

**Minutes from the Alaska Scientific Review Group Meeting**  
**NMFS Alaska Fisheries Science Center, Seattle, WA**  
**27-28 February 2020**

This report summarizes the 2020 meeting of the Alaska Scientific Review Group (AK SRG), held at the NMFS Alaska Fisheries Science Center in Seattle, WA, from 27 to 28 February 2020. This document is intended to summarize the main points of discussion and does not attempt to record everything that was said during the meeting.

### **General Topics**

#### Welcome and introductions

Megan Peterson, AK SRG Co-Chair, called the AK SRG meeting to order. Robyn Angliss introduced John Bengtson, who welcomed the AK SRG to the Alaska Fisheries Science Center (AFSC). The AK SRG adopted the agenda. All participants introduced themselves, their roles, and their background.

*AK SRG members present:* Elizabeth Concepcion, Eric Regehr, Greg O’Corry-Crowe (AK SRG Co-Chair), John Citta, Kate Stafford, Lorrie Rea, Megan Peterson (AK SRG Co-Chair), Mike Miller, Thomas Doniol-Valcroze.

*Observers and invited participants:* Alex Zerbini (AFSC), Brian Brost (AFSC), Brian Fadely (AFSC), Devin Johnson (AFSC), Jennifer Ferdinand (AFSC), Jeremy Rusin (AFSC), Jeremy Sterling (AFSC), Jessica Crance (AFSC), LTJG James Freed (AFSC), John Bengtson (AFSC), Katie Sweeney (AFSC), Kim Goetz (AFSC), Kim Shelden (AFSC), Marcia Muto (AFSC), Mike Cameron (AFSC), Nancy Friday (AFSC), Nancy Young (AFSC), Paul Wade (AFSC), Peter Boveng (AFSC), Robyn Angliss (AFSC), Rod Towell (AFSC), Rolf Ream (AFSC), Shawn Dahle (AFSC), Tom Gelatt (AFSC), Jon Kurland (NMFS Alaska Regional Office, AKR), Suzie Teerlink (AKR), Mridula Srinivasan (NMFS Office of Science and Technology, ST), Zac Schakner (ST), Deborah Fauquier\* (NMFS Office of Protected Resources, OPR), Kristy Long (OPR), Lisa Lierheimer\* (OPR), Shannon Bettridge (OPR), Aimee Lang (NMFS Southwest Fisheries Science Center), Kim Parsons (NMFS Northwest Fisheries Science Center), Sam Simmons (Marine Mammal Commission), Nicole Kanayurak (North Slope Borough), Amy Van Cise (Woods Hole Oceanographic Institution).

\* Participated by phone/webinar.

#### Administrative issues

Marcia Muto provided information about administrative issues, including travel forms and sending receipts for reimbursement, the hotel shuttle, and the social hour scheduled for the end of the day.

#### Minutes from previous Alaska SRG meeting

Nancy Young noted that LT Blair Delean took the minutes at the 2019 AK SRG meeting and a draft was circulated among meeting participants. Feedback from some AK SRG members and other meeting participants was incorporated into the minutes. The minutes will be considered final unless NMFS receives additional comments. No further comments were shared at the meeting.

### **2019 Alaska SRG Meeting Recommendations**

Peterson provided a review of the 2019 Alaska SRG meeting recommendations and NMFS’ responses, which are available online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/scientific-review-groups#alaska-scientific-review-group>

Peterson and AK SRG members expressed appreciation for the changes to the marine mammal stock assessment reports (SARs) made in response to the AK SRG’s comments and

recommendations and stated that they look forward to NMFS' presentations on particular issues and future progress reports on others. Regarding the AK SRG's recommendation for the addition of specific tables to the SARs (recommendation #6), Peterson suggested this could be a topic to revisit for additional recommendations.

### **NMFS Headquarters updates**

#### Transition of SAR national coordination from NMFS Office of Protected Resources (OPR) to NMFS Office of Science and Technology (ST)

Mridula Srinivasan described a recent decision by NMFS to transfer components of the SAR program from OPR to ST, given that ST holds a science function within the agency; ST has interdisciplinary expertise, including the fish stock assessment enterprise that resides within ST; and ST is already involved in activities that intersect with the SAR program. She described areas that ST will focus on, based on feedback from the NMFS Science Centers and Regional Offices, including improving SAR quality (e.g., readability, methods consistency, and ways to monitor key population metrics and improve scientific rigor), implementing SRG recommendations, and streamlining the SAR development and publication process. She emphasized that ST will still work with OPR, Science Centers, and Regional Offices to place a stronger emphasis on science and advance the science.

#### Brief overview on SAR/clearance process

Zac Schakner reviewed the current SAR development and publication process and timeline, which centers around three primary milestones: SRG meetings, publication of draft SARs, and publication of final SARs. He noted that delays in various steps of the process sometimes lead to a situation in which NMFS is publishing final reports and drafting new reports concurrently.

Greg O'Corry-Crowe asked if both the process and the SAR content are being reviewed and if they will be more standardized. Srinivasan responded that SARs are reviewed by the SRGs and that NMFS relies on the SRGs for feedback. She described efforts to standardize SAR summary tables, update the SAR preface to include details of what has changed within the SAR, and integrate information to improve the product, which is useful to a number of people, including scientists and managers both within and outside of NMFS. She also mentioned that ST is learning the process and their role and then plans to think about how they can improve things. Peterson asked about take-homes from the survey. Srinivasan offered to share responses and pointed out issues with text redundancy, legacy text, the convoluted SAR process, inconsistencies with metrics used, and the staggering issue of data that are always ahead of the SARs. Thomas Doniol-Valcroze asked what NMFS does with contradictory public comments. Shannon Bettridge stated that this is rare and if there is any information leading to a significant change in a SAR (e.g., potential biological removal (PBR) level or strategic status), NMFS would notify the SRG. Angliss pointed out the fair division of labor between NMFS Science Centers, NMFS Regional Offices, and NMFS Headquarters to make sure the SARs are as specific as possible. Sam Simmons added that NMFS publishes the responses to public comments in the Federal Register Notice when releasing the final SARs.

#### Marine Mammal Protection Act (MMPA) and Guidelines for Assessing Marine Mammal Stocks (GAMMS) overview and management considerations

Bettridge presented an overview of the MMPA and the GAMMS and discussed how the SARs and the input provided by the SRG affect management decisions. Bettridge reviewed the MMPA's goals and objectives, SAR requirements in MMPA section 117(a), and the SAR cycle and timeline, noting the role of the SRG in reviewing preliminary draft SARs. Strategic stocks are reviewed every year and non-strategic stocks at least every three years, and SARs are revised if there is substantive new information. Peterson asked whether NMFS would update a non-strategic SAR if significant information is available, and Bettridge confirmed that it would. Bettridge summarized MMPA

section 117(d), which establishes the regional SRGs and the topics on which they advise; key aspects of the GAMMS, which guide development of the SARs; and the serious injury policy, which is currently under review per requirements of the policy. The SRG will be asked to review any changes to the policy once drafted. Bettridge summarized how information in the SARs is used in management activities (e.g., List of Fisheries (LOF), Take Reduction Plans, negligible impact determinations). She also discussed the statutory implications of depleted and strategic stock designations. O'Corry-Crowe asked whether NMFS applies the MMPA and GAMMS to populations outside the U.S., and Bettridge replied that NMFS only rarely does so (e.g., the case of Russian beluga whales that were the subject of a request for a U.S. import permit).

John Citta asked how optimum sustainable population (OSP) evaluations are made for depleted designations. Paul Wade explained that NMFS' regulatory definition of OSP is a population range between the maximum net productivity level (MNPL) and the carrying capacity (K). MNPL is sometimes considered to be 50-60% of K, and Bayesian assessments sometimes integrate over the range of 50-70% because of uncertainty. The PBR simulations used 50% of K, but bias/robustness trials were also conducted using a higher value of MNPL. MNPL is identical to maximum sustainable yield if the catch is proportional to age structure. Bettridge noted that PBR was introduced to the MMPA because data were not available for most stocks to allow calculation of OSP. (See Taylor et al. 2000 for an explanation of why the conservation goal moved from OSP to PBR.)

Eric Regehr stated that for polar bears and other long-lived species, PBR is a very conservative harvest level and you could greatly exceed PBR and still be well above MNPL. This could have management ramifications for species where take is close to or exceeds PBR. Peter Boveng stated that the level of conservativeness of PBR depends on the uncertainty in the data, as part of a management control rule that is robust to things that are unknown. Wade noted that he does not agree that PBR is overly conservative and thinks it is appropriately conservative to achieve the management objectives set by NMFS. Regehr stated that for a lot of long-lived species, there is non-linear density dependence such that MNPL is well above half of K, and the potential growth at that population size is well above one-half  $R_{MAX}$ , which is why PBR is inherently conservative. Wade noted that Jeff Laake did an analysis of harbor seals in WA with a good dataset (Jeffries et al. 2003) and estimated MNPL as just above 50% of K (56% and 60%K for inland and coastal stocks, respectively).

The AK SRG had several questions about take reduction planning. In response, Kristy Long stated that if several commercial fisheries take a marine mammal stock above certain levels, NMFS would convene a Take Reduction team for all of the fisheries and ask all to reduce their impact to the extent they can. However, if the main source of mortality and serious injury (M&SI) is not commercial fishing, convening a Take Reduction team would not be a priority for NMFS' limited resources. These other sources of M&SI would need to be addressed through other mechanisms under MMPA section 112(e).

New draft policies/guidelines on: (1) criteria for negligible impacts from fisheries, and (2) internal policies for designating new stocks

Bettridge provided an update on two recent policies and guidelines. NMFS recently released draft guidance for negligible impact determinations (NID) under MMPA section 101(a)(5)(E) (draft NID policy), which is available for public comment through 16 March 2020. Section 101(a)(5)(E) allows NMFS to authorize incidental take of Endangered Species Act (ESA)-listed marine mammals in commercial fisheries if, among other things, the take will have a negligible impact on the stock. Bettridge described issues with the previous guidance (1999 NID criteria) and introduced the proposed new guidance, which involves two thresholds (negligible impact threshold total, or  $NIT_T$ , and negligible impact threshold single, or  $NIT_S$ ) and a two-tier analysis similar to the MMPA LOF's

tier analysis. She highlighted that one of the key differences from the old criteria is the ability to authorize take in certain individual fisheries even when the combined human-caused M&SI level is above the threshold. Because Bettridge's presentation was an overview of the draft guidance and did not describe the specific calculations for the negligible impact thresholds, Doniol-Valcroze questioned the basis for saying  $NIT_T$  is roughly equivalent to PBR for an endangered stock. Bettridge stated that NMFS focused on defining a negligible impact as causing no more than a 10% delay in time to recovery. Wade expanded on this, noting that some people have advocated using 10% of PBR as a negligible impact threshold, but if that is 10% of an endangered stock's PBR (which already has 0.1 as the recovery factor), that results in a very small number. He explained that the endangered species PBR is already set to be very low (via the recovery factor) such that, in a sense, it is already negligible and it is unnecessary to go lower than that. Therefore, the draft negligible impact threshold is not calculated relative to PBR but is its own independent assessment with a separate negligible impact factor (similar to a recovery factor) to get to the  $NIT_T$ . Citta asked whether NMFS considered allocating  $NIT_T$  among fisheries that take the stock, rather than holding all fisheries to a single, conservative standard. Bettridge replied that PBR is a goal, not a quota, so NMFS does not want to allocate portions of PBR to different users and that the Take Reduction program under MMPA section 118 is the mechanism for reducing fisheries take. Regehr asked if total M&SI including subsistence take exceeds  $NIT_T$ , whether fisheries would be compared to the lower threshold ( $NIT_S$ ), and Bettridge confirmed that they would. Mike Miller asked whether this could expand the potential for fishermen to blame Native hunters. Bettridge acknowledged that the new draft policy would allow for authorization of individual fisheries and, thus, has the potential to reduce conflict. Doniol-Valcroze asked whether other countries would need to comply with the new policy, given the requirements of the MMPA import rule for providing a PBR and bycatch estimates for fisheries. Long stated that the MMPA import rule does not have a link to MMPA section 101(a)(5)(E), so the policy would not apply.

Bettridge then presented information on the recently finalized NMFS policy for designating stocks under the MMPA. She provided background on the need for a standardized process for designating stocks, with a goal of ensuring stock revisions are collaborative, repeatable, consistent, and transparent. One important change is that the policy specifies stocks are management units that comprise one or more demographically independent populations (DIPs) and that, while NMFS generally expects a DIP to be a stock, there may be rare cases where DIPs would be combined into a stock if the agency is unable to manage at a DIP level. Additionally, if distinct population segments (DPSs) are established under the ESA, stocks should be aligned with the DPSs unless there is a compelling reason not to, and only DIPs from the same DPS should be combined. O'Corry-Crowe commented that managing known DIPs together is a revolutionary change. He also questioned whether Bettridge's statement regarding aligning stocks with DPSs covers all the eventualities, and Bettridge clarified that the guidance does not preclude NMFS from identifying a stock of animals that are not members of a DPS. Bettridge then outlined the policy's flowchart, which she characterized as mainly a communications plan. She noted that SRG recommendations regarding stocks feed into Step 1, in which Regional Offices and Science Centers together identify priorities for reviewing stock structure. Finally, she discussed the next steps, including revising the GAMMS and beginning implementation of the policy, likely starting with humpback whales.

Simmons pointed out that Step 2 of the flowchart (identifying DIPs) could take a number of years and asked whether the public and SRGs would be made aware of what is going on behind the scenes, such as identifying in a SAR that it is possible the stock contains multiple DIPs. Bettridge confirmed this would happen.

The group discussed AK SRG members' questions about the motivation for the policy of allowing multiple DIPs to be combined, potential pitfalls of doing so, whether NMFS might conduct

simulations or a risk assessment to develop rules of thumb for when it might be problematic to combine DIPs, and whether the good intentions for careful, thoughtful implementation of the policy might fade over time and lead to inappropriate or dangerous lumping. Bettridge emphasized that the policy is meant to increase transparency in decision making, including documentation of any changes to DIP delineation or stock designation, and the SRGs, Marine Mammal Commission (MMC), and public will be able to review and comment on these changes. She also said the policy is an acknowledgement that NMFS does not always have the information needed.

#### **NMFS Alaska Regional Office (AKR) updates**

Jon Kurland presented information on a variety of topics. After providing a brief overview of the definition and requirements of critical habitat, he described the status of critical habitat designations for ringed seals and bearded seals. These species were ESA-listed in 2012 based on anticipated consequences of future climate change. A 2014 proposed designation for the Arctic subspecies of ringed seals was “shelved” during litigation on the listings; once the listings were reinstated, NMFS committed, via a lawsuit settlement, to publishing proposed critical habitat rules for both species by 15 September 2020 and final rules by 15 September 2021. NMFS could move directly to a final rule for ringed seals; but, because several years have elapsed since the 2014 proposed rule and most stakeholders will be looking at the two ice seal critical habitat designations together, NMFS is choosing to publish a new proposed rule for ringed seals alongside a proposed rule for bearded seals. Kurland noted that the 2014 proposed designation for ringed seals was a broad area, including all the sea ice and covering most of the range, and NMFS received a lot of negative comments about the breadth of the designation.

Kurland then provided an update on the proposed critical habitat designation for ESA-listed DPSs of humpback whales, which published in October 2019. The 2016 revision to the humpback whale ESA listing and identification of DPSs triggered the requirement for designating critical habitat for each listed DPS that occurs in U.S. waters. The Mexico and Western North Pacific DPSs spend time in Alaska waters for at least part of their life cycle. Following a lawsuit, a settlement agreement established dates for publication of a proposed rule by 26 September 2019 and a final rule by 28 September 2020. In response to questions from O’Corry-Crowe regarding critical habitat, Kurland noted that identification and designation of critical habitat can provide a benefit to the species by helping other entities focus their conservation actions, outreach, and research, and, while critical habitat cannot be designated outside U.S. waters, there are ways to acknowledge that, biologically, the breeding areas are essential. Regehr asked if temporal areas are included and Kurland noted that there is no temporal aspect to a critical habitat designation, i.e., an area is either designated as critical habitat or it is not, but that can be considered in the ESA section 7 consultation process. For example, if an activity occurs in critical habitat during a time when the essential features are not there or the animals are not there, it may be easier to conclude that the activity has no effects on the habitat.

Kurland briefly mentioned the forthcoming redelineation of humpback whale stocks under the MMPA, given that the current mismatch of stocks and DPSs is creating management difficulties. Now that the stock policy has been finalized, the humpback whale stock revision should happen soon.

Kurland discussed the possibility of designating the small population of harbor seals in Iliamna Lake as a separate stock. NMFS received a petition to list the population under the ESA and prepared a “DPS report” in 2016 that concluded the population is discrete from other populations but not ecologically significant, so it did not meet the definition of a DPS. However, given its discreteness, it is arguably a DIP, which raises the question of whether it should be classified separately from the Bristol Bay stock. Following discussion among the AK SRG and other meeting

participants regarding the basis for the discreteness determination, Kurland stated that in February 2020, NMFS received a new listing petition for the Iliamna Lake population, and NMFS will defer the stock determination until the petition is addressed.

Finally, Kurland gave an update on NMFS' guidance for apportioning takes between western and eastern Steller sea lion stocks in Southeast Alaska (SEAK), which is being revised to incorporate new information on the overlap of animals from the two stocks. The revised guidance is based on brand resights and available genetic information to provide a better picture of where and in what proportions western animals are reasonably expected to occur. There are still challenges in apportioning takes and NMFS is using the best available science. The revised guidance will be used to determine the expected proportion of eastern versus western animals in regions of SEAK for purposes of ESA section 7 consultations, research permitting, and stranding response, NMFS needs to have additional discussions regarding the applicability of this approach for apportioning fishery interactions.

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

#### Update on Alaska Marine Mammal Observer Program (AMMOP)

Angliss provided some comments on the AMMOP. In 2018, the program officially moved from AKR to AFSC. The program has been dormant for a couple of years as AFSC consults experts to develop the first AFSC-run marine mammal observer program. AFSC's Fisheries Monitoring and Analysis (FMA) division is expected to take the lead since they manage the observer program for the North Pacific fishing fleet, while MML expects to be consulted on the design of the program to ensure the necessary marine mammal bycatch information can be obtained. A team of MML, FMA, and AKR staff met to develop a proposal for an observer program for state-managed gillnet fisheries in SEAK. The program moved from AKR to AFSC with no money attached, so AFSC must compete for funds. AFSC is currently seeking funding but is not optimistic that it will be supported this year. The program is estimated to cost more than \$1 million per year to observe the SEAK gillnet fishery, which is AFSC's first priority. Down the line, AFSC, AKR, and Headquarters will decide, based on the data, the next priority for observations. However, there is likely not enough funding to cover more than one state fishery at a time.

#### MML fiscal year 2020 (FY20) project priorities

Bengtson provided an overview of MML and its research programs and described MML's priorities for funding marine mammal projects in FY20. Marine mammal information needs, including basic population features, key populations, and drivers of potential impacts, inform setting these priorities. Bengtson presented MML's provisional FY20 budget allocations, including projects likely to be funded, those that are on the cusp, and those which are not likely to be funded. MML can seek other sources of funding for projects not funded by MML (e.g., Regional Office, Headquarters, Navy, Bureau of Ocean Energy Management (BOEM)). Doniol-Valcroze noted that North Pacific right whale research is likely to be funded and asked whether that was a result of the AK SRG's recommendation. Bengtson and Srinivasan replied that Headquarters, Regional Offices, and Science Centers do consider SRG recommendations when setting priorities and, in this case, ST, OPR, MMC, and MML were able to provide funds to support analysis of the North Pacific right whale acoustic recording data. Nicole Kanayurak noted that Steller sea lion studies in Russia are identified as being on the cusp in one slide and likely to be funded in the next slide. Bengtson stated that AKR is supporting research in Russia through a pinniped grant program, and AFSC complemented that funding to support analysis of data.

## Research updates

### Gray whale and ice seal unusual mortality events (UMEs)

Deborah Fauquier, the NMFS National UME Program Coordinator, provided an overview of the UME designation criteria and process, the UMEs currently open nationwide, and specific data on the ongoing gray whale and ice seal UMEs. O’Corry-Crowe asked about the gray whale UME, how it is defined, and if it is unusual to have a UME designated for the species’ entire range. Fauquier explained the UME designation and that it is not unusual to designate the entire range, as they have also done for North Atlantic right whales. Fauquier summarized the challenges with getting UME data for ice seals given the reporting delays from hunters, who report when they return from a hunt, and excessive decomposition of animals as a result of delayed response to stranded animals. In 2020, they hope to include communities as part of the investigative team and store sampling equipment to respond to these events more rapidly. Regehr asked whether there were methods to estimate total mortality based on observed strandings, particularly for ice seals. Fauquier deferred to Boveng for ice seals but noted that there was an analysis of total gray whale mortality following the 1999/2000 gray whale UME, and estimates have also been made for bottlenose dolphins in the Gulf of Mexico. Boveng stated that there is not a defensible way to calculate ice seal mortality from stranding data. However, for the previous ice seal UME that began in 2011, there were aerial survey data from the Bering Sea in 2012-2013 that showed very large decreases in abundance. While it is unknown whether the change in abundance was a reflection of the UME, it is the best explanation available and suggests that hundreds of stranded seals might correspond to tens of thousands of seal mortalities at sea that are never detected. Doniol-Valcroze indicated that this is similar to gray whales, where a large proportion died during the UME. Fauquier noted that the analysis of the Sarasota, Florida bottlenose dolphin strandings estimated 30% of the dead animals were recovered. For populations with a larger geographic range, however, the percentage of recovered carcasses might be 10% or less. O’Corry-Crowe asked whether an analysis of environmental conditions in the Pacific region is planned, and Fauquier replied that in the next few months, Sue Moore on the UME investigative team will be working on analyses of environmental conditions for the ice seal, gray whale and Guadalupe fur seal UMEs. Peterson asked whether the rate of UMEs has increased in the last few years, especially given the marine heat waves in 2014-2016 and 2018-2019. Fauquier replied that UMEs do not seem to be reflecting the change in environment for all species and that there are still multiple factors influencing the UMEs. Regehr asked whether there was evidence for compensation through demographic mechanisms in the populations, such as an increase in natality after the large mortality events. Citta stated that they have not seen obvious compensatory effects and, in general, pregnancy rates are high and age at maturity is high. He noted they are seeing some declines in spotted seals, but there are not enough aerial surveys to confirm what is going on.

### Update on Pacific Marine Assessment Program for Protected Species (PacMAPPS) cruises

Bengtson presented information about a multi-agency coalition (U.S. Fish and Wildlife Service, Navy, BOEM, NOAA) to conduct marine mammal and seabird surveys on a broad scale, with the goal of estimating abundance and trends, distribution, and habitat use and ultimately to derive seasonal spatial density models. The Marine Assessment Program for Protected Species (MAPPS) surveys started in the Atlantic (AMAPPS) and Gulf of Mexico (GoMAPPS) and then, about 5 years ago, began in the Pacific (PacMAPPS), not including the Arctic. Surveys in the Gulf of Alaska as part of PacMAPPS are proposed for 2022 and, although there is currently no funding or ship time allocated, MML is pursuing both. The coalition is also in the early stages of proposal planning for Arctic MAPPS (ArMAPPS) surveys, targeted to begin in 2023, which would likely be a combination of aerial and ship-based surveys, acoustics, and tagging on different spatial and temporal scales on a rotational schedule. Doniol-Valcroze asked whether the Gulf of Alaska survey would use a towed acoustic array to estimate beaked whale abundance around seamounts. Bengtson replied that seamounts are important areas where there might be stratified sampling to target certain species or areas of known activity. Nancy Friday added that in the Gulf of Alaska, MML hopes to deploy

long-term acoustic moorings in addition to using a towed array and sonobuoys. Doniol-Valcroze stated that there was a survey of Canadian Pacific waters in 2019 at the same time as the PacMAPPS survey of the California Current Ecosystem and there would be a benefit to linking up with the survey of the Gulf of Alaska to allow a coast-wide assessment. Bengtson agreed but stated that PacMAPPS includes five survey areas around the Pacific to be surveyed on a rotational basis given logistical and budget constraints. O’Corry-Crowe emphasized that any information that can be learned from the surveys about where you would expect to see large whales would help in planning for other studies.

#### Electronic monitoring (EM) in groundfish and halibut fisheries

Jennifer Ferdinand, Director of AFSC’s FMA division, presented information on the EM programs for Alaska’s groundfish and halibut fisheries. The division runs large observer programs and a large EM program that are relatively integrated. The vast majority of monitoring effort is in the full coverage fleet, which has 100% observer coverage combined with video for compliance monitoring. The partial coverage fleet includes a larger number of vessels covered at a much lower rate, in which vessels can either be in the observer selection pool or voluntarily opt into the EM selection pool. Monitoring is funded through industry fees. In the full coverage fleet, which includes longline and trawl catcher processor vessels, there are observers on the vessel or in the processing plant for all trips and deliveries and video systems on deck for halibut sorting and discards. There is an observer on board, so most marine mammal interaction observations come from this fleet. EM in the full coverage fleet is used for compliance monitoring only. This is a mature, single-objective EM program that is combined with the existing observer program to enhance observer data quality. Video footage could be requested if it could assist in the identification of a marine mammal take or marine mammal harassment; but, to date, NMFS has not requested footage for marine mammal information. The partial coverage fleet covers “small” fixed-gear vessels. If vessels choose to have EM instead of observers, the EM data are used for catch estimation. While there can be a higher monitoring rate for partial coverage fisheries (30% coverage if vessels opt into the EM pool), the cameras offer limited visibility (since they are focused on fishery removals) and may miss marine mammal interactions with gear. Additionally, marine mammal sightings data are not collected, and data review is slower than observer reports. The division also runs a pilot program for partial and full coverage for a single fishery (pollock pelagic trawl catcher vessels, for now), in which vessels choose to have EM instead of observers. In this program, video is used for compliance monitoring only and not catch accounting. There is a higher monitoring rate for vessels that would otherwise be in the partial coverage fishery; but, again, the cameras offer limited visibility. Cameras will not capture marine mammal sightings, and they may or may not capture entanglements (unless caught/landed by trawl), and fishermen are not authorized to collect marine mammal samples or length data. Data review is even slower than in the other programs because vessels can complete three trips before sending in the video data on a hard drive. The video data are only reviewed for discards since vessels are not allowed to discard much besides large organisms (such as marine mammals). Angliss asked whether video reviewers record if a marine mammal is seen on deck. Ferdinand confirmed that they do, although this has not occurred in the few videos that have been reviewed to date. In summary, Ferdinand emphasized that EM systems are proven in Alaska for single-objective programs and are gaining ground in the multi-objective program (replacing observers). She also noted that EM use is expanding throughout the country and the roles of EM and observers will likely change as technology evolves and data users adapt. Peterson asked if the number of observers is likely to continue to decrease as use of EM increases. Ferdinand replied that both types of monitoring are funded from the same pot of money, so both cannot be increased.

#### Precision of M&SI estimates

In response to a recommendation from the AK SRG, Wade presented information about the precision of M&SI estimates. The first part of the recommendation was that procedures for

estimating M&SI be improved, including associated precision estimates. Wade stated that MML has generally used ratio estimators but it is possible to use model-based estimators that might improve estimates, including precision, and MML plans to do so at some point in the future. The second part of the AK SRG's recommendation was that guidelines be developed for the use of the estimated precision when comparing M&SI with PBR. Wade described the base case of how the PBR simulations were originally run, including the assumption that a normally distributed bycatch estimate is available each year with a mean equal to PBR, with some variation. The goal is to recover populations to OSP if they are depleted and to maintain them at OSP if they are already there, with 95% probability. He conducted a base case and then trials with various biases to see how it performed. Mortality biases were explored in cases 1, 5, and 8, including large biases in the mortality estimate and in the precision of the mortality estimate. In bias case 1, a recovery factor of 0.5 allowed the trial to succeed. All bias trials were then run with a recovery factor of 0.5, and it demonstrated that PBR still works even under all of the biases. Wade summarized sections of the GAMMS which specify that mortality estimates can be averaged across as many years as necessary to achieve a CV of less than or equal to 0.3 and that assigning a recovery factor of less than 1.0 compensates for uncertainties, including mortality. Wade discussed a 1999 analysis of "false positives" in classifying a stock as strategic due to mortality exceeding PBR when that is not actually true, and he described a power analysis for the SEAK harbor porpoise stock that showed the probability of misclassifying a stock as strategic versus the survey interval. That analysis assumed the true rate of bycatch is 1%. Wade recently ran a simple comparison that assumed the true rate of bycatch is at a lower, negligible, level and found false positives are very rare. He characterized this as reassuring, in that a false positive is more likely when levels of mortality are non-negligible (but not enough to make the stock depleted).

Regehr stated that for some species, the underlying model is mis-specified (non-linear density dependence), and some species have differences in the reproductive value in different classes of animals. In developing harvest risk assessments, modelers ask managers what their risk tolerance is with respect to meeting their objectives, and it is not a scientific decision. Wade responded that managers were involved in defining the risk tolerance for the quantitative definition of PBR, and the GAMMS provide for more risk tolerance (through increasing the recovery factor), particularly for stocks subject to subsistence hunting. Additionally, the GAMMS discuss changing the recovery factor if, for example, bycatch is highly skewed to pregnant females. O'Corry-Crowe asked whether risk tolerance could be quantified for combining DIPs under the new stock policy, to take into account the risk to the smallest possible DIP that is being combined, to assure people that combining the DIPs is not increasing the risk to smaller DIPs. Wade replied that you could use simulations to adjust the risk tolerance to make it safer when pooling across DIPs, but the results would depend on how the underlying scenario is built. He noted an example of combining the individual DIPs of bottlenose dolphins in the Gulf of Mexico, where there is currently no Take Reduction team despite a lot of bycatch, so there is no ability to reduce the bycatch. If the DIPs are combined such that managers can make efforts to reduce bycatch across the entire span of DIPs, this would be an improvement and actually reduces risk to the DIPs by combining them. O'Corry-Crowe noted that this is a well-intentioned argument, but it is unclear how universally applicable it is. Wade acknowledged that combining DIPs could potentially be a slippery slope and welcomed any advice on how the SRGs could contribute to oversight and review of such decisions.

Doniol-Valcroze asked whether there was a rule of thumb regarding selection of a recovery factor based on the CV of the mortality estimate. He also noted that in the SARs, he had not seen discussions of the recovery factor being linked to uncertainty around the mortality estimate. Wade replied that the default recovery factor is 0.5 for stocks of unknown status, but if the CV of the mortality estimate is very large, the recovery factor should be reduced. He stated that this guidance might be underutilized in the SARs. He pointed to the first PBR workshop report (Barlow et al.

1995), in which there was an alternate proposal to use the CVs of the abundance and mortality estimates and run the model to obtain stock-specific percentiles for the minimum abundance estimate ( $N_{MIN}$ ). Workshop participants ultimately decided that it would be simpler to have a standard for  $N_{MIN}$ , rather than stock-specific percentiles. Doniol-Valcroze stated that it is not necessary to “tune”  $N_{MIN}$  but, rather, just consider using a different recovery factor for stocks with an imprecise estimate of bycatch.

Kanayurak asked whether the GAMMS include guidance on a level of uncertainty or imprecision where it is counter-productive to even provide the number in the SAR. Bettridge stated that, in some cases, NMFS retains old bycatch estimates in a SAR because they remain the best available data but makes sure to note the age of the data. Wade also noted that some stocks have an unknown or undetermined PBR because the data are unavailable or insufficient. Angliss added that some SARs provide multiple estimates and note the problems with or caveats for using the estimates.

#### Summary of $N_{MIN}$ and $R_{MAX}$ values in the SARs and reasons for deviations from default values

Young distributed a table summarizing information from the Alaska SARs about each stock’s abundance estimate,  $N_{MIN}$  estimate, and maximum net productivity rate ( $R_{MAX}$ ) value, and how these do or do not diverge from the “defaults” outlined in the GAMMS. She first discussed the  $N_{MIN}$  estimates and listed some of the variables that must be considered in determining whether the “default” is used, including the methods for collecting, analyzing, and presenting the abundance data, which can vary by stock; whether a transboundary stock is defined (or assessed) based on its entire range or just in Alaska; whether surveys cover the stock’s whole range or, if just portions of the range, how big the portions are relative to the whole stock size, which affects whether and to what extent the estimate likely reflects total population size or is an underestimate; whether abundance estimates have been corrected for certain biases, which affects the interpretation of whether the estimates represent stock abundance or are best characterized as minimum estimates; and how old the data are and whether they can still be considered reliable. She then described different ways in which SARs estimate  $N_{MIN}$ . Regarding  $R_{MAX}$ , she noted that 40 of 45 stocks used the default  $R_{MAX}$  values and described the rationale for using other values for the remaining five stocks. Kate Stafford had a question regarding the use of the default  $R_{MAX}$ , instead of zero, for AT1 Transient killer whales, because there has been no recruitment to the population in decades. Young pointed out that the stock’s PBR (0.01, which is effectively zero) is unlikely to change much given the small size of the population. Doniol-Valcroze followed that with some minor editorial critiques and a question regarding averaging  $N_{MIN}$  if you have a great time series. Angliss answered that it is a case by case basis depending on the available data. Regehr expressed a concern regarding  $R_{MAX}$  for stocks facing density-dependent limitations. The AK SRG expressed appreciation for the table and expected to use the information when reviewing individual SARs and making recommendations for increased consistency across SARs.

#### **Alaska SAR reviews**

Muto requested the AK SRG’s feedback on the summary table in SAR Appendix 2, which shows substantive changes in the SARs, and highlighted the effort to include more information in the SAR preface.

#### Bearded seal, Alaska

Lorrie Rea expressed appreciation for the changes made to the SARs based on last year’s AK SRG comments, particularly the addition of subsistence harvest data from Nelson et al. (2019) and the consistency in the discussions of threats in the ice seal SARs. Specific to the bearded seal SAR, she noted the population estimate was for only part of the stock, but the SAR described limitations of the data and why there was limited application. Citta asked about harvest data from Barrow (Utqiagvik) and plans for updating harvest estimates in the SAR. Boveng noted that MML does not

have access to the raw data but could request the data from the Ice Seal Committee and look at other ways to analyze data and incorporate new data.

The AK SRG discussed ways to maintain and improve upon the harvest data estimates, including potentially quantifying CVs or errors. However, Boveng emphasized that it may not be useful to focus on uncertainty in the mortality estimate when the abundance estimate (and therefore PBR) is for just a fraction of the stock. Miller expressed concern that information in the Native harvest paragraph needs context and suggested repeating some of the information from the  $N_{MIN}$  section. Rea agreed that such redundancy would be helpful, and Peterson suggested adding just one sentence at the end of the Native Subsistence Harvest Information section to provide context.

Regehr noted that  $N_{MIN}$  is calculated from the abundance estimate that is itself a subsample, despite the caveats to the abundance estimate. He asked Boveng whether the abundance estimate is so biased that it would be justified to set  $N_{MIN}$  equal to the abundance estimate. Boveng replied that the cases where  $N_{MIN}$  is set to equal the abundance estimate are for counts, where the researchers know they counted at least that many animals, which is a different scenario from an abundance estimate derived from a transect survey and corrected for availability during haul out. He did not think it would be supported to use the best estimate for a portion of the range as  $N_{MIN}$ . Regehr stated he thought it might depend on how much of the range was surveyed.

O’Corry-Crowe suggested that text be added to specify that the population’s range and the survey area are not comparable. Boveng further noted that surveys are conducted in the breeding area and harvest occurs in an area where different stocks are mixed, so the harvest data should not be partitioned out from the survey area. Doniol-Valcroze suggested that new text should reflect that PBR issues are with the survey area and not with the accuracy of the estimate. Peterson recommended that Doniol-Valcroze send specific text to Muto indicating how the SRG would like this framed in the SAR. Boveng noted that some of the revised text in the ringed seal SAR regarding this issue could be helpful in the bearded seal SAR. He also suggested that the next co-management meeting would be an opportune time to talk with the Ice Seal Committee to request harvest data and let them know the data were well-received by the AK SRG and improved the SARs.

#### Spotted seal, Alaska

Rea summarized the spotted seal SAR and suggested a sentence be added to the Habitat Concerns section regarding harmful algal blooms as a potential concern given future climate change. Regehr echoed others’ positive comments about including harvest data from Nelson et al. (2019) and suggested that legacy text explaining why good harvest data are not available could be removed from the SAR. He also noted that for ice-associated seals, ice loss is a primary conservation concern and suggested the Habitat Concerns section be expanded to describe which life-history characteristics are dependent on ice and how these are disrupted/affected by climate change. Boveng requested guidance on how much information to add to the SAR about climate change, given that there are existing risk assessments for ice seals that exceed 200 pages. Peterson noted that the AK SRG has considered this issue in the past but also needs to be careful not to overload the SARs. She suggested a potential restructure, with a climate change section for ice-associated species or those deemed vulnerable to ice loss, and noted this could be a potential topic for a formal SRG recommendation.

#### Ribbon seal, Alaska

Regehr thought the SAR was well done. He suggested clarifying what “using a very limited subsample of the data” means in reference to the abundance survey. Citta asked whether ribbon seals are harvested in Russia, and Boveng replied that he does not think there is a subsistence harvest of seals there. Stafford asked whether Mike Cameron’s analysis of changes in ribbon seal

distribution would be reflected in the next SAR revision. Cameron replied that it could be included, although it might be too detailed for the SAR. Stafford supported including this information in the SAR, especially if the shift in distribution persists.

#### Ringed seal, Alaska

Rea said the SAR is well written. She noted that the abundance is estimated for only part of the stock, and is not corrected for seals in the water, and the SAR includes a thorough discussion about how  $N_{MIN}$  is extremely negatively biased. In fact,  $N_{MIN}$  is considered such an underestimate that the PBR is referred to as a “putative PBR” and, although removals exceed the putative PBR, this should not be considered an indication of risk to the stock.

Rea asked about the increase in ringed seal mortality in 2017-2018 in the Bering Sea/Aleutian Islands flatfish trawl fishery. Boveng noted that many young ringed seals came ashore in the Aleutian Islands in spring 2018, which may have influenced the encounter rate. He thought it might be worth mentioning this in the SAR and citing a NMFS report on stranded ringed seals in the Aleutian Islands. Rea thought this may not be necessary this year, but it would be helpful to include if it becomes a pattern.

Doniol-Valcroze asked how a CV for the mortality estimate was derived for a fishery with 100% observer coverage. Angliss volunteered to look into this. Doniol-Valcroze then discussed his comments on the SAR. He noted there was no change in the science in this document compared to the previous SAR, but there was mainly a change in the stock name (i.e., Arctic versus Alaska stock), which he thought was fine. He thought Regehr’s comment on the ribbon seal SAR was also applicable, in that it would be helpful to get a sense of how big the surveyed area is relative to the stock’s range. He expressed discomfort with some of the new text in the SAR, as it raises a consistency issue. For example, the PBR is unchanged from the previous SAR, so it appears the only reason for the new qualifying text is that mortality now exceeds PBR. He also considered the use of the word “extreme” to describe the negative bias of the  $N_{MIN}$  estimate to be a bit extreme because, for example, the bias of not correcting for seals in the water is similar to not correcting for submerged whales, which is mentioned in other SARs but without the “extreme” language. He also disagreed with the term “putative PBR,” suggesting that the SAR should instead describe the caveats to the data inputs and decide to either use or not use the PBR. He suggested this might be a case where you do not report an  $N_{MIN}$ . Alternatively, he suggested that the SAR state that the PBR represents a certain part of the range and that it cannot and should not be compared to the mortality estimate. He thought this was a better justification, given that the same number was considered appropriate in the past. Kurland said he advocated for a qualification on PBR (i.e., the “putative PBR” terminology) given the situation, because exceeding PBR has regulatory implications and, given the underestimation of abundance here, NMFS does not want to create the illusion of a problem where there is not one. He suggested the AK SRG could recommend a way to be more consistent across SARs when there is not confidence in PBR.

Rea asked whether harvest data could be reported only from the area surveyed. Boveng stated that surveys are conducted in the breeding area, while harvest occurs in coastal communities throughout Alaska. Because of seasonal dynamics in the seals’ distribution, he did not see a way to parse the harvest data to include just the surveyed area.

Bettridge noted there are pitfalls with Alaska SARs stating there is no  $N_{MIN}$  because only a portion of the range has been surveyed, because that estimate is technically a minimum. The statute says a PBR should be calculated but does not say it cannot be caveated. Angliss stated that MML has started excluding the heavily caveated numbers from the SARs summary table so they will not be used out of context.

In closing, Boveng acknowledged the challenges with naming and describing the ice seal stocks accurately because they have been defined as Alaska stocks consisting of individuals within U.S. waters, rather than defined as the whole biological stock with an assessment for abundance and mortality in U.S. waters. This was addressed in the draft ringed seal SAR (proposed to be renamed as the Arctic stock) but also needs to be addressed in the other ice seal SARs, to make them more compliant with the GAMMS. Bettridge said she would get back to Boveng about whether a stock can simply be renamed, or whether this is a redefinition of the stock.

At the end of this discussion, Peterson adjourned the meeting for the day.

### **Research updates, continued**

Peterson welcomed the group back for Day 2. Muto noted that some new documents, including follow-ups from the Day 1 presentations, are posted on the AK SRG VLab website. Peterson asked AK SRG members to send minor text edits on the SARs directly to Muto.

#### SEAK harbor porpoise abundance survey

Alex Zerbini presented a preliminary estimate of harbor porpoise abundance from a 2019 vessel-based survey in the inland waters of SEAK as well as efforts to evaluate harbor porpoise stock structure through collection and analysis of environmental DNA (eDNA) in water samples. Zerbini highlighted that the most recent stock-wide and inland waters abundance estimates for this stock are outdated and new estimates are needed. He shared the preliminary estimate from the 2019 survey with the AK SRG and described future work and data analyses.

Kurland asked about the timeline of the eDNA analysis and the steps beyond that project. Zerbini referred the question to Kim Parsons, who responded with their timeline of events as well as their plans for hosting a postdoc to process the eDNA samples. She went into further detail regarding additional future plans for the harbor porpoise eDNA samples as well as plans to analyze eDNA samples from killer whale fluke prints and then apply that technique to harbor porpoise. Angliss asked for clarification regarding the content of the summary that will be available later this year, and Parsons replied that they will have a good idea of harbor porpoise stock structure based on their analysis of eDNA and tissue from stranded and bycaught animals.

O’Corry-Crowe asked what is driving density and influencing where harbor porpoise are found and Zerbini replied they do not know for sure at this stage in the analysis. Doniol-Valcroze and Miller followed up with questions regarding survey design and survey area, which Zerbini answered. Citta expressed his concern about bycatch exceeding PBR and asked how this might play out; Angliss responded that a SEAK observer program is in development. Peterson closed the discussion with remarks indicating that this information will be included in the 2021 SAR and will be discussed next year.

#### State-managed fishery-marine mammal interaction data

Angliss began this topic with the AK SRG’s comment from last year regarding bycatch data for state-managed fisheries and highlighted points that were covered in NMFS’ written response. She stated that observer coverage is limited to a certain number of fisheries, and state-wide opportunistic entanglement reports are focused around populated areas. However, the Alaska Department of Fish and Game (ADF&G) maintains a database of reports of Steller sea lions hooked or entangled in troll gear (flashers), which they have shared with the AFSC. Angliss stated that AFSC and AKR have a good sense of all the available data, and Suzie Teerlink confirmed that AFSC is using every available resource. Teerlink mentioned that AKR and AFSC work on partnering with other sources of data, including fishermen and independent projects, by sending out informational flyers. However, for

some non-attended fisheries, such as crab fisheries, even the fishermen might not have a good idea of entanglements. Peterson asked how the data are received from ADF&G, and Teerlink replied that ADF&G is a partner and reports to AKR. The only information that might be missed are anecdotal reports. Angliss agreed but mentioned that whenever anecdotal information is received, MML staff check the MML database to see if that information has already been reported by another source. Teerlink noted that all of the stranding partners are distributing information on AKR's behalf and that all of the available data from those sources goes to AKR. Teerlink said she is trying to reach out to fishing association directors and other groups as well, but information from those sources is anecdotal and not coalesced.

Angliss then followed up Doniol-Valcroze's question from Day 1 regarding ringed seal entanglement data and what is meant by 100% observer coverage. In this particular case, the reported 100% observer coverage was rounded up from 99.7% coverage. Although observers are on board 100% of the vessels, sometimes not all of the catch is monitored.

#### Eastern North Pacific right whale research

Jessica Crance presented information about current research on North Pacific right whales. Research includes long-term and short-term passive acoustic monitoring throughout North Pacific right whale habitat in the Bering Sea and northern Gulf of Alaska to detect whales and hopefully assess relative abundance and population trends over time. Other research includes using historical baleen samples to determine if the isotopic composition of baleen tissue can indicate where the whales were travelling. Crance wrapped up the presentation by describing future projects in connection with PacMAPPS and ArMAPPS and efforts to increase outreach to Native Alaskan communities, whale watching tour operators, and organizations/operations along the West Coast to spread awareness of the importance of documenting sightings of North Pacific right whales. In response to questions from AK SRG members Stafford and O'Corry-Crowe, as well as participants Angliss and Teerlink, Crance clarified aspects of the survey design.

#### Cook Inlet beluga whale research

Wade described the Cook Inlet beluga whale research program, including field projects by MML and collaborators, as well as the most recent abundance estimate. Wade indicated the various changes they have made in the data analysis and modelling approaches for the abundance estimates, as well as improvements to group-size estimation. Wade then described a recent project to estimate calf production using unmanned aircraft systems (UAS) and photogrammetry and followed with an overview of various ongoing projects—including acoustic studies; biopsy surveys; and aging, genetic, and pathology work—and how they are all being connected via photo-identification and genetic identification projects. He wrapped up the presentation with an overview of all the different aspects of research being conducted on Cook Inlet beluga whales. Wade indicated that future work will include continued ongoing projects as well as new projects focused on prey eDNA, spatial distribution mapping, and machine learning/artificial intelligence for photo identification. He then outlined the various threats to the species and the work that is ongoing to address those threats. O'Corry-Crowe and Wade discussed the accuracy of the abundance trend and the effect one year can have on the analysis, especially given the changes that have been made to make the estimator more robust. Wade acknowledged issues with the survey design but said they are confident in their data and analysis. Stafford then asked about using UAS to assess body condition to compare with the Bristol Bay stock, and Wade indicated their interest in this approach.

#### **SAR reviews, continued**

##### Steller sea lion, Western U.S.

Rea stated that the SAR is well written in terms of the mixing between the endangered western stock and the non-listed eastern stock and it includes a great discussion of how populations are

represented in the U.S. portion of the western stock as well as good coverage of what is going on in Russia. She noted that information on vital rates is still lacking for many portions of the population, so there are no demographic multipliers used. She suggested that information about environmental contaminants, a habitat concern for some portions of the eastern stock, could be included in this SAR. She agreed to write a sentence or two on this topic for the SRG to review.

O’Corry-Crowe agreed that the SAR is well written and detailed. He asked about the value of Table 1; Katie Sweeney replied that the trend data in the table begin in 2002, when the population started to recover. O’Corry-Crowe replied that that did not come across in the table and requested the addition of some explanatory text. He noted that all of his other comments on the SAR were minor.

Peterson asked whether the AK SRG anticipates providing a new recommendation about stock delineation in general. Beth Concepcion said there is more work that needs to be done regarding how the populations are separated and intermix.

Doniol-Valcroze commented that using a long time series is an improvement over using just the last count. He asked whether  $N_{MIN}$  is the point estimate of the estimated count or the lower 20th percentile of that interval; Sweeney replied that  $N_{MIN}$  is the point estimate of the predicted count. Doniol-Valcroze acknowledged that counts are a conservative estimate of  $N_{MIN}$  but asked whether it would be more consistent with the way NMFS has approached  $N_{MIN}$  in general to use the lower 20th percentile if there is an estimate with uncertainty. Peterson and Doniol-Valcroze discussed whether, for stocks with direct counts or photo data, there is confidence that the count is a minimum abundance estimate or whether it is necessary to use the lower 20th percentile. Sweeney commented that she thought it would be overly conservative to use the lower 20th percentile. Devin Johnson clarified that the predicted estimate represents the number that would have been seen if researchers had been able to survey every site multiple times (to account for animals moving in and out of the site), and it does not represent an abundance estimate, so using the 20th percentile of that predicted estimate is not appropriate. Peterson suggested that the AK SRG could recommend that the SAR authors add a sentence or two to clarify why this estimator is correct for  $N_{MIN}$ .

Concepcion asked about the second paragraph in the Habitat Concerns section, which discusses a period of stability in the western Aleutian Islands from 2014 to 2016 followed by a decline from 2016 to 2018, which coincided with a fishery closure from 2011-2014. She asked whether there was a citation missing or if it was just an inference based on timing. If it was just an inference, she recommended that the mention of the fishery closure be removed from the SAR. Tom Gelatt said this is not a new sentence; the SRG had previously requested it be moved there from another section of the SAR. He said the period of stability and fishery closure did occur at the same time. Peterson suggested some restructuring of the text including potentially citing prey competition studies. Peterson and/or Concepcion will send recommended edits to Muto.

#### Beluga whale, Beaufort Sea

After Rea summarized key components of the SAR, Regehr raised the topic of transboundary subpopulations, noting that the GAMMS state that population data should be included for the entire biological unit, not just the U.S. portion. The transboundary Beaufort Sea beluga whale SAR comports with the GAMMS, but the ice seal SARs are inconsistent, with stock information restricted to just the U.S. Peterson suggested that this could be a topic for a recommendation from the AK SRG.

#### Beluga whale, Eastern Chukchi Sea

Citta began the discussion by expressing his lack of confidence in how well the abundance of this stock is understood. He stated that the timing of the mark-recapture surveys and the timing of the

aerial surveys for beluga whales in this area do not overlap in a way that would provide an understanding of the dispersal and mixing of Eastern Chukchi Sea and Beaufort Sea beluga whales. This results in an overestimate of the Eastern Chukchi Sea stock, but it is the best available science. O’Corry-Crowe questioned if there is some sort of structure in the population driving the anomalous dispersal behavior. Citta was unsure if it was anomalous and recommended that text be added to the Status of Stock section indicating that mixing of the two different populations could be an issue and that it would not take many whales to result in an inflated abundance estimate. Doniol-Valcroze agreed to a lesser degree and commented that the SAR was a huge improvement and does the best it can with the available information. He agreed that text should be added to indicate mixing may be occurring as well as text regarding uncertainty about stock delineation. Doniol-Valcroze also stated that the estimate could be improved if the entire time series was averaged rather than just using the most recent survey, as Wade showed for Cook Inlet beluga whales. Averaging the recent years’ surveys would provide a more conservative estimate than using the most recent survey estimate, which in this case is one of the highest estimates in the series. Citta expressed some concern with averaging. Peterson suggested submitting the recommended change to Muto and not making it a formal recommendation. Doniol-Valcroze closed the discussion by highlighting the high CV indicating high uncertainty, which addresses some of Citta’s concerns.

#### Beluga whale, Bristol Bay

Regehr opened the discussion by describing the SAR and highlighting the new information added from O’Corry-Crowe’s work on delineation. He was pleased that the new mark-recapture-based estimate was similar to previous count-based estimates. He also recommended revising the  $R_{MAX}$  section to use the default value, given that the confidence interval of the empirical estimate is high and may or may not exceed the default, and Citta agreed. Regehr expressed a concern that the M&SI estimate from U.S. fisheries is reported to be zero but there is also text stating that no reliable information is available, and he recommended clarification. Concepcion expressed her concern about the increase in subsistence takes and asked for clarification on the change. She also suggested that the Stock Definition and Geographic Range and Habitat Concerns sections be simplified to focus on this population and not all beluga whales. Regehr questioned why observer counts during abundance surveys are not corrected for whales missed at the surface and Citta highlighted the challenges with counting animals grouped in large numbers and the challenges with moving to a video detection system. Doniol-Valcroze agreed with the comment regarding the confidence in the abundance estimate based on similar numbers from two different types of surveys as well as with the concern over the  $R_{MAX}$  value.

#### Beluga whale, Eastern Bering Sea

After Rea summarized key components of the SAR, O’Corry-Crowe commented on the improved abundance estimate and requested the literature be cited (i.e., Ferguson et al. instead of NMFS, unpublished data). He noted abundance may be underestimated as well as the CV and questioned if  $N_{MIN}$  is being overestimated. Citta guessed that abundance was not underestimated. He felt that harvests, especially struck and lost animals, are underestimated and that the correction factors for surveys were displeasing. Doniol-Valcroze asked why the correction factor is not the same as for other beluga whale stocks. Citta replied that the Alaska Beluga Whale Committee wants to estimate the correction factor for each stock but this has not been done. Doniol-Valcroze commended the science team’s efforts to get the data and have abundance estimates for all of the beluga whale stocks. Peterson emphasized the achievement and appreciated the new information in the SAR.

After a short break, the discussion continued and Peterson stated that the PBR value is in the SAR for a reason and it has uncertainty, so that should be addressed by an AK SRG recommendation that the federal agencies work on a co-management agreement. Citta stated that co-managers realize that NOAA will not get involved until the stock is depleted, and they realize it will be too late by

then. He said the co-managers are trying to develop a management plan but it is challenging given that many hunters do not think they are harvesting from this stock and, thus, think they are doing no harm. Citta suggested the AK SRG should keep an eye on this issue and recommended that NOAA work with co-managers to support the development of a harvest management plan.

#### Northern fur seal, Eastern Pacific

Regehr summarized many aspects of the SAR, noting the discussion of different trends at different rookeries, the issue of not having a CV for the expansion factor used to estimate total population from pup counts, and various aspects of the abundance estimate, including the low CV for the abundance estimate and his support for using multi-year averages. He noted that the PBR is well in excess of known takes. He commented on pup production stability in the past decade, use of the empirical  $R_{MAX}$  value following reduction to extremely low population density, and subsistence harvest levels. Regehr then brought up various topics about habitat concerns and mentioned that he would like to see more text on climate change impacts in the Habitat Concerns section. O’Corry-Crowe also highlighted the different trends at the different rookeries, wondered if this is a result of movement or internal recruitment, and noted that the population increase on Bogoslof Island seems to be tapering off. Rolf Ream replied that there is a new abundance estimate that will be included in the 2021 SAR and that they are trying to get a better grasp on dispersal between rookeries. Regehr asked about using a deterministic expansion factor, and Ream stated that the current expansion factor is outdated. Rod Towell confirmed it was fitted to a curve without much data on older animals. Regehr asked about pup dynamics, movements, and natality, to which Ream replied that there is an ongoing 10-year vital rates project and natality is high.

#### Beluga whale, Cook Inlet

Doniol-Valcroze stated that new, peer-reviewed methods have produced better precision for estimates of abundance and trends. He considers use of the default 4%  $R_{MAX}$  in the PBR calculation to be justified, despite the population’s lack of recovery. He and Regehr suggested that, given the increasing information available on the population’s demography, there is potential to use an integrated population modeling framework to identify which life-history parameters are limiting recovery. Wade stated that the University of Washington (Andre Punt and Charlotte Boyd) received a grant to do that work, which aligns with MML’s interest.

#### Killer whale, AT1 Transient

Stafford said this SAR does not change much from year to year, so there is not much to comment on, but she said that she does comment each year that the stock’s actual maximum net productivity rate is zero, not the default 4%. Peterson asked why the population was not listed under the ESA. Wade explained that, based on NMFS’ DPS policy, the agency determined the population is discrete but not significant to its taxon. He provided some background on what the DPS policy requires for a population to be considered significant.

#### Killer whale, ENP GOA, AI, BS Transient

Doniol-Valcroze commented that the stock definition discussion in the Stock Definition and Geographic Range section is too long and detailed and could be shortened to focus only on this ecotype, rather than all killer whale ecotypes. The Population Size section includes outdated abundance estimates that are interesting and might inform an understanding of trends, but he did not think that information should be carried over to the  $N_{MIN}$  section. He did think the number of different individuals in a photo catalog was a reasonable estimate for  $N_{MIN}$  but questioned how recently animals in the catalog had been seen and whether the sentence “All the animals have been photographed in the past 10 years” may be outdated, and he asked the SAR author to provide a clarification in the text.

Peterson asked about the plans and timeline for reassessing stock structure, since this stock may include three different communities. Wade said data are available and, now that the MMPA stock policy has been finalized, there is potential to begin a DIP analysis. He discussed some of the data on movements, stable isotopes, and genetics, noting some complications in interpretation of the data, particularly for the eastern Aleutian Islands. Parsons said new data are “in the pipeline” to look at transient killer whale stocks from the Gulf of Alaska and eastern Aleutian Islands south through British Columbia, and this greatly increased sample size might help clarify some of the stock structure questions. There are additional samples from southern California and along the West Coast, which may also help differentiate West Coast Transient killer whales.

Peterson asked for more details about the 2016 ship strike mortality, in which a killer whale was caught in the propeller of a vessel in the Bering Sea/Aleutian Islands flatfish trawl fishery, and asked if there are other accounts of killer whale ship strike events in the region. Concepcion noted the stock identification of the whale in this event is unclear, as the event is also in the West Coast Transient killer whale SAR, and she recalled that a large adult killer whale pushed a juvenile killer whale into the propeller.

Peterson concluded the discussion of this SAR by saying she is looking forward to seeing how the new information will be used in evaluating DIPs; but, for now, the AK SRG’s comments are pretty straightforward.

#### Killer whale, West Coast Transient

Stafford acknowledged that this stock, with its broad range, is difficult to assess and expressed appreciation for the significant revisions to the SAR, including a lot of new data from the inland waters of Canada. She hoped that work by Parsons and others would provide a better understanding of this stock. Concepcion said she found the SAR’s new fisheries information helpful and had no further comments.

Doniol-Valcroze provided clarification about the Towers et al. (2019) paper, of which he is a co-author. He emphasized that the analysis focused on animals seen frequently in recent years in coastal Canadian waters and suggested the SAR clarify that this is not an estimate of abundance for the entire West Coast Transient population. However, he felt that using the Towers et al. (2019) estimate as an  $N_{MIN}$  is reasonable and a very conservative number. He plans to collaborate with John Durban this year to update the abundance estimate using a mark-recapture analysis with all of the newly available information on transient killer whales, which should provide a more robust estimate compared to the previous Bayesian mark-recapture estimate.

Rea and Peterson noted the SAR does not contain a Habitat Concerns section and that information about contaminants for at least the Puget Sound part of the population should be included.

Finally, Doniol-Valcroze said the SAR indicates there is no reliable estimate of trend, but he hopes there will be soon. The Towers et al. (2019) analysis documented a 4.1% increase due to recruitment, which could be due to an increase in available prey resources.

#### Harbor porpoise, Southeast Alaska

Stafford noted that this SAR will likely change quite a bit over the next few years to include the new abundance estimate Zerbini is developing and, potentially, new fishery observer data. Zerbini said he hopes to have final abundance numbers ready for the 2021 SAR. Citta asked for an explanation of why SEAK harbor porpoise did not appear to be a funding priority in Bengtson’s budget presentation. Long clarified that Bengtson’s presentation included only what AFSC funded and that other funds are available within NMFS. Because this is a bycatch issue, it ranks as a high priority for

the Take Reduction program, and the Take Reduction program has invested money over several years to address SEAK harbor porpoise. Stafford suggested it could still be a topic for an AK SRG recommendation.

Regehr and others discussed the importance of understanding stock structure, particularly the dynamics and exchange between inland and coastal waters, given that the recent survey of inland waters resulted in a much smaller (one tenth) abundance estimate compared to the estimate from the range-wide (coastal and inland waters) survey in the 1990s. He suggested that if there is legitimate uncertainty about whether animals in inland waters are part of a larger group, it would be good to clarify this in the SAR. Parsons said work is underway to analyze the genetics of all bycaught and stranded animals in Alaska and along the West Coast using single nucleotide polymorphism data. This should provide a good sense of the scale of the population structure and the factors that may be driving significant population subdivisions. Although the Alaska sample sizes are quite small, and the SEAK sample sizes are even smaller, she expects the results should hint at whether animals from those areas are part of a larger population, based on effective population size indicators. She also said that NMFS is establishing a network of collaborators to fill in some spatial gaps in sampling, but this is opportunistic. She identified the need to dedicate time to getting close enough to harbor porpoise to collect eDNA.

#### Harbor porpoise, Gulf of Alaska

Miller said the stock is data poor and has an old, outdated estimate of abundance. Concepcion noted there were no updates to the SAR besides updated dates. She highlighted that the stock is considered strategic, but this is based on old data and the absence of a PBR, so wondered whether the strategic designation is still applicable. Peterson asked whether any Gulf of Alaska fisheries had been observed more recently. Wade replied that all of the fisheries still exist and effort has not declined but acknowledged that the observer data are old. Doniol-Valcroze pointed out that there have been no recent surveys for harbor porpoise in the Gulf of Alaska but asked whether acoustic data collected during a 2013 beaked whale survey in the Gulf of Alaska could be used for a distance sampling estimate of harbor porpoise. Crance said she was not sure if anything had been done with those harbor porpoise data but said she would check with the contractor who collected the data to see what could be done. Peterson suggested this could be included as an informal or formal recommendation to improve this SAR.

#### Harbor porpoise, Bering Sea

Miller summarized the SAR, describing older abundance estimates that have been corrected for the detection probability on the trackline.  $N_{MIN}$  is based on the corrected estimate from a 2008 ship-based survey of the partial range, because the spatial coverage of the more recent survey (2010) was even more limited due to bad weather. There was a substantial decrease in  $N_{MIN}$  from the previous SAR, dropping from over 40,000 to 4,125.  $N_{MIN}$  is described as an underestimate because it is based on a survey of only small portions of the stock's range. Miller questioned why the number is even reported if it is based on such a small sample. PBR is undetermined but the SAR says M&SI likely exceeds PBR, which he felt was unsupported.

Wade explained that the SRG had recommended the stock be considered strategic because there are many unobserved gillnet fisheries, and the strategic status was a way to signal that this is something that should be considered by NMFS. Peterson suggested the AK SRG recommend that SAR authors add text to clarify why the stock is strategic; however, the AK SRG did not recommend that the stock be changed to non-strategic. Bettridge stated that as Headquarters finds cases where a strategic stock does not actually meet the statutory definition of strategic, they request a change. Peterson thought that was fine but did not want the change to non-strategic to come from the AK SRG.

Miller noted that the “new” abundance estimate from the 2008 survey is considered outdated, so  $N_{MIN}$  is considered unknown. Regehr argued that outdated estimates for the whole range can be more valuable than a more recent estimate from just a small portion of the range. He asked whether it might be informative to show a figure that visually compares the survey area to the stock’s range to put things in perspective. Simmons reported that Boveng had said this type of figure might be possible for some stocks but not for ice seals, given how abundance data are collected. Bettridge said ST is currently working with the Science Centers to revisit SAR maps, and this might be something that could be addressed through that effort.

Stafford stated that Miller covered her concerns, and she hoped that the PacMAPPS and ArMAPPS surveys might produce data to update the abundance estimate.

#### North Pacific right whale, Eastern North Pacific

Doniol-Valcroze indicated there is some new information in the SAR but no change in overall conclusions. He noted that some new detections have been made but sightings are rare and commented on the skewed sex ratio. He pointed out the new sentence about PBR being too high. While he acknowledged the author’s intent, he did not think the new sentence should be included, given the data and information already provided. Peterson commented on the improved wording in the Stock Definition and Geographic Range section but also noted that some of the Population Size text could be improved. She commended the author for the Habitat Concerns section and looks forward to the forthcoming research with acoustic overlap, which will hopefully have better resolution. Doniol-Valcroze agreed with Peterson’s comment regarding the improved text but expressed his concern that there is still a lot of information in the SAR for a population without much available data. Peterson wondered whether there have been lessons learned from other species with similar skewed sex ratios, and AK SRG members replied with examples including Hawaiian monk seals and northern elephant seals. Crance stated that Aimee Lang is conducting an ongoing analysis (which, thus, is not in the SAR) that shows the species’ sex ratio is even more skewed than previously thought and noted that a previously undocumented haplotype from a female mother that is currently being analyzed was potentially detected in a biopsied male. Simmons indicated that a map of sightings might be helpful instead of a long description; Peterson noted that the AK SRG has suggested this in previous reviews.

#### Sperm whale, North Pacific

Peterson noted that there is not a lot of new information in this SAR. She commented on the interactions, takes, and decrease in observer coverage in the longline fisheries, which made the already high CVs even higher. She also noted the change in the Gulf of Alaska sablefish longline fishery’s classification in the LOF from Category III to Category II, based on the M&SI of sperm whales. Concepcion commented on the increase in transitions from longline to pot fishing and the resulting decrease in marine mammal interactions. Peterson commented that some fishermen have switched to pot fishing and catch per unit effort is okay; however, the sablefish population had good recruitment and should increase, so it will be interesting to see if there will be increased marine mammal interactions, especially given that longline fishing is still common in the Gulf of Alaska. Long commented that usually the fishery category is not mentioned in the SAR but Peterson thought it would be simple to include. Bettridge noted that it would be hard to keep this information updated in the SARs, because the LOF changes every year, so it would be better for the SARs to link to the LOF.

#### Humpback whale, Western North Pacific

Peterson said the humpback whale stock structure is currently under revision and, because the SAR is expected to change dramatically in the next couple of years, it is likely not helpful to provide

detailed comments now. She asked for clarification on whether international fisheries are included when discussing total mortality estimates, noting that the SAR has some information about takes in Japanese fisheries that are not included in the M&SI estimate. Wade explained that the GAMMS have different guidance for migratory and non-migratory stocks. For migratory stocks, the guidance is to prorate based on the proportion of time spent in U.S. waters. Therefore, the PBR for comparison to just U.S. fisheries takes should be a portion of the total PBR; while, if you have information from throughout the stock's range, you should include all takes and compare to the total PBR. Angliss proposed this issue not be addressed until after the SAR is revised following the humpback stock redelineation. Peterson suggested that the AK SRG keep tabs on how this is reflected in the SAR in the future. She stated that while there is limited data on bycatch in foreign fleets, available information should be included and counted against PBR.

#### Humpback whale, Central North Pacific

O'Corry Crowe asked about the timeline for review of humpback whale stock structure, and Bettridge replied that NMFS aims to have new SARs for the 2021 cycle, although that could change. Concepcion asked for more information about an observed interaction in 2018 in the Bering Sea/Aleutian Islands pollock trawl fishery, and Angliss directed her to the 2014-2018 injury determination spreadsheet, which will eventually be published as a NMFS Tech. Memo.

Doniol-Valcroze mentioned that Fisheries and Oceans Canada (DFO) produced a humpback whale abundance estimate of 12,000 in British Columbia, based on a 2018 summer survey that covered inshore and offshore waters for the first time. He expects the information to be published and posted on the DFO website later this year and available to be included in the next SAR revision. He volunteered to recalculate abundance estimates with different strata, if needed, to match the new MMPA stock units. Peterson asked whether he was seeing an increase in humpback whale entanglements and Doniol-Valcroze confirmed an uptick in both ship strikes and entanglements but said that made sense given that more whales are spending more time in British Columbia waters and more individuals are staying through winter.

Wade noted that Jay Barlow initiated a proposal to hold a workshop to use existing photo-identification collectors to do a "SPLASH 2" to estimate abundance for North Pacific humpback whales, especially given that the HappyWhale.com algorithm has gotten much better and the automated match rate is high. He is unsure if funding for this project was received. Doniol-Valcroze said DFO does not centralize their humpback whale photo-identification data now that the species has been downlisted in Canada; but he is happy to contribute DFO's catalog, which is updated through 2012.

#### Fin whale, Northeast Pacific

Peterson highlighted the improvement in clarifying that the abundance estimate is based on a portion of the stock. She noted that the species does not often interact with fishing gear, and pointed out one noteworthy ship strike in 2018. She inquired about the recent abundance surveys from British Columbia, and Doniol-Valcroze confirmed that abundance data were collected for fin whales during the humpback whale survey. Peterson requested that this information be included in the next SAR revision, acknowledging that, while this information is not for humpback whales in U.S. waters and may not apply to  $N_{MIN}$ , it is the best information available stock wide. Stafford brought up the recent UME, highlighting that the 17 whales impacted are likely an underestimate and, although the stock is not directly impacted by U.S. fisheries, M&SI from the UME does exceed PBR and is worth watching. She commented on the importance of the upcoming surveys on large whales in the U.S. EEZ in the Gulf of Alaska and Bering Sea.

### Bowhead whale, Western Arctic

Citta stated that he had comments on bowhead biology and editorial comments on the SAR but nothing significant. He said there was not a lot to comment on from a management standpoint because there is good information on the stock's abundance and harvest rates. Although data are not as good on entanglement rates, it appears the stock is increasing, or it was until very recently, and there will be an updated abundance estimate soon. The stock is intensively managed by the International Whaling Commission (IWC), and NOAA largely lets IWC determine harvest levels.

O'Corry-Crowe reported no significant comments on the SAR.

Doniol-Valcroze reported a sighting (with video) of a young bowhead whale in British Columbia last year. The sighting has been submitted for publication in *Biodiversity Records*. Citta noted that bowhead whales appeared to have shifted their migratory pattern last fall. He stated that he disagrees with the findings of Chambault et al. (2018), cited in the draft SAR, that bowhead whales avoid sea surface temperatures above 2°C. He said he has seen bowhead whales spending time in summer along the Mackenzie Delta, feeding in waters above 6°C. Craig George found that bowhead whale body temperature remained constant during a hunt, independent of how long the whale was chased, so the whales clearly have the ability to shed heat. Citta's group plans to write a response to Chambault et al. (2018).

### **Other discussion**

Regehr commented that PBR is not intended to be used for subsistence harvest calculations; however, cases where subsistence hunts do approach PBR have raised red flags, which can lead to confusion. He noted that whether the removal level will achieve a target population level depends in part on the risk tolerance. He provided an example of polar bear harvest levels in Canada that have the same objective as PBR (maintain above MNPL) but a higher risk tolerance (80% probability rather than 95% probability of achieving), and the resulting removal level is six times higher than PBR. He stated that the GAMMS allow for increasing the recovery factor to 1.0 for populations that are harvested for subsistence and not known to be declining. He thought it was strange that the GAMMS allow an increased PBR (via the recovery factor) for subsistence harvested stocks when PBR is not used to manage subsistence harvest and because that also increases other sources' ability to take animals from a stock that is already being targeted by subsistence hunters. Wade explained that while the MMPA specifies total human-caused mortality should be compared to PBR, management actions are only spelled out for commercial fisheries; NMFS does not have authority to directly manage subsistence hunts. The specific language in the GAMMS was developed as a way to build in some higher risk tolerance within the mechanism of the GAMMS for stocks that are subject to subsistence hunts. When developing the GAMMS, the modelers were aware that if you can run a stock-specific model, you could get a more precise answer and an allowable take level higher than PBR, but that was not possible for the 300+ stocks of marine mammals under NMFS' jurisdiction. Wade also noted that there tended not to be bycatch issues for marine mammal stocks that are subject to subsistence hunts, and increasing the PBR (via the recovery factor) does not allocate more takes to a fishery because PBR is not used as a quota. Angliss emphasized that PBR is a useful index, but it is not used in harvest management.

Simmons noted that NMFS is making an effort to standardize the SAR summary tables and urged AK SRG members to review the changes to the tables.

### **SRG meeting conclusion**

Bettridge briefly discussed the SRG membership process, which includes assessing the current SRG composition and identifying key expertise gaps and needs. The process typically starts in May and concludes in December. Meeting attendees discussed the location and timing of the next AK SRG

meeting. The AK SRG tentatively agreed to hold next year's meeting in Anchorage during the first week of March. The open session of the meeting was adjourned; the AK SRG met directly after in a closed session to develop their recommendations.