said it’s frustrating to use the default CV of 0.2 when there is a more precise CV available on the estimates. Pendleton said the CV of 0.2 was chosen as a default 20 years ago and reviewed by the AKSRG; this may need to be revisited. Boveng said 0.2 may not be an appropriate CV and is likely the result of sampling error, but a CV of 0.007 is not appropriate either. Doniol-Valcroze recommended being more consistent with the CV and said that a few clarifying sentences would be helpful. Also, it would be helpful to have an overall stock trajectory in addition to trajectories for the individual rookery locations. Pendleton said the listed entanglements are likely a large underestimate. The “Habitat Concerns” section should also include the Bogoslof eruptions. Doniol-Valcroze said the use of a species-specific population growth ( $R_{MAX}$ ) in the northern fur seal SAR is much better than using a default value.

#### **Alaska Bearded Seal SAR Review**

John Citta said the  $N_{MIN}$  should include a CV. Boveng said there is no CV due to the way the estimate was produced. The 20th percentile of the posterior distribution was used to calculate  $N_{MIN}$ . Michael Cameron referenced the GAMMS definition of a population  $N_{MIN}$  and said the only population estimate available is for the Bering Sea. The language in the SAR has changed four times recently. Sometimes it’s called the  $N_{MIN}$  and sometimes it’s called the  $N_{MIN}$  of the Bering Sea. Citta asked if there are any data on population trend. Instead of saying that there are no reliable trend data, it would be better to say that there are no trend data. Citta said the minimum estimate of the bearded seal harvest for 2011-2015 doesn’t add up to the total included in the table and suggested adding column totals and averages to the table. It would also be helpful to obtain more consistent data from Barrow/NSB where a majority of the bearded seal harvests occur. Under “Status of Stock”, the discussion of key uncertainties should mention the direction of the bias (e.g., too high), if known. Cameron said a formal analysis to determine the potential direction of bias has not been completed. Bettridge said the Guidelines for Assessing Marine Mammal Stocks (GAMMS) directs SAR authors to note uncertainty, and this could be a reflection of that uncertainty. Pendleton said the statement regarding bias should be eliminated. The “Stock Definition and Geographic Range” section cites data from the 1970s and 1980s, which should be

revisited to determine if those data are still accurate. Pendleton said it's best to remove any forward-looking statements in the "Population Size" section. There are unpublished MML data in the "Fisheries Information" section. The SAR's intent is for all data and documents to be reviewable by the public. Muto said, in this case, a NMFS Tech Memo was published to describe the bycatch analysis procedure. Bycatch data for subsequent years is cited as MML unpublished data. If the bycatch analysis procedure changes, an updated NMFS Tech Memo will be published. Pendleton said in the "Alaska Native Subsistence/Harvest Information" section, it seems odd to average the data after stating that an estimate cannot be generated.

#### **Alaska Ribbon Seal SAR Review**

Citta asked how far back the subsistence harvest data is used in the SARs. Muto responded with the most recent 5 years. Citta said the harvest of ribbon seals is largely dependent on ice and the harvest spikes in some years (roughly once every 10 years). Sometimes the ribbon seal harvest can be substantially higher due to the locations of seals and ice, and this may not be captured in the SAR's 5-year window. Citta said it might be worth mentioning that the location of seals and ice can determine harvest size. Pendleton said fishery observer data does not expire. Should the harvest data also not expire? Pendleton proposed modeling the harvest based on harvest sites and harvest counts. Boveng said variability and trend in harvest data could be used to compute missing values in the last 5 years. Boveng questioned whether it would be worth the effort to do this in the current budget climate. Pendleton said it's probably not worth the effort given the small size of the ribbon seal harvest. The distribution information in the SAR, which is based on data from the 1970s and 1980s, should be reviewed.

#### **Cook Inlet Beluga Whale SAR Review**

Stafford said the beluga whales in Yakutat are not regularly observed, which should be noted in the SAR. Citta said it would be helpful to include the rationale for combining Yakutat beluga whales with the Cook Inlet beluga whale stock. Pendleton said the Yakutat beluga whales are part of the Cook Inlet stock, but not part of the DPS. Stafford said Figure 2 mentions regulated hunting, but there hasn't been subsistence hunting since 2005. The subsistence hunting regulations will be revisited in 2023. Citta said the possibility for hunting exists, even though population levels are not expected to be high enough to support hunting for many years, so the term "regulated hunting" is not inappropriate. Is it still reasonable to say that the commercial fishery risk is low in the "Human-Caused Mortality and Serious Injury" section, given that the only observer program was 18 years ago and lasted only 1 year? Do we have any more recent information? Citta said, in regard to population size in the "Stock Definition and Geographic Range" section, there is a sentence that mentions "little reduction in assessment quality". What metric of assessment quality is being used? On page 3, under "Population Size", include the CV. Under "Minimum Population Estimate", an  $N_{MIN}$  of 306 is provided but Citta calculated 311. In the "PBR" section, a PBR of 0.61 is provided but Citta calculated 0.62. In the "Other Mortality" section, it's stated that in 2014, live stranding events contributed to the death of two whales. What from the necropsy indicated that the stranding led to the death? Wade said it was the ingestion of mud. Citta said to add a statement about that to the SAR. What is the nature of the "bias" noted in the "Status of Stock" section? Perhaps "uncertainty" is a better term. Pendleton said the SAR used to indicate PBR was undetermined if applicable. Wade said the law requires the establishment of a PBR. Doniol-Valcroze said the word "bias" is the issue. PBR carries certain assumptions, and those assumption are not being met in the case of the Cook Inlet beluga whale stock. Wade said it is a deterministic model, and there could be year-to-year stochastic events. There could be other non-direct forms of human mortality that affect the population. Pendleton said the AKSRG could possibly suggest some wording. Doniol-Valcroze said the

use of confidence intervals in Figure 2 would be preferable to standard error. Standard error does not help with understanding the situation.

### **AT1 Transient Killer Whale SAR Review**

Peterson appreciated the addition of the age/sex information to the SAR. Peterson asked if there were any data to suggest interactions between AT1s and other killer whales. Pendleton said if there were such data, it would be included in the SAR. Peterson said the whales cannot reproduce, but the maximum net productivity rate is listed at 4%. Shouldn't the productivity rate be 0? Muto said an AKSRG recommendation is needed to change the number. Peterson asked why 4% is being used. Clapham said 4% is the default rate. Doniol-Valcroze said we need to be consistent. This is the same concern, that basic assumptions are not being met, that was discussed during the Cook Inlet beluga whale SAR review. PBR equations use the maximum rate, not the current rate, so there is not an issue here. However, it's perfectly fine to say that the current rate is 0. Peterson agreed. Doniol-Valcroze wondered why  $R_{MAX}$  was not consistently listed in brackets throughout the SAR. There may be sufficient information on killer whales to update the  $R_{MAX}$  to something other than 4%. Pendleton said there is good wording related to this topic in the Hawaiian monk seal SAR, which he will share tomorrow. Peterson said the "Fisheries Information" section of the SAR states that managed fisheries that operate in the range of this stock, including gillnet fisheries, are not known to cause incidental mortalities. It should be stated that these fisheries are largely unobserved and there is the potential for interaction. Peterson said a statement should be added to the "Status of Stock" section explaining why the group is not listed as threatened or endangered. Bettridge agreed that it would be helpful to have an explanation in the SAR. Doniol-Valcroze said it's stated that the AT1 killer whales are below their optimum sustainable population (OSP) in the "Status of Stock" section. Is it a legal requirement to phrase the wording in this way? Does OSP apply to one pod of 22 killer whales? PBR is used most of the time because OSP is unknown. PBR was designed to ensure that OSP is eventually reached, even if OSP is unknown. Long said the GAMMS specify that each SAR include a comparison to OSP. Doniol-Valcroze said most SARs do not mention OSP, so why does the AT1 killer whale SAR? Bettridge said they should all include a comparison to OSP, although for most stocks OSP is unknown. Doniol-Valcroze said restating the sentence that the population was at 32% of its highest known level, and therefore was below OSP, would work.

### **Pacific White-Sided Dolphin SAR Review**

Doniol-Valcroze said we do not know exactly how many Pacific white-sided dolphins there are. There is no stock structure, no recent abundance estimate, no information on trends, and the PBR is undetermined. The "Stock Definition and Geographic Range" section could be cleaned up, including adding a statement that the stock boundary is 45° North. In the "Population Size" section, there is mention of a survey completed in 1993, but the SAR does not discuss the range of the survey. There is an estimate of 26,000 animals in the SAR, but there is not an associated CV listed. Is there a CV available that can be added? The "Population Size" section estimated 15,000 Pacific white-sided dolphins based on a single sighting. It is unreasonable to base an estimate on a single sighting. Doniol-Valcroze said the estimate is honest but he would rather it not be used, or some words should be added to describe why the estimate should not be used. Doniol-Valcroze had an issue with directly using the population estimate of 26,000 as the  $N_{MIN}$  without taking the estimate uncertainty into account. The "Status of Stock" section says there are a "few key uncertainties" in the assessment. Remove "a few", as there are many uncertainties. Pendleton said the SAR states that several fisheries are not observed and that more descriptive language would be beneficial. The "Habitat Concerns" section states that animals that use

bays and have near-shore habitats have problems with urban and industrial development, which does not seem entirely appropriate for Alaska. There does not seem to be a lot of urban and industrial development in Alaska. Sam Simmons asked if there are any plans to survey, since the last stock estimate occurred in the 1990s. There was consensus that a dedicated survey is likely not on the priority list. Simmons said other regions are able to develop abundance estimates on small cetaceans using data from non-dedicated surveys. Are there other recent surveys that have sightings that can be used to update the Pacific white-sided dolphin SAR? Pendleton said that Pacific white-sided dolphins are very erratic and extremely hard to survey. A new survey is a possible AKSRG recommendation, but there is no indication at this time that there is an issue with the stock. There have not been reported takes in the monitored fisheries.

### **Southeast Alaska Harbor Porpoise SAR Review**

Pendleton said the “Status of Stock” section talks about how the survey estimates are biased low, but mortality is also likely biased low. Pendleton suggested stronger wording in the discussion of uncertainties. One key uncertainty is that the estimates of mortality are not well known and are underestimates. Rea said the stock structure is very generalized due to a lack of genetic data. Rea asked if it’s possible to obtain information from eDNA in order to better define stocks. Parsons said there is hope but that targeting nuclear markers from eDNA is challenging. The hope was that genome sequence data from SNPs could be mined to obtain nuclear markers. There just isn’t as much genetic material in the eDNA samples, but in a few years we’ll probably be there. Citta said that in the “Minimum Population Estimate” section, pooled 2010-2012 abundance estimates were used to calculate an  $N_{MIN}$  of 359; however, he calculated an  $N_{MIN}$  of 351. Pendleton said this SAR does not have a population estimate or PBR for the entire range of the stock. There is a PBR for parts of the stock, but not for the whole stock, and it seems arbitrary. Bettridge said in some cases in the past the Alaska SARs did not provide an  $N_{MIN}$  unless it was range-wide. There is a statutory requirement to calculate an  $N_{MIN}$ , but some SARs have not included one. Technically, there is a number that is known to be a minimum, which needs to be included, with caveats. Long said we know there is ongoing bycatch and this information also needs to be included in the SAR. Pendleton said the SAR does indicate that fishery takes exceed PBRs at a local scale. Peterson wondered why the PBR is not listed in Appendix 2. Is it because the PBR is not a formal management PBR, but rather used more for reference in the SAR? Muto said it was decided that it would be a compromise to calculate the PBR and  $N_{MIN}$  but not include them in Appendix 2 and have the reader reference the SAR for details instead. Long said this is a formal PBR, but the concern is that the PBR will be taken out of context if included in the appendix. Pendleton asked if this could lead to a reclassification to a Category I fishery at a local scale. Teerlink said the fishery is already a Category II fishery and the requirements are the same for Category I and Category II fisheries. There is also a mismatch in the spatial extent between where we understand the bycatch to be occurring and the range of the fishery, which includes all of SE Alaska. Pendleton said the PBR and  $N_{MIN}$  are calculated at a local level. Teerlink agreed but said the fishery includes all of SE Alaska. Teerlink said fishermen self-reports are received from this fishery, even if they are flawed. Pendleton said the bycatch estimates for mortality are likely extreme underestimates. Clapham said the stock structure is the key to all of this. We do not know how much of a problem we have until we know what stock structure is, which is why Parsons’ work is really exciting. Significant progress will be made in stock structure in the not-too-distant future.

### **Gulf of Alaska Harbor Porpoise SAR Review**

Stafford said we do not have a good population estimate (it's 20 years old) and a PBR cannot be generated. Data in Table 1 are anywhere from 15-30 years old. NMFS considers this stock strategic but that might not be legitimate given the age of all of the data, the inability to calculate a PBR, and the lack of an  $N_{MIN}$ . Is this stock more similar to Southeast Alaska harbor porpoise or Pacific white-sided dolphins in terms of risk due to human-caused mortality? Peterson asked if changes to fisheries over time should be investigated. It's odd that fishery interaction data are maintained, while abundance data are dropped. Pendleton said mortality data and abundance data are treated very differently. One is very conservative, while the other is more neutral. Doniol-Valcroze asked if there are guidelines for including fisheries data or mortality data in the SARs. Long said there are guidelines in the GAMMS which indicate that mortality data should be maintained if more recent data are not available. Stafford said it would be helpful to know if the fishery has changed or stayed the same. Pendleton said Kate Wynne, if she were present, would have said there is no reason to believe that the fishery is the same and there is no reason to believe that these fisheries estimates should be used any longer; and she gathered the data. Long said a change to this estimate would require evidence that the fisheries have changed substantially, and NMFS does not have such evidence. Pendleton was unsure if that data exist. Wade said that fishery bycatch data used to be deleted from the SARs (e.g., the Southeast Alaska harbor porpoise SAR) and he stressed the importance of maintaining fishery bycatch data in the SARs. Peterson said she is not suggesting the bycatch data be pulled out of the SAR, but language could be incorporated to add context and make it stronger. Teerlink was unaware of any obvious shifts in fishing effort. Alex Zerbin asked whether Kate Wynne thought the bycatch issue was worse or better. No one knew the answer. Pendleton reiterated that bycatch mortality for harbor porpoise is grossly underestimated. Wade said the SAR would benefit from adding language about bycatch and that SE AK fisheries have only been observed for the last few years.

### **Bering Sea Harbor Porpoise SAR Review**

Doniol-Valcroze appreciated the information on stock structure uncertainties. The abundance estimate relied on a robust and well accepted population estimate from 1999, which has a CV and  $N_{MIN}$ , but the estimate is too old to be used. There are also a series of abundance estimates available from stock assessment surveys using a long time-series of data starting in 2002. The SAR includes uncorrected estimates for these surveys but then says they are not used because they are not designed for harbor porpoise. How do we decide which data can be used and which cannot be used? Why are these recent estimates not used, even with caveats? A lack of correction factors is not sufficient justification for not using these  $N_{MINs}$ . The SAR states that this stock is listed as strategic because the level of mortality would likely exceed the PBR with complete observer coverage. Doniol-Valcroze does not doubt the statement but wondered how this can be known. In the "Status of Stock" section, he suggested removing "a few" from the phrase "there are a few key uncertainties", especially with the uncertainty surrounding stock structure and abundance estimates. How do we choose which estimates can be used and which cannot? There is an issue with consistency, not necessarily with the numbers. Bettridge said NMFS is internally looking at the issue of inconsistency. Doniol-Valcroze said one option would be to average the estimates and then caveat the  $N_{MIN}$  with the fact that the estimate is minimal. Pendleton wondered if there are subsistence data on harbor porpoise. Rea said this SAR is based on U.S. federal fisheries. Is there an observer process or information available on state fisheries? Long said the MMPA authorizes observation of any fishery, state or federal, but it is expensive, sporadic, and takes time to

accumulate the necessary funds. Bettridge said it would be useful to the agency to receive the AKSRG's input on prioritizing fisheries to be observed. Helker asked about the feasibility of having electronic monitoring (EM) on gillnet boats. Long said it depends on the fishery. The concern is that animals in SE AK are typically too far from the boat to be consistently detected with EM, but EM could be an option for detection of presence or absence. Pendleton said the AKSRG lacked fisheries experience and is not in a position to advise NMFS on which fisheries should be monitored.

#### **Assigning Mortality and Injury to Mixed Stocks**

Bettridge reviewed the GAMMS guidance for assigning serious injury and mortality. In areas where there is more than one stock of marine mammals and a serious injury or mortality occurs, that serious injury or mortality is assigned to the associated stock if it can be identified. If it's not possible to identify the stock, the serious injury or mortality is prorated to the associated stocks in the area. In cases where there is insufficient information on the proportions of stocks in the area, the GAMMS indicates that the take should be assigned to all of the stocks, which leads to an overestimate of takes. In such cases it is advised that the SARs mention the potential for take overestimation. Doniol-Valcroze asked if there is no specific information available to allocate a take to a specific stock, will the take be partitioned relative to the size of each stock? Bettridge said such action would be appropriate.

#### **Assigning Mortality and Injury to Eastern and Western Stocks of Steller Sea Lions in Southeast Alaska**

Greg O'Corry-Crowe said the genetic evidence, as it relates to the mixing of Steller sea lions (SSL) in northern SE AK is as follows. In the 2014 paper, both western and eastern mitochondrial DNA lineages from samples in the late 1990s and early 2000s were found in northern SE AK. These findings indicated that SSL females had immigrated and given birth to pups from both DPSs. There was also evidence of admixed individuals in northern SE AK, which indicated that some females had successfully bred with males from other DPSs. The study revealed successful immigration and interbreeding. More recently, in a study by Mike Rehberg in which long-term data on the genotyped pups sampled in the late 1990s and early 2000s were reviewed, we found that eastern and western lineage SSL pups had very local movements in that region as they got older. Also, some were determined to breed in northern SE Alaska, which indicates success with immigration and breeding by those pups. Going forward, the primary issues surrounding the DPS "boundary region" are three-fold. We want to know who the first generation male and female SSLs are breeding with. How successful they are in terms of their pups' survival, and has there been a change in the pattern of immigration and breeding since 2004. To get to the question about apportioning take in this region, there are three primary points. First, it may look like a typical mixed stock issue, where take needs to be apportioned to two or more discrete stocks, but there are key differences. The boundary zone is not a temporary mixing zone. The first key difference is that the region is a newly colonized area where sea lions have come to live and breed. Secondly, the region may have its own dynamics, independent of the source DPS, but this remains to be seen. Thirdly, demographic independence can emerge quite quickly, and the colonization of a new area can result in a new demographically independent group. That's the first major issue, that the mixed stock concept is not an easy fit. The second issue is deciding what to do with admixed individuals. Does evidence of interbreeding and intermixing indicate a softening of the DPS boundary? Does it indicate a shift of the DPS boundary? The answer is no, based on the previous points made in this discussion, which seem to suggest that the boundary region is somewhat discrete. Another question is, that unlike the ESA, do all the animals in a species need to be included in a stock? If every animal has to be in a stock, then it raises questions about how to apportion SSLs to include admixed individuals in northern SE AK. When do we

stop calling the boundary region a mixing zone? Is it now another separate demographic unit? Would it equate to a stock under the MMPA, or would it equate to some other yet-to-be-defined entity. Maybe that's not a question for today.

O'Corry-Crowe said the MMPA defines a stock as a group of marine mammals of the same species or smaller taxa in a common spatial range that interbreed once mature, which may emerge to be the case. O'Corry-Crowe argues that the recent history and current dynamics of northern SE AK highlight the need for new management approaches to accommodate recently colonized areas. Should uncertainty over the long-term viability of a recently colonized area influence the stock ID process? Is there a timeframe required for a stock to be recognized as such? Is apportioning take to source populations the most practical interim solution, and how would that be accomplished to achieve the mandates of the MMPA? Possibly the biggest question is how capable are the GAMMS in dealing with the dynamics of immigration, colonization, and stock formation? We all know that the Steller sea lion issue has highlighted these fundamental gaps.

Pendleton presented a few slides on Steller sea lion movements throughout Alaska. Western SSL females have been observed to move from the west to northern rookeries in Southeast Alaska. Eastern females were not observed to move to the west. Eastern males move a lot. There is cross boundary movement and breeding taking place. Angliss asked if most of the serious injury and mortality for SSLs is taking place in the Bering Sea. Helker responded yes, if considering observed incidents. However, the instances that are being discussed are unobserved, meaning they have not been observed by a fisheries observer. These animals have been spotted on Alaska Department of Fish and Game (ADF&G) resight cruises. Teerlink said the ARO accounts for the fact that western animals cross the boundary. Pendleton reiterated O'Corry-Crowe's message that this appears to be a permanent closure of the gap in the range and that the question of apportioning take needs to be dealt with going forward.

Bettridge said movement to identify this as a separate stock would bring forward management complications when considering the ESA perspective. Doniol-Valcroze asked if there was a way to estimate the proportion of animals that belong to a stock in a certain area. O'Corry-Crowe said we can genotype the individuals that have been recovered, but there is still the issue of deciding which stock they belong to. Doniol-Valcroze asked if there was a way to quantify proportions in the meantime. Pendleton said probability estimates of animals from one stock being in the other stock do exist. The estimates have not been used for quantifying proportions, but they are available. Doniol-Valcroze said there were two examples of using apportion models to apportion takes using genetic data. Another approach is to use telemetry to apportion takes. Citta asked about the magnitude of the proportions. Pendleton said movements can be up to 20% depending on the source, but 4-5% is more common. Rea said this sounds like an important discussion to have and asked if these types of discussions can happen away from the meeting over a webinar. Pendleton said we can come back to this later. Boveng said thinking of this in a general way and moving towards a broadly applicable approach will be frustrating. Life histories, natural distributions, and seasonal distributions are highly variable for different species. There are many factors that will complicate anything broadly applicable. Jon Kurland said he would welcome input from the AKSRG on this topic.

### **Chukchi Sea Polar Bear Population Estimation Project**

Nathan Hostetter (U.S. Geological Survey) gave a presentation on a collaborative polar bear research project. Polar bear research that has been conducted thus far is based on 420 live capture releases of

polar bears from 2008, 2011, 2013, 2015, and 2016. A total of 107 radio collars were deployed. Hostetter said this presentation will be based on population dynamics data derived from the research. In terms of the population analysis, the goals were to estimate reproduction, survival, and abundance for the Chukchi Sea polar bear population. For the Chukchi Sea population, the sampling area occurred between the Seward and Lisburne peninsulas. The sampling area is about 25,000 sq km. In comparison, the U.S.–Russia polar bear management area is roughly 1.6 million sq km. Reasonable life cycle models, one for males and one for females, were developed and underpin the research approach. The male model includes sex and age information, while the female model includes reproductive status information. Observable states are characterized by bears being inside the sampling area. Unobservable states are outside of the sampling area. The female model is more complex than the male model due to the multiyear reproductive cycle of polar bears. Capture/recapture data include direct/physical captures and remote/telemetry observations of bears in known and partially-known states. Overall there were 200 observations of female bears and 190 observations of male bears from 2008 to 2016. Once a direct observation of an individual is made, age and reproductive status are known. Remote observations are also informative, but the state of the bear could not always be determined. Data from physical recaptures is less prevalent than telemetry data due to the lower probability of physically recapturing an animal.

Hostetter said the integrated population model allows count and demographic data to be analyzed simultaneously. The four integrated data sets include the catch-mark-recapture data, litter-size data, count data, and weaning data. The data come together in an integrated model to provide estimates of vital rates and abundance. The integrated model allows for a more efficient use of available data, as well as the formal representation of true uncertainty. The model was implemented using a Bayesian framework. The datasets were analyzed with and without the use of informative survival priors. Informative priors (means from multiple case studies) were used for survival and breeding probability. The survival estimates range from 0.59 for age 0 cubs to 0.92 for adult males, which may contain a negative bias. Current population density relative to carrying capacity is unknown. The use of informative priors increased the estimates and reduced uncertainty. The breeding probabilities were 0.82 and average litter size was 2.2. Productivity of Chukchi Sea polar bears remains high when compared to previous estimates. Denning adult females, which typically head to Wrangel Island for denning, were largely absent from the sampling area. The recapture probability within the sampling area was 0.17, in part due to failures in radio collars. Estimates indicate that the number of bears using the sampling area was relatively stable over the years. Density and abundance was calculated at 0.0031 bears per square km in the study area from 2008 to 2016, which was then extrapolated to the larger Polar Bear Specialist Group (PBSG) management boundaries, yielding 3,297 bears (95% CI = 1,716 – 6,770). However, this does not reflect potential variation in density habitat relationships. There were 6,135 bears in the U.S.–Russia management area. These estimates are in line with previous studies. The density extrapolation procedure assumes the springtime distribution of polar bears throughout the areas of interest is correlated with habitat quality. Next steps include a manuscript and harvest risk assessment. The goal is to provide a report on harvest risk assessment to the U.S.–Russia Commission in June 2018.

Doniol-Valcroze asked how priors were established for movements outside of the study area. Hostetter said the priors for movement were a vague uniform 0 and 1; no prior information for movement was assumed. The only parameters that used informative priors were survival and breeding probability,

everything else relied on vague priors. Doniol-Valcroze asked how confident Hostetter was that the model was able to tease apart the probability of capture vs. movement in and out of the study area. Was there a strong correlation between those two parameters? Hostetter said using telemetry data from GPS collars was the only way to tease apart those parameters. They had direct information to estimate movement parameters, which allowed them to tease apart both the movement and detection. There is still some probability of a bear being a permanent immigrant, which is defined as a tagged individual that completely leaves the study system and remains outside of it. Hostetter said they wished they could obtain multiple years of capture/recapture and GPS data from bears that have been tracked outside of the study area. Citta asked if it would be possible to expand on the model with data collected outside of the study area. Can the model be built on? Hostetter said one of the goals was to generate a flexible framework that could incorporate additional information as it becomes available. The model wouldn't need to be completely rewritten for new data. Citta asked if the model could incorporate newly marked bears in the study area. Hostetter said one of the assumptions is that survival is the same inside and outside of the study area, but that it was a great idea that will need some additional thought.

### **U.S. Fish and Wildlife Service (USFWS) Updates**

Patrick Lemons said the USFWS manages three stocks of sea otters across Alaska; the Southeast Alaska stock, Southcentral Alaska stock, and Southwest Alaska stock, which is listed as threatened under the ESA. Sea otter SARs were last updated in 2014, and there is no new information available that would allow for updates. There are five management units for sea otters in the Southwest Alaska stock. There is an ongoing genetic study with a draft manuscript in preparation looking at the five management unit boundaries, as well as the overall stock boundaries between the southwest and southcentral stocks. The study aims to ensure that management and stock boundaries make sense, and preliminary information indicates that current stock boundaries appear to be reasonable. Lemons hopes to have a peer-reviewed version of the manuscript available next year. Efforts are being made to update the population level information for the southwest stock. Regular surveys in the far western Aleutians occur approximately every 2-3 years, most recently in 2015. Aerial surveys are relied on for population monitoring. Boat-based surveys are used to develop a correction factor for animals that are missed during the aerial surveys, which is then applied to aerial survey areas. The goal is to have updated population estimates for all five management areas in the southwest stock by 2019.

Lemons said a large oil and gas lease sale recently occurred in lower Cook Inlet, which overlaps sea otters in the southwest and southcentral stocks. A survey of the area was completed in 2017 using intensive search unit (ISU) methods. The survey has shown, based on preliminary information, that there are approximately 11,000 sea otters in this area, which is a considerable increase from the last survey completed in 2002. The feasibility of using more camera-based surveys in the future instead of ISU techniques is being investigated, which would potentially increase survey precision and decrease cost.

Lemons said the USFWS oversees two stocks of polar bears in Alaska; the Chukchi Sea and Southern Beaufort Sea stocks. The U.S. Geological Survey (USGS) is the primary entity conducting research on the Southern Beaufort Sea stock. The USFWS primarily researches the Chukchi Sea stock. Polar bear SARs are expected to be finalized and published in the Federal Register in 2018. Current polar bear research is focused on updating population estimates, updating stock boundaries, fasting status studies, oil spill scenarios, and Wrangel Island polar bear ecology. Simulated oil spill scenarios in the Chukchi Sea have been conducted. The worst case scenario, as predicted by Shell, would be characterized by a large blowout in the late fall, and suggests that 40% of bears in the Chukchi Sea could be exposed to oil. Polar

bear ecology on Wrangel Island, where roughly 600 bears were observed in the fall of 2017, will also become a critical area of study moving forward. Peterson asked if the oil spill study was out. Lemons said the study is published and that he would send it to the AKSRG.

The Pacific walrus is a single stock that occurs in the Bering and Chukchi seas, and the stock boundaries stretch from the U.S. to Russia. There are three general breeding areas for the Pacific walrus, which are rapidly changing due to changes in sea ice dynamics. The SAR was updated in 2014, and there is no new additional population information that would be useful for updating a SAR at this time. However, significant effort has been made in order to obtain better population information. A genetic mark-recapture study began in 2013, and preliminary data from 2013-2015 produced a total abundance estimate of 283,213 with a 95% CI of 93,000 to 478,975. This number, which may be an overestimate, is based on a simple analysis and should be interpreted with caution. The CI should tighten up once the 2016 and 2017 data are incorporated into the estimation. Integrated population model approaches are being investigated. Newer mark-recapture techniques are also being investigated. These techniques, which are complex, will allow for a more precise population estimation by reducing the CV. The USFWS hopes to have a new population estimate derived from using better techniques, and with 2017 data, published in the next 12 months. The USFWS issued a finding under the ESA listing for Pacific walruses in 2017. The finding, which was published in the Federal Register in October 2017, indicated that Pacific walruses were not warranted for an ESA listing. A lot of additional information on walrus biology and sea ice dynamics has come forward since the 2012 findings. Pacific walruses are handling declining ice and using land-based haulouts better than anticipated. Additionally, there has been a dramatic decline in subsistence harvest since 2012, which was not considered a population threat in 2017. Coastal haulout mortality is also dramatically lower now than in 2012.

#### **Marine Mammal Commission (MMC) Co-Management Review Project**

Vicki Cornish said section 119 was added to the MMPA in 1994, which encourages the USFWS and NMFS to enter into co-management agreements with Alaska Native Organizations. The agreements may include supplying grants to the Native organizations for various purposes outlined in the MMPA. In 2008 the MMC conducted a review of co-management in order to assess progress since 1994. The review, which focused on the structure of co-management efforts, generated various recommendations that have remained applicable. In 2016 the MMC returned to Alaska and heard about the impact of climate change on subsistence use during listening sessions. The MMC also heard various other concerns, including the need to enhance communication and consultation. The 2016 listening sessions were wrapped up with a joint meeting with the Indigenous People's Council for Marine Mammals (IPCoMM), which recommended that the MMC work with IPCoMM and the Alaska Native Organizations to facilitate an updated review of co-management. In 2016 the MMC submitted a proposal to the North Pacific Research Board to conduct a review of co-management. The MMC was then awarded a grant to increase the effectiveness of marine mammal co-management in Alaska, which is now underway. Jenna Malek said the newest co-management review will take place over the next 12 months. The overarching goal is to increase the effectiveness of marine mammal co-management in Alaska. A steering committee was assembled from Alaska Native and federal co-management partners to assist with the review. The Alaska Native Steering Committee consists of a diverse group of folks from all over the state.

Malek said the objectives of the review include the development of a working definition of co-management under section 119 that is acceptable to all partners and to provide recommendations that are applicable to all partners in order to increase the effectiveness of co-management. The MMC wants

to ensure that the new recommendations generated from the review move forward. Many of the issues highlighted in the 2008 review are still occurring. This is a group effort that will require cooperation from all sides. The timeline is aggressive, and report results are due to communities and agencies in March 2019. Boveng asked how the Steering Committee was selected. It seems like the Alaska Native representation was restricted to the Alaska Peninsula and north. Malek said most of the recommendations came from folks who are very involved in co-management. The nominations included individuals who have the time, capacity, and willingness to contribute. Malek said the MMC would like to ensure that this process is inclusive if areas are not represented on the Steering Committee.

### **Alaska Dall's Porpoise SAR Review**

Stafford said there are no recent abundance estimates. On page 2 there is a statement that there are no reliable estimates of abundance from British Columbia. Why mention Canadian estimates of abundance? The "Annual Human-Caused Mortality and Serious Injury" section states that the total estimated human-caused mortality and serious injury level of the Alaska stock of Dall's porpoise is 38 harbor porpoise. Under "Habitat Concerns", the mention of Dall's porpoise in the Arctic may not be appropriate given that there were just two sightings in the Arctic in recent years, even if the records are accurate. Stafford said the "Status of Stock" section should state that there are "key uncertainties" not a "few key uncertainties". Citta said there are some estimates of abundance that could be used to back-calculate an  $N_{MIN}$ , even if the estimates don't cover a huge part of the range. Zerbini said the problem with Dall's porpoise is that they have a responsive movement that is not corrected for, which leads to overestimates of abundance. Citta agreed with Zerbini but thought it would be helpful if those issues were clarified in the text. Zerbini agreed with Citta and said biases were mentioned at the end of the "Population Size" section. Doniol-Valcroze said it would be worth emphasizing the lack of a correction factor and bias. Pendleton said a default  $R_{MAX}$  should be established for porpoise if the cetacean  $R_{MAX}$  is not considered to be correct. In the "Fisheries Information" section, the 2012/2013 Southeast Alaska drift gillnet fisheries observer program data estimate is not extrapolated to other regions. Pendleton said it would be worth extrapolating those mortality estimates to other areas of the fishery. Doniol-Valcroze said the  $N_{MIN}$  is unknown since the estimate is greater than 8 years old, but the SAR should state that no recent reliable and unbiased data are available.

### **North Pacific Sperm Whale SAR Review**

Peterson said this SAR has many data limitations. The last discussion focused on the lack of stock structure information for this stock, which has not changed. There is no  $N_{MIN}$  or PBR, and there has been an increase in concern about sperm whales takes. Figure 1 is very nondescript, and there may be a better figure to replace it. There is conflicting information on stock structure. The sentence that states that information in Mizroch and Rice (2013) suggests that stock structure should reviewed and updated to reflect current data should be reworded or removed. Clapham agreed with Peterson and said stock structure is not definitive and will not be determined anytime soon. Peterson said that in the "Population Size" section it may be possible to piece together an  $N_{MIN}$ , starting with Jan Straley's publication of 100 known individuals in Southeast Alaska. Doniol-Valcroze agreed with Peterson and said the AKSRG should make a recommendation about generating an  $N_{MIN}$ . There is no abundance estimate for sperm whales in U.S. waters, but surveys have been completed in Alaska, and it should be possible to come up with an  $N_{MIN}$ . At what point is available information used to generate population estimations? Long said this is a conversation that needs to take place internally. Long would be interested in hearing the AKSRG's thoughts on whether or not the available sperm whale data are sufficient or appropriate to

use for an  $N_{MIN}$ . Doniol-Valcroze is seeking consistency and said the SAR could be specific about why the survey data are not being used to calculate an  $N_{MIN}$ . Zerbini agreed and said that more specific language could be added to provide data use justification across the board.

Bettridge said we need to be consistent with the statute, which states that an  $N_{MIN}$  needs to be included. In some Alaska SARs, the  $N_{MIN}$  is not included in Appendix 2 when the AFSC is uncomfortable with the calculation. Rather, the  $N_{MIN}$  is included in the SAR text with plenty of caveats. Peterson said under “Fisheries Information”, it should be stated that the level of observer coverage changed in 2012. In the discussion of depredation under “Other Issues”, Peterson has drafted some new language based on a number of newly available publications that show that sperm whale depredation has a significant impact on catch rates. The depredation discussion needs to be updated because it is outdated. Pendleton wondered why a 2014 take was removed from Table 1. Helker said the removal of the take was based on a review of the original observer forms. After the review, it was determined that all fishing gear was recovered from the whale during the entanglement incident, which has been documented in the Human-Caused Mortality and Injury NMFS Tech Memo.

#### **Western North Pacific Humpback Whale SAR Review**

Stafford said NMFS will be completely reviewing humpback whale stock structure, and this SAR will likely be revisited very soon. The SAR states there have been no reported takes of humpback whales from this stock via native subsistence hunting in Alaska or Russia from 2012 to 2016. Stafford said there is no mention of the humpback whale that was harvested for subsistence in 2016, which made the news. Citta said a letter was sent to the Native community stating that they were not supposed to harvest humpback whales. The mayor sent a letter in response saying that the whale was a gift from the ocean, and they would do it again. Pendleton asked if there is a possibility that stock structure will not be revised by NMFS. Bettridge said there is a possibility, but it’s unlikely. Pendleton said in the “Minimum Population Estimate” section there is no CV provided for the SPLASH estimates. There is no justification for the origin and use of the default CV of 0.3. A recovery factor other than 0.1 should be used for the PBR calculation since the population is reported to be growing and fairly abundant. Pendleton suggested following the GAMMS guidelines for the recovery factor for this stock and using a number larger than 0.1. Wade said this statement should be clarified to state that the population was found to be growing between certain prior periods of time, but it’s not currently known whether the population is still growing. Pendleton said the data below Table 2 in the “Fisheries Information” section are really old (20–25 years old). Is that data still worth keeping in the SAR? The human-caused mortality data in the discussion of key uncertainties in the “Status of Stock” section are really poor and are a huge uncertainty. The data do not seem very good for this particular stock.

#### **Central North Pacific Humpback Whale SAR Review**

Peterson asked if the IWC assessment process is linked to the SARs and the re-organization of this stock. Bettridge said no, not explicitly. Wade said the IWC process would not be finished in 2018. The IWC process is essentially using the same information as the ESA DPS information. Clapham agreed and said there are several scenarios that are being explored in the model that is currently being considered. Clapham was hopeful that the IWC would wrap up their assessment in about a year. Peterson said the SAR lists or mentions a very large number of studies that have been completed and recommended prioritizing what’s included in the SAR. Peterson suggested adding a yearly total at the bottom of Table 2, as well as a longer-term figure that includes the minimum annual detected human mortality over a 10-15 year period. Doniol-Valcroze thought the “Stock Definition and Geographic Range” section was

too detailed, given that the current stock structure is known to be inaccurate and there are plans for revision. There are also too many details in the “Population Size” section. It’s not necessary to list the number of uniquely identified individuals every time. Doniol-Valcroze recommended simplification. Too many numbers can be distracting. Doniol-Valcroze asked if there are any studies or evidence that can be used to show that the stock is increasing. Teerlink said there will not be another SPLASH study that will provide a broader perspective any time soon, but there are localized studies that have shown a continued increasing population. It has to be assumed that those localized areas can be generalized to the broader area. Doniol-Valcroze believed the localized studies would be enough justification, but this information should be added to the SAR in order to justify statements regarding a continued population increase. Pendleton said the key uncertainties discussion should state that the mortalities and serious injuries listed in Table 2 occurred in unmonitored fisheries and, therefore, represent a gross underestimate of actual mortality.

### **Northeast Pacific Fin Whale SAR Review**

Rea said there is no reliable range-wide population estimate, but provisional estimates are used for the Aleutian Islands. The  $N_{MIN}$  is based on a survey of only a portion of the stock’s range, which leads to a high level of uncertainty. Rea said most of the uncertainty is due to a lack of information on stock structure. The PBR is 5.1 and likely to be biased low. Rea wondered if Unusual Mortality Event (UME) numbers are ever used in respective population inferences. Pendleton did not think so. Stafford suggested adding the Rone et al. (2017) surveys to Figure 1. Peterson said it seemed inconsistent that the Rone et al. (2017) surveys were used to calculate an  $N_{MIN}$  for fin whales but not for sperm whales. Doniol-Valcroze agreed and said there are a variety of valid reasons behind using a survey for one species and not for another, but it needs to be justified in the SAR. Zerbini said the sperm whale and fin whale abundance estimates came from the same survey, but sperm whales have a stock structure problem and a  $g(0)$  bias. Fin whales do not have the same  $g(0)$  bias or an issue with stock structure segregation. Thus, the abundance estimate from the survey is more representative for the fin whale in comparison to the sperm whale, but the justification needs to be clear in the SAR. Wade agreed with Zerbini, but said that because there is a sperm whale stock in Alaska with a SAR, it should have an  $N_{MIN}$ . It may seem odd to manage a stock of males in Alaska, but they are an important aspect of the sperm whale population and this is not included in the SAR. Pendleton asked if there was evidence of increasing fin whale numbers outside of the referenced surveys. Zerbini said there is evidence in the North Pacific. Two surveys, one conducted in the Bering Sea and one in the Aleutian Islands, both showed increased trend estimates for fin whales, but both surveys have associated caveats. Clapham said estimates from the IWC POWER surveys will be available at some point. Pendleton said this survey data may provide justification to update the recovery factor.

### **Alaska Minke Whale SAR Review**

Stafford said this SAR is short, concise, and contains very little data. The SAR states that population size estimates cannot be used because only a portion of the stock’s range was surveyed. Rea said she assumes there is no minimum population estimate because it was a partial survey with no correction factors. This is also a common stock with no documented fisheries mortalities; thus, Rea was not sure how pressing it was for a PBR to be generated. There is no  $N_{MIN}$  or PBR for this stock. Interannual variability is stated to occur between warm and cold years in the “Population Size” section. Is that variability taken into account when estimating abundance and does that increase uncertainty? Wade was not certain. Bettridge said there have been cases in the Atlantic in which survey numbers from

multiple years are averaged when certain years yield very low numbers. Doniol-Valcroze asked why there was not an  $N_{MIN}$ . Is it because the estimates are too old or because they don't cover the entire range of the stock? Stafford said the estimate was for only part of the range, but it's also >8 years old and therefore out of date. Doniol-Valcroze asked if an  $N_{MIN}$  should be generated even if it doesn't cover the entire population range. Stafford said the 2010 survey data was collected by observers during pollock surveys, not from designated marine mammal surveys. Zerbini agreed, but said the pollock survey vessels transited parallel lines moving across the shelf.

### **Eastern North Pacific Right Whale SAR Review**

Doniol-Valcroze thought there were too many details in the SAR. Some information is repeated throughout the SAR, and there are too many specific sighting details. The "Population Size" section should just focus on information relevant to population size. Sighting details should be in the "Stock Definition and Geographic Range" section, and the "Population Size" section should focus on the mark-recapture survey that provides the  $N_{MIN}$ . The last sentence of the PBR paragraph is questionable. Which direction is the bias, and where did the 30 mature females come from? Why 30, and what does that have to do with the value of the PBR? The statement makes it sound as if this is a guideline, and it should be clarified. The maximum net productivity rate of 4% is stated to be unrealistically high in the SAR. Doniol-Valcroze did not agree with the wording of the statement. The 4% is a theoretical rate and not intended to represent current productivity rates. The SAR states that there were low observed calving rates, which does not provide the overall maximum theoretical net productivity rate. Clapham said he would rewrite the SAR from scratch next year in order to address the issue of discussing specific sightings, which have been tacked on over the years. Clapham was also unsure about where the 30 mature females came from. Muto thought the phrase originated from Doug DeMaster in response to public comments on the draft 2015 SAR. Clapham proposed changing the description to "a low number of females". Clapham asked if it's necessary to quote a maximum theoretical net productivity rate. Bettridge said if one exists specific to the stock, we could use that. Clapham said we don't have one, and there have only been two calves seen in a century. Clapham suggested the SAR could state that "given the small number of females, and due to the fact that we have only seen two calves in the last 100 years, the use of 4% is inappropriate". Doniol-Valcroze said 4% is used to calculate the PBR in the next paragraph. Bettridge said transparency is the key. Pendleton said given the population information, at best there is one calf in the population at any one time. Doniol-Valcroze said one paragraph states 4% is unrealistic and then another uses that 4%. Pendleton asked if another default should be used. Peterson asked why this differs from the AT1 Transient killer whale SAR where the maximum net productivity rate is applied, but they clearly are not reproducing. Bettridge said the GAMMS indicate that in cases where the stock is not conforming to normal situations a PBR is still calculated, but the SAR should mention that it's not consistent with normal circumstances.

Pendleton said the 4% maximum net productivity rate should be used in calculations, but caveats should be included. Doniol-Valcroze said changing the 4% implies that we have new information, but we don't. We should not have a maximum net productivity rate just to be conservative. Pendleton provided the wording used in the Hawaiian monk seal SAR as a potential model. In summary, the monk seal SAR states that a PBR is calculated, but due to underlying dynamics, which do not appear to be normal, the PBR is undetermined. Zerbini said the last few sentences of the right whale SAR are trying to make the same argument. Pendleton said the mention of bias raises red flags and some additional wording would be beneficial. Wade said the PBR framework does not work for tiny populations close to extinction.

Wade did not like the mention of bias because it does not correctly capture the issue, but he did like the text from the Hawaiian monk seal SAR. Clapham said the IWC POWER surveys are in the Bering Sea this year. The eastern Bering Sea survey was completed last year and the survey will either cover the central or western Bering Sea this year. The western Bering Sea survey depends on Russian permits, which is unlikely. Acoustics will not be used in the western Bering Sea due to Russian concerns about detecting submarines. The IWC POWER survey is a fantastic opportunity. Wade said there has never been a whale survey conducted in the donut hole/basin section of the central Bering Sea.

### **Western Arctic Bowhead Whale SAR Review**

John Citta said the map needed to be revised, and edits should be made to the migration routes. It was once believed that there were two different stocks, but scientific evidence indicates that there is only one stock. The evidence for bowheads actually summering in the Bering Sea is scant. Table 2 contains abundance estimates and CVs. There is a listed range and CV for 2004; what's going on there? Is the CV for the range? It seems like there is something missing from Table 2, and it should be clarified. Citta asked why the ice-based estimate was used rather than the aerial survey. Doniol-Valcroze said both are represented in the SAR, so why use one over the other. Citta said it would be helpful to have a figure that contained different symbols for different survey types. Megan Ferguson said Figure 3 needs to be revisited. The caption is accurate but the figure needs to be corrected. Citta said the harvest numbers in the SAR do not match up with Craig George's numbers. Landed and struck and lost whales should be consistently accounted for in the SARs. Citta will forward a couple reports that he obtained about bowhead whale entanglements in crab gear. On page 6, at the end of the "Alaska Native Subsistence/Harvest Information" section, include struck and lost whales in the total. Citta suggested citing a paper on the effects of ambient sound on bowheads in the "Status of Stock" section. Stafford said the reference would be Blackwell et al. (2015). Stafford suggested condensing the paragraph about the effects of anthropogenic sound on bowhead whales. Pendleton said the "Status of Stock" section states that a few whales have been reported as killed or seriously injured by commercial fisheries. However, it's also mentioned that a 12% entanglement rate has been observed through scars; thus, mortality could be substantially higher, which should be stated in the SAR. Muto said there are new papers that can be cited in the bowhead SAR, which will be made available to the AKSRG via the VLab website. Pendleton said all SAR editorial changes should be sent to Muto.

### **SRG Conflicts of Interest**

Rea asked about conflicts of interest within the SRG. Rea said NMFS' ethics folks said there are no issues with conflicts if the SRG member's comments remain on the science used in the SARs. However, there could be a conflict of interest if the comments are made on future research that is relative to the SRG member's area of research. Bettridge said the Terms of Reference cover conflicts of interest. SRG members should recuse themselves from discussions that would benefit them financially, as well as from applicable recommendations if they want to be extra careful. In general, recommendations are fairly generic. Pendleton said most SRG members work on projects that receive NOAA funding at one time or another. Bettridge agreed and said the reality is that most SRG members have some contracts with NOAA.

### **Gaps in AKSRG Expertise**

Pendleton asked what areas the AKSRG lacks in expertise. Citta and Stafford said commercial fisheries. Peterson said she has a background in commercial groundfish fisheries and attends council meetings on and off. Pendleton said in addition to commercial fisheries, other areas of expertise that are needed

include small cetaceans, subsistence harvest, and co-management. Citta, Rea, and O’Corry-Crowe all have pinniped expertise. Doniol-Valcroze said O’Corry-Crowe brings genetics expertise, but asked if there was enough expertise in stock delineation. Bettridge said usually there is an acknowledgment that stock structure needs to be changed or reexamined. Then, once that work is done, the SRG reviews the newly proposed SAR and stock structure information and provides input before it is released for public comment. Doniol-Valcroze said if that’s the case, should AKSRG membership be strengthened in this field of expertise. Bettridge said possibly, but not immediately, because the process of stock delineation does not happen overnight. Pendleton pointed out that there have been at least three recent cases of the AKSRG making recommendations about revising stock structure and at least one has happened, one is pending, and the other has not made progress. There is good expertise on large whales, but would it be useful to have expertise on specific species of large whales? Killer whales and humpback whales were considered. Helker presented an Excel spreadsheet that depicted AKSRG member expertise. Bettridge said the spreadsheet was created during the process of generating the Terms of Reference. NMFS had a general understanding of SRG expertise, but SRG members were asked to self-identify their areas of expertise just to be certain. Bettridge said Kate Wynne is leaving the AKSRG and Grey Pendleton, Mike Miller, and Kate Stafford are up for review this year. There is also one AKSRG member who has not been present at the last two AKSRG meetings. Pendleton reiterated that commercial fisheries, co-management, subsistence harvest, small cetaceans, large whales/humpbacks, and bycatch estimation are areas of expertise that are needed on the AKSRG. Angliss said the AKSRG could help with commercial fisheries expertise recruitment. There were no applicants from the commercial fisheries field during the last call for AKSRG members. Angliss said it would be helpful if folks in the room provided SRG nominations for qualified individuals with commercial fisheries expertise.

#### **Location of 2019 AKSRG Meeting**

Pendleton asked where next year’s AKSRG meeting should be held. There was strong support for holding another meeting in Seattle. The group emphasized the importance of having the SAR authors available to answer and address the AKSRG members’ comments and concerns in real time. Rea said the USFWS may not have anything to review next year, especially given the timing of when they expect the data to become published and available. There were no objections to a Seattle meeting in 2019. Bettridge thanked the AKSRG members for their time and contributions.