

Minutes from the Alaska Scientific Review Group Meeting
NMFS Alaska Fisheries Science Center, Seattle, WA
7-9 March 2022

This report summarizes the 2022 meeting of the Alaska Scientific Review Group (AK SRG), held virtually from 7 to 9 March 2022. 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

AK SRG members: Beth Concepcion, Donna Hauser, Eric Regehr, Greg O’Corry-Crowe (AK SRG Co-Chair), John Citta, Kate Stafford, Lorrie Rea, Megan Williams (AK SRG Co-Chair), Nicole Kanayurak, Thomas Doniol-Valcroze

NMFS:

- *Alaska Fisheries Science Center (AFSC)*: Alex Zerbini, Brian Brost, Brian Fadely, Burlyn Birkemeier, Catherine Berchok, Christy Sims, Dana Wright, Erin Richmond, Gavin Brady, LTJG James Freed, Janice Waite, Jeremy Sterling, Jessica Crance, John Bengtson, John Jansen, Katie Luxa, Katie Sweeney, Kim Goetz, Kim Shelden, Megan Ferguson, Michael Cameron, Michelle Lander, Molly McCormley, Nancy Friday, Nancy Young, Paul Wade, Robyn Angliss, Rolf Ream, Stephanie Grassia, Tammy Ahlers, Tom Gelatt, Vladimir Burkanov
- *Alaska Regional Office (AKRO)*: Jill Seymour, Jon Kurland, Julie Scheurer, Kathleen Leonard, Mike Williams, Suzie Teerlink
- *Northwest Fisheries Science Center (NWFSC)*: Kim Parsons
- *Office of Protected Resources (OPR)*: Eric Patterson, Jackie Taylor, Kristy Long, Shannon Bettridge
- *Office of Science and Technology (OST)*: Zachary Schakner
- *Pacific Islands Fisheries Science Center (PIFSC)*: Laura McCue
- *Southwest Fisheries Science Center (SWFSC)*: Aimee Lang, Jim Carretta

Fish and Wildlife Service (USFWS): Ashley Stilson, Charles Hamilton, Patrick Lemons

Marine Mammal Commission (MMC): Dee Allen, Dennis Heinemann, Erin LaBrecque, Hannah Wellman, Sam Simmons, Vicki Cornish

General Topics

Welcome and introductions

Megan Williams, AK SRG Co-Chair, welcomed everyone in attendance and highlighted some of the past year’s work that would be discussed during the meeting. John Bengtson then welcomed everyone and thanked the AK SRG for their commitment and assistance for providing their perspectives to assist the Marine Mammal Lab (MML) with the work they do. Bengtson acknowledged Mike Miller, who stepped down this year, for his many contributions to the AK SRG, as well as Marcia Muto, who retired at the end of 2021, for her years of help and assistance with the SARs and coordinating AK SRG meetings.

Bengtson and Williams thanked Young and Freed for arranging this year's meeting and Williams introduced the two new AK SRG members, Donna Hauser and Nicole Kanayurak. Samantha Simmons announced that she would be leaving the MMC and Erin LaBrecque would be filling her role. Young reviewed meeting protocols, logistics, and the VLab website.

Minutes from previous Alaska SRG Meeting

Freed asked if there was any opposition to accepting the 2021 AK SRG meeting minutes. There were no further comments and the minutes were considered final.

2021 Alaska SRG Meeting Recommendations

Williams reviewed the AK SRG's recommendations from their 2021 meeting. NMFS' responses were not available at the time of the meeting, but Young summarized the anticipated responses. Following the meeting, the AK SRG's recommendations and NMFS' responses were posted [online](#).

There was only a brief discussion of the responses. Lorrie Rea asked which climate science regional action plan (RAP) would include the Aleutian Islands. Williams guessed they would be in the Bering Sea RAP; following the meeting, NMFS confirmed that the Aleutian Islands would be the focus of their own RAP in the future. Williams noted an overall lack of marine mammal details in the Climate Fisheries Initiative documents and urged MML to maintain a strong link between NMFS and the AK SRG on the Initiative.

NMFS Headquarters updates

SRG membership review and Terms of Reference update

Schakner summarized NMFS' process for revising the SRG Terms of Reference (ToR), including soliciting input from the AK SRG. The revised ToR, available [online](#) and on the VLab website, have no large-scale changes and the SRG appointment tenure will remain a maximum of three consecutive three-year terms. Schakner stated that NMFS greatly values the SRG recommendations and requested that the SRG provide their recommendations within three months of the annual meeting so that NMFS has time to incorporate changes into the draft SARs. He also discussed the SRG member review process, highlighting the five strong nominations received in 2021 and optimism for increasing their reach for nominations moving forward. Schakner then mentioned that NMFS discovered a technical error with the Federal Register notice announcing availability of the 2021 draft SARs, which required extension of the public comment period.

Guidelines for Assessing Marine Mammal Stocks revision

Patterson provided an update on NMFS' revision of the Guidelines for Assessing Marine Mammal Stocks (GAMMS). He provided a high-level overview, since NMFS plans to provide more detailed in-depth webinars to the SRGs and MMC to answer any questions and before releasing the document for public review. Patterson said the SRG can provide comments at that time, or can wait until the public comment period. Patterson stated that revised policy is expected to be released for public review in late spring to early summer, finalized by the late summer in 2022, and implemented beginning with the 2023 SARs.

Patterson summarized the process of forming an internal working group and outlined the topics considered, including new topics as well as topics that were not finalized in the 2016 GAMMS revision. Simmons asked how the GAMMS pertain to the USFWS. Patterson replied that NMFS has mentioned the GAMMS revision to the USFWS and NMFS is happy to engage, but noted that the USFWS has not formally accepted the GAMMS and that there is nothing specific in the GAMMS that would impact USFWS.

Thomas Doniol-Valcroze asked whether current guidance relating to use of abundance data older than eight years still applies to the draft 2022 SARs. Patterson replied that NMFS is still using the existing GAMMS so the 8-year rule still applies. However, this will be addressed in the forthcoming revised GAMMS, which will describe options for using older data.

Doniol-Valcroze asked about peer review of the SARs. Patterson replied that peer review could be conducted by the SRG or external individuals or groups, depending on the specific topics to be reviewed (e.g., routine application of an existing model to estimate bycatch vs. first-time use of a new model). Schakner added that there are governmental requirements for levels of peer review and NMFS wants to ensure the SARs are meeting them. Doniol-Valcroze commented that it is not always clear to him if the SRG should be suggesting changes to the science or only changes to the interpretation of the science results and so it would be helpful to see more about the peer review process in the revised GAMMS.

Williams noted how this process has played out in the AK SRG. For example, during last year's meeting the AK SRG reviewed new abundance estimates for Southeast Alaska (SEAK) harbor porpoise; because the results had not yet been formally peer-reviewed, they were not included in that year's SAR.

SAR reviews and revisions

Schakner segued into how NMFS is looking internally at how to enhance SAR quality and peer reviews. He noted that this year there are fewer SARs to review by intention to try to streamline the SAR review process. He stated that, as required by the MMPA, NMFS would review SARs annually for strategic stocks, stocks that have new information, and stocks that have not been reviewed in 3 years. He described the difference between reviewing and revising, where reviewing involves using a decision matrix to consider whether any of the MMPA's conditions for revising a SAR have been met (i.e., if the status of stock has changed or can be more accurately determined), while revising involves going through the entire review and publishing process. He noted that more formally distinguishing between the review and revision steps is expected to streamline workflows and ensure the SARs that need revision get the highest quality peer review to create a higher quality SAR.

Simmons asked about the interpretation of the language of "can be more accurately be determined" and whether the availability of new mortality and serious injury (M/SI) information would contribute to more accurate stock status assessments. Young responded that she would be talking about this specifically on day 3 of the meeting. Young noted that it is tricky because M/SI estimates might not be available when the SARs are reviewed and so, depending on if it meets a certain threshold of change in M/SI, a SAR revision may not be needed as long as the M/SI information is made available elsewhere (e.g., in a report). Simmons appreciated the explanation and advocated that the SRG should be

consulted regarding the initial SAR reviews. Young agreed that it would be helpful to bring the SRG into the initial review process.

Doniol-Valcroze requested confirmation that strategic stocks would be reviewed annually though the SRG may not see them annually if not revised, which Young confirmed. Williams said that since there will be fewer SARs to review during the SRG meetings, it would be pertinent to make time to review the M/SI of strategic stocks that are not being revised to ensure they do not fall off the radar and are still being tracked by the SRG. O’Corry-Crowe confirmed that this is a sensible approach.

Serious Injury Policy revision

Jackie Taylor summarized the ongoing review of [NMFS’ policy for distinguishing serious from non-serious injury of marine mammals](#). NMFS found that the determination process is generally working well but established an internal working group to address topics for revision. Taylor indicated that NMFS plans to provide webinars to the SRGs and MMC in spring 2022, which may be paired with presentation of GAMMS revisions, with the goal of addressing SRG and MMC comments before releasing the documents for public review if time allows. Taylor said that the SRGs are welcome to comment during the public comment period as well.

Marine Mammal Nonlethal Deterrents rule

Kristy Long provided an update on NMFS’ progress in developing [guidelines for safely deterring marine mammals](#). She stated that NMFS received over 330 public comments on the proposed rule, most of which were generally supportive of the guidelines and measures. Some commenters requested more protective measures for marine mammals and/or prohibiting certain deterrents (e.g., seal bombs), while others asked for more flexibility for using deterrents and having as many options as possible. Other commenters requested that the guidelines evaluate the effectiveness of the deterrents, however, Long stated that NMFS does not have the capacity to do so. Long noted some important updates since the proposed rule was published, including new science on otariid acoustic thresholds and forthcoming updates in NMFS technical guidance for assessing effects of anthropogenic sound on marine mammal hearing. Long explained that the NMFS Office of Protected Resources is working with NMFS Regional Offices, Science Centers, General Counsels, and the Office of Aquaculture to determine how NMFS will respond to the public comments and how to incorporate this new information into the final rule, with the goal of publishing a final rule in summer 2022.

MMPA 101(a)(5)(E) permits

Long described NMFS’ recent [authorization](#) under MMPA section 101(a)(5)(E) to take Endangered Species Act (ESA) listed humpback whales in the Alaska Bering Sea Aleutian Island Pacific Cod pot fishery. As part of the requirements for issuing such authorization, NMFS determined that the M/SI had a negligible impact on the affected species or stock by comparing the M/SI to the negligible impact threshold. The final authorization was published on February 3, 2022 and is effective for three years, however, Long indicated that NMFS may need to revisit the authorization once the new humpback whale stock designations are finalized.

Doniol-Valcroze requested a reminder of the negligible impact threshold, how it is calculated, and how it compares to PBR, and Long provided that. Patterson shared a link to the negligible impact criteria

[procedural directive](#) and Long shared the authorization's [Federal Register notice](#). Williams asked about the process that triggers this process, which Long said is whether the fishery is a Category 1 or Category 2 fishery on the [MMPA List of Fisheries](#) and whether the fishery has incidental M/SI of ESA-listed marine mammals.

Eric Regehr asked if there is a biological basis for the PBR and negligible impact thresholds and stated that these thresholds are like comparing apples and oranges depending on whether the stock is subject to natural predation. Wade responded that natural mortality would be absorbed into the R_{MAX} factor in the PBR calculation and the GAMMS allow for adjustment to R_{MAX} from the default values based on stock-specific information. Doniol-Valcroze mentioned that they have faced a similar situation for harbor porpoise along the west coast of Canada where populations are declining in some areas, presumably from killer whale predation. He noted there is reluctance to change R_{MAX} unless there is very good data, whereas managers seem more agreeable to adjust the recovery factor and managers have opted for a more precautionary recovery factor for harbor porpoise. Regehr suggested that NMFS and the SRG might want to revisit this in the future when looking at the ringed seal SAR. Patterson assured Regehr that NMFS' framework has a lot of protection built into it and so in reality it would take a significant predation pressure above and beyond what is already accounted for in the conservative nature of PBR for it to become an issue.

USFWS Updates

Williams provided a brief summary of the SRG's 2021 recommendations related to USFWS-managed species and Lemons summarized USFWS's responses, which are available on VLab. While he could not discuss the specifics of the walrus and sea otter SARs because of ongoing litigation, he noted that USFWS aims to have draft revised SARs ready for public comment by the end of 2022 and present them at the 2023 AK SRG meeting. Lemons stated that following publication of the draft polar bear SARs in June 2017, USFSC incorporated public and SRG comments and sent them to headquarters but they were not released until June 2021. He noted that based on USGS radio satellite tagging data, the Southern Beaufort Sea population has remained stable from 2010 to 2016 and so USFWS decided not to update the SAR in 2021. Lemons noted that there are many partners involved and USFWS is waiting on the results from a variety of projects including genetic mark-recapture, aerial surveys, and an instrument-based approach all aimed at providing stakeholders with updated information. In regards to the Chukchi Sea polar bear SAR, Regehr noted peer-reviewed science on abundance and harvest risk assessment that has been published since 2016 but not incorporated into the SAR. While the SAR discusses management changes through 2020 and increases in harvest levels in 2018, the PBR value remains outdated and much smaller than the sustainable harvest level. Lemons acknowledged his concerns and reiterated that this SAR was just finalized after a long delay and he anticipates updating it in the next year.

Lemons began his presentation by providing an update on northern sea otters. He summarized completed, ongoing, and upcoming activities and publications related to the three stocks in Alaska, including studies on genetics, contaminants, life history events, impacts of mariculture activities, abundance, distribution, and status.

O’Corry-Crowe asked about unusual mortality events (UME) and if USFWS does any metagenomics work, environmental barcoding, or microbiome studies to document and categorize the different pathogens in the environment in which the animals live. Lemons replied that there is nothing he knows of but would be interested in discussing more. O’Corry-Crowe replied that those studies in the far western regions could be coordinated with other marine mammal studies and that it would be great to keep the conversation going. Williams expressed interest in the ongoing mariculture research. Lemons replied that they are currently trying to gather information on the spatial extent of farms, which are right over prime sea otter habitat, and working with farmers to gather information on their interactions and how they are trying to keep otters out. He also mentioned some large farms that are being permitted and after they open, they plan to have a monitoring program. He did note that they are very early in the process as this all has come on very rapidly over the past couple of years and that it is likely a very widespread issue.

Lemons next presented information on the Pacific walrus stock and summarized completed and ongoing research activities including a genetic-based mark recapture effort that produced an abundance estimate more than twice of what was previously estimated in 2006. Other studies include a behavioral assessment of auditory thresholds and how they respond to aircraft, haulout mortality estimation, development of a harvest risk assessment and a potential consequence of disturbance model, and continuation of co-management with the Eskimo Walrus Commission. Upcoming work includes population assessment, harvest risk assessment, and close-kin mark recapture model development.

Last, Lemons mentioned the two stocks of polar bears, noting that USFWS is developing an ESA species status assessment, which should be completed in July 2022 and will inform the next five-year review. He mentioned that the SARs drafted in 2017/2018 were not released until 2021 so they are missing a lot of new information that has come out since. Lemons reviewed the completed research and monitoring activities, which included evaluating the efficacy of aerial infrared surveys to detect artificial polar bear dens, modeling spatiotemporal abundance and movement dynamics using an integrated spatial capture-recapture movement model, evaluating the effects of human disturbance on denning polar bears, intra-population differences in polar bear movement and resource selection patterns, and behavioral response of polar bears to aircraft overflight in autumn. He then described the upcoming work on bear behavior in relation to boat-based viewing activity, evaluating the use of deterrents, estimating the impacts to onshore polar bears from simulated oil spills, quantifying the phenology of den emergence and departure, identifying the presence of offspring from movement data of adult female bears, validation of noninvasive tools for evaluating ursid body mass, and determining the feasibility of Kotzebue as a base of operations for future capture-recapture monitoring efforts in the Chukchi Sea. Lemons also indicated the Russia-US program work that is currently on hold.

Regehr asked about methods for assessing polar bear body condition (i.e., physical or chemical analysis vs. visual analysis). Lemons replied that it would most likely be visual based and done in association with known metrics from USGS capture work. Williams asked if the anthropogenic impact-focused research is being driven by funding sources, to which Lemons replied that their research on anthropogenic impacts on polar bears is being driven by what they have been seeing over the last 5 years in the southern Beaufort Sea, where PBR is being exceeded by human removals. He stated that

while PBR is not the only metric determining sustainable levels of impact, USFWS is still concerned. USFWS understands that oil and gas development on the North Slope have the potential to cause more impacts and more lethal takes than previously thought, so that has motivated them to invest and to better understand the total amount of human caused removals that may be impacting the stocks. Lemons emphasized that while USFWS is concerned about the impacts of climate change, the agency must focus on things that can be controlled or managed, such as impacts to denning bears and take authorizations.

O’Corry-Crowe asked if USFWS would consider the potential value of metagenomics work to look at not just health of the bears but also behavior, habitat use, and stocks in different regions. Lemons acknowledged that he was not a geneticist and suggested bringing in polar bear researchers to discuss this further, which O’Corry-Crowe agreed. Lemons also mentioned that he has shared the walrus close-kin mark-recapture work with the polar bear program because he thinks close-kin mark recapture could be game changing in regards to better estimating the polar bear population. Regehr asked whether USFWS is considering designating polar bear DPSs given evidence that subpopulations are faring differently around the Arctic. Lemons replied that it is not being discussed explicitly and the ESA species status assessment is being developed for the species as a whole, but information is being gathered to assess those types of questions.

Marine Mammal Lab overview

Bengtson provided an overview of the MML fiscal year 2022 (FY22) budget, which at the time of the meeting had yet to be confirmed but MML assumed would be similar to the FY21 budget. He described the MML leadership organization, highlighting changes including selection of Nancy Friday as the new deputy director and program leader changes to three of the four MML programs. Bengtson shared that MML plans for a full survey year and summarized the process by which MML sets its annual priorities given limited budgets, changes in political administrations, and new information needs that come up. Finally, he listed the projects that could be completed in FY22 and indicated the projects that are scheduled to be completed, those that they will attempt to complete, and those that they want to do but are unable to afford.

NMFS Alaska Regional Office updates

Jon Kurland first stated that the Alaska Regional Office (AKR) does not have many updates but that wanted to ensure there was time set aside to answer the SRG’s questions. Suzie Teerlink described two projects that are being funded by AKR, including 1) uncrewed aircraft system (UAS) work and 2) using HappyWhale data in combination with genetic information to produce estimates of abundance for Southeast Alaska humpback whales and to differentiate between the humpback whale DPSs in each area of Alaska. Teerlink mentioned that AKR is supporting a workshop for fishermen and fisheries managers on marine mammal deterrence, focusing on Alaska gillnet interactions with harbor porpoises but also considering all marine mammal interactions with gillnets. She said there would be a national meeting this spring to provide the lessons learned in Alaska as well as a regional workshop on the Atlantic coast this summer that will bring in participants from around the country who have worked on similar efforts the last couple of years.

Williams requested more information on NMFS' engagement with SEAK gillnet fishermen and how NMFS is collaborating with stakeholders to get the word out. Teerlink first noted that AFSC leads the effort to understand various scientific components of the issue, including estimating harbor porpoise abundance, evaluating stock structure with genetic and other data, and establishing a marine mammal observer program for the state fishery. She stated there is interest and some likelihood that there will be funding to do some more observations. Teerlink also described AKR's outreach efforts, such as a presentation at the SEAK Gillnet Task Force meeting and follow-up meetings with key stakeholders, as well as plans to brief ADF&G biologists that manage the salmon fishery. Teerlink stated that AKR is working to build a foundation of outreach in talking to stakeholders about NMFS' concerns and sharing updates on studies to keep them in the loop. Kurland added that the harbor porpoise stock delineation issue has been key to informing stakeholders on how big of a bycatch problem there is and AKR is excited on how it has progressed and that the SRG will be reviewing the harbor porpoise work AFSC has done.

SEAK harbor porpoise

Alex Zerbini summarized the current MMPA designation of three harbor porpoise stocks in Alaska, the boundaries of which have been unchanged since they were first delineated in 1997. Zerbini noted that since 2008, the Alaska harbor porpoise SARs have suggested that harbor porpoise stock structure is likely on a finer scale than what is currently reflected. He and Kim Parsons then described NMFS' recent effort to review and document the lines of evidence (distribution gaps, trends in abundance, and genetics) NMFS used to evaluate the delineation of demographically independent populations (DIP), as prescribed by NMFS' DIP Delineation Handbook (Martien et al. 2019¹). This evaluation is documented in a draft NOAA Tech Memo (Zerbini et al. in prep²) that was available for SRG review. Zerbini presented a map of SEAK harbor porpoise distribution from aerial and ship surveys and highlighted gaps in the coastal distributions of porpoises near Cape Suckling, Cross Sound, and Dixon Entrance. Zerbini then pointed out areas in SEAK inland waters that could represent geographic barriers between the northern and southern areas, including Dry Strait, Wrangell Narrows, Keku Strait, and Lower Chatham Strait. He then discussed Dahlheim et al.'s (2015³) evaluation of differences in trends in harbor porpoise abundance in sub-regions of SEAK inland waters. That analysis found that the trend was steady near Glacier Bay/Icy Strait but abundance declined steadily around Wrangell/Zarembo from 1991 to 2010 at a rate of 2-4% per year. Parsons then summarized the evaluation of harbor porpoise population genetic structure throughout Alaska as well as in SEAK in particular. Parsons and colleagues found genetic differentiation within the inland waters of SEAK between those samples collected in the northern region and those to the south, with the southernmost area of the northern SEAK harbor porpoise population located near Kake. Parsons noted

¹ Martien, K.M., A.R. Lang, B.L. Taylor, P.E. Rosel, S.E. Simmons, E.M. Oleson, P.L. Boveng, and M.B. Hanson. 2019. The DIP Delineation Handbook: A Guide to Using Multiple Lines of Evidence to Delineate Demographically Independent Populations of Marine Mammals. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-622.

² Zerbini, A.N., K.M. Parsons, K.T. Goetz, R.P. Angliss, and N. C. Young. In prep. Identification of three demographically independent populations within the currently designated Southeast Alaska harbor porpoise stock. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-XXX.

³ Dahlheim, M.E., A.N. Zerbini, J.M. Waite, and A.S. Kennedy. 2015. Temporal changes in abundance of harbor porpoise (*Phocoena phocoena*) inhabiting the inland waters of Southeast Alaska. Fishery Bulletin 113(3):242-255.

low sample sizes within certain regions of the currently designated SEAK stock, including coastal and offshore waters and waters around Yakutat Bay.

Zerbini then summarized the findings of Zerbini et al. (in prep) that delineated two harbor porpoise DIPs in SEAK inland waters, a northern SEAK inland waters DIP and a southern SEAK inland waters DIP, and grouped the remaining harbor porpoise within the range of the SEAK stock as the Yakutat/SEAK offshore waters “unit”. Zerbini then discussed data availability and limitations, particularly the need to evaluate the existence of sub-structure within the Yakutat/SEAK offshore waters unit and the relationship between porpoises in the unit and those in the inland waters DIPs.

John Citta asked whether there is a biological reason to assume there is no harbor porpoise movement between offshore and inland waters. Zerbini replied that we lack data to determine the connection between animals in offshore and inland waters, but it is known that harbor porpoises typically remain in small areas and limited tagging data show that they do not move long distances. He acknowledged that there are harbor porpoises close to the outer coast and so those animals might come into inland waters, but they do not know. Parsons added that there is some indication that in neighboring areas such as Copper River and Cook Inlet, inshore and offshore harbor porpoise are different, and emphasized that it would be helpful to get eDNA samples to address the question, especially from Sitka, AK where she has heard of offshore spring surges in harbor porpoises. Citta then asked, given the lack of available data on movements or connectivity, whether the delineation of separate groups between inland and offshore waters was due to conservation concern for the inland waters animals, which Zerbini confirmed.

Kate Stafford asked what additional data would be needed to address the data limitations, such as eDNA, acoustic sampling, or sighting surveys. Zerbini and Angliss replied that the two highest priorities are collecting and analyzing more eDNA samples and conducting offshore surveys to better understand abundance on the outer coast. Angliss suggested that if the SRG have any comments on what should be prioritized, it would be useful to know, but noted that there are far more priorities in cetacean research than there are resources available. In reality, any resources put towards SEAK harbor porpoise would be competing with things like North Pacific right whales. It is unlikely NMFS would find additional resources for more SEAK harbor porpoise work, which is why the DIP evaluation and proposed stock split are the best step NMFS can do with available resources.

Regehr asked if there is a broad calculation or way to equate genetic differences to dispersal rates or to something quantitative and demographic. Parsons replied that the limiting factor is the lack of tissue samples and stated that if they had the SNP data, then they could potentially estimate the number of potential migrants, which could provide evidence of significant differentiation. She said that since they are limited to eDNA samples and mitochondrial sequences at the moment, it would be a bit of a reach to estimate potential migrants. O’Corry-Crowe commended the study and progress being made but commented that while the SNP analysis could be key to understanding that, the mtDNA does not prove demographic independence of philopatry at all. He stated that Parson’s combination of nuclear and mtDNA could look at kinship and directly measure whether close relatives are staying home or leaving and that is the only way genetics can measure philopatry and demographic independence. Parsons agreed and stated that the data show significantly higher estimates of relatedness among harbor

porpoises sampled in the particular geographic region than all the other regions where they have significantly higher estimates, so it reinforced the patterns they saw from the mtDNA.

Beth Concepcion requested clarification regarding whether the stock has been split or if it is still at a proposal stage. Patterson stated that as outlined in the MMPA stock policy, SARs are not final until signed by the NMFS Assistant Administrator. For now, it will remain a draft proposal to split the SEAK harbor porpoise stock into three stocks, but NMFS scientists wrote the draft SAR to reflect the split because that is the direction they think they are headed, but until finalized, the three new SEAK harbor porpoise stocks will remain as proposed stocks and can be identified that way.

Review draft 2022 SEAK harbor porpoise SAR

Doniol-Valcroze expressed appreciation for efforts made to trim the SAR down and remove previous abundance estimates to make it more to the point. He suggested that text be added to define $g(0)$ and specify whether it addresses availability bias or perception bias. He also noted that $g(0)$ is newly applied to the SAR this year and remains unpublished and not reviewed outside of this group. Zerbini replied that while the $g(0)$ estimate has not been published, it was calculated based on published methods (Barlow 2015⁴). Doniol-Valcroze responded that he is in favor of applying it this year.

Citta commented that NMFS' choices for delineation of the stock make sense. He pointed out that the SAR says the mortality estimates are minimum estimates and asked whether NMFS is trying to get better observer coverage and better M/SI estimates. Angliss stated that AFSC is interested in pursuing this to get a better understanding of M/SI. She reminded the SRG that the AFSC's Fisheries Monitoring and Analysis (FMA) division is now responsible for the observer program and there has been some startup money provided but it has been a slow start. Citta noted the SRG's historical frustration with NMFS prioritizing funding for species facing threats that are very difficult to change (e.g., ice seals and climate change) rather than harbor porpoise, for which something can be done if the money is provided. Angliss stated that it is helpful to have the SRG make recommendations regarding priorities. She said that it was not only MML but also OPR that heard the call to do something about bycatch and so with NMFS Office of Protected Resources' funding, Zerbini and Kim Goetz have been and are currently implementing baseline monitoring of whether pingers will successfully deter harbor porpoises from nets. Bengtson said that MML appreciates the SRG's perspective on where MML should study and what management decisions should be taken but he reminded him that when money is provided from Congress, the appropriations have specific guidelines on how they are spent. He stated that there is not one pot of money that MML decides where to spend and MML also shares the frustrations in where they can spend money and the lack of money, but he appreciates his perspective.

Regehr summarized his thoughts on the SAR and asked why the Northern SEAK Inland Waters stock is not strategic even when the M/SI is approaching PBR and there is only 5% observer coverage. Angliss replied that the numbers we have do not justify a strategic status. Regehr suggested that if observer coverage were increased from 5% to 100%, M/SI would likely go up, and it would only take one or two additional animals to exceed PBR. Angliss replied that they do not know what total M/SI would be and

⁴ Barlow, J. 2015. Inferring trackline detection probabilities, $g(0)$, for cetaceans from apparent densities in different survey conditions. *Marine Mammal Science* 31(3):923-943.

that there are many situations where they rely on extrapolated numbers due to low observer coverage. Regehr asked if the estimates for the SEAK salmon drift gillnet fishery have been extrapolated, which Angliss confirmed. Young clarified that the estimates from Manly (2015⁵) are not extrapolated to the entire SEAK salmon drift gillnet fishery or the entire harbor porpoise stock range; observed harbor porpoise bycatch was only extrapolated to the fishing subdistricts that were observed. Regehr then asked about the percent observer coverage listed in Table 1 of the SAR, and Young replied that those are overall coverage of the five observed subdistricts in each year and do not reflect total fishing effort in other fishing districts nor total fishing effort throughout the range of the harbor porpoise stocks. Citta commented that he also struggled with the M/SI estimates while reading the SAR and asked about the methods for assigning M/SI to a particular stock when the fishing subdistricts span two different stocks. Young replied M/SI were assigned to a stock based on location, with any take in subdistrict 8A assigned to the Northern SEAK Inland Waters stock range while any take in the other observed subdistricts were assigned to the Southern SEAK Inland Waters stock

Young stated that, based on the SRG members' questions, the SAR text is not clear and NMFS needs to clarify the text in this section of the SAR. Patterson commented that this subject will be addressed in the revisions to the GAMMS and it will discuss how to deal with information from only a portion of a stock's range.

Summary of co-manager review of 2020 EBS beluga whale SAR, request for SRG advice on scientific points raised in ABWC letter

Kurland opened the discussion expressing that this has been a painful issue after discovering that there had been miscommunication between NMFS and the Alaska Beluga Whale Committee (ABWC). He described NMFS' authority under MMPA section 119 to enter cooperative agreements with Alaska Native Organizations and NMFS' cooperative agreement with the ABWC. Under the agreement, both parties consult one another on issues that include, but are not limited to, any possible change in designation or status of western Alaska beluga whales under the MMPA. He then explained that the Eastern Bering Sea (EBS) beluga whale 2020 SAR was not appropriately consulted with the ABWC. Kurland stated that this event led NMFS to identify a need for an explicit step in the SAR revision and review process to send draft SARs for subsistence harvested stocks to co-managers for review before public review. NMFS temporarily withdrew the 2020 EBS beluga whale SAR to allow time for the consultation. The ABWC provided technical feedback on various aspects of the SAR and requested that NMFS work with the AKSRG to evaluate the technical issues. Kurland stated that NMFS plans to keep the 2020 SAR withdrawn while staff work on a revised SAR and will consult with the AKSRG at a later date.

Megan Ferguson provided an overview of the 2017 EBS beluga whale abundance estimate that was cited in the now-withdrawn 2020 SAR, outlined the ABWC's scientific concerns, and provided responses. She stated that the 2017 abundance estimate is a designed based analysis with the same

⁵ Manly, B.F.J. 2015. Incidental takes and interactions of marine mammals and birds in districts 6, 7, and 8 of the Southeast Alaska salmon drift gillnet fishery, 2012 and 2013. Final Report to NMFS Alaska Region. 52 p.

geographic strata as Lowry et al. 2017⁶, which were based on the 2000 survey. As for detection bias, the analysis accounted for the effects of perpendicular sighting distance and a suite of other potential covariates that affect perception bias, the most important being Beaufort sea state and turbidity, but did not account for transect detection probability because at the time, they did not have the data to do so. For availability bias, she reported that they assumed a correction factor of 2.0, which was consistent with the analysis in Lowry et al. 2017 and she believed the consistency was important in terms of looking for potential changes in population.

Ferguson discussed each of the ABWC's four comments related to negative biases in the abundance estimate. First, the ABWC commented that the 2017 aerial survey did not cover the full seasonal range of the EBS beluga stock; Ferguson responded that, given the relatively high density of belugas at the southernmost range of the survey, the study area of the next survey would be extended southward to Scammon Bay but cannot do anything with the existing data. Second, the ABWC suggested that the availability bias correction factor (2.0) is conservative; Ferguson responded that NMFS is following up with the North Slope Borough and John Citta to understand the preliminary results of fieldwork that has resulted in a conclusion that the correction factor is negatively biased. Third, the ABWC commented that small, dark animals are likely undercounted in aerial surveys and the availability bias correction factor may not adequately account for this. Ferguson explained that to estimate the probability of detecting a beluga whale by color, beluga color would need to be recorded for every animal sighted during aerial survey and independent data are needed for a mark-recapture analysis. Ferguson noted that MML's aerial survey protocols in 2017 did not collect information on beluga coloration, only number of calves, and MML's existing aerial imagery likely have insufficient resolution to identify dark belugas. She also noted that the proportion of dark animals in the population is expected to vary annually with calf production and survival, so it would not be accurate to use a correction factor derived from another survey to estimate this source of bias. She stated that future survey protocols would need to be revised to derive this correction factor. Fourth, the ABWC noted that the 2017 estimate was not correct for transect detection probability, which Ferguson responded that they now have data to address that issue. She said that using the methods from Hamilton et al. (2017⁷) and aerial survey imagery from Aerial Surveys Of Arctic Marine Mammals (ASAMM), she derived an estimate of transect detection probability, which would be a probabilistic way of addressing whether sightings from one observer match the sightings from an independent observer.

The ABWC also recommended using an R_{MAX} of 4.8%, based on a published estimate of growth in the nearby Bristol Bay population (Lowry et al. 2008⁸), instead of the default value of 4.0%. Ferguson mentioned that NMFS used the default 4.0 since there is not a stock-specific estimate but discussions are ongoing. Finally, Ferguson noted that some of these issues are also applicable to other Alaska

⁶ Lowry, L.F., A. Zerbin, K.J. Frost, D.P. DeMaster, and R.C. Hobbs. 2017. Development of an abundance estimate for the eastern Bering Sea stock of beluga whales (*Delphinapterus leucas*). *Journal of Cetacean Research and Management* 16:39-47.

⁷ Hamilton, O.N.P., S.E. Kincaid, R. Constantine, L. Kozmian-Ledward, C.G. Walker, and R.M. Fewster. 2017. Accounting for uncertainty in duplicate identification and group size judgements in mark-recapture distance sampling. *Methods in Ecology and Evolution* 9(2):354-362. DOI: 10.1111/2041-210X.12895.

⁸ Lowry, L.F., K.J. Frost, A. Zerbin, D. DeMaster, and R.R. Reeves. 2015. Trends in aerial counts of beluga or white whales (*Delphinapterus leucas*) in Bristol Bay, Alaska, 1993-2005. *Journal of Cetacean Research and Management* 10(3):201-207.

beluga whale SARs except for Cook Inlet belugas. Ferguson then outlined proposed next steps, including seeking SRG feedback on the issues raised, completing a revised EBS beluga abundance estimate, discussing the updated abundance estimate with co-managers, seeking SRG review of the revised estimate and draft EBS beluga SAR, and making the revised abundance estimate and draft EBS beluga SAR available for public comment.

Doniol-Valcroze had positive comments regarding the presentation and the path moving forward. Regarding the survey area, he suggested that they could work out the maximum increase they would expect if they apply the observed density to a slightly bigger area. Ferguson replied that she did not feel comfortable doing an extrapolation outside the surveyed area based on space alone because her existing density surface model was only based on space and did not incorporate environmental covariates. Doniol-Valcroze agreed this makes sense.

Citta requested that Ferguson expand more on the transect detection probability (perception bias) correction factor and what it does. Ferguson replied that a correction factor for one component of perception bias had already been applied. She described how detection functions are fitted to line-transect data that reflect that it is easier to detect animals closer to the plane. Ferguson found that the shape of the detection function is largely due to the perpendicular distance from the plane but is also a function of beaufort state and turbidity. She said that having data from just one team of observers only gives the shape of how quickly the detection function goes to zero with distance, but independent observers are needed to let you know the intercept of the detection function. Ferguson noted that they have independent observer data from ASAMM aerial imagery that can be used to estimate the intercept of the detection function; the ASAMM data are not from Norton Sound but they are the best they have.

Citta noted that he agreed with Ferguson that a constant correction factor should not be used for the proportion of calves. He said that some people have used an 18% correction factor for years, but correction factors are dependent on animal behavior, the environment, and other factors. With regards to availability correction factors, which account for animals not available to be counted because they are diving, Citta said that the ABWC had asked him to look into estimating correction factors using their satellite tag data but it does not work very well, especially for Norton Sound where fresh water affects the ability of the tags' saltwater switches to distinguish water from air. In effect, tags have trouble recording when they are actually at the surface and visible to aircraft because the tag thinks it is at the surface, when in fact it is below the surface.

Regehr asked Kurland whether NMFS is considering developing guidance that goes beyond what the co-management agreement outlines about how they communicate with ANOs or partners specifically for belugas. Kurland confirmed that on day three Young would present information on creating an explicit step in the SAR development and review process for communication and coordination with ANOs whenever there is a substantial change to a SAR subsistence harvest stock. Regehr then asked whether PBR is an appropriate metric to compare against subsistence harvest for the purpose of designating a stock as strategic. Kurland stated that is a challenge and they welcome SRG input to consider the issue, but Patterson noted that the MMPA requires a comparison of total human-caused

mortality and serious injury, which would include subsistence harvests, to PBR, so other than modifying PBR values (e.g., recovery factor, N_{MIN}), this cannot be changed without an act of Congress.

Citta conveyed that the ANOs feel that that PBR is not intended to apply to subsistence harvest, and while he does not know whether that is true, he suggested that this would become a bigger issue as marine mammal populations begin to decline with declines in sea ice. Kurland replied that it is clear that NMFS must base their determination of strategic status on the status relative to PBR and that is the framework they are under. Williams referenced the ABWC's letter of concerns where they state that it is inappropriate to use the PBR protocol for setting management thresholds for subsistence harvest of marine mammal in Alaska and should use an alternate protocol that meets the mandates of the MMPA, and asked for NMFS' stance on this. Kurland replied that there is currently nothing they can work through and that they have been clear with ABWC about that. He stated that they hear their concerns and all that can be had is an intellectual discussion around the propriety of basing the designation on PBR and that they will need to work on the current framework.

O'Corry-Crowe commended Kurland and stated that progress is made from issues like this. He then commented that there are potential problems with the lack of consultation built in and echoed Ferguson's indication that there might be bigger fundamental problems present with estimating beluga whales, which has been a long overdue discussion. He stated that PBR being applied to subsistence gets to the heart of the management and co-management objectives and that it will take something dramatic as said by Patterson.

Bengtson appreciated the discussion and emphasized MML's commitment to work with Alaska Native partners and the SRG to pursue a solution and develop a revised EBS beluga SAR as soon as possible. Young noted that NMFS does not plan to withdraw other beluga whale SARs that may have similar analytical issues, but plans instead to provide a footnote in those SARs to note that NMFS recognizes issues may exist and will be addressed in future SARs if warranted. She welcomed SRG feedback on that approach.

Marine Mammal Lab research updates

PacMAPPS and plans for ArMAPPS

Crance provided background and the objectives of the PacMAPPS surveys. She explained the shared interest among government branches within the US exclusive economic zone and noted the other past MAPPS (Marine Assessment Program for Protected Species) surveys in other bodies of water around the US, including those already completed as part of PacMAPPS. The final piece within the Pacific was the Gulf of Alaska, which was completed on a 25-day survey leg at sea that resulted in over 2,300 km of on-effort survey transects, 667 marine mammal sightings, 96 deployed sonobuoys, 20 CTD casts, 117 nutrient samples, and the retrieval and deployment of long-term passive acoustic moorings. Crance provided details on the sightings including the locations and species, and highlighted two separate North Pacific right whale sightings. She explained that the next steps are to finish the analysis, including calculating $g(0)$, create density and abundance estimates, create spatial density maps from both a design-based and model-based estimate, calculate abundance estimates using the $g(0)$ correction factor, and then distribute the results for publications.

Angliss highlighted that this survey had been planned for 2022 but with little notice and a huge amount of effort to switch gears while on another research project, Crance, with Goetz and Angliss, was successfully able to put the survey together in 2021. Angliss explained the multi-year plan of PacMAPPS and their hopes to do another survey in the Gulf of Alaska when resources are available. She stated that they are actively pursuing acoustic work in that region. ArMAPPS would be conducted using aerial- or vessel-based surveys, depending on the focus in the particular year and given that, the optimal platform depends on the species. She said the first ArMAPPS project would be the EBS beluga whale survey in spring 2022, followed by cetacean vessel surveys in the Bering Sea in 2024 or 2025. She mentioned that the bowhead whale abundance survey is a key survey traditionally done using ice-based census from the North Slope Borough (NSB) using Ferguson's analysis, but aerial surveys to get bowhead whale abundance may be a viable method. She noted that they are proposing to complete another bowhead whale survey in 2025/2026, however she highlighted that it is a very expensive project that requires significant partnerships to make it happen, which will take a while to bring together. Angliss said their goal was to complete the bowhead whale survey in 2025 if funds are available in order to have enough time to put a report together for the IWC by 2029. She then stated that they would also like to do offshore cetacean surveys in the Chukchi Sea from either a vessel or aerial platform, and finally, they will be continuing to pursue year-round movements and distribution information using acoustics from both cetaceans and pinnipeds in the Bering, Chukchi, and Beaufort Seas. She noted that they do not have base funding for the long-term support of PacMAPPS and ArMAPPS and that they are relying on partnerships from other agencies and management groups, such as ABWC, NSB, BOEM, and the US Navy. Angliss was also aware that NMFS has been trying new initiatives internally to bring in support directly for SAR-related work given that AFSC, like other Science Centers, are short on SAR funds.

O'Corry-Crowe was interested in the timeline that showed more surveys happening in later years. Angliss replied that they try to distribute the work evenly between years but there are several realities to consider, such as NOAA white ships being slightly more available during odd years than even years, as well as trying to make sure subsistence harvested stocks get a new abundance estimate every 8 years.

Concepcion was interested in hearing more about the North Pacific right whale sightings around Unimak Pass. Crance shared that a fisherman notified ADF&G, which contacted the stranding network, which contacted her research team. She reported that they did not get high enough quality photos or videos to match any of the animals to the catalog of known animals, but they were able to respond by sending notifications out via the USCG and the AIS messaging system to alert mariners of whales in the area.

Cook Inlet beluga whale abundance estimation

Wade provided an update to the recent aerial surveys. He mentioned since the 2018 surveys, the 2020 survey was canceled and rescheduled for 2021. The 2021 video group size analysis was recently completed and an abundance estimate is anticipated to be available by June. Due to weather, they only got two survey days in the upper inlet and the survey days they had were not during the ideal minus tides, so they had to pivot to line transect surveys given that the animals were more dispersed

at high tides. He mentioned that Kim Goetz is leading a project using very high-resolution satellite images as part of the geospatial artificial intelligence for animals (GAIA) collaboration, with the help from crowdsourcing to select satellite images to be analyzed. He stated that Goetz is working through data validation to confirm if the sightings are whales and that they will use images on survey days to see if there are whales outside of the survey area.

Wade then summarized when the UAS surveys and photogrammetry work takes place, their progress in analyzing the data collected from previous years, and the methods of the analysis. Wade reported preliminary results of the 2019 survey (~20% of photos still being matched): a standard closed population mark-recapture model with constant capture probability gives an abundance estimate of 267, while the preferred Chao model that includes heterogeneity in capture probability gives an estimate of 271 animals; these are remarkably similar to the 2018 estimate of 269. Wade said he thought this was a good indicator that mark recapture estimates could be used as a supplementary method or possibly a replacement for aerial surveys. Wade then discussed some future plans moving forward including the use of artificial intelligence/machine learning through a contract with WildMe and BOEM to develop an algorithm to match individuals between photographs.

Wade then said that the SRG had asked about looking at life history parameters of stranded whales, noting that McGuire et al. (2020⁹) analyzed stranding data very carefully in relation to photo-identification catalogs. Wade also noted that there is some unpublished work in progress from a UW PhD student (Amanda Warlick) working on an integrated model fit to the aerial survey estimates and McGuire's photo-identification catalog and is pulling out annual life history parameter estimates. Wade highlighted that survival and fecundity took a dip in 2010 to 2012, possibly related to reduced Chinook salmon runs in Cook Inlet. With recent heat waves in the region from 2016 through 2020, they will be looking to see if there are further declines in life history parameters in more recent years.

North Pacific right whale recent research and future plans

Crance stated that other than future IWC POWER cruise surveys, MML is focusing on continued long-term passive acoustic monitoring. They are looking into increasing the spatial coverage of recorders into new areas primarily in the western habitat, as well as collaborating with DFO Canada to ground truth acoustic detection data. Stafford expressed interest in the automatic detection and classification system. Crance replied that it was a combination of spectrogram correlator and energy detector and they are working on incorporating machine learning. They both discussed the details of the classification and Catherine Berchok added that it uses a random forest model for classifications and that they have had better success with this than with Mark Baumgartner's (WHOI) low-frequency detection and classification system.

Crance discussed the goals of the POWER surveys and that they eventually hope to be able to compare western North Pacific right whale calls to the eastern calls to see if their vocalizations are different

⁹ McGuire, T.L., K.E.W. Shelden, G.K. Himes Boor, A.D. Stephens, J.R. McClung, C. Garner, C.E.C. Goertz, K.A. Burek-Huntington, G. O'Corry-Crowe, and B. Wright. 2020 Patterns of mortality in endangered Cook Inlet beluga whales: Insights from pairing a long-term photo-identification study with stranding records. *Marine Mammal Science* 37(2): 492-511. DOI: 10.1111/mms.12766.

between the two stocks. Crance stated that she thinks they have enough evidence to say they are genetically distinct based on biopsy data. Crance described the increased outreach efforts they are pursuing with other government agencies as well as the public and Alaska Native communities. She mentioned efforts to identify North Pacific right whale migratory patterns and calving grounds through stable isotope analysis using baleen plates and their continued work on whale call identification and processing.

Angliss identified prioritized information needed on North Pacific right whales, including occurrence, distribution, and range and MML's long-term research plans with the available resources. She noted the various research approaches they can take including expanding the acoustic mooring network and working with subsistence hunters.

Williams asked about the proposed work and wanted to know how certain areas are prioritized over others. Crance and Berchok both explained the existing mooring network is dictated primarily by the cruise track needed to service the decades-long EcoFOCI moorings and conduct CTDs and plankton nets at their long-term sampling stations. No funding is available to have the dedicated ship time needed to expand beyond this cruise track, although the AFSC MACE program is helping to deploy a new mooring near Pribilof Canyon this summer.

Stafford asked about their future plans of getting density estimates and if there is any effort into getting cue-rates at different times of the year in different locations. Berchok explained her proposal to deploy an array of acoustic moorings in right whale critical habitat, which would allow for localization. Angliss added that they have vessel and aerial surveys outlined, which will be able to provide abundance and density estimates, though there is currently no funding available.

Review draft 2022 SARs

Western Arctic bowhead whale

Stafford appreciated the updates to the SAR, including removing older text and condensing to improve readability. She noted that the SAR has a new abundance estimate and PBR, but pointed out that the abundance estimate is quite low and is described as an underestimate. She wondered why the SAR did not include Ferguson's updated abundance estimate from the 2019 aerial survey in the next SAR, but hopes that Ferguson will present the estimate and it will be included in next year's SAR. Stafford also highlighted the increased shipping traffic along the Russian coast through the Bering Strait as something for the SRG to keep in mind going forward. Hauser had nothing to add but appreciated Stafford's comments and planned to email her minor comments on the Habitat Concerns section. Stafford added that a statement in the Status of Stock section regarding the stock's abundance not known to be in decline is not entirely true and she offered to help rephrase the statement. Doniol-Valcroze concurred with Stafford and pointed out some minor edits he recommended but noted there was nothing of major concern. Citta, Stafford, and Doniol-Valcroze had some back and forth about the status of the stock. Citta noted that both the aerial- and ice-based surveys in 2019 likely fell short of the true estimate of abundance for different reasons, and while the aerial-based may be a better estimate, it did not cover the whole range. However, from a management perspective, there are no concerns even if the numbers are biased low. He noted that the IWC harvest quota is based on a strike

limit algorithm and the current quota was based on an assumed population size of 8,000 whales. Doniol-Valcroze recommended removing Figure 2 or modifying it to include the 2019 abundance data, since those data were used in the calculation of PBR, and Citta and Stafford agreed.

The SRG members noted that they would like to see a revised bowhead whale SAR in the 2023 SAR cycle.

AK Resident killer whale

Doniol-Valcroze prepared a brief slideshow to help describe his concerns with the SAR, which mainly stem from data used in the abundance estimate. He noted that several of the sources cited have not been peer reviewed or are not available online. He also expressed concerns about using photo-ID catalogs where dead animals are not removed, which results in an overestimate. He discussed his concern that the datasets are dated and not from the same years, so it is not clear that they could be added together without scientific discussion of the uncertainty created. He also noted spatial overlaps between some regions between datasets and some evidence of movements/exchange across regions, which complicates the picture. He stated that while he is not hugely concerned about the final number, because while it is probably an overestimate, the population is probably growing, but he was concerned that there were a lot of decisions made in the SAR that really should belong in a scientific paper or something that could be peer reviewed in more depth. Finally, he noted that all of the numbers are over 8 years old.

O’Corry-Crowe was curious if any of the sightings from the 2021 PacMAPPS survey were included; Doniol-Valcroze confirmed that they were not. O’Corry-Crowe asked NMFS to characterize whether the sightings extended the range of the stock such that the SAR’s map or range description should be updated.

Wade provided some clarification on Fearnbach’s PhD thesis, which is publicly available and was reviewed by NMFS, so it met NMFS’ standards for use in a SAR. He also clarified that there is no overlap between the data used in Fearnbach’s mark-recapture and the Gulf of Alaska. Wade also explained the GAMMS’ guidelines regarding the use of abundance data more than 8 years old if there is reasonable assurance that the population has not declined. In this case, Wade explained, Matkin’s group has documented increases in all pods in the Gulf of Alaska, but there is less assurance that the Aleutian Island and Bering Sea populations have not declined. Doniol-Valcroze recommended adding text to the SAR to make it clear why older data can be used. He also suggested removing text from the SAR regarding the mark-recapture estimate, since those data were not used in the minimum abundance and PBR calculations and because he considered it misleading to choose only the largest (and oldest) number in the time series. Alternatively, if that information is left in the SAR, he recommended mentioning the whole time series, and expressed additional concerns about which data should be used for the abundance estimate.

O’Corry-Crowe requested more clarification on the location of surveys and Wade responded. Citta requested that NMFS should better describe how the abundance estimate was calculated, but did not provide specific suggestions. He also asked for an update on the status of the evaluation of stock

structure. Wade replied that Kim Parsons' paper¹⁰ on genetic differentiation on North Pacific killer whale populations was published a while ago, which found fairly strong genetic evidence of multiple populations in both transient and resident killer whales. He also stated that NMFS began drafting white papers to present the scientific arguments for revising the stock structure, including genetic data, social network analyses, movements from photo-ID and tagging, and stable isotopes. The effort was paused while NMFS developed a stock policy, and since the policy was published in 2019, staff's time and effort has gone toward revising humpback whale stock structure. Wade thought it would not take much effort to pick the white papers back up and move forward, but there is limited manpower.

Williams expressed interest in fishery interaction information, including information on depredation and feeding on discards, and flagged that section of the SAR to encourage MML to look at all the available data to understand how those interactions are increasing. Wade replied that they have continued to collect photographs of killer whales that could potentially be used for a mark-recapture estimate in the Aleutians, but noted that it would take some matching effort and dedicated research to do so.

Sato's beaked whale

Given that this is a newly identified species without much information available, Rea did not have many comments or anything to add, but was excited to see the new species documented. O'Conry-Crowe concurred and highlighted that this species designation was based on a very small sample size but noted that the mitochondrial DNA data and morphology analysis make it clear they are a distinct species. He was curious what NMFS does for data-poor species when you are not able to estimate any parameters and cannot determine if it is depleted. He noted that absence of information on a potential issue is not the same as the absence of an issue. Young replied that it has come up and that an undetermined PBR is not the same as zero PBR.

SAR Process updates

Change in MML's process for determining which SARs to review, seeking early input from Alaska Native Organizations

Young reviewed the SAR process, the statutory requirements for reviewing and revising SARs, and MML's newly formalized process for reviewing SARs to determine which SARs to revise, and steps in the process to seek input from headquarters, AKR, and the SRG on the list of SARs to be revised. She also highlighted a new, explicit step in MML's SAR development process that, for any stock that is used for subsistence by Alaska Natives, if a draft SAR includes any substantive changes from the previous final SAR (particularly a status change), MML will make the draft SAR available for review by the applicable Alaska Native Organization(s) (ANO) prior to transmitting the draft to headquarters to initiate public review.

¹⁰ Parsons, K.M., J.W. Durban, A.M. Burdin, V.N. Burkanov, R.L. Pitman, J. Barlow, L.G. Barrett-Lennard, R.G. LeDuc, K.M. Robertson, C.O. Matkin, and P.R. Wade. 2013. Geographic patterns of genetic differentiation among killer whales in the northern North Pacific. *Journal of Heredity* 104(6):737–754. DOI: doi.org/10.1093/jhered/est037.

Regehr asked what is meant by ANO review, specifically whether there would be a formal consultation and what parameters would be set for including or not including their suggestions, to which Young replied that NMFS is still working that out. Bengtson commented that based on the MMPA co-management agreements, this conversation with ANOs would be a process where both sides get to share their viewpoints and the outcome would be based on mutual discussions. Hauser asked whether AFSC's new tribal research coordinator could serve as a liaison for the discussions with ANOs or if NOAA/AFSC has the capacity to establish that type of role. Bengtson replied that the person hired in that role is not specifically employed for marine mammal co-management discussions and that AFSC engages native and coastal communities throughout Alaska on many different levels. He mentioned that the new position's role is still being defined but their first task is to become an effective communicator with Alaska communities regarding fisheries activities. He noted that co-management relationships with ANOs have largely been held with the scientists and at the AKRO. Citta added support to Bengtson's explanation to provide more insight for Hauser on how MML and AKRO interact with ANOs.

Williams expressed her support for simplifying and improving the flow of the SAR process and also provided some suggestions on criteria to consider that would warrant a SAR revision, such as certain thresholds for population declines or increases in M/SI. Doniol-Valcroze commented that he would like to see a summary of decisions for how NMFS is deciding which SARs are being revised and which are not. Young replied that they do create a document similar to this already for AKRO and headquarters, to which Doniol-Valcroze responded that it would be nice to share with the SRG and incorporate into the SAR review process. Patterson stated that although they do have an internal document for this, it should be considered that they are trying to reduce the workload to increase the quality of the SARs and so having additional steps to show why NMFS is revising certain stocks as suggested by Doniol-Valcroze would need to be balanced. Regehr concurred with Williams' comments about having certain thresholds be met or if there was some sort of discretionary catch-all NMFS could use that would trigger a revision, such as if there has been some noticeable concerning change in the ecology or environment. Regehr noted that it could be just some new information that was made available at the time of the review and would not necessarily need to be a novel research. Young agreed that it would be helpful to add an explicit step for revising a SAR if there is a legitimate reason or concern, even if none of the other criteria were met. Williams agreed.

Simmons suggested that, when determining which SARs to review, NMFS should develop a more definitive threshold for "stocks for which significant new information is available." Young suggested that when having authors review SARs and if there is one not slated to be reviewed but there is significant new information, they could add it to the list to review. Regehr stated that it would also be beneficial to share this review process with USFWS, to which Patterson replied that NMFS has had preliminary conversations with them about our plans to formalize the SAR review process. Simmons noted that MMC can facilitate cross-agency conversations and also encouraged the SRG to take ownership to share that information as well.

Marine mammal bycatch estimation for Alaska fisheries

Brian Brost defined marine mammal bycatch, estimation requirements under the MMPA, and how data from the North Pacific Observer Program are used to estimate bycatch in Alaska fisheries. He

explained the current method of estimation based on the stratified ratio estimator, as described in a technical report by Breiwick (2013)¹¹, which expands observed marine mammal bycatch to include the unobserved portion of the fleet. Estimates are stratified by vessel length, region, and time period and then combined to obtain annual estimates for each marine mammal species and fishery. Brost then discussed shortcomings of the ratio estimator approach, including that low coverage rates and rare events combine to yield volatile annual estimates and false zeroes when no bycatch is observed. Looking ahead, Brost hopes to implement and evaluate alternative methods (e.g., model-based approaches) and report methods and results in a citable format.

Williams appreciated the explanation and requested more information on the next steps for applying any new methodology to the SARs. Brost did not know who ultimately gets to decide what methods are used for bycatch estimation, but indicated that they must first identify and document a better alternative. Williams suggested the use of zero-inflated distributions, generalized additive models, and generalized linear models to handle data with many zeros, which Brost agreed.

Concepcion asked about vessels that are moving to electronic monitoring (EM) and if EM can be used for marine mammal bycatch detection. Long confirmed that there are EM reviewers that record and document marine mammal bycatch events and forward them to NMFS, but felt that there might be a way to point cameras in certain directions to be more successful at documenting and potentially merging human and electronic observing.

Humpback whales

Update since Joint SRG meeting, DIP evaluation, and stock identification

Patterson provided an update on the status of NMFS' process to reconcile four North Pacific distinct population segments (DPSs) identified under the ESA and the three North Pacific stocks designated under the MMPA. He summarized findings of an internal working group that identified three DIPs and four units, as documented in NOAA Tech Memos that were shared in draft form at the Joint SRG meeting. He shared NMFS' recommendation for designation of five stocks, which is documented in several memos to the record and which are implemented in the draft 2022 SARs. Schakner described the next steps, which included SRG review of the draft SARs and the normal SAR cycle of public review before finalizing and publishing final SARs.

O'Corry-Crowe acknowledged all of the work going into this and highlighted the challenge of putting every whale into a stock, which he felt might be making it more difficult for managers to understand what is going on with the populations. He explained his challenges with reading the draft SARs and having to work through the logic to understand NMFS' decisions regarding stock designation relative to DIP identification, particularly why NMFS did not designate each DIP or unit as its own stock. He also provided some suggestions on how to make it easier to understand the SAR map. Patterson replied that NMFS has also been struggling with these issues but mentioned that the memos to record, which had not been distributed to the SRG, outline how NMFS goes from DIPs to stocks through a series of

¹¹ Breiwick, J.M. 2013. North Pacific marine mammal bycatch estimation methodology and results, 2007-2011. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-260, 40 p.

questions. O’Corry-Crowe raised some concerns regarding management implications to lumping or splitting DIPs, such as the possibility that DIPs would be lumped into a single stock to make a conservation or management problem “go away.” Patterson acknowledged that the process and considerations are complicated, and in an effort to be transparent, NMFS would try to provide memos to the record to help clarify the process. Patterson welcomed any comments or suggestions.

Doniol-Valcroze raised concerns with estimating abundance and mortality on mixed feeding or breeding areas. Patterson acknowledged the difficulty and stated that the methods may vary by SARs. For example, some of the draft humpback SARs rely on movement probabilities from the 2004-2006 SPLASH dataset to apportion abundance and M/SI in mixed areas. Doniol-Valcroze expressed additional concerns with the proration of the different DIPs based on relative abundance and if one DIP changes, they all change but Patterson informed him that Wade is working on addressing that. Doniol-Valcroze pointed out that there will be uncertainty in the abundance estimates, which means the mortalities will also have uncertainties and wondered how that will be quantified. Patterson indicated that there is always uncertainty in the estimates and Wade commented that abundance estimates are not explicitly used in prorating the mortality.

Apportioning mortality and serious injury

Wade explained how the 2004-2006 SPLASH data and photo-identification matches were used in multi-state mark-recapture models to determine area-specific abundance estimates and estimates of movement between winter and summer areas, as documented in Wade et al. (2016¹²) and Wade (2021¹³).. He then explained how, in the draft Hawaii, Western North Pacific, and Mexico-North Pacific humpback SARs, NMFS prorates M/SI to a stock or DIP/unit using the movement probabilities. He also noted other potential methods for prorating instead of movement probabilities, such as using proportions from a recent genetic mixed-stock apportionment study (Lizewski et al. 2021¹⁴). Lastly, Wade outlined next steps, including the IWC Scientific Committee’s forthcoming comprehensive assessment and Wade’s plans to revisit the movement probability analysis and submit the manuscript to a journal.

Doniol-Valcroze and Wade discussed linkages between abundance estimates and movement probabilities. Wade explained that his multi-state analysis is a form of integrated analysis, with capture probabilities estimated along with movement probabilities, and capture probabilities are used to estimate abundance. However, for the Hawaii stock, the estimate of abundance from Wade’s model

¹² Wade, P.R., T.J. Quinn II, J. Barlow, C.S. Baker, A.M. Burdin, J. Calambokidis, P.J. Clapham, E. Falcone, J.K.B. Ford, C.M. Gabriele, R. Leduc, D.K. Mattila, L. Rojas-Bracho, J. Straley, B.L. Taylor, J. Urbán R., D.Weller, B.H. Witteveen, and M. Yamaguchi. 2016. Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas. Paper SC/66b/IA21 submitted to the Scientific Committee of the International Whaling Commission, June 2016, Bled, Slovenia.

¹³ Wade, P.R. 2021. Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas. Paper SC/68c/IA03 submitted to the Scientific Committee of the International Whaling Commission.

¹⁴ Lizewski, K., D. Steel, K. Lohman, G.R. Albertson, Ú. González Peral, J. Urbán R., J. Calambokidis, C.S. Baker. 2021. Mixed-stock apportionment of humpback whales from feeding grounds to breeding grounds in the North Pacific based on mtDNA. Paper SC/68c/IA01 submitted to the Scientific Committee of the International Whaling Commission.

was not reported in the SAR, but instead, the SAR reports an abundance estimate from a recent line-transect estimate from Hawaii. In that example, Wade explained, the estimates of movement probabilities used to prorate M/SI have no connection to and no correlation with the abundance estimate, so if the abundance estimate were changed in the future, we would not need to change the way we are prorating M/SI. Wade acknowledged that movement probabilities have likely changed since the SPLASH data were collected as different populations changed size at different rates. He noted that movement probabilities could potentially be updated using newer information from HappyWhale.com, but there are big holes in the spatial extent of data, such as the lack of data for the Aleutians and Bering Sea. Wade noted that these issues are being considered as part of the SPLASH II effort.

Doniol-Valcroze then asked about whether uncertainty around the movement probabilities is taken into account in the proration of M/SI. Wade responded that the PBR equation does not explicitly consider the uncertainty around the M/SI estimate, but the PBR framework has been tested for robustness to uncertainty in M/SI through simulations. He noted that while the recovery factor can be adjusted based on the CV of the M/SI estimate, it is a small adjustment.

O’Corry-Crowe asked whether there are multiple DIPs in Hawaii and whether Wade has a sense of the relative abundance of each. Wade responded that we do not have data to identify multiple DIPs in Hawaii. He noted that maternally directed movement to an area would make a herd demographically independent if there is tight fidelity, but that straying would reduce that independence. O’Corry-Crowe suggested that more work needs to be done to ensure that genetic differences between groups do in fact mean philopatry. Wade described genetic analyses available for animals in SEAK, which is essentially a “pure” herd with 98% of whales migrating to and from Hawaii, and the finding that this herd was significantly genetically different from other whales in Hawaii. Because of this, NMFS identified the SEAK-Hawaii herd as a DIP. He noted that such analyses are not available for the herds that winter in Hawaii and summer in other areas, because most summering areas are mixed-stock areas and sample sizes are small from animals that can be photo-identified to a herd and have a genetic sample. As such, he stated that there is no information at this time to support identification of those herds as DIPs. Wade also noted that whales may move between feeding areas and he has generated an estimate of straying, though considers it unreliable. O’Corry-Crowe noted that the possibility of straying is not clear in the SAR map (Figure 1) and knowing the level of individual variation is critical.

Williams, Young, and Patterson noted that the humpback whale SARs were only initially reviewed during this meeting, given that the draft SARs were not made available until just before the meeting, but that they would schedule a follow-up SRG intersessional meeting in the near future to discuss those new SARs.

Other

Long provided comments from the previous day’s conversation regarding bycatch estimates and requested SRG feedback on whether NMFS should be extrapolating SEAK drift gillnet bycatch fishery-wide. Williams asked why the estimate for this specific fishery had not been expanded to obtain a fishery-wide estimate; Teerlink replied that it was in part a decision based on not being able to make

the case that the fishery was the same throughout SEAK and had the same overlap with SEAK harbor porpoise. She offered to provide more details if needed by the SRG but it was suspected that it was a logistical element. Williams said that the SRG would consider whether or not bycatch should be extrapolated fishery-wide.

Closing remarks

Closing remarks of the meeting were shared. SRG members then met in a closed session to discuss their recommendations.