Minutes from the Alaska Scientific Review Group Meeting
NMFS Alaska Fisheries Science Center, Seattle, WA
5-6 March 2024

This report summarizes the 2024 meeting of the Alaska Scientific Review Group (AKSRG), held in Seattle, WA (with virtual access) on 5-6 March 2024. This document is intended to summarize the main points of discussion and does not attempt to record everything that was said during the meeting.

Attendees
The following individuals attended all or part of the meeting, in person and/or virtually.

Alaska SRG members: Maile Branson, John Citta, Beth Concepcion, Thomas Doniol-Valcroze, Michelle Fournet, Donna Hauser, Greg O'Corry-Crowe (Co-Chair), Lori Quakenbush, Eric Regehr, Megan Williams (Co-Chair)

NMFS:

- *Alaska Fisheries Science Center (AFSC)*: Robyn Angliss, John Bengtson, Burlyn Birkemeier, Peter Boveng, Arial Brewer, Brian Brost, Amelia Brower, Mike Cameron, Manuel Castellote, Jayme Charlson, Sarah Chinn, Cynthia Christman, Shawn Dahle, Brian Fadely, Bob Foy, Nancy Friday, Tom Gelatt, Kim Goetz, John Jansen, Elaina Jorgensen, Stacie Koslovsky, Michelle Lander, Jessie Lindsay, Josh London, Katie Luxa, Brett McClintock, Molly McCormley, Maggie Mooney-Seus, John Moran, Erin Moreland, Tony Orr, Rolf Ream, Erin Richmond, Kim Shelden, Jeremy Sterling, Katie Sweeney, Rod Towell, Jay VerHoef, Paul Wade, Janice Waite, Amanda Warlick, Nancy Young, Tonya Zeppelin
- *Alaska Regional Office (AKRO)*: Michelle Dutro, Anne Marie Eich, David Gann, Lydia Kleine, Jenna Malek, Julie Scheurer, Jill Seymour, Suzie Teerlink, Michelle Trifari
- *Northwest Fisheries Science Center (NWFSC)*: Kim Parsons
- *Southwest Fisheries Science Center (SWFSC)*: Jim Carretta, Aimee Lang
- *Office of Science and Technology (OST)*: Zac Schakner
- *Office of Protected Resources (OPR)*: Meghan Gahm, Kristy Long, Jaclyn Taylor

U.S. Fish and Wildlife Service (USFWS): Alice Garrett, Angela Gustavson, Charlie Hamilton, Anita Harrington**,** Ryan Wilson

Marine Mammal Commission (MMC): Vicki Cornish, Dennis Heinemann, Erin LaBrecque, Sue Moore, Lori Schwacke

Other: Jordan Bernard (Alaska Department of Fish and Game, ADFG), Lauren Divine (Aleut Community of St. Paul Island), Kenneth Hagans (Department of Commerce Office of General Counsel, Ethics Law and Programs Office), Lacey Jeroue (Pacific States Marine Fisheries Commission), Janet Neilson (Glacier Bay National Park & Preserve), Lori Polasek (ADFG), DJ Schubert (Animal Welfare Institute)

General Topics

Welcome and introductions

AKSRG Co-Chairs Megan Williams and Greg O'Corry-Crowe welcomed everyone. AKSRG members, including new members Maile Branson and Michelle Fournet, and in-person meeting participants introduced themselves. AFSC Marine Mammal Lab (MML) Director John Bengtson gave a brief welcome and spoke about MML's budget. Nancy Young reviewed meeting protocols and logistics.

Department of Commerce ethics briefing

Kenneth Hagans, an attorney at the Department of Commerce's Ethics Law and Program Office, presented information about requirements for special government employees.

2023 AKSRG Meeting Recommendations

Because NMFS's responses to the AKSRG's 2023 recommendations had not yet been officially cleared by the agency, Young provided a summary. She noted that, once cleared, the responses would be made available online.[1] The AKSRG discussed a subset of these, as summarized below.

- Emerging issues for cetaceans: NMFS agrees that monitoring and understanding cetacean sensitivity and vulnerability to potential climate change impacts is critical and notes that upcoming Pacific and Arctic Climate Vulnerability Assessments (CVA) may help identify which species are more likely to be negatively affected by climate change. O'Corry-Crowe asked if there would be an increased focus on cetaceans and Eric Regehr asked if the CVA rankings would be used for funding decisions on a stock/population basis or species-wide. MML explained that research and funding are prioritized depending on the types of funds received, and most of AFSC's protected species funding is specifically appropriated for research on Alaska seals and sea lions. Jeremy Sterling noted MML has an employee specifically working to identify climate-related needs for marine mammals and is working with climate and ecosystem modelers to integrate existing data.
- Marine mammal bycatch: MML planned to present information on model-based estimators for marine mammal bycatch and incorporation of electronic monitoring (EM) data into the bycatch estimation procedure at this meeting, but the key staff person is on medical leave and was unable to complete this work. MML plans to have new bycatch estimates published and incorporated into the 2025 stock assessment reports, and to present this information at the 2025 AKSRG meeting. Williams noted more vessels will be transitioning to EM in the future. Young reported there are efforts by OST to compile reports about EM nationally and document bycatch estimation methods. Young and Williams discussed that this will be a topic at the 2025 joint SRG meeting.
- Collaboration with Russia on shared populations: MML noted that as feasible and allowed by U.S. government guidelines, NMFS will communicate with Russian and other scientists to acquire any population trend data that become available. O'Corry-Crowe asked if the U.S.-Russia bilateral and the holarctic meetings have been continued, and Bengtson reported they

[1] Posted online post-meeting at https://www.fisheries.noaa.gov/s3/2024-04/NMFS-Responses-to-2023-Alaska-SRG-Recommendations.pdf

have been put on hold. The AKSRG discussed that non-governmental channels may be possible for communication.

- Consultation with Alaska Native co-management groups: Young discussed that MML recognizes the importance of consultation with Alaska Native co-managers. MML and AKRO are reaching out to the co-management groups to discuss their preferences for communication and engagement on draft SARs. This will be a tailored approach as the various co-management groups have varying levels of capacity in their participation in the SAR process and NMFS would like to make this as easy as possible for co-managers to engage.

NMFS Headquarters updates

Zac Schakner began by introducing the new SRG meeting code of conduct, which was distributed to in-person participants and posted on VLab and applies to all meeting participants. He noted that the code in the SRG Terms of Reference will be expanded in the future. He then provided a refresher on the SRG membership review process, summarizing information on SRG member term limits and procedures and listing the current status of each AKSRG member's appointment. He announced that NMFS' MMPA "stock policy" is up for review in November 2024 and there will be opportunities for AKSRG involvement. Finally, he provided information about the 2025 joint SRG meeting, including potential dates, location, focus, agenda ideas, and regional SRG meetings. Schakner requested that the AKSRG identify 3-6 weeks in spring 2025 as their preferred options for the joint meeting.

Humpback whale recovery planning

Meghan Gahm introduced herself and summarized NMFS' ongoing humpback whale recovery planning efforts, focusing on progress since the last AKSRG meeting. She provided background on the 3-part Endangered Species Act (ESA) recovery plan framework, which is a shift away from the traditional static recovery plan and includes a Recovery Status Review (a living document), the recovery plan (final document), and recovery implementation strategy (a living document) to make the process more nimble and able to be updated without a formal process involving public comment and Federal Register notices. She then summarized the ESA listing of humpback whale distinct population segments (DPSs), the post-delisting management plan for DPSs that no longer qualified for ESA listing, and current recovery planning efforts for the three listed DPSs in U.S. waters. She summarized progress to date, the target timeline, and next steps including recovery plan maintenance, along with related efforts such as ESA 5-year reviews. Finally, she described engagement with partners including states and territories and Alaska Native communities and West Coast tribes.

NMFS Alaska Regional Office updates

Suzie Teerlink presented updates from AKRO. She first introduced Anne Marie Eich, the Assistant Regional Administrator for AKRO Protected Resources Division. She then described the MMPA 101(a)(5)(E) permit process, which authorizes the incidental commercial fishing take of marine mammals for species or stocks that are designated as depleted because of their ESA listing. She explained that there are four current 101(a)(5)(E) permits for Alaska species, and proposed 3-year permits were published in the Federal Register on March 5, 2024. Williams asked about the process for determining which fisheries and stocks must have permits, and Teerlink said this is based on an internal analysis. Doniol-Valcroze asked whether PBR comes into play in the analysis; Teerlink said that one requirement for issuing a permit is to make a "negligible impact determination" and NMFS has

quantitative guidance for determining negligible impact that is similar to PBR. Doniol-Valcroze asked whether red flags raised under PBR would also be raised under the negligible impact threshold. Teerlink said yes in general because the negligible impact threshold uses similar parameters. Teerlink also briefly highlighted that AKRO is supporting killer whale research. Finally, she listed other work by AKRO, including ESA 5-year reviews for North Pacific right whale and ringed seals, revision of North Pacific right whale critical habitat, and an update to the northern fur seal conservation plan.

NMFS Marine Mammal Lab research updates

Alaska harbor seal abundance and trend

Peter Boveng presented on AK harbor seal abundance and trend work. He showed a map of the currently designated 12 stocks, noting that NMFS is evaluating whether seals at Iliamna Lake are a demographically independent unit, but that assessment likely will not be completed before the 2025 SAR revision. He said the 2025 SAR is anticipated to include new assessments based on updated survey counts from 2016-2022, revisions to abundance and trends analytical methods, and a more complete description of analytical methods, and would be accompanied by a methods publication and peer-reviewed source publication for abundance and trends. He shared a draft table of counts of seals hauled out on shore.

He described revisions to the abundance and trends analysis. First, the haul-out data groups were changed (reduced from 6 groups to 3; glacial sites are still analyzed separately), to get better consistency within groups given haul-out habitat and typical tidal regimes. The model structure was also revised to more naturally integrate haul-out and count data. Boveng presented draft graphs for abundance by stock and noted that the changes they made in the methods mostly re-create trends reported previously, with a few exceptions. He pointed out that there is a time-series estimate for the first time for the Pribilof Islands, which was made possible from a collaboration with the Aleut Community of St. Paul by surveying with small drones. He also noted that the graph for the Aleutian Islands shows a biologically unrealistic increase between 2018 and 2019, likely because they have not yet accounted for the detection rate of seals during visual surveys; they have experimental photographic survey data which they will use to look into this. He also reported that there is an apparent declining trend for Southeast Alaska and Prince William Sound stocks since 2011. Boveng pointed out that lower survey effort for most stocks over the past decade has reduced precision; current CVs are fairly low (<0.25), but increase quickly without new surveys.

Doniol-Valcroze asked about telemetry and data for correction factors. He asked whether Boveng noticed any change in haul-out behavior over time and noted that seals in British Columbia are spending more time hauled out, which complicates comparisons of old to new data. He said this is potentially due to the presence of Bigg's killer whales, which would have an impact on direct mortality and behavior. Boveng said they do not have the scope for detecting trends in their haul-out database because they are so sparsely spread in space and time; the data are pooled over broad areas and fairly long intervals of time to form priors for the counts. He said it would be good to have a sense of whether time spent hauling out is changing, especially given environmental perturbations, but MML does not have the data and he does not foresee getting that data in the near future.

Hauser asked for an update on Iliamna harbor seals. Boveng said O'Corry-Crowe is leading development of a draft manuscript on genetics. He noted the Iliamna stock evaluation is embedded in the context of harbor seal co-management, which has been in flux due to dissolution of the Alaska Native Harbor Seal Commission, though it is now potentially in reconstitution. He said a potential stock revision needs to have a clear conversation with co-management partners. MML is continuing to monitor seals in the lake fairly thoroughly and has not seen changes there.

Regehr asked if there was a hypothesis about what is driving the decline in Southeast Alaska (SEAK). Boveng said they have not had much time to explore that. He is not aware of changes in mortality and serious injury (MSI) sources, though there is not good information on that. He noted the analyses are in draft form, and though he thinks the declines are real, they may not be quite as steep as they are in the current version.

SEAK drift gillnet observer program update

Lacey Jeroue (Pacific States Marine Fisheries Commission) introduced herself as the project manager for NMFS' Alaska Marine Mammal Observer Program (AMMOP). She explained that the primary goal of AMMOP is to obtain bycatch data to construct statically reliable estimates of marine mammal MSI, with a focus on harbor porpoise. She presented a map showing the extent of the SEAK salmon drift gillnet fishery, with five state-managed districts as well as terminal harvest areas adjacent to hatcheries. Four ADFG districts and approximately six terminal harvest areas may be subject to monitoring in the coming years because they are within the ranges of the two inland water harbor porpoise stocks. She showed a map of SEAK gillnet fishery effort, most of which occurs out of Juneau, but noted that there has been a large decrease in gillnet fishery participation over the last 10 years.

Jeroue described her use of the R package ObsCovgTool (developed by Jim Carretta and Alex Curtis at SWFSC) to determine observer coverage levels for estimating rare bycatch. She noted that to ensure 95% probability of witnessing a MSI harbor porpoise bycatch event, the tool suggests 11% coverage in northern inland waters stock region and 31% coverage in southern inland waters stock region; from there, suggested rates get higher with additional objectives. She said these levels are quite high compared to the 2012-2013 program and would have a much higher cost. She noted that incorporating electronic monitoring (EM) might lower costs; her initial conversations with gillnetters is positive for EM. AMMOP partnered with Archipelago Marine Resources and a gillnetter in the 2023 salmon season and a vessel install proof of concept was verified, but unfortunately no imagery was collected. In 2024, the objective is to determine if EM is viable for the fishery and AMMOP's needs.

Williams said it sounds like a fundamental shift in focusing on EM, and asked whether AMMOP is budgeting for imagery processing time and staffing. Jeroue said she expects the program will use 2024 to test the technology with about four months of field trials (June-September/October) and then launch the observer monitoring program in 2025, with both observers and EM.

Fournet asked whether there is a long-term plan for data management and storage, and the feasibility of artificial intelligence (AI) for data analysis. Jeroue said technical staff will advise, but understands that Pacific States Marine Fisheries Commission does a lot of the data storage for the current EM program, so AMMOP would try to leverage their expertise. She said that AI is something she will be

looking into in the future, depending on the outcomes of the EM trials. She noted that researchers in Denmark are working on a machine-learning algorithm to identify harbor porpoise in their gillnet fishery and they are willing to collaborate, but for now, her focus is on viability of the EM itself. Jeroue also noted that Archipelago Marine Resources is working on a "big thing identifier," which would at least point an imagery reviewer to a unit in time in the footage to review species ID, if a species identifier is not available.

Southeast Alaska harbor porpoise pinger research update

Kim Goetz presented information on NMFS' pinger study. She noted that pingers have been shown to be effective elsewhere, but the present study is evaluating effectiveness specifically in SEAK. The study, conducted at Auke Recreation Area with a control site at nearby Lena Cove, tested a porpoise/ dolphin pinger and a whale pinger, both of which can be heard by harbor porpoise. The study involved acoustic recordings along with intense visual observations and was conducted in two phases: monitoring (no pinger) to understand harbor porpoise density in the area, and the experiment (with pingers). Goetz presented sighting rates for both phases, including very different behavior (mating and foraging) that was observed during the experimental phase, which may suggest that porpoise do not pay attention to the pingers when they are involved in the other behaviors. She outlined next steps including finishing analyzing the acoustic data, collecting another year of data in 2024, and hopefully testing pingers on nets by working with AMMOP.

Citta asked for clarification on the sighting rate slides. Goetz clarified that the graphs were only for the experimental site (Auke Bay Recreation Area), and that they show sightings per unit effort. Citta asked how pinger use is reflected on the graph; Goetz replied that the pinger data have not been analyzed yet, but the pingers are cycling on and off throughout the time period on the graphs.

Doniol-Valcroze noted the variability and asked whether it will be difficult to tease apart the effect of the pingers. Goetz replied the acoustic data are still undergoing analysis and that is something they will be looking into. Doniol-Valcroze also asked about the impact of weather, given how that affects sightings. Goetz replied they did not collect visual sighting data if there were whitecaps, but the acoustic array was active during the whole experiment.

O'Corry-Crowe asked about the acoustic recorders. Goetz said they are F-pods, as well as a high-frequency soundtrap to understand the start and end of the pinger cycle. They discussed that echolocation is being recorded, which means an animal will still be detected even if it stops vocalizing.

Fournet asked how far the pinger sound is traveling, because there might be a spatial mismatch between what you are observing and what the porpoise are actually experiencing. Goetz said the acoustician (Manolo Castellote, who was not able to be present during the presentation) modeled this and would know more, but the F-pods (click detectors) were spaced 150 m apart with the farthest one 300 m from the pinger, so they should be able to detect a difference across the different locations in the study area. She said they will be looking at this in their analysis.

Alaska Department of Fish and Game (ADFG) harbor porpoise research plans

Jordy Bernard, a biometrician at ADFG, presented ADFG's perspective on recent changes to SEAK harbor porpoise assessments and some information about upcoming surveys. He discussed ADFG's concerns with the data underlying NMFS' recent split of SEAK harbor porpoise into three stocks and his agency's belief that additional information is needed to establish demographic independence. In particular, he said more information is needed about whether animals move between high-density areas, and transit rates and movements through the areas used to delimit the two inland water stocks. Bernard then stated that perceived genetic differences between the harbor porpoise stocks may be a sampling artifact, and described specific concerns. Regarding abundance, he noted that more stock-level estimates would be helpful, particularly for the southern stock that may be affected by management. Bernard outlined next steps including ADFG submitting a formal request to NMFS for an independent review of analyses used to split the stock, which he expects will resolve differences of opinion with a focus on biological data. He then provided an overview of ADFG's planned surveys: aerial surveys in 2024 and 2025 using a combination of human observation and video imaging (with multispectral infrared imagery), and vessel surveys in 2024 (northern waters) and 2025 (southern waters) using a small vessel that will also allow them to collect eDNA and access shallower waters. ADFG expects this will allow them to produce three estimates (two from the aerial surveys and one from the vessel-based survey).

Regehr asked whether there is agency-level guidance on quantitative thresholds for considering genetic differences to be important in terms of management. Bernard said there is not a threshold Fst, it is more a case-by-case basis. O'Corry-Crowe said there have been attempts over the years to find such a level of differentiation and NMFS has put out a series of papers in relation to that, like defining subspecies, but in general you have to be careful because you are reconstructing a demographic history.

Citta noted that NMFS and the AKSRG have discussed SEAK harbor porpoise and their status for many years, and he supports additional research. He asked if ADFG thought about investigating offshore harbor porpoise and whether there is movement between inshore and offshore. Bernard replied that ADFG is focused on the inland waters stocks, especially the southern one since it could affect management of the SEAK gillnet fisheries, but from an ecological standpoint, it would be good to learn about the offshore harbor porpoise stock. He said it would be interesting to look at offshore waters if funds were available for a survey, but it would be complicated because of the big geographic scope.

Citta asked about previous work with infrared cameras in small cetaceans and whether you can see harbor porpoise in infrared imagery. Bernard said USFWS used the same plane and contractor for a sea otter survey in inland waters, and while infrared has some complications, USFWS saw ~100 harbor porpoise during their survey, suggesting the detectability with infrared is good. Teerlink asked if Dall's and harbor porpoise could be distinguished with infrared; Bernard replied that ADFG is hoping to record video during the flight, so if there are issues raised with species ID, they could build that into the abundance estimate.

Fournet noted the impact of survey platform noise on harbor porpoise behavior and surfacing intervals, which in turn affects detection probability, which might make comparing estimates between years (and

platforms) complicated. She asked if there is a correction to the detection factor based on how loud the platform and environment are. Bernard said each year will have an aerial and boat-based survey, which could allow a comparison of the two different platforms and provide a recommendation on the most effective survey method. He noted that there is a concern about vessel survey noise scaring animals away from the boat and underestimating the population size.

Doniol-Valcroze agreed that the assumption of demographic independence and trend could be better tested with more surveys. He noted that it can be difficult to reconcile aerial- and vessel-based surveys for harbor porpoise, even when you apply the right formals and math, and stated that in general the methods give you the same trends but it may be hard to compare the estimates directly. Regehr asked if ADFG has considered the benefits to analyzing different survey data in the same analytical context, and whether ADFG would compare the survey estimates after the fact or synthetically. Bernard said they will start by analyzing them independently.

Williams asked if there were any efforts to build on the study design used by NMFS. Bernard said the ADFG boat survey would be modeled after NMFS' study but would use a smaller boat so they also conduct genetic sampling. Doniol-Valcroze asked for clarification about whether ADFG thought there were flaws in NMFS' vessel-based abundance study's survey design. He and Williams discussed that ADFG's skepticism seems to be not about the study design, but rather about the genetics sampling and analysis and splitting of the stock. Bernard confirmed.

Long asked for more information about the request for independent review. She noted the AKSRG serves as an independent review body for SARs and reviewed the stock split that was made. Bernard replied that they would request the Center of Independent Experts (CIE) review the data. Polasek said she recognizes that NMFS will not change the stock determination without additional data, but that it is important to have independent experts look at the data in depth to determine if data were robust enough to make a stock split decision. Long listed some considerations regarding CIE reviews (cost, timeline, quality of the evaluation dependent on who the reviewers are), and Schakner noted many of the experts in this subject matter were already AKSRG members. Long also strongly encouraged ADFG to coordinate with AFSC staff when designing surveys so any results would be comparable/useful with regard to existing data and analyses.

Williams said the AKSRG reviewed the harbor porpoise data and analyses in previous years but could take a deeper dive inter-sessionally or at a follow-up meeting if that would be helpful.

Angliss mentioned that NMFS had an informal dialogue with ADFG about the data and stock determination, and it is clear there are points of disagreement about interpretation of the information even after that meeting. She appreciates that ADFG has found resources to collect additional information and appreciates ADFG's offer to revisit their study designs, and noted NMFS is standing by to provide support in study design and data collection procedures.

2024 NMFS SAR review and revision process & ANO involvement

Young summarized the timeline and NMFS procedures followed for the 2024 SARs. She reviewed MML's process for determining which SARs to revise, including first conducting and documenting a

review to determine which SARs to revise; sharing the draft list with NMFS Headquarters, AKRO, and the AKSRG, along with a summary of key information for stocks that were reviewed but not proposed for revision; and then moving forward with developing revisions to those SARs.

Young also described efforts to engage with ANOs in review of draft SARs for species subject to subsistence harvest, recognizing the need for a customized approach given the ANOs' different levels of interest, engagement, and capacity and the frequency and formality of their meetings. She noted that MML and AKRO plan to give an overview to ANOs during their normally scheduled meetings and ask how they would like to be involved. Young noted that MML continues to work on the process and timeline for meaningfully engaging the ANOs in SAR reviews. For 2024, the draft Eastern Pacific northern fur seal SAR was shared with Lauren Divine from the Aleut Community of St. Paul Island tribal government, and the Bristol Bay beluga whale SAR was shared with the Alaska Beluga Whale Committee.

Branson made note that inclusion of ANO review should not be limited to entities with co-management agreements. She said that many ANOs wish to be involved in SAR review but have been unsuccessful in establishing formalized agreements with agencies. Branson expressed that SAR review should be extended to all interested ANOs.

Hauser asked how recent federal guidance related to Indigenous Knowledge (IK) is being considered and incorporated into the SAR review process. She also suggested that NMFS seek feedback from tribal partners on the process and ask if they have suggestions on incorporating IK. Eich said that it has been an emphasis of this administration and listed actions such as the recent hiring of an AKRO tribal liaison and an AFSC tribal research coordinator, as well as continued work through co-management partnerships with ANOs. She noted that each co-management partnership works differently and through co-management meetings, partnerships, and general engagement, AKRO is trying to get a better sense of what works for each organization. She said that AKRO is also trying to ramp up on tribal engagement and be more proactive on requests for tribal consultation.

Regehr described an example in which a systematic framework was developed for incorporating IK into quantitative population models for polar bears. After the meeting, he shared three documents related to this effort, which were then distributed to meeting participants. Eich also noted examples of recent efforts regarding IK, including working with the Aleut Community of St. Paul Island to integrate IK into the northern fur seal conservation plan and a new working group and task force for integrating local knowledge, traditional knowledge, and subsistence information into the North Pacific Fishery Management Council process. She emphasized that NMFS is still learning and trying to do better moving forward, but that these are positive steps. Sterling provided another example, in which MML is working with the Aleut Community of St. Paul Island to incorporate observations from locals and test model validation in a publication about northern fur seal departure times. Doniol-Valcroze asked whether the journal was resistant to the integration of the two knowledge systems; Sterling said there were no reviewer comments on the way IK was used in the manuscript. Hauser said that the examples showing how knowledge is woven together are useful and could be good guides, but she does not necessarily endorse subsuming IK into western science.

Aleut Community of St. Paul Island's Northern fur seal research

Lauren Divine introduced herself as the Director of the Ecosystem Conservation Office (ECO) of the Aleut Community of St. Paul Island. She discussed ECO's focus on natural resource and wildlife management, which is rooted in subsistence resource management, and bridging that with social science, interdisciplinary work, and building teams around food security. Divine presented information on the rich diversity of wildlife on the island, the culture of the Unangax̂ people, and the history of the people and island. She highlighted two important community members: Paul Melovidov, their main island sentinel, knowledge holder, and expert in environmental monitoring with scientific expertise; and Robert Melovidov, a halibut fisherman, Tribal Council Member, knowledge holder, and seal foreman who runs the community harvest in the summer.

Divine said the Aleut Community of St. Paul Island holds a co-management agreement with the federal government for northern fur seals, Steller sea lions, and harbor seals, though most of their activities center around northern fur seals. She described the creation of ECO in 1996 to provide a Tribal voice in marine mammal issues and management decisions, collect environmental data around subsistence harvest data and knowledge, enforce wildlife and environmental laws and ordinances, and participate in the co-management process, and its evolution into leading local research and management activities for northern fur seals (including the Conservation Plan) and Steller sea lions (including the Recovery Plan) to help the species recover.

Divine presented information on ECO's programs, including those for marine mammal disentanglement, marine debris cleanups, and marine mammal stranding monitoring and biosampling. She also noted their work on research studies, including a tagging study to look at fur seal presence and types of disturbance, as well as contributing to broader emigration and foraging questions, and a collaboration with MML and Duke University to use UAS to monitor harbor seals and Steller sea lions, as well as reindeer surveys. Katie Sweeney commented that ECO's UAS program has been very helpful to MML in getting consistent counts of Steller sea lions, and Divine replied that they appreciate these types of collaborations.

Divine also presented information on ECO's Indigenous Sentinels Network data collection mobile and web-based apps, which are used to collect scientific environmental, weather, and location data. She said the apps are also being used to help with data collection of marine mammals in the Aleutians, SEAK, and into the northern Bering Sea across different marine, coastal, and terrestrial ecosystems.

O'Corry-Crowe thanked Divine for an excellent presentation and commended her and ECO on their subsistence harvest reports, which contain a lot of important information. Divine said they do a lot of consultation/partnership building with other ANOs and tribal governments, and are hoping to help with reporting, data collection and visualization, possibly with the Chugach Regional Resources Commission and Aleut Marine Mammal Commission. She said they are also looking at the Indigenous Sentinels Network as a shared network service across ANOs so they can transfer biosampling techniques and methods, share funding support, centralize analytical support for processing samples, and help with grant and report writing.

Divine noted that she is currently reviewing the northern fur seal SAR. She said that the SARs are a "black box" to tribes and subsistence users and that, as Eich mentioned earlier, listening sessions and Tribal Engagement, and even formal Tribal Consultation, would be well received by the ANOs and tribal members who are interested in learning more about this process and what it means and does not mean for their subsistence use.

Citta asked about the ECO organizational structure and how they are funded. Divine replied that the tribal government consists of the Tribal president, a 6-member tribal council, the executive director, legal counsel, and department directors and staff throughout their government. They apply for Alaska Native Co-management Funding Program, Section 119 under the MMPA, which supports a lot of their co-management activities. They also receive funding from the EPA Indian Environmental General Assistance Program, grants, private foundations, and Bureau of Indian Affairs Tribal Climate Resilience Program. She said they leverage different grants together to work across different objectives, and they are open to collaborations.

Draft SAR review: Northern fur seal – Eastern Pacific

Following O'Corry-Crowe's summary of the SAR's major changes, several AKSRG members commented on the shortened time span used in the new pup count and pup production estimation figures (SAR Figures 2-6). They noted that a lot of information is lost and contributes to a shifting baseline, and suggested that the new figures and text continue to describe the longer time series. Towell acknowledged that it is difficult to decide which years of data to include in the SAR and said it would be easy to update the figures to include the older data. Quakenbush added that it would be helpful to add gridlines to the figures to make it easier to see the annual information.

Divine commented on the human-caused MSI section, focusing particularly on the reporting of animals entangled in marine debris and whether entanglements involving net fragments should instead be attributed to commercial trawl fisheries. She argued that commercial trawl fisheries should be responsible for entanglements involving gear they discarded into the water, and the way the data are presented in the SAR takes away that link. Teerlink responded that the net entanglements are considered human interactions regardless of whether they are attributed to marine debris or a commercial fishery, and thus they are included in the total of human-caused MSI that is compared to PBR. She also noted that because there is no way to know the primary target of the fishery at the time the net was discarded, nets cut off fur seals generally cannot be attributed to a particular commercial fishery. Teerlink emphasized that the commercial trawl fisheries have high observer coverage so fur seal entanglements during active fishing are not being missed. Williams noted that it is important to distinguish between electronic monitoring vs. human observers because EM may not capture the interactions; Teerlink responded that we do need to understand whether EM is collecting data on entanglements in the same way, but years of human observer data indicate that almost all fur seal entanglements involve dead animals, and live animals are not being cut out of trawl nets and released alive. Teerlink, Divine, and others planned to continue their discussion of this topic after the meeting.

Citta asked about the correction factor for expanding pup production estimates to population estimates. Rolf Ream noted that one of the goals of their tagging efforts is to update the expansion factors based

on more contemporary estimates of survival rates of different age classes. Sterling explained that MML is working on a manuscript looking at the correction factor.

Draft SAR reviews: Harbor porpoise – Gulf of Alaska and Bering Sea

Given similarities in the updates for these two harbor porpoise stocks, the AKSRG reviewed the two harbor porpoise SARs together. Doniol-Valcroze summarized the SAR revisions, first noting the SARs continue to have a disclaimer at the top to indicate that there is likely finer stock structure than currently defined. He also noted that there were very few changes in the data available for the PBR calculation. For instance, the Gulf of Alaska harbor porpoise SAR still relies on a 1998 aerial survey estimate of abundance, and while it is fully corrected with a fairly accurate CV for that kind of survey, it is quite old. He also mentioned the application of new guidance from the GAMMS regarding adjusting N_{MIN} to account for increasing uncertainty in the abundance estimate over time. He noted that the SAR authors determined there was not enough information on trend to provide a reliable basis for projecting N_{MIN} forward, and thus N_{MIN} is considered unknown. He also stated that we do not have a good idea of total MSI for either stock.

The AKSRG then discussed the draft SARs' proposal to change the stocks' statuses from strategic to non-strategic, based on the GAMMS' new approach for calculating a "critical N_{MIN}" when an estimate for N_{MIN} unavailable or only represents a portion of the stock range and available information on human-caused MSI is incomplete. Citta noted that the AKSRG originally supported the approach because it could allow some decision-making without complete information, but in this case, the data are so old that he would not necessarily be comfortable with using them to support a non-strategic designation. Doniol-Valcroze agreed, and said that the approach makes sense on paper but there are issues with its application to these harbor porpoise stocks given the uncertainty in the stock structure, the uncertainty in how much the MSI is an underestimate, and the need to make a comparison to the old N_{MIN}, even though we do not trust that N_{MIN}. Doniol-Valcroze discussed that there is no guideline about the point at which you would consider an N_{MIN} estimate too old to compare to the critical N_{MIN}, and similarly, there is no threshold for the comparison between the N_{MIN} and the critical N_{MIN}. For example, the Bering Sea stock's N_{MIN} is 23 times the critical N_{MIN} so a non-strategic designation might be safe, because it is unlikely that a) the abundance is 23 times lower than the previous estimate (which was already acknowledged to be an underestimate because the survey area covered only a small portion of the stock's range), b) the MSI is 23 times higher than has been measured, or c) a combination of those two factors. However, the Gulf of Alaska's N_{MIN} is only 3.6 times the critical N_{MIN}, which might be too close, given other uncertainties. Regehr argued that calculating a critical N_{MIN} value when N_{MIN} is unknown and MSI information is incomplete is nonsensical, especially when the degree to which the MSI estimate is an underestimate is unknown. O'Corry-Crowe commented that, in practice, few if any stocks would be considered strategic using the critical N_{MIN} approach, and he is worried about setting a precedent. Williams noted that this application of the GAMMS guidance is quite different from the sperm whale case that the AKSRG considered when the new guidance was drafted.

Doniol-Valcroze asked if a new harbor porpoise abundance estimate might be generated from the next cetacean survey in the western Gulf of Alaska. Angliss replied it is possible, if sufficient data are collected. She also noted that there might be an estimate from the recent PacMAPPS survey, but she did not remember if there were enough harbor porpoise sightings in the eastern Gulf of Alaska to

generate an estimate, given that there was little to no survey coverage of areas of harbor porpoise preferred habitat.[2] Doniol-Valcroze stated that the consequence of a change in the stocks' strategic status would be less if we knew a new estimate was coming.

Branson noted that she would provide comments separately about the numbers of harbor porpoise interactions in the text about Table 1 in the Bering Sea harbor porpoise SAR.

Concepcion and other AKSRG members expressed concern that the Habitat Concerns section of both SARs was proposed to be deleted rather than updated. Young explained that section was deleted because the revised GAMMS specified that the Habitat Concerns section, renamed to "Other Factors That May Be Causing a Decline or Impeding Recovery," should be included in SARs for strategic stocks and the two harbor porpoise stocks were proposed to be changed to non-strategic. She noted, though, that the GAMMS say that an Other Factors section may also be included in SARs for stocks that are not strategic. The AKSRG recommended keeping the Habitat Concerns/Other Factors sections, especially because the abundance estimates are not well supported.

Killer whale bycatch and other assessment issues

Young presented information about killer whale bycatch in commercial fisheries and in the AFSC longline research survey in 2023. Eleven whales were taken from May to September 2023, all in the Bering Sea or Aleutian Islands. Ecotype and stock ID were determined by genetics (if available) and location; if genetics were not available, an animal was assigned to all stocks whose ranges overlap the location where the take occurred. Seven whales were killed or seriously injured by gear in the Alaska Bering Sea Aleutian Islands flatfish trawl fishery; six of them were determined to be from the Eastern North Pacific (ENP) Alaska Resident stock and were females, while one whale without a genetics sample was assigned to the ENP Alaska Resident, ENP Gulf of Alaska/Aleutian Islands/Bering Sea Transient and ENP Offshore stocks and its sex was unknown. One male whale was killed by gear by the NMFS Alaska Fisheries Science Center Longline Research Survey; there was no genetics sample and the animal was assigned to the ENP Alaska Resident and ENP Gulf of Alaska/Aleutian Islands/Bering Sea Transient stocks.

In addition to the eight MSI in fishing gear, three whales observed taken in fishing gear were determined to be "previously dead." Young explained that the "previously dead" category is assigned to animals with signs that they were already dead before coming into contact with fishing gear. The fisheries observers provide photos and descriptions, and also indicate if they believe a dead animal has been caught in gear more than once. MML reviews this information, and the 2023 previously dead killer whales were also reviewed by a group of veterinarians from NMFS OPR, who confirmed MML's findings. She noted that previously dead animals are not included in the annual reports of human-caused MSI, bycatch estimates, or the SAR unless the cause of death is determined to be human-related. For example, one of the three previously dead whales had fresh propeller wounds on its body from an unknown vessel and therefore would be included in the SAR.

[2] Following the meeting, MML confirmed that a harbor porpoise estimate was not able to be generated.

Young then presented historical data on observed killer whales killed or injured incidental to fisheries in Alaska. She explained that more killer whales have been taken in the last few years, with 2023 being the highest year, and that most of them were taken in the Bering Sea Aleutian Islands flatfish trawl. She then summarized the current ENP Alaska Resident, ENP Gulf of Alaska/Aleutian Islands/Bering Sea Transient and ENP Offshore stocks' SAR values and stock status and reviewed the preliminary 2018-2022 and 2019-2023 average annual MSI estimates. She noted these preliminary MSI numbers were below PBR levels.

Young also discussed the all-female sex bias in the commercial fisheries takes of the known sex whales. She referred to the NMFS Guidelines for Assessing Marine Mammal Stocks (GAMMS), which state that if MSI includes more than 50% females, the recovery factor should be decreased to compensate for the greater effect of this mortality on the population. She also pointed out that in comparison to 2023, from 2007 to 2022 there was a mix of males and females taken. She noted that other potential considerations in the recovery factor include uncertainty in the determination of stock structure.

O'Corry-Crowe questioned whether the recent increase in killer whale bycatch is significant. Wade suggested a simple binomial probability could be performed to determine how probable it would be to observe the numbers bycaught. Regehr commented that the probability of catching seven females, assuming the population sex ratio is 50/50, is low. O'Corry-Crowe commented that this type of information is relevant to help put the bycatch numbers in context. Williams brought up that we know there are questions related to current stock structure as presented in the SARs, so although the current PBRs are important to consider, PBR comparisons may not be the best benchmark to determine whether there is a conservation concern.

Beth Concepcion, an AKSRG member who works with the flatfish trawl fishery, provided information about steps taken in 2023 to try to avoid killer whale captures in the deep-water flatfish fisheries. She noted that the fishery had not caught any killer whales in a long time until 2020 when the fishery caught two killer whales, and another two in 2021. They reached out to NMFS and Craig Matkin of the North Gulf Oceanic Society and began working with Dr. Hannah Meyers. Concepcion explained that the fishery first tried to stop running fish from the factory during setting and hauling so that there were no discards during those times, and to steam upwards of 12 hours to try and "lose" the killer whales. Unfortunately, those methods did not work. Towards the end of the season, one of the vessels created a "fence" made out of webbing that was put in front of the net in an effort to make the whales more aware of the net opening. This seemed to be effective and would be looked at as a possible solution during the fleet's trip to the St. John's Memorial flume tank. They are planning a full data analysis to look at when killer whales are foraging at the net during setting, fishing, or retrieval, how they are associated with catch composition or depth, and how many animals were involved, to inform potential gear modifications. She stated that they are continuing to work on these gear modifications and will be testing them during the 2024 season. She also pointed out that this was a big issue for the fishery because no vessel wants to catch a whale.

O'Corry-Crowe asked whether this is a new behavior. Concepcion responded that this is either new behavior or something they have not seen before. She said the killer whales have always been around

the boats, but these interactions with the vessels increased in 2020 and there seem to be more whales following the vessels the entire time the boats are out there. The group speculated on what might be causing the increased interactions with the flatfish trawl fishery. Wade discussed that the behavior may be related to prey resources, particularly salmon populations that have declined, which may increase killer whales' reliance on other prey. Williams commented that there are fewer boats longlining in the Bering Sea than in the past and killer whales that previously depredated longlines may now be depredating in the flatfish trawl fishery.

Doniol-Valcroze noted that depredation behavior is a cultural phenomenon in specific groups that can be spread to other groups. He asked if there is a way to document the individual whales to see if the recent increases in the presence of killer whales near the vessels are the same animals or whether it is an expansion of the behavior. Wade responded that Fearnbach et al. (2014) present a social network analysis of killer whales present near longline boats, but is not a rich dataset of seeing the same individuals many times and the networks may be at the level of pods rather than matrilines. He added that Dahlheim had another dataset of killer whale presence near trawlers from a 14-year period ending in 2010; those data include "repeat offenders" and social groups. He said they would like to crossmatch the datasets, repeat the social network analysis, and see which groups were involved with the trawlers, but resources are limited. O'Corry-Crowe noted a kinship analysis could be done on the existing genetics data to see if the dead animals were closely related. Katie Luxa commented that thousands of killer whale images have been collected by observers more recently, some of which may be of photo-ID quality. The group discussed using an algorithm to match killer whale dorsal fins but noted that more work needs to be done to streamline killer whale data processing and algorithms. MML would like to work on this, but their resources are limited, though they noted the data are available for collaborators. Doniol-Valcroze said that if the takes are random, that does not have as much of an impact as takes of entire groups, matrilines, or key individuals. He said photo-ID could be important to determine this and should be included in any funding proposals. Concepcion said photo-ID of existing and future photos collected by Dr. Meyers was included in their funding requests.

The AKSRG discussed developing a recommendation that the ENP Alaska Resident stock SAR be updated next year to include the updated MSI data, and that they will think about giving recommendations around needed research or other SAR updates. Doniol-Valcroze suggested they think about recovery factors given the sex ratios of the takes. Regehr commented that in some mating systems, reproductive values for males and females are very different. Wade agreed and noted that it has been documented in terrestrial wildlife that taking high-value males out of a population can suppress birth rates. There are examples of the opposite, but in general, it is bad for a population to remove a lot of females, which is why the GAMMS addresses the recovery factor value. Wade noted that the GAMMS do not provide case-specific simulations, and this is the first time there has been such a sex-skewed bycatch. Wade pointed out that John Brandon and Andre Punt looked at sex-skewed bycatch in a 2018 publication of PBR explorations, which can give an idea of the magnitude of the effect and whether a 0.5 recovery factor is sufficient. Wade commented that Punt also published another paper in 2020 looking at a more thorough explanation of the robustness of PBR and whether 0.5 Fr is sufficient for various things such as sex-skewed bycatch. He said that sex ratio was not included, but Punt put together an R package and he might already have it in the code. Regehr pointed out that PBR was developed without sex-specific considerations in mind, but in the demographic

processes that underlie PBR, sexes have different values, as do animals of different ages. Wade responded that though they had discussed including that during development of the PBR approach, they did not have any cases where there was sex-skewed bycatch, so they decided it was not worth their time to do simulations. He acknowledged that now we have a case where we need the sex specific considerations and is why Punt developed his model that is age and sex specific.

Day 2 Welcome

O'Corry-Crowe opened the meeting by acknowledging the passing of John Craighead George, and he and Citta shared words to honor and remember him.

Draft SAR review: Beluga whale – Cook Inlet

Citta summarized the updates in the SAR. He said that while he feels confident that the researchers have a good handle on the population abundance, the methods for estimating abundance have been evolving over time and he found the SAR is a little unclear about what methods are currently being used. He said that he also found the trend section to be a bit confusing but praised Figure 2 for giving a full picture of what is going on. Doniol-Valcroze said that the current method for estimating abundance is to use a weighted average of the last three estimates (2016, 2018, and 2022), and while averaging buffers against interannual uncertainty, the new estimate has still changed the overall perception of the trend for the last few years.

Citta asked Wade about SAR text that says some groups are counted while some have video. Wade said that there used to be a protocol to use video for larger groups but not for smaller groups, but since 2018 all groups are videoed.

Citta asked why Figure 2 shows estimates for 2021 and 2022, but the SAR does not use the 2021 estimate in the weighted average. Wade characterized issues with the 2021 survey, including bad weather and a delayed start due to covid protocols that meant the survey took place in late June after the big chinook run was over, so whales were more dispersed. He referred to Figure 15 in Goetz et al. (2023) showing the very large CV for the 2021 abundance estimate. He noted that the imprecise 2021 estimate should not really inform the trend estimate, but because they used a moving average that accounts for uncertainty, the confidence intervals were really wide; when the 2021 estimate was excluded, the confidence intervals were less affected. Wade said that he has already developed a Bayesian model where he will fit the trend to multiple sources of abundance estimates, taking into account their uncertainty, and this model will be incorporated into a future SAR. He noted that within that model, the 2021 estimate has no influence. Citta and Doniol-Valcroze suggested that the 2021 estimate be removed from Figure 2 and text should be added to the SAR that mentions that there was a 2021 survey that resulted in a very imprecise estimate. Doniol-Valcroze also pointed out that without the 2021 estimate, the trend is more conservative. O'Corry-Crowe asked whether the dashed lines in Figure 2 were based on the probability intervals not including the 2021 estimate; Wade confirmed. O'Corry-Crowe asked whether the uncertainty around the trend gets bigger as the time interval between surveys gets bigger. Wade said that the terminal point is the moving average of the last three points and does not take the time interval into account, which is another reason to move to a parametric model. Doniol-Valcroze suggested that a sentence be added to the SAR to describe how the change

from annual surveys to surveys every two years (skipped 2020 due to covid), and now four years between the two most recent surveys (2018 and 2022, dropped 2021 because of low confidence) may affect confidence in the trend.

Fournet commented that, as a first-time reviewer of the SAR, she found the document was not transparent and the description of the methods was hard to follow. She provided some specific examples where additional detail was needed to clarify how the estimates were generated.

Citta asked whether NMFS has made a decision about using line-transect methods to survey Cook Inlet belugas. Wade summarized the outcome of a 2023 workshop, in which participants evaluated the strengths and weaknesses of three different methods to estimate Cook Inlet beluga abundance: "conventional" or "traditional" aerial surveys, which are coastal censuses of groups with no correction factor for missed groups and a complicated analysis using video data to estimate group size; line transect, which was first done in 2018 using closing mode and more recently using passing mode; and photo-identification from overhead photos taken by unmanned aircraft systems (UAS). Based on the workshop participants' individual conclusions, MML formally decided to stop doing conventional surveys, and this year to conduct the line-transect aerial survey and collect UAS images for mark-recapture.

Regehr asked about the conservation benefit of ultra-high precision, high frequency estimates given resource limitations, and whether NMFS considers this to be the right place to put this amount of money towards. Angliss and Wade explained that Cook Inlet beluga are a NMFS Species in the Spotlight and the current funds cannot be used for other species, but research priorities within the Cook Inlet beluga research program can be reevaluated over time. The funding is NMFS-directed, not appropriated at a higher level. In response to further questions about the program, Angliss explained that NMFS published criteria for determining if a species qualifies, there is no sunset for how long a species remains in the program, and species are not removed when another is added.

O'Corry-Crowe asked why the trend is estimated for 10 years rather than a longer period. Wade replied that the timeframe is required for the harvest management plan: the most recent 10-year trend is a trigger for whether harvest can resume. He said that the 10-year trend and the moving average together give a good picture of what is going on in the population. O'Corry-Crowe asked whether Wade thinks the data show that from 2002 or 2004 the population increased, then declined, and is now increasing again, or whether those changes are related to the analytical issues Wade previously discussed. Wade said he thinks the 2016 and 2018 estimates were unusually low because of the failure of the traditional survey method to account for missed groups and whales spreading out. He reported that in his first attempts at fitting a Bayesian model and estimating the portion of the population missed in a year, the model estimated those two years were particularly low. Based on this, Wade thought the amount of decline, and the subsequent amount of recovery, was likely exaggerated. Citta noted that if you calculate a rate of increase from about 2016 and 2022 using the point estimates, the rate is ~9%. Wade replied that when you look at the moving average, the rate of increase is larger than 4% but the confidence interval includes 4%, so one could say it is due to the randomness of the numbers they got and it is overestimated due to the precision of the numbers available. Wade noted that he has been looking at this in the Bayesian model, by estimating lambda for every year of the model and putting a

prior distribution for lambda t, bounding it on the upper end so that lambda cannot exceed 4% to prevent the population model from increasing too quickly. He noted, however, that there might be transient dynamics that would allow the population to increase at more than 4% in a given year.

Quakenbush noted that the SAR's reference to Quakenbush 2003 can be deleted, and asked about the sighting of belugas near Kodiak this year. Jill Seymour said that Verena Gill (NMFS AKRO) interacted directly with the member of the public who shared the sighting via the Belugas Count Facebook page, and while there were no photos, the reporter is an established pilot who knows what belugas look like from the air. She said that Gill is working on compiling that information more officially. However, the stock identification for those whales is unknown.

Hauser noted the large citizen science effort in Cook Inlet (Alaska Beluga Monitoring Program) and encouraged MML to use photos from other efforts beyond just drone surveys.

Draft SAR review: Beluga whale – Bristol Bay

Citta summarized the draft Bristol Bay beluga whale SAR, focusing on the abundance surveys and estimates. He explained that there is a long history of aerial surveys that mainly fly along the coastlines in July during sockeye runs. These surveys are similar to the Cook Inlet beluga aerial surveys but with no video component; the Bristol Bay belugas are counted visually from the plane. Bristol Bay belugas are sighted in very large groups, which is why line-transect methods were not used historically. He said the surveys have produced a series of abundance estimates corrected for whales that were unavailable because they were diving and for missed calves. The 2022 survey's abundance estimate is 1,669 belugas, compared to the previous SAR's reported abundance of ~2,000 belugas. He noted that the draft SAR concluded that population growth had slowed, or possibly could be in decline, though the change was not statistically significant. However, he said ABWC questioned whether enough flight lines were flown in 2022, and NMFS questioned whether the correction factors used were appropriate.

Citta and Quakenbush described how two surveys can be flown in Bristol Bay in one day, with each survey covering the entire survey area; if that is done for five days, there are up to 10 surveys to pick from. However, only three surveys were used in 2022. Citta explained that because the Bristol Bay estimates can be so variable, the CV actually increases when there are more surveys. Doniol-Valcroze said the entire survey area for St. Lawrence Estuary belugas can also be flown in one day and estimates can be very variable, and agreed that the concern of having only three counts for Bristol Bay belugas in 2022 is warranted.

Quakenbush reported that the correction factors used in the analysis of the 2022 Bristol Bay survey data were the same factors used since the 1990s, to allow comparison of count totals and trends for the ABWC. Doniol-Valcroze commented that the correction factor values are fine when you have a time series, but because there is no CV associated with them, the variability could be an issue: group sizes could be over- or under-corrected because correction factors capture mean behavior. He also commented that even though the 2022 estimate is 20% lower than previous estimates, because the CV is also lower, there is only a 10% difference in N_{MIN}. Additionally, because a well-justified, higher R_{MAX} value was used compared to the previous SAR, the change in PBR in the end is small.

Citta commented that he does not think there is value in spending time trying to estimate new correction factors. He said that correction factors based on tag or focal follow data are variable, too, and that it makes more sense to try some sort of integrated direct estimate. He sees value in doing at least one video survey to get an idea of how well the group sizes are being counted. He also suggested that they could try to conduct line transect surveys at times when whales may not be as aggregated.

Wade commented that Cook Inlet beluga surveys are typically flown at 1 km distance from the coast and observers look in both directions, but they primarily see groups along the coast. However, when they have run transects offshore, they have found groups at the very ends of transects, which would have been missed in the traditional coastal survey. Citta replied that belugas in Bristol Bay are virtually never seen on offshore transects, but they still fly the offshore transects to make sure they are not missing groups. Wade commented that repetitive surveys can help determine if groups are being missed, noting that Stephanie Thurner (University of Washington graduate student) did simulation modeling and proposed flying two Cook Inlet beluga surveys to get at the proportion of animals missed, but this was rejected because it would have been too expensive.

Wade commented he is impressed that the aerial survey estimate matched the genetic mark-recapture study super-population estimate. Regehr noted there is a lot of power in having multiple observation processes such as aerial vs. mark-recapture surveys or surveys at different times of year, because not all surveys will be subject to the same bias. He said that bringing multiple processes together will add power to get at the latent variable, which is how many belugas there are. Doniol-Valcroze noted that it is common to use the most recent abundance estimate for Arctic small cetacean populations, but managers may struggle to respond to biologically implausible changes in abundance when the interannual changes may just be random variation or sampling variation. Regehr agreed, and said that an integrated framework provides more consistent estimates and inter-annual changes abundance are linked to estimated values of demographic parameters, so there will not be an unrealistic growth rate.

Status update on Kotzebue Sound beluga DIP evaluation

Angliss described NMFS' efforts to evaluate whether there is a demographically independent population (DIP) of beluga whales in Kotzebue Sound. She noted that she planned to present a more substantive update but NMFS is behind schedule, though moving as quickly as possible given the keen interest in the decision. After listing the internal working group members, she described NMFS' initiation of the review in response to publication of a relevant paper by O'Corry-Crowe et al. (2021) and a letter from the ABCW recommending that NMFS identify Kotzebue Sound beluga whales as a separate stock. NMFS followed the process in NMFS' 2019 stock policy and guidance from the DIP Delineation Handbook to develop a draft summary of the lines of evidence regarding demographic independence, which was shared with the ABWC for review at their December 2023 meeting. NMFS has since been working to incorporate ABWC input into an updated draft and share the draft internally within NMFS. She noted that once NMFS completes its internal review of the DIP evaluation report, NMFS will provide the report to the ABWC before finalizing it. If the determination is made that there is a DIP, NMFS will again coordinate internally to consider whether the DIP should be designated as a separate MMPA stock.

Hauser said it was great to hear how much NMFS is working with the ABWC, but noted that the tribe in Kotzebue may have a different opinion than the ABWC and asked about the process for coordinating with tribes. Angliss responded that NMFS received a letter from someone not in the ABWC and reviewed and considered that information while developing the report. She also noted that NMFS is continuing to discuss when and how to have conversations with Alaska Native communities on this topic. O'Corry-Crowe applauded the agency for engaging relevant entities in the process and said that he appreciated the update and would like to know more in the future. Angliss suggested that NMFS could potentially plan to update the AKSRG during an inter-sessional meeting.

USFWS updates

Alice Garrett gave a short introduction and thanked the group for including her, and then handed the presentation over to Charlie Hamilton. Hamilton began by thanking the AKSRG for their comments and suggestions on the walrus and sea otter SARs, which made the SARs more complete and accurate. He recognized the work and effort from ANOs, North Slope Borough, and the State of Alaska, and appreciates the continuing collaboration. Hamilton mentioned USFWS has a new walrus and sea otter lead, Daniel Bjornlie, who started last fall. USFWS has been working on a species status assessment for Pacific walrus to inform whether they should be listed under the ESA; they anticipate making a decision in late summer 2025. Hamilton stated this year's USFWS presentation would focus on polar bears, but also noted that they had a successful walrus survey effort last year and anticipate launching another in June 2024 to focus on walrus population status.

Citta asked about the status of the Pacific walrus and three sea otter SARs that the AKSRG reviewed last year. Hamilton replied USFWS reviewed the AKSRG's and others' comments, made corrections to the SARs, finalized the SARs, and notified the AKSRG in August 2023. He noted that the Federal Register notice of availability and the four SARs are available online and on VLab.

Ryan Wilson then presented on the USFWS polar bear research program, which has a strong management focus to inform regulatory decisions. Wilson discussed their recent research in the Southern Beaufort Sea (SBS), including studies looking at den phenology and the influence on litter survival (Andersen et al. 2024), and the effect of aircraft overflight disturbance to bears and altitude thresholds (Quigley et al. 2024). Other studies include evaluating potential impacts of an oil spill along the 1002 coastline of the Arctic National Wildlife Refuge, using photos to estimate bears' body mass instead of using a subjective body condition index; estimating a bear's age based on methylation levels in the DNA instead of taking teeth, evaluating the effectiveness of using deterrents to move bears away from communities; evaluating tools to estimate the takes of bears around human activity, and looking at polar bear and grizzly bear data to see if there is a signal in the movement data that could indicates if a sow is coming out of a den with newborn cubs or whether she lost them and is headed out to begin hunting. Lastly, Wilson noted that there has been boat-based polar bear viewing in Kaktovik and there is a need to better understand levels of take, or if take is occurring. They are planning on boat-based field work in Prudhoe Bay in autumn 2024.

Wilson reported that their biggest on-the-ground research effort in SBS is to increase their capacity to monitor, understand, and mitigate human-polar bear conflicts in the oil field. They have had two pilot seasons with partners to catch bears in culvert traps with the goal of creating known histories for

individual bears and their responses to deterrents, and are looking at how bears are moving between industries and communities.

Wilson then discussed USFWS' Chukchi Sea research, including a recently published study assessing changes in potential denning habitat on Wrangel Island (Chinn et al. 2023). He also mentioned they are starting to look at oil spill simulation models to see what impact increased shipping in the Bering Strait region and Northern Sea Route could have on polar bears and walruses. Wilson said they are re-establishing and adapting a monitoring program in the Chukchi Sea because there is a need for an updated population estimate by 2026 to inform harvest management. They are initiating a new pilot effort of biopsy darting from helicopters to collect genetic samples instead of doing physical captures, and they will assess the safety of over-ice operations.

Regehr thanked Wilson for the presentation and acknowledged the huge amount of high-value work coming out of the program. He commented that the new Chukchi Sea research program Wilson described likely would not be able to produce a new abundance estimate due to the shorter time period, challenging conditions, and not putting out radio collars to get movement data. Regehr explained that the first abundance estimate was produced in 2016 and was a product of 8 years of capture-recapturing many bears and was the minimum amount of data they could use for their modeling. This led to the U.S.-Russia Commission adopting a sustainable harvest limit in 2018, in which updated demographic information is needed every 10 years. He said that if there is not an updated estimate, either the harvest has to accept more risk or the harvest could be reduced; either way, there would be impacts to communities that are dependent on polar bears for subsistence. Wilson agreed there is high value in obtaining movement data, but they are planning an approach similar to a spatial capture-recapture approach by Hostetter et al. (2022), and they could get indicators of bear movements by sampling a known animal in different places across the study area and season. He said previously marked bears that could be re-sighted, and previous estimates can inform priors, which may help reduce the amount of effort required to get a valid estimate. Wilson said he is hoping the pilot season will give them enough information to dive deeper into the best study design given the limitations. He also noted that in terms of sustainable harvest level being contingent upon the updated abundance estimates every 10 years, if there is reduced certainty in a new estimate, there is flexibility to step back and be a bit more cautious about the quota, though they hope to avoid that.

Wilson stated that they are also working with NMFS to include polar bears in the ice seal aerial surveys that NMFS will be conducting next year. He said they are open to bringing in as many data streams as possible to get the best data. Regehr encouraged USFWS to invest in a joint instrument-based survey with NMFS, that can produce an abundance estimate. Hamilton recognized the concerns Regehr raised and said that there are many-pronged approaches, primarily to monitor the population status itself. He noted there are means and aspects of harvest management under other regimes such as bilateral commitments, and that they are capturing as much information as they can to describe the status of the stocks.

Draft SAR review: Polar bear - Chukchi Bering Sea and Southern Beaufort Sea

The AKSRG briefly reviewed each of the two polar bear SARs separately and then discussed issues related to both SARs together.

Chukchi-Bering Sea (CBS) stock

Regehr said the CBS polar bear SAR was scientifically accurate, comprehensive, and easy to understand. He highlighted that there were several potential abundance estimates and he supports the SAR's rationale for what was chosen. He also noted that he would send comments in writing, including a suggestion to revise the blanket statement about sustainably harvesting a declining population.

Southern Beaufort Sea (SBS) stock

Citta said he thinks the SBS stock needs a harvest risk assessment, as was done for the CBS stock. Regehr agreed, noting that updated demographic parameters (abundance, vital rates) are needed to do an accurate assessment. He discussed the fact that the SBS and Northern Beaufort Sea (NBS) populations are not demographically independent, but rather have a lot of movement between the areas, and an aggregate abundance estimate would be positively biased. He described efforts toward metapopulation analyses that explicitly model movement in and out of the SBS, which, along with joint sampling in the U.S. and Canada, should provide the best possible estimates of abundance and demography, which could then be used in a harvest risk assessment. He noted that there is a SBS-NBS working group of Canadians and Americans that are planning to do that, following the parameter estimation.

R_{MAX}

Doniol-Valcroze and Regehr discussed the R_{MAX} value of 10% in the CBS SAR, which is the upper limit of the point estimates from a matrix model that used demographic data from all of the subpopulations that have those data. They noted that 10% is not a CBS-stock specific value based on empirical data, so the current text in the draft SAR is misleading and should be revised. However, they agreed that 10% is an appropriate R_{MAX} for the CBS stock, given the other evidence of a productive sub-population that is not being limited environmentally,

Doniol-Valcroze and Regehr noted that the SBS SAR describes previous, lower R_{MAX} estimates that were based on stock-specific empirical estimates of population growth rate, but selects 10% for the stock. Regehr said that he believes that 10% is a reasonable rate for the species broadly, under ideal conditions. Williams noted that conditions likely are not ideal given changes in sea ice associated with climate change. Regehr said that with respect to climate change, it is important to consider both density dependent impacts and independent impacts on a population. He said that this motivated the expansion of the modeling framework for polar bears to explain things analytically. Williams suggested that the AKSRG could constructively request more consideration of R_{MAX} for the SBS stock in light of current environmental conditions, potentially for the next time the SAR is reviewed.

Recovery factor (F_r)

Regehr asked Hamilton about the F_r for the SBS stock. Hamilton said that historically FWS has used the recommendations from Taylor et al (2003). Doniol-Valcroze highlighted that SAR states Wade and Angliss (1997) recommend an F_r value of 0.48 when the CV of the abundance estimate is 0.3-0.6, but in fact, this recommendation relates to the CV of the mortality estimate, not the abundance estimate. He argued that the reduction of the F_r from 0.5 to 0.48 is not needed for this stock. Regehr noted that there is some uncertainty in the M/SI estimates associated with incomplete or delayed harvest

reporting, though it cannot be quantified, but Doniol-Valcroze said it is negligible compared to some of the estimates of fisheries bycatch seen in other SARs. O'Corry-Crowe stated that the recovery factor can also be adjusted to accommodate additional information and to allow for management discretion as appropriate and consistent with the goals of the MMPA, such as if the sex ratio of human-caused MSI is skewed. Regehr said that he feels comfortable with an F_r of 0.5 given the AKSRG's discussion.

Harvest relative to PBR

Quakenbush and Citta noted that the SBS SAR indicates that subsistence harvest (21) exceeds PBR (21) but does not interpret what that means. Quakenbush said the situation was complicated because it is a transboundary stock that is harvested in both Canada and the U.S. Regehr stated that the Canadian harvest has decreased to almost zero because changes in the sea ice has limited people's ability to access the bears, and additionally, because the boundary of the stock changed so the Canadian portion of stock shrunk. Regehr also noted that the U.S. and Canada just finished four years of coordinated capture-recapture sampling in the SBS; given criticism of recent estimates showing declines that involved only sampling in the U.S., he thought the new effort should produce a more robust abundance estimate that people would feel more comfortable using for management. He stated, though, that there may be danger in this "wait and see" approach, and that the SAR should clearly identify that harvest exceeds PBR. He emphasized that, while this is appropriate in a legal context, harvest exceeding PBR is not necessarily problematic in a biological sense. He specifically mentioned that the sex ratio of the harvest is skewed 2:1 males to females because of prohibitions on taking females with cubs. O'Corry-Crowe mentioned that the sex ratio of the take would be important to mention in the SAR.

Citta said that harvest (~46) is close to exceeding the PBR (52) for the CBS stock, though it is below the sustainable level of removal established by the U.S.-Russia Bilateral Commission at the 2018 meeting (85). He noted that most of the estimated annual harvest was in Russia. Quakenbush said it is illegal to harvest a polar bear in Russia, despite the quota, so reporting is likely not accurate. Regehr said that U.S.-Russia relations have broken down so we have very little idea of what is currently happening there in terms of harvest. He noted that the estimate of 32 bears harvested per year in Russia was based on community surveys in the early 2010s. He suggested that the SAR could say that the U.S. gets zero data from Russia but that there is some level of illegal, unmonitored, unreported harvest. For example, there is evidence that during the economic collapse in the late 1990s, Russians illegally harvested 200-300 bears a year from the CBS population because of food security issues.

Hamilton emphasized that MMPA section 117(e) specifies that the stock assessment section (117) "shall not affect or otherwise modify the provisions of section 101(b)," which covers Alaska Native subsistence harvest.

Other

Hauser said she appreciated that both SARs discuss bilateral agreements and Alaska Native agreements, but said there was not a lot of information about co-management agreements in Alaska, or even the source of harvest data in the SARs. Citta asked whether FWS engages with co-management groups on draft SARs and shares draft SARs before they are finalized. Hamilton replied that FWS reaches out to ANOs and other groups during the public comment period.

Citta asked about the status of the Pacific walrus and three sea otter SARs that the AKSRG reviewed last year. Hamilton replied USFWS reviewed the AKSRG's and others' comments, made corrections to the SARs, finalized the SARs, and notified the AKSRG in August 2023. He noted that the Federal Register notice of availability and the four SARs are available online and on VLab.

Inferred mass mortality of humpback whales in SEAK since the Northeast Pacific marine heatwave

Teerlink introduced Janet Neilson, a humpback whale biologist at Glacier Bay National Park and Preserve, who presented research and findings associated with humpback whales and the marine heatwave. Teerlink noted that while we are not revising the humpback SARs this year, we are staying on top of issues such as effects of the marine heatwave on humpbacks, so that we can best incorporate the information in future SAR revisions.

Neilson focused her presentation on work in SEAK and Prince William Sound (PWS). She explained that it has been over seven years since the marine heatwave subsided in 2016, and many humpbacks that were alive before the heatwave remain missing. This led to the question of whether the humpbacks shifted their distribution or if they died. She stated her presentation would describe why they think the continued absence indicates a mass mortality has occurred.

Neilson described the Park's humpback whale monitoring program, which has a high level of survey effort and consistent methods and is a long time series, allowing their numbers to be used as a relative index of abundance of humpbacks in SEAK. She said the population was increasing at 5% per year until the heat wave, and by 2018, they documented fewer than half as many whales as prior to the heatwave, which was a 58% decline overall. They also documented increased rates of emaciation and sharp declines in calving and survival. These results were published in Gabriele et al. (2022). She said that over the past five years, conditions have improved but counts remain 30% lower than before the heatwave, and many whales with long sighting histories remain missing.

Neilson reported they looked at annual sighting histories of Glacier Bay/Icy Strait whales to determine how many whales are missing. They also searched other photo ID databases, including Happywhale, in which the majority of humpbacks in the North Pacific are cataloged, to search for sightings of Glacier Bay/Icy Strait whales that were sighted elsewhere. They classified whales that had been missing for ≥5 years and not seen anywhere since the heatwave as likely dead. Based on these data, during and after the heatwave the inferred rate of mortality more than doubled, and mothers with calves may have been the most vulnerable.

She reported some sightings showed short-term movements, but there was no evidence of abandoning long-term feeding areas. It is possible whales shifted to areas without photo-ID efforts, but that is looking less likely as more years go by with these whales remaining missing. She said they questioned whether it was significant that these whales have also not been seen in wintering areas, so they looked at the animals that are still alive and found that 73% have had at least one wintering area sighting since the heatwave, which indicates the absence of missing whales is significant. Neilson said the researchers also looked more closely at the 58 whales that disappeared; 39 whales had at least one wintering area sighting and all had migratory ties to Hawaii (38 whales had been seen only in Hawaii,

one whale had been seen in both Hawaii and Mexico, no whales had been seen only in Mexico), which indicates Hawaii migrants may have been more susceptible to mortality than whales from Mexico. She said this is consistent with the Cheesman et al. (2024) paper, which documented a 34% decline in the Hawaii DPS following the heatwave, while the Mexico DPS had no decline and then continued slow growth. She noted these Hawaii population-level declines indicate that this was not isolated to SEAK and suggest a mass decline occurred that went undetected due to a lack of carcasses. She and co-authors expect to produce a peer-reviewed publication in the next year.

Neilson then presented a few slides from the PWS study, which began in 2008 as a predator-prey study. The heatwave impacts in PWS may have been even more severe than in SEAK: the study indicates the population was increasing through fall of 2014, crashed by 2017, and the numbers remain low, despite recovering prey populations. Humpback calf counts have also been low. Neilson also mentioned that there was a large whale Unusual Mortality Event (UME) in the western Gulf of Alaska and British Columbia in 2015-2016, and although PWS and Glacier Bay were not included in the UME boundary, the abrupt increase in mortality also affected these whales. She said the most likely scenario is that they left SEAK without sufficient energy reserves and died while migrating to Hawaii.

On her last slide, Neilson provided links to the National Park Service's annual monitoring reports for humpback whales in Glacier Bay.

Regehr commented that this is an amazing dataset and presents an opportunity to use a multi-state capture-recapture model to correct for different observation probabilities in different locations. He said it could also estimate true survival, not apparent survival which is conflated with immigration. Neilson responded that it is planned to be part of their analysis. Doniol-Valcroze added that such an analysis would not change the logic of approach or results, and it would not have to rely on arbitrary thresholds.

Doniol-Valcroze commented that they have not seen as strong of a signal of decline in British Columbia (BC) as was seen in SEAK or the wintering grounds. He suggested that may be because there is a more heterogeneous mix of Mexico and Hawaii whales in BC and a geographic gradient for migratory destinations; in northern BC, whales mostly come from Hawaii, so the signal should have been detected there, too. Neilson commented that Glacier Bay/Icy Strait is the only consistent long-term data, which resulted in the clear signal there. Doniol-Valcroze mentioned that some of the BC survey work shows an increase in humpbacks in BC, but that they did not have fine-scale resolution in time to look at post-heat wave impacts.

John Moran, who works on the PWS project, noted the 2023 survey had few whales but they did see four calves, and the whales look well nourished for the first time since the heatwave. He said they are conducting acoustic surveys with USGS to monitor prey and have seen prey numbers increasing, however, the humpback numbers have not yet responded despite the improving conditions. Neilson commented that overall things are looking better in Glacier Bay/Icy Strait too, but that there is a shifted baseline of what normal is; humpback numbers have been flat over the last five years and they are not back to pre-heatwave numbers.

Williams questioned what can be done to increase resilience for highly vulnerable cetacean species. Neilson responded that we had thought humpbacks were not this vulnerable and were resilient in optimal conditions, and that it was surprising to discover they were so vulnerable to the heatwave. She said besides the bigger issues of curbing climate change, we need to continue long-term monitoring and increase protections such as approach regulations, managing whale watching pressure, and encouraging best practices. She said the prevailing narrative is that humpback whales are a conservation success story, but we now understand they are also an indicator of how fast things can change.

O'Corry-Crowe thanked Neilson and Moran and said they will watch closely as we prepare for next year's SARs. Neilson remarked that to end on a good note, humpback numbers in Hawaii look good this winter, and that hopefully Alaska will also have a good 2024 season.

Closing remarks

Williams thanked all meeting participants and organizers. She reiterated a welcome to new AKSRG members, Branson and Fournet. AKSRG members then met in a closed session to discuss their recommendations.