Minutes from the 2017 Meeting of the Alaska Scientific Review Group

22 – 23 February - Anchorage, AK

This report summarizes the 2017 meeting of the Alaska Scientific Review Group (SRG). This document is intended to summarize the main points of discussion and does not attempt to record everything that was said during the meeting.

Meeting Called to Order and Adoption of Agenda

Kate Wynne, the SRG chair, called the Alaska SRG meeting to order and adopted the agenda. All participants introduced themselves, their roles, and their background.

Alaska SRG Members Present: Kate Wynne, Karl Haflinger, Greg O'Corry-Crowe, Kate Stafford, Grey Pendleton, Megan Peterson, Thomas Doniol-Valcroze, Mike Miller

Observers and Invited Participants: Shannon Bettridge (NMFS HQ/PR2), Kristy Long (NMFS HQ/PR2), Mridula Srinivasan (NMFS HQ/S&T), Jon Kurland (NMFS ARO) Suzie Teerlink (NMFS ARO), Paula Moreno (USM), Sam Simmons (MMC), Lisa Lierheimer (NMFS HQ/PR2), Robyn Angliss (AFSC), Marcia Muto (AFSC), Van Helker (AFSC), Lowell Fritz (AFSC), Peter Boveng (AFSC), Mike Cameron (AFSC), Tom Gelatt (AFSC), Jeremy Sterling (AFSC), Rod Towell (AFSC), Marilyn Dahlheim (AFSC), Kim Parsons (AFSC), Paul Wade (AFSC), Kim Sheldon (AFSC), Rod Hobbs (AFSC), Phil Clapham (AFSC), Patrick Lemons (USFWS), Charlie Hamilton (USFWS), Mary Colligan (USFWS), Michelle St. Martin (USFWS)

Overview of Agenda and Stock Assessment Report (SAR) Review Process

Charlie Hamilton said the U.S. Fish and Wildlife Service (USFWS) was pleased the Alaska SRG was meeting in Anchorage, and appreciated the opportunity that the SRG meeting presented for SRG members to meet with USFWS staff.

Wynne briefly reviewed the contents of the agenda and reminded the group that SRG members are encouraged to review every draft Stock Assessment Report (SAR) and that each SAR has SRG members assigned as primary and secondary reviewers. She said major changes to each SAR are summarized in Appendix Table 2 and noted in Microsoft Word's Track Changes. SRG members should conclude their review of the SARS and then submit the reviewed and edited documents to Marcia Muto within two weeks after the meeting. Any substantive issues need to be discussed as a group before submitting comments/edits to Marcia Muto.

Muto said she revises the draft SARs to incorporate SRG edits and comments in the weeks following the SRG meeting, and then submits then SARs to National Marine Fisheries Service Headquarters (NMFS HQ). NMFS HQ may propose additional changes, which are incorporated into the draft SARs. The draft SARs are then made public and undergo a 90-day public comment period. Any changes made in response to public comments are incorporated, and the SARs undergo another review by NMFS HQ before being finalized. Muto said she will send the SRG two notices. One when the SARs are posted for public comment and another when the Federal Register notice announcing publication of the final SARs is posted. The Federal Register notice reports any changes to the SARs following public comment.

Wynne reminded the SRG that any tracked changes in the draft SARS are not changes to the last version of the SAR that the SRG reviewed but are changes to the last published edition of the SAR. There may be changes from the version of the SARs reviewed at the last SRG meeting that are not obvious.

Shannon Bettridge said the SRG reviews a preliminary draft of the SAR at the SRG meeting. SARs are then edited based on SRG comments, public comments, and input from NMFS HQ. Bettridge added that there are usually very few changes made to the SARs following public comments. Major changes to SARs are not made without consulting with the SRG.

Minutes from Previous Meeting

Wynne said she appreciated the detail of the 2016 Alaska SRG meeting minutes, and recommended that new SRG members read the minutes from the 2016 Alaska SRG meeting and the 2016 Joint SRG meeting. Muto asked if anyone had additional comments or edits to the 2016 meeting minutes. There were no comments. Wynne said that the meeting minutes are adopted as is.

2016 SRG Recommendations

Wynne said the 2016 SRG meeting produced 5 recommendations for NMFS. The following is a summary of 2016 SRG recommendations and responses:

- **NMFS should conduct a review of the status of eastern stock Steller sea lions with respect to their Optimum Sustainable Population (OSP).** *NMFS was supportive of conducting an OSP determination.*
- **Alaska Fisheries Science Center (AFSC) should move forward with updating killer whale and humpback whale stock structure and SARs.** *AFSC staff intended to submit a draft manuscript with additional analysis of killer whale stock structure to the SRG for review prior to the 2017 meeting, but AFSC has no progress to report on updating killer whale stock structure.*
- **We recommend again that each SAR clearly indicate the number of fisheries that potentially interact with a marine mammal stock and the number of those fisheries that are monitored.** *Suzie Teerlink drafted proposed text to address this SRG recommendation.*
- **AFSC and the ARO should implement changes to the existing process for extrapolating serious injury and mortality from observer records to reduce errors and bias, and use the updated methods in the 2017 SARs.** *AFSC staff intended to present a proposed alternative approach and results at the 2017 meeting, but AFSC has no progress to report on implementing changes to bycatch estimates, and the existing bycatch estimation methods are still being used.*
- **AFSC and the ARO should consider the recommendations and proposals made at the Joint SRG meeting by Jim Carretta and Jeff Moore regarding alternative approaches for bycatch estimate calculations.** *AFSC and the Alaska Regional Office (ARO) reviewed Carretta and Moore's bycatch estimation processes, and Paul Wade has had discussions with Moore regarding modifying these models for use with Alaska bycatch data.*

Doniol-Valcroze asked if the SRG's recommendations were binding. Bettridge said that the recommendations are not binding, however, the agency relies on the SRG for review of NMFS marine mammal science. The agency tries to follow the SRG's recommendations, and if not, provides a good justification for not doing so. Wynne added that the SRG is a federal advisory group, and that the SRG's role is to advise and comment on the science in the SARs, but often budgets constrain the SRG recommendations. Greg O'Corry-Crowe asked whether discussion on recovering populations fell under the scope of science advisory. Bettridge said that section 117 of the Marine Mammal Protection Act (MMPA) defines the SRG as a science advisory group, but the act also specifies that the SRG can advise in other areas. O'Corry-Crowe asked if the SRG can suggest actions that the agency can take to achieve management goals. Bettridge said management recommendations are helpful, but the agency does have limitations on the actions it can take. Wynne said the SRG can identify science needs, and funding

can then be sought by external groups through grants such as the Saltonstall-Kennedy grant program or Bycatch Reduction Engineering Program, based on the needs identified by the SRG.

NMFS Headquarters Update

Bettridge provided the SRG with updates from NMFS HQ. She told the SRG that NOAA is within the Department of Commerce, and the head of NOAA is a politically appointed position. Ben Friedman, the Deputy Undersecretary, is NOAA's acting administrator until a new administrator is appointed. NOAA is composed of many line offices, including NMFS. The head of NMFS is also a politically appointed position, and Sam Rauch is acting administrator for NMFS until a new administrator is appointed. Rauch has filled this role in the past, and is familiar with protected species issues. NMFS former chief scientist, Richard Merrick, recently retired and Cisco Werner, former head of the Southwest Fisheries Science Center (SWFSC), is the current acting chief scientist. Due to the change in administration, there is a substantial amount of flux in higher level NOAA positions. Bettridge said that she did not expect the hiring freeze to impact filling these higher-level positions, and that the recent executive order on federal regulations, which requires that two existing regulations be removed for each new regulation added, may be interpreted to only apply to regulations that are considered "significant." Significant regulations are interpreted to produce economic impacts of greater than $100 million. Not many regular NOAA actions meet that threshold. NOAA's expectation on the 2017 budget is that the continuing resolution will continue for the remainder of the fiscal year.

Wynne asked if there were any changes to NOAA websites since the change in administration, such as those containing information on the Endangered Species Act (ESA). Bettridge said NOAA is revamping its websites, but this is unrelated to the change in administration. NOAA's websites are currently disjointed, with information distributed across a variety of agency websites. Work is being done to change the appearance of NOAA's sites and to centralize information.

Bettridge thanked the SRG for assistance on the recent membership review. The SRG had 5 members step down due to natural attrition in 2016, and the SRG added four newly appointed members in 2016. NMFS recently adopted a new vetting requirement for SRG members. This was required by the Department of Commerce. The vetting consists of a rigorous review of new and reappointed members. Existing members do not need to go through vetting until they are reappointed. New members are required to sign statements asserting that they are not registered lobbyists, and must disclose any financial interests that might conflict with their work on the SRG. NMFS HQ has a membership orientation packet for new SRG members. The packet consists of SRG FAQ, a copy of the Guidelines for Assessing Marine Mammal Stocks (GAMMS), the Marine Mammal Protection Act (MMPA), and the SRG Terms of Reference. Bettridge asked if the SRG thought anything should be added to the packet. Megan Peterson suggested the packet include information on how the SARs are edited, posted for public comment, and finalized following the SRG meeting.

Doniol-Valcroze said the Canadian SAR process involves discussion with the scientists that contribute data to the SARs. He said the packet should be clearer that the SAR contributors and authors would not be present at the SRG meeting. Wynne said the SRG meeting is held in Anchorage for the benefit of the USFWS every two or three years. Most years, the meeting is held in Seattle, and Marine Mammal Laboratory (MML) staff are available to discuss the SARs with the SRG.

MML Funding Changes

Robyn Angliss presented MML's operational spending for the past 10 years broken down by stocks and major projects. She said a significant amount of MML's operational funds (funds not obligated to

permanent labor) originate from outside the agency. A decline in operational spending from FY2015 to FY2016 was driven by:

- Reduced funding received in the form of transfers (such as money from NMFS HQ, ARO, or West Coast Region)
- No funding received from the Office of Marine and Aviation Operations (OMAO) to cover the cost of aerial surveys
- Conclusion or cancellation of some reimbursable projects

Angliss said the *Species in the Spotlight* program is great for the species that are in the spotlight, but not great for those species outside the spotlight. *Species in the Spotlight* resulted in the transfer of Alaska pinniped funding to Cook Inlet beluga whale research and Hawaiian monk seal research. Paul Wade is leading the new Cook Inlet beluga research effort, which is why Wade has been unable to follow up on the killer whale stock delineation and the bycatch estimate improvements. The transfer in Alaska pinniped funds to expanded Cook Inlet beluga whale and Hawaiian monk seal research comes at an obvious cost to Alaska pinniped work. The Director of AFSC has also directed MML to conduct abundance surveys for subsistence stocks at least every 8 years. Therefore, some additional funds from the Alaska pinniped line item are also going to be redirected to study beluga whales and bowhead whales in coming years.

Over the last couple years MML has distributed outreach material summarizing planned MML field research to Alaska coastal communities, tribes, and native organizations. Outreach materials have not been distributed yet this year because research plans are still undetermined due to funding uncertainty. Angliss listed some projects that were likely to be cancelled in FY2017 and some additional projects that will be cancelled if funding declines from FY2016 to FY2017. MML also anticipates permanent staffing levels to decrease over time, with the target being a 10% reduction over the next 5 years. As staff retire or resign the newly created vacancies may not be filled.

Grey Pendleton asked if the plan to survey subsistence stocks every 8 years included pinniped stocks. Angliss said that cetacean stocks would be surveyed first, since their Potential Biological Removal (PBR) levels are outdated. After cetaceans are updated over an approximately 5-year period, it is uncertain whether funds would be redirected to pinnipeds. Pendleton asked if the new beluga survey work would be done entirely by MML or contracted. Angliss suspected that the work would be conducted by both MML and contractors.

ARO 2017 Priorities, Observer Program, Pinniped Funding

Kurland briefed the SRG on the Species in the Spotlight program. He said in order for a stock to be eligible for spotlight status, it needs to be listed as endangered with a declining trend. There also needed to be a reasonable chance for recovery. Eight species were selected for the program nationwide, including the Cook Inlet beluga whale. The significance of including a species in the program is that NMFS will make efforts to redirect discretionary spending to help the selected species. NMFS grants to tribes and states will receive priority that benefit *Species in the Spotlight*. ARO recently completed the final recovery plan on Cook Inlet beluga whales, which lays out many actions to improve the stock. The additional resources available to selected stocks through *Species in the Spotlight* will help those stocks, but those new resources come at a cost.

Stafford asked why North Pacific right whales were not selected by Species in the Spotlight. Kurland said the criteria for inclusion in the program require the species to be endangered, have a declining trend,

and there must be actions NOAA can take to recover the stock. There are not many known actions that could recover North Pacific right whales like there are for Cook Inlet beluga whales. O'Corry-Crowe asked if NMFS included the public in the decision-making process of identifying actions to recover species like the Cook Inlet beluga whale. Kurland said there was a very public recovery plan development process that included a series of science panels and stakeholder meetings.

Kurland said ARO recently reexamined Steller sea lion critical habitat, and has drafted an internal report on critical habitat for the Western U.S. Steller sea lion stock that will soon undergo peer review. ARO has also been working on updating subsistence harvest regulations for northern fur seals on St. Paul Island due to a petition from the community on St. Paul to modify subsistence harvest regulations to allow a pup harvest. ARO has issued a draft environmental impact statement and a proposed rule to authorize that harvest. The public comment period on that action closes in early March. There is nothing to report on the Alaska Marine Mammal Observer Program (AMMOP). The last field operations under AMMOP occurred in 2013, and ARO does not have the operational funds to support another field operation. Kurland said there are inefficiencies associated with the ARO running AMMOP, and it may be more efficient to operate AMMOP out of AFSC's observer program. Efficiencies to be gained include shared resources and economies of scale in contracting, training, equipment, and logistics.

Wynne discussed alternatives to observer programs, mentioned beach surveys on the Copper River Delta, and asked if those surveys were something ARO can maintain or expand on. Kurland said that the Copper River monitoring is significantly different from AMMOP. Copper River monitoring consists of flights over the Copper River Delta to locate marine mammal carcasses. These overflights were arranged because the ARO received information that a significant number of carcasses were stranded on the beach. Clear signs of human interaction were identified, and ARO staff are interested in determining if there is an ongoing problem. Surveys were conducted in 2015 and 2016, and will occur again in 2017. Mike Miller asked if the surveys were funded by NOAA's Office of Law Enforcement (OLE). Kurland said the ARO funded the surveys, but is coordinating with OLE, and an investigation into the intentional takes identified during the surveys is underway.

Kurland discussed Alaska pinniped funding and the redirection of pinniped funds to *Species in the Spotlight*. The ARO has a grant program which distributes earmarked funds to pinniped research. Funds have been distributed through a competitive grant process for several years, but the funding available for grants in 2017 is expected to be much lower, and it is unclear whether the program would continue at a reduced level. Haflinger asked which species the ARO grant program funded research on. Kurland said that pinniped research was funded by the program, with a considerable portion of the funds being provided to the Alaska Department of Fish and Game (ADF&G), University of Alaska, University of British Columbia, and the Alaska SeaLife Center.

Guidelines for Assessing Marine Mammal Stocks (GAMMS) Update

Bettridge briefed the SRG on the 2016 updates to GAMMS. She said the 1994 amendments to the MMPA required that NMFS begin publishing SARs for all marine mammals under NMFS' jurisdiction. The MMPA, however, only provided very general guidance regarding the composition of SARs, so NMFS and the USFWS held multiple workshops over the years to develop and revise the guidelines for developing the SARs. The product of these workshops was the first edition of the GAMMS. The most recent revision to the GAMMS occurred in 2016, and was the product of a workshop called GAMMS III. The workshop produced a technical memo, which included the workshop's recommendations. Seven of the nine recommendations from GAMMS III were adopted.

The latest update to GAMMS requires that SARs now:

- State whether it is plausible the stock contains multiple demographically independent populations that should be separate stocks
- Summarize all human-caused mortality and serious injuries
- Summarize the most prevalent potential sources of human-caused mortality and serious injuries that are not quantified (e.g., fisheries that have never been observed or have not been observed recently, ship strikes)
- Include a description of key uncertainties in various sections, and evaluate the consequence of uncertainties on assessment of stock's status

Bettridge said each region is implementing these guidelines a little differently, and the implementation is ongoing. Future revisions to GAMMS will include addressing the two GAMMS III recommendations that were not adopted. These recommendations were to:

- Develop a framework to calculate PBRs for stocks with outdated abundance information
- Develop a clear method to determine when stocks should be designated as strategic if they are declining and are likely to be listed as threatened under the ESA in the foreseeable future

Jason Baker is on detail with the Office of Protected Resources (OPR) to develop an approach for calculating a PBR for stocks with outdated abundance information. Any proposed approach will be vetted internally before being distributed to the SRGs for comment. The other major aspect of the revision is the development of guidelines for determining when a stock should be classified as strategic. A stock is considered strategic if it is ESA listed, if it is depleted, if human-caused mortality exceeds PBR, or if it is declining and likely to be listed as threatened under the ESA in the foreseeable future. This last provision is problematic. Clear guidance on that language needs to be issued. Pendleton asked if this change would address the instances where a stock is identified as strategic but not under any of the provisions in the statute. Bettridge said there are approximately 20 stocks where this is being done, and those stocks will be addressed following any forthcoming guidance.

Megan Peterson asked if Jason Baker's approach will make use of existing dedicated survey data or alternative sources of data. Bettridge said Baker is looking at using existing data. The approach may fix outdated PBRs for many, but not all, stocks. The original GAMMS III recommendation was to assume a 10% decline per year over the last 8 years once abundance estimates became outdated. That approach did not receive public or legal support. Doniol-Valcroze said the 8-year rule is arbitrary and suggested modifying the 8-year threshold, because only the uncertainty increases as an estimate ages from 8 to 9 years. Bettridge said that Baker's approach is in line with Doniol-Valcroze's comments. Baker is working towards eliminating the 8-year expiration of abundance estimates, while still encouraging the agency to collect the data. The expectation is that the new approach will be incorporated into the 2019 SARs.

Bettridge said NMFS issued a final rule that changed the ESA designations for humpback whales in late 2016. With this rulemaking, NMFS identified 14 distinct population segments (DPS). Some of those segments are considered endangered, some threatened, and a number are not warranted for listing. In the North Pacific, there are 4 DPSs under the ESA and 3 stocks under the MMPA, and they do not perfectly align. This is a challenge for management. Last spring, the agency started a process to examine the stock structure of humpback whales. An internal working group considered equating stocks with existing DPSs. The working group has identified two possible approaches but has not made

a final decision. NMFS anticipates holding a webinar to present the SRGs with the two approaches and receive SRG feedback. NMFS will then move forward with stock delineation, and the 2018 SARs will reflect the new stock delineation. Associated with this, the agency has been grappling with the stock delineation process. The MMPA does not provide guidance on how to delineate or redefine existing stock boundaries, so NMFS is working on an internal process to make the stock identification process clear and transparent. Bettridge said she will provide that guidance to the SRG when it is completed.

O'Corry-Crowe asked if Bettridge could elaborate on how the humpback whale stocks and DPSs differ. Bettridge said the DPSs are based on breeding areas and the stocks are roughly based on breeding areas. Sometimes one stock overlaps in time and space with multiple DPSs. This is a challenge for management and PBR calculations. Pendleton said the SARs would be much easier to understand if the stocks and DPSs match up. Bettridge said the differences in DPSs and stocks also confuse the public, research permit applicants, and take permit applicants. There are reasons to make them match but also some good arguments for keeping them separate.

Doniol-Valcroze asked why the ESA and the MMPA have different objectives. Bettridge said the ESA is meant to prevent species from going extinct, while the MMPA focuses on managing functioning elements of the ecosystem. Therefore, it is logical that there can be multiple stocks within one DPS. Since the two acts have different objectives, the underlying rules that define a stock and DPS are different. Doniol-Valcroze said that management units in Canada are often based on local opportunities for hunting, rather than on biological grounds. O'Corry-Crowe asked if Canada relied on demographic data to define stocks. Doniol-Valcroze said demographic and biological data are used, but the emphasis is on preventing resources from vanishing at a local scale. Megan Peterson asked what the implications were when a stock was labeled strategic. Bettridge said the biggest implication of a strategic label was the requirement to convene Take Reduction Teams (TRT). Pendleton said that there has never been a TRT in Alaska and, historically for Alaska stocks, strategic status only indicates that the SAR receives an annual review. Kristy Long said TRTs only apply to strategic stocks if the stocks interact with Category I fisheries.

Model to Convert Steller Sea Lion Counts to Total Abundance

Lowell Fritz provided an update on MML's work to estimate abundance from pup counts and brand resight data. Calkins and Pitcher (1982) originally reconstructed Steller sea lion age distribution to estimate total abundance, and found the ratio of total abundance to pups was about 4.5 to 1. This ratio was used for obtaining total abundance from pup production estimates, but the ratio was estimated from data in the late 1970s and, since then, the Steller sea lion population has decreased substantially. The current validity of the 4.5 ratio is unknown, so Devin Johnson developed a Bayesian model that uses information on pup production by region and survivorship to estimate abundance by age, sex, and region.

Fritz presented a table with estimates of total abundance for 2016. The total abundance estimate was 64,029 sea lions for the western DPS in Alaska. This estimate consists of a count of 12,631 pups and an estimate of 51,938 non-pups. An N_{MIN} of 53,303 sea lions is currently used in the 2017 SAR. This N_{MIN} is based entirely on counts of 12,631 pups and counts of 40,672 non-pups. Johnson's model estimates an additional ~11,000 non-pups more than the count. The ratio of non-pups to pups was greater than 5 to 1 for most western DPS regions. This is higher than the 4.5 calculated by Calkins and Pitcher. The ratio-estimator was found to be the lowest in the western Aleutian region at approximately 4 to 1.

Fritz presented an example of theoretical regional PBRs for the western DPS of Steller sea lions. Regional PBR was lowest in the western Aleutians at only 5 animals, but was greater than 80 animals for most other regions. Overall PBR for the western DPS was calculated to be 384 using Johnson's model, higher than the current PBR of 320 in the SAR, but more rigorous survival values for the western Aleutians are required. Branding began in the western Aleutians in 2011, and estimates of juvenile survival will be available soon. Information on natality would be a good addition to the model and would allow for better calculation of generation time and R_{MAX}. A generation time of 11 years was calculated for the western stock using the current natality information, which equates to an R_{MAX} of 9%. This R_{MAX} is lower than the default 12% pinniped value. If the 9% R_{MAX} was used to calculate PBR, then PBR would be 293 instead of the 320 currently in the SAR.

Bettridge asked why Fritz proposed using N rather than N_{MIN} to calculate PBR. Fritz said that MML has been asked to calculate a total abundance estimate for Steller sea lions. In the past, that was done using the 4.5 pup multiplier. Johnson's model is a more rigorous approach, which uses information from pup counts and survival to calculate a better total abundance estimate. N is more appropriate than N_{MIN} for this application. Pendleton said that for Steller sea lions, N is derived from a count. This is different than how N is obtained for most other stocks. Bettridge said this approach differed from that defined by statute. Pendleton said that the definition of N_{MIN} is in the GAMMS, not in statute. Haflinger asked if satellite-tag data could also be used to adjust counts. Fritz said MML has not tried that type of approach due to the many age and sex classes information would be required for. A separate haul-out rate would be required for male and female juveniles, adult females with pups and without pups, adult females with a juvenile, subadult males, and adult males. Obtaining those haul-out rates at the same time that normal aerial surveys are conducted would be a challenge. Haflinger asked if it was necessary to estimate the ability to resight marked pups. Fritz said that pup resight rates were accounted for in the model, but resight probability and apparent survival can only be calculated for a long-term project. Pendleton asked if the model had been run backward to see what abundance looked like through the 1990s and early 2000s. Fritz said that had not been done but could be.

Phocid Seals Research Update

Peter Boveng briefed the SRG on phocid research in Alaska. Boveng's program conducted four major research and monitoring projects in 2016:

- Abundance and distribution of ice-associated seals based on aerial surveys
- Breeding season ecology of ribbon and spotted seals using satellite telemetry, and tissue sampling in the marginal ice zone of the Bering Sea
- Impacts of cruise vessels on harbor seal pups in glacial fjords
- Ecology and vital rates of harbor seals in the western Aleutian Islands using satellite telemetry and sampling in the western Aleutians

Abundance and Distribution of Ice-associated Seals

Boveng said his program has continued analysis of data from the 2012-2013 Bering Sea spring aerial surveys and the final abundance estimates will likely be lower than those currently in the SARs, which were based on just a snapshot of data obtained from the 2012 surveys. A spatial model was the basis for the snapshot estimates currently in the SARs, but a more complicated spatial temporal model was required to analyze data from all surveys, and additional haul-out data must be incorporated into the model before final estimates can be generated.

An aerial survey of bearded seals, ringed seals, and polar bears was conducted over the Chukchi Sea in 2016. Thirty percent of the images from that survey have been processed to date, and the polar bear detection rate is calculated to be 78%. Depending on the results, a similar survey for ice-associated seals and polar bears may be conducted in the Beaufort Sea. This aerial survey involved U.S. and Russian aircraft and relied entirely on instrumental detection with thermal and color cameras instead of visual observers. The detection rate is calculated by visually reviewing color images collected during bear overflights and recording any bears found. Then thermal images paired to color images are run through detection software, and thermal detections are compared to visual detections to see how many bears were missed. The detection rate of 78% has been calculated for polar bears, based on a small sample of survey data. The detection rate for seals is over 90%. Boveng said he is evaluating the logistical and scientific feasibility of doing similar surveys with Canadian partners in the Beaufort Sea. Results from the Chukchi Sea survey will help in determining the amount of effort needed for a Beaufort Sea survey to calculate credible polar bear estimates.

Breeding Season Ecology of Ribbon and Spotted Seals

There was a tagging and sampling research cruise to the marginal ice zone of the Bering Sea in April 2016. Satellite telemetry provided information on seal movements, habitat, and haul-out rates of ribbon and spotted seals. Samples were collected for research on seal pathology, hematology, condition, genetics, mercury-contamination, and diet. The project was timed early enough in the season to focus on sampling mother-pup pairs, which allows for data collection on pup condition. Some residual symptoms of the Northern Pinniped Unusual Mortality Event (UME) of 2011 were observed in ribbon seals. These signs presented on seals as unusual coats, alopecia, and residual skin lesions.

Impacts of Cruise Vessels on Harbor Seal Pups in Glacial Fjords

This project is a collaboration with the National Park Service and consists of tagging pups with satellite linked tags, monitoring movements and haul-out timing relative to fine-scale logging of vessel movements, and then testing for effects of vessel proximity on pups' haul-out timing. The focus will be on the amount of time pups spend in the water, which is known to be energetically challenging for young pups. One of two field seasons have been completed, and the data are being analyzed. One early observation is that many of the harbor seal pups have dispersed quite quickly out of Disenchantment Bay and range as far north as Prince William Sound and south to Icy Strait. Fortunately, it appears enough seals stayed in Disenchantment Bay to make the analysis viable, especially when the second year is added to the sample.

Harbor Seals in the Western Aleutians

Boveng said his program has tagged harbor seals with satellite-linked tags in the Aleutian Islands annually since 2014. In collaboration with SeaWorld and the Alaska SeaLife Center, his program tagged 35 harbor seals during a 2016 research cruise to the western Aleutian Islands. All 35 seals were tagged with GPS tags, 32 of which also received SPOT-flipper tags. Ten of these seals also received Life History Transmitter (LHX) tags. LHX tags were developed by Marcus Horning from the Alaska SeaLife Center. LHX tags are long-term temperature loggers that are surgically implanted into the animal's abdominal cavity. The tags transmit the data collected over the life of the animal to a satellite after the death of the animal. Tags are released from the animal's body by decomposition or disgorgement by predator. The temperature transition from body temperature to ambient temperature can allow for inference on mortality (e.g., natural causes vs. predation). Tags implanted in females also have the potential to record reproductive events by body temperature. This is a long-term project, and the tags are designed to last 10 years or longer. The study will also compare the movements and behavior between seals that

receive LHX tags to those without LHX tags. This will help confirm the assumption that LHX tags will not have a significant effect on movement or behavior of the seals that carry them. An initial review of seal tracks confirm that the seals tend to spend most of their time in relatively shallow continental shelf waters with occasionally forays into deeper waters.

Teerlink asked how individual species can be identified with thermal imagery. Boveng said that the thermal cameras are used to detect the presence of a warm-blooded animal on cold sea ice. The thermal data collection is coupled with collection of color imagery, and identification of species is done using color imagery. Species identification is not a perfect process, but Boveng's program has quantified error rate and the observer effects on that error rate. The error rates and observer effects are then incorporated into the model when calculating population estimates. Doniol-Valcroze pointed out the automated detection rate for polar bears was only based on 23 overflights of bears. Detection rate is a very important number to correctly estimate. He asked if it was possible to collect a larger sample size to more accurately determine detection rate. Boveng said the sample size could be increased by scouring more color images to find bears for which visual detection is independent of thermal detection. This is a daunting task. More opportunities to fly the system over polar bears where there is a good chance of capturing the bear with the instruments would be simplest. There may be opportunities to do this in the future, but it may be awhile before the detection rate estimate is updated.

Doniol-Valcroze asked Boveng if he knew how many bears are picked up with the thermal imagery that would have been missed based on visual analysis of the color images or visual surveys. Boveng said he thought the thermal imager identified a single polar bear that the photo technician did not find in a trial of 13,000 images. A similar experiment conducted with seals showed that a technician detected 81% of seals, whereas the thermal imager identified more than 95% of seals. Pendleton asked if separate detection probabilities could be estimated for polar bears by size or age class. Boveng said size and age classes are tough to judge from imagery. In some cases, size and age may be clear (e.g., mother and cub), but it would be tough to judge the size and age of lone bears. Pendleton asked if the progress made on processing 30% of the imagery consisted of combined Russian and U.S. surveys, or just U.S. surveys. Boveng said their Russian colleagues were analyzing their own data. The 30% progress was only related to U.S. surveys.

Wynne asked why NMFS was coordinating with USFWS, given that polar bears are not a NMFS-managed species. Boveng said USFWS is an important partner and supported the Chukchi Sea survey with a substantial in-kind contribution. USFWS is interested in obtaining direct estimates of polar bear abundance from a survey, rather than relying solely on mark-recapture. Ecologically it is an interesting survey given the predator-prey relationship between polar bears and ringed and bearded seals.

Miller asked how spotted seals and ringed seals are distinguished visually in the color imagery. Boveng said his program has investigated the visual attributes that are helpful to technicians when identifying these species. The greatest number of misclassifications occur with spotted seals and ribbon seals. Body shape has a big role in how an observer identifies a species, and the ringed seal shape is quite different than the spotted seal shape. Habitat is also a discerning factor. Haflinger asked at what speed and altitude the survey aircraft operates during surveys. Boveng said the instruments allow the aircraft to fly much higher than if they were carrying visual observers aboard. The surveys are conducted at 1,000 feet and at a speed of 150 knots. A visual survey for similar species would typically be flown at 400 feet. Higher altitude flights also produce less disturbance to animals and hunters.

Update on Long-range Unmanned Surveys for Cetaceans

Angliss briefed the SRG on preliminary results from the 2015 comparison of manned to unmanned aerial surveys of cetaceans in the Arctic. She said manned aerial surveys are used to assess marine mammal population distribution and abundance, investigate relationships between animals and their environment, and monitor the effects of human activities on animals. However, there are concerns about observer fatigue, safety, especially in very remote areas, and the potential disturbance to wildlife. There is a multi-agency interest in understanding under what circumstances Unmanned Aircraft Systems (UAS) might assist or replace manned aerial surveys for cetaceans. In 2015, a 3-way comparison was conducted between:

- Observers in manned aircraft
- Digital photos obtained from cameras mounted to the manned aircraft
- Digital photos from cameras mounted to the unmanned aerial vehicle (UAV)

The project was led by NOAA and supported by NOAA, BOEM, and ONR. In-kind support was provided by Shell, and the North Slope Borough was a collaborator. The project selected an Insitu ScanEagle due to its proven record. The UAS required a considerable footprint, and the entire UAS package needed to be flown to Barrow on a C130. A Nikon D810 camera with a 20 mm lens was installed in the UAV, and a Nikon D810 camera with a 21 mm lens was installed in the manned aircraft. The cameras were programmed to collect images at an interval to ensure substantial overlap between images given the expected airspeed of the platforms. The UAV and manned aircraft were limited in their ability to survey by the same weather conditions, but the manned aircraft could transit through precipitation to access clear survey areas, whereas, the UAV could not. The UAV collected survey data over 22 hours of flight time and the manned aircraft collected survey data over 27 hours of flight time. Over 77,000 images were collected. The image resolution was sufficient to differentiate between the small number of cetacean species in the Arctic, but higher resolution would have been required if the survey was conducted in an area with more diversity.

The image analysis required considerable effort. It took photo technicians nearly 7 hours to review every hour of flight time. Photo technicians identified 37 sightings of 44 individual animals after 333 hours of review. Preliminary abundance estimates were calculated for bowhead whales. CVs were lower for human observers than when images were used to estimate density and abundance because human observers could visually sample a much larger area and see more whales. The cost of the UAS survey was significantly more expensive than the manned photo strip survey and analysis or the manned line transect survey and analysis. Due to weather, the UAS was unable to achieve the desired number of flight hours, and the goal of a CV of 0.3 or less should have been achieved with double the flight hours.

Kate Stafford asked what the future for this project entailed. Angliss said the project was experimental, and intended to determine whether it was feasible to use UAS to collect density estimates. It is feasible but expensive. Robyn said she believed that manned aircraft will continue to have a large role in aerial surveys, but that UAS is a possible substitute. Doniol-Valcroze asked why the UAS survey was so expensive. Angliss said the cost was due to the size of the team and the costs of transporting the system to Barrow. The plan was to operate 2 UAS at a time, and the UAS pilots are restricted to 8 hour days. Therefore, each system needed multiple pilots, engineers, and other support. O'Corry-Crowe asked if there was any aspect of the UAS survey that could be more useful than a manned survey. Angliss said that some people think that UAS imagery can be mined for information but said she did not think this was possible with the imagery obtained from this project.

Adequacy of Alaska Marine Mammal Stock Assessments

Angliss said information on mortality and bycatch is compared to PBR to categorize U.S. commercial fisheries. If commercial fisheries exceed a certain PBR threshold, then TRTs may be convened to develop plans to reduce bycatch in those fisheries. Assessment of PBR requires a minimum population estimate (N_{MIN}) that is less than 8 years old, a population growth rate (R_{MAX}), and a recovery factor (FR). Anthropogenic mortality for each stock must also be determined, and data are provided by observer or stranding programs.

There were 155 NMFS and USFWS stocks in 1996 and 337 stocks in 2015. The increase in stocks is partially due to splitting single stocks of harbor porpoise, harbor seals, and bottlenose dolphins into multiple stocks, as well as the addition of new stocks in the western Pacific. In Alaska, there were 39 stocks in 1996 and 51 stocks in 2015. In that time, the percentage of Alaska stocks with calculated PBRs has remained unchanged at 67% but across all areas the percentage of stocks with calculated PBRs has declined from 63% to 48%. The initial focus of the SARs and PBR was to manage fishery interactions with marine mammals, but the focus of the SARs has broadened and now lists significant anthropogenic removals from any source. The List of Fisheries (LOF) is updated annually and classifies U.S. commercial fisheries into categories depending on the level of incidental mortality or serious injury to marine mammals. Fisheries are ranked from category I to category III based on their level of incidental mortality and serious injury of marine mammals, with category I fisheries having the highest level of incidental takes. Alaska had no category I fisheries in 1996 or 2015, 13 category II fisheries in 1996 and 18 in 2015, and 38 category III fisheries in 1996 and 61 in 2015. In some regions SARs have provided NMFS with the information necessary to identify bycatch issues, but this has not been as effective in Alaska. There are data gaps in bycatch information for the state fisheries and there are unknowns regarding stock structure and abundance. Many stocks do not have a PBR. In some regions, Take Reduction Plans have worked to recover populations, but there have not been sufficient takes documented in Alaska to trigger the need for a TRT. The management of subsistence hunting falls outside of the SAR process entirely, and there is inadequate data on subsistence take levels.

Another way to examine SAR quality is to use the annual review of the different types of data that go into a SAR. This annual review scores the quality and frequency of assessments for a variety of SAR components including stock identification, abundance, and threats. A level of 0 or 1 is considered inadequate, and a level of 2, 3, or 4 is considered adequate. Forty-two percent of Alaska's stocks are considered adequate, but that is projected to decline substantially to 17% in FY2021 as PBRs and abundance estimates become outdated. That decline assumes stable funding. Assessment quality can be improved by collecting additional data, or through new methodologies that make the most out of the available data.

Wynne asked what types of non-survey data Angliss proposed using to improve SAR adequacy and asked whether NMFS needed more data or a better analysis of existing data. Angliss said, in some cases, there are data available that have not been analyzed, but this is more of a problem in other regions than it is for Alaska. MML has some excellent statisticians that are attempting to do a lot with a minimal amount of information, but other science centers may be able to do more with currently available data if the analytical expertise was available. For example, many bottle nose dolphin stocks have ongoing photo identification programs, but those programs have not culminated in estimates of abundance.

Wynne asked if NMFS faced any penalties for publishing inadequate SARs. Mridula Srinivasan said there have been no consequences due to declining SAR adequacy. Adequacy levels have already declined. This fact has been presented to leadership; however, the response is that NMFS needs to leverage the

resources that are currently available. Almost 80% of NMFS stocks are not even assessed. Another problem is that the number of identified stocks is continuously increasing. It is worth considering whether all the stocks need to be assessed, or if just a portion of those stocks can be assessed. There may be a better system to track NMFS stocks. For fish, NMFS has a fish sustainability index which only tracks or assesses a fraction of the total fish stocks.

Doniol-Valcroze asked if there is an effect on subsistence hunting for stocks that do not have a PBR. Kurland said PBR is not used for managing subsistence hunting. There are no limits on subsistence takes, except for depleted stocks. Kristy Long said PBR is a metric for evaluating removals from a population, but it is not meant as a management cap. Many fisheries exceed PBR for a stock, but they are still operating. O'Corry-Crowe asked what PBR is used for. Angliss said PBR is used to categorize U.S. commercial fisheries, and to decide whether Take Reduction Plans need to be developed. Bettridge said PBR is also used when making negligible impact determinations.

Angliss asked if her presentation addressed the SRG's questions that came up at the last SRG meeting. Wynne said the SRG was not as concerned with the SAR quality issue as much as the intent and purpose of the SARs. The intent of the SARs under the 1994 MMPA amendment was to have an objective method to identify the stocks that are in trouble. Lloyd Lowry pointed out years ago that the system would not work if there were not funds available for surveys. Wynne said she did not think there would be sufficient funds in the future to conduct the level of surveys necessary for the current SAR system. PBR and the whole GAMMS framework may not work anymore. Bettridge said NMFS may develop another metric in the next year to propose to the SRG that will be used to measure SAR adequacy. Pendleton proposed rating the quality of various elements within the actual SARs.

Western U.S. Steller Sea Lion SAR Review

Pendleton said there were several places in this SAR where information obtained through personal communication is cited. Publicly accessible documents need to support personal communication citations and unpublished data should also not be cited. Muto said MML authors have been working on eliminating personal communication citations and citations of unpublished data. Bettridge said in general, the other regions have been consistent in not citing personal communications or unpublished data except for the stranding database, which is not something that is normally published. Muto said the Alaska SARs cite unpublished data for the bycatch estimates, but there is a published paper that defines the bycatch estimation methods. Fritz said there are 3 personal communication citations in this SAR, 2 of which relate to pup counts from Russia, which are not published or summarized in anything other than Vladimir Burkanov's spreadsheets. Fritz said this information is not published anywhere and likely will not be published anywhere. Pendleton said Burkanov could draft a memo for the record and post it online. Bettridge said any citations need to be a peer reviewed article or a NMFS technical memo, processed report, or reference document. Other regions have pulled information from the SARs, even though it was useful, because there was not a reference for it. The SARs cannot cite documents that are not published or cannot be reviewed.

Pendleton said that forward looking statements, like the one describing the development of a model to estimate abundance, have a history of staying in the SARs for years. Pendleton cautioned against adding any forward-looking statement to the SAR. Pendleton recommended revising Table 3 under the 'Mortality' section. This section documents 8 shot Steller sea lions that were discovered during an aerial survey over the Copper River Delta. The mortalities were averaged over 5 years, but there was only 1 year of survey effort. He recommended an annual average of 8 Steller sea lions be added to the table.

Haflinger said Appendix 2 contains columns for many variables, including N_{EST}. However, there is no definition for N_{EST}, and N_{EST} appears to be calculated inconsistently. Bettridge said NMFS is required to include an N_{MIN} in the table, but not N_{EST}. Haflinger said the N_{EST} is a distraction in Appendix 2, since there is no consistency in how it is being calculated. He proposed removing the column, or instead listing the population estimate if one is available. Doniol-Valcroze said N_{EST} might represent the mean population estimate from a survey. This column is confusing for Steller sea lions; but, in most cases, it shows the difference between the mean abundance estimate and the minimum abundance estimate. In some cases, N_{MIN} and N_{EST} are the same, such as with AT1 Transient killer whales where it is known that there are 7 individuals and there is no uncertainty. Wynne said that footnotes would help with interpreting Appendix 2. Doniol-Valcroze said defining N_{EST} in the legend and noting any exceptions would be appropriate.

Haflinger said the subsistence takes in the Pribilofs seem high relative to the counts that were reported in the last aerial survey report. The counts from St. Paul were of the same magnitude as the subsistence harvest. Fritz said there seem to be more sea lions in that area in the winter when subsistence hunting usually occurs. In summer, most of those animals return to the eastern Aleutians and are not available to be counted.

Haflinger asked if NMFS has a methodology to effectively monitor the movements of western stock animals to the east. Fritz said a cohort was branded at Graves Rock in 2016, an area that is thought to be contributing to the eastern migration. NMFS branded cohorts at Marmot and Sugarloaf as recently as 2014, rookeries which also contribute animals to the east. Examining the distribution of these branded animals should provide enough information to update the estimates that Lori Jemison and Pendleton produced several years ago on cross-boundary movements. Haflinger said if the cross-boundary movements became more pronounced it will become increasingly challenging to generate individual estimates for the stocks. Pendleton said there is a well-established mixing zone between the western and eastern stocks.

O'Corry-Crowe asked if the mixing of Steller sea lion stocks presented an issue that was incompatible with current stock definition and identification. Bettridge said stock identification in areas where stocks overlap is case specific. Individual stocks can be identified in areas where there are complete photo identification catalogs or sometimes with genetic samples. Often, the stock an individual belongs to cannot be determined and individuals from unknown stocks may be assigned to multiple stocks or arbitrarily assigned to a certain stock. As a general trend, NMFS has split larger stocks into more numerous smaller stocks, and one of the concerns that is often expressed by managers is that stocks are split so finely that they cannot be managed. Peterson asked if there are enough data to suggest any changes to trend or population resulting from fisheries closures that have occurred in the last 5 to 10 years. Fritz said there has been an increase in population in the eastern part of the Western U.S. Steller sea lion range. This increase occurred in an area where there were changes to fisheries in the late 1990s and early 2000s. Fisheries were not manipulated to the same extent in the western Aleutians, since it is harder to relocate fisheries due to the narrower shelf in that area. MML observed a levelling of Steller sea lion counts in the western Aleutians between 2010 and 2014, when fisheries in the area were closed. Some fisheries in that area have reopened and it will be interesting to see what happens.

Wynne said abundance estimates lose credibility over time, and they are no longer reliable after 8 years. There is not a similar timeline for observer data, and Table 2 includes observer data from the early 1990s. She pointed out that half of the mortality estimate in this SAR is comprised of 26-year-old data. Wynne appreciated the addition of a sentence to the SAR text which stated that the bycatch data may

not be representative of current bycatch, but she said Table 2 is misleading since the title of the table indicates the mortality estimates are based on data from 2011 to 2015, but data from the 1990s are being used.

Alaska Spotted Seal SAR Review

Mike Miller provided the primary review of the spotted seal SAR. He said the population is referred to as a single population in U.S. waters, but the population estimates are specific to the Bering Sea. Miller asked what the northern boundary of the Bering Sea was considered to be. Boveng said the boundary line is the Bering Strait, and that virtually the whole spotted seal population enters the Bering Sea in the winter and stays for the breeding season in spring. Miller asked if the SAR needed to include estimates and N_{MINs} for the Beaufort and Chukchi seas, if the entire U.S. population is in the Bering Sea at the time of surveys. Boveng said the estimates for the Beaufort and Chukchi seas should be removed from the SAR. He also said the following sentence in the 'Status of Stock' section should be removed because it is contrary to the current understanding of spotted seal seasonal distribution: *The best available abundance estimate involved spotted seals in the Bering Sea, and it is known to be biased low because spotted seals in the Chukchi and Beaufort seas were not counted.*

Miller said that Table 2 in the 'Alaska Native Subsistence Harvest' section should clarify that the harvest estimate is calculated based on the 12 listed communities in the table, and that the overall harvest is much higher. Miller asked if the section could reference the Alaska state surveys that were greater than 8 years old. These state surveys found the annual harvest of spotted seals numbered in the thousands. Miller said that the state surveys may still be reliable despite their age, as smaller subsistence surveys conducted over the years have been consistent with the state survey's findings. Miller thought it was important to attempt to represent the actual harvest levels, so that if there is another statewide harvest survey in the future, the jump from a known 352 seals to an estimated 6,000 seals will not come as a surprise. Wynne said that Appendix 2 was revised from ~5,000 seals to 352. It is important to note that this harvest figure is derived from a fractional survey of communities. Boveng said the SAR states that 352 seals is a minimum estimate and that Miller's point regarding higher historical take levels was reasonable. Boveng said he could put more emphasis on 352 as a minimum and that more seals are harvested by those communities.

Pendleton said the SAR was confusing because stock and DPS terminology were used throughout the SAR. He said the range figure should define the boundaries of the Alaska stock's distribution, because it appears to show the distribution of spotted seals belonging to more than just the Alaska stock. Boveng said that the SAR's range figure could be modified to be consistent with other stocks. Mike Cameron said the Alaska stock of spotted seals is contained within U.S. waters and its boundaries are defined by the EEZ. All surveys were conducted in U.S. waters, and the population estimate is for spotted seals in U.S. waters. Pendleton said some additional shading or hashing should identify the Alaska stock within the overall spotted seal range. Pendleton said an estimate of total harvest would be more helpful than providing a known harvest quantity. Pendleton said he liked the information on ocean acidification that was included in the 'Habitat Concerns' section and recommended that similar verbiage statements be included in at least all baleen whale SARs. Stafford said information on ocean acidification is also relevant to Pacific walrus.

Doniol-Valcroze asked why the N_{MIN} for the Beaufort Sea was not used for an N_{MIN} value in the SAR. Boveng said that N_{MIN} may be biased downward, because there are seals in Russian waters that are not included in the population estimate. Bettridge suggested using the N_{MIN} in the SAR, even if it is biased low. This is consistent with other SARs, and an explanation regarding the downward bias can be

included in the SAR. O'Corry-Crowe said that half of the spotted seal population is located across a political border. He asked how useful any population estimates were. Bettridge said NMFS is required to assess stocks in U.S. waters. Unfortunately, in some cases only a portion of a species' or stock's range is surveyed. O'Corry-Crowe said ice seals are the most extreme example of this problem. He said the SAR should be very clear that the SAR only focuses on a portion of the spotted seal range.

Cook Inlet Beluga Whale SAR Review

Doniol-Valcroze said the Cook Inlet beluga whale stock is a strategic stock with well-defined stock structure. It is evident that considerable effort has been put into assessing this stock. He said he has high confidence in the population estimates, status, and the lack of recovery. He agreed with the commentary in the SAR that states the calculated PBR is not recommended for use.

O'Corry-Crowe said the SAR should identify the known causes behind the lack of recovery, what is being done to identify the causes of the lack of recovery, and what the recovery strategies are. The SAR contains detailed but passive science, seemingly documenting a species going extinct, and the SAR would benefit from some type of assurance that actions are being taken to prevent further decline. For example, there could be more detail on causes of death, such as pathology, in the 'Annual Human-Caused Mortality and Serious Injury' section. Sentences, such as the following in the 'Habitat Concerns' section should indicate why something is unknown and what can be done or is being done to resolve the unknowns: *Whether this contracted distribution is a result of changing habitat, prey concentration, or predator avoidance or can simply be explained as the contraction of a reduced population into a small number of preferred habitat areas is unknown.* He said his comments apply to other SARs as well. Bettridge said SAR authors have struggled with the tendency to keep adding information to the SARs, without taking an equivalent amount of information out. Therefore, authors tend to report only what is required in the GAMMs. Rod Hobbs said at the end of the 'Habitat Concerns' section, there are several sentences about the recovery plan, and the threats are ranked. O'Corry-Crowe said he wanted the SARs to include the root causes for the decline and lack of recovery as well as what is being studied. Haflinger said he does not want to see speculation in the SARs, and that O'Corry-Crowe's recommendation would also lead to works-in-progress being reported in the SARs which would distract from the science.

Pendleton pointed out the 'Alaska Native Subsistence / Harvest Information' section states that harvests will be allowed if the 5-year average abundance is above 350. That decision to allow a subsistence hunt could be based on just two surveys, given that aerial surveys are conducted biennially. Hobbs said there is a complicated algorithm for determining how much harvest can be taken. The goal of the harvest plan is to allow any harvest that would not prevent the population from recovering to 780 animals in 100 years. Biennial rather than annual surveys, may lead to higher variation in harvests but is not expected to change probability of recovery in the algorithm.

Beaufort Sea Beluga Whale SAR Review

Doniol-Valcroze said this SAR documents a large stock with little known information. The SARs should emphasize that the tagging studies have extremely small samples sizes for each stock, and some of the information in the SAR, such as winter range overlap, may not be reliable. The Beaufort Sea stock's sample size was 4 tagged whales out of an estimated 40,000 and inferences about the entire population are being made from the movements of 4 whales. The SAR should also mention that the stock's geographic range extends into Canadian waters. The stock appears to be very abundant at 40,000 animals, but this estimate is based on old surveys. The last abundance estimate is 25 years old, and no N_{MIN} or PBR is provided in the SAR. However, the last published SAR did publish a N_{MIN} based on a 25-

year old survey because trend data were available. He asked why the trend information is no longer used to define N_{MIN}. Bettridge said the 2016 GAMMS allow trend to be used to estimate abundance.

Doniol-Valcroze said the first sentence of the 'Current Population Trend' section states the current population trend of the Beaufort Sea stock of beluga whales is stable or increasing, but this is based on 25-year old data and is not relevant. The 'Current Population Trend' section should briefly explain that complete surveys are 25 years old, and more recent surveys that compare relative numbers in a subset of the stock's range indicate that the population is stable or increasing. The Beaufort Sea beluga whale section in Appendix 2 provides an N_{EST} and a CV, but no N_{MIN} is listed for the stock. Muto said that an N_{MIN} cannot be determined and used for calculating PBR if the data used to calculate it are greater than 8 years old. Doniol-Valcroze said the text includes an N_{MIN}, but it is not used to calculate PBR. To be consistent, the SAR should not contain an N_{MIN} if it is not credible.

O'Corry-Crowe said there is satellite-telemetry information available that is not reflected in Figure 1. Figure 1 makes is appear as if the Eastern Chukchi Sea and Beaufort Sea stocks share the same wintering ground. There is some sympatry in space but not in time, and this is a very important point to make and should be represented in the figure. The geographic range of the map should be shifted to further north, because some important summer distribution is not depicted. Stafford said there is an error under the 'Habitat Concerns' section, in that there have not been significant changes in the Beaufort Sea stock's departure date from the Beaufort and Chukchi seas. Based on a small number of satellite-tagged animals and some acoustic information, the Beaufort Sea beluga whales do not seem to be changing their phenology. Pendleton said Table 1, which contains the summary of subsistence takes, stopped including struck and lost animals after 2012. He said any information from 2011 and 2012 should be reported, even if newer data are not available. The SAR states there are no reported fisheries-related serious injuries or mortality to any Beaufort Sea beluga whales, so the estimated fisheries mortality is zero. The SAR then contradicts that statement with another that states fishery bycatch cannot be considered approaching zero mortality rate because PBR is undefined. Pendleton said it does not matter what PBR is. If the mortality rate is zero, then it will always be less than 10% of any PBR.

Eastern Chukchi Sea Beluga Whale SAR Review

Pendleton said some beluga whales were being counted under subsistence takes that were taken in subsistence gillnet gear. If whales are taken in fishery gear, they should be counted as a fishery interaction whether they are consumed or not, since it is important to track that gillnets kill beluga whales. Van Helker said belugas might be intentionally targeted in subsistence nets, and some nets have larger mesh to intentionally catch belugas. Beluga whales could also become entangled, and rather than being released are harvested. It would not be reasonable to assign these takes to a fishery or gear type when the intent might be to harvest beluga whales.

Stafford said the Eastern Chukchi Sea stock has an outdated population estimate. Lloyd Lowry just submitted a paper that provides an updated population estimate of 28,000 animals with a CV of 0.6. This survey occurred in 2012. Rod Hobbs said Lowry's document is in prep, which is why it was not cited in the SAR, but it could be cited at the SRG's request. Stafford asked about the reliability of the estimate, and whether the 2013-2016 Aerial Surveys of Arctic Marine Mammals (ASAMM) survey data could be combined with the 2012 survey. Hobbs said survey data for the same area could be pooled across multiple years to create a better estimate. Doniol-Valcroze said any recent reliable estimate should be reported in the SAR. O'Corry-Crowe said there was a paper published recently that investigated consistency in the genetic patterns of these beluga stocks. Both genetics and the seasonal timing of beluga returns were found to be very consistent over multiple years. Despite dramatic

changes in the eastern Chukchi Sea and changes in the dates of ice breakup, the same whales have been observed to return to the same locations for decades; however, there have been anomalies as well, with whales migrating to the wrong location at the wrong time. These anomalous events are highly correlated with unusual sea ice events. Wynne asked O'Corry-Crowe if he would draft a sentence on that topic that Muto could update the SAR with. Pendleton said that there was an increased potential for killer whale predation on beluga whales due to loss of sea ice. This should be noted in the 'Habitat Concerns' section. O'Corry-Crowe said there is evidence of increased predation by killer whales on this stock.

Eastern Bering Sea Beluga Whale SAR Review

Pendleton said he did not have any comments on this SAR. Miller did not have any comments. Doniol-Valcroze said that the SAR includes an N_{MIN}, but then explains that the N_{MIN} is unreliable. To be consistent, the SAR should report N_{EST} and then explain that N_{MIN} cannot be calculated.

Bristol Bay Beluga Whale SAR Review

Pendleton said the survey data used for calculating the population estimate are from 2004 and 2005, and despite the age of the survey data, both N_{MIN} and PBR are calculated using that older data. He said John Citta presented a more recent population estimate of 3,009 animals from a 2011 survey at the Alaska Marine Science Symposium, but there may not be anything published to support that estimate. Hobbs said the paper to support that population estimate is in prep.

Stafford said the 'Habitat Concerns' section discussed the changing Arctic. She said this paragraph may not be applicable to Bristol Bay belugas, and appears to be copied from another SAR, and it would be useful to think about different habitat concerns for this stock. Stafford offered to draft alternative text. Doniol-Valcroze said he did not think it was appropriate to multiply the maximum yearly count by the usual multiplier to account for submerged whales. The Lowry paper states that the variability among counts was between 300 and 1,000. Lowry mostly attributed the variability in counts to variability in diving behavior. Doniol-Valcroze recommended multiplying the average count with the correction factor, and if not that, then the SAR should report the maximum count. He said there is an increasing amount of literature that supports using variation in survey data to infer information about variability in dive times, which is informative when developing a correction factor. This is worth investigating, since it could provide information about the variability of diving behavior. Doniol-Valcroze offered to draft some text to include in the SAR regarding the variability in counts. Pendleton said even if the variation in counts is not explained by variation in dive behavior, it is still not appropriate to take the maximum count and divide it by the sightability factor. Hobbs said he agreed, and asked the SRG to provide their proposed changes to the existing text. He added that there is new aerial survey data, and genetic mark-recapture data that will be reported soon. Peterson said the Bristol Bay salmon set gillnet fishery should be mentioned in the 'Habitat Concerns' section.

AT1 Transient Killer Whale SAR Review

O'Corry-Crowe said the AT1 Transient stock has been thoroughly reviewed over the years. The stock is very small and there have been several genetic studies that complement the field surveys conducted by Craig Matkin. In general, resident and transient killer whales tend to have quite discrete nuclear and mitochondrial DNA. Research on killer whale mating strategies has documented outbreeding in killer whale populations to counter inbreeding depression. It would be very interesting to know if the AT1 killer whales are outbred. If AT1 killer whales are outbred, then they are not completely isolated. It would also be interesting to learn whether AT1 killer whales are inbred and how genetically

compromised the stock may be. He said the SAR should contain more information on the age and sex of AT1 killer whales, and asked if there was detailed information on the whales that have died since the oil spill. Pendleton said many whales have disappeared, and only one or two carcasses were recovered. O'Corry-Crowe asked why the AT1 stock was not listed as an endangered species. Bettridge said NMFS has never received a petition. O'Corry-Crowe said the SAR should elaborate on why the stock was originally delineated. Doniol-Valcroze requested the SAR include a sentence describing the numbers of males and females in the AT1 stock and any information on age distribution or congenital problems that might be the cause of the stock's lack of reproduction. Pendleton said a maximum productivity of zero should be included in the SAR. He asked if there was any progress on changing the name of 'transient killer whales' to 'Bigg's killer whales'. Bettridge said stocks have been renamed before, but it takes a strong interest and considerable effort.

Summary Text for SARs Regarding Fisheries with Potential to Cause Mortality or Serious Injury
Teerlink said one of the 2016 recommendations from the SRG was that each SAR should contain a summary statement indicating the number of fisheries that potentially interact with a marine mammal stock, and the number of those fisheries that are monitored. The ARO and the AFSC worked together on a response to the SRG's proposal. Tallying the fisheries, as proposed by the SRG, is problematic because there is not a good metric for comparing dissimilar fisheries. An example statement follows:

Based on historical reports and their geographic range, Steller sea lion mortality and serious injury could occur in several fishing gear types, including trawl, gillnet, longline, and troll fisheries. However, observer data are limited. Of these fisheries, only trawl fisheries are regularly observed and gillnet fisheries have had limited observations in select areas over short time frames and with modest observer coverage. Consequently, there are little to no data on Steller sea lion mortality and serious injury in non-trawl fisheries. Therefore, the potential for fisheries-caused mortality and serious injury is greater than is reflected in existing observer data.

Muto said this statement is NMFS' attempt to address the SRG's request to report on the potential for fishery interactions in unobserved fisheries. This statement is something that will not require an extensive amount of work, will not go out of date quickly, and is transparent. Wynne said longline fisheries needed to be included in the list of regularly observed fisheries. Pendleton said the proposal was better than nothing but thought the statement will become boilerplate language and will not be updated. He said he preferred an approach that would require updates. Muto said NMFS would update the language as observer, fishery, and mortality information changes. Teerlink said that including the numbers of fisheries would encourage the reader to compare numbers of fisheries, which is not appropriate, because individual fisheries may be drastically different in size, methods, or impact. Long said that tallying the number of fisheries is less subjective than the new text. Teerlink said there is room for improvement in how the text is written to make it less subjective but using numbers of fisheries is also subjective and less transparent to the reader.

Wynne said the proposed text should eliminate imprecise terms such as 'several' when referring to many fisheries, and instead reference the LOF. Teerlink said it would help to direct the reader to the LOF. Long said the LOF lists the number of permit holders and vessels by fishery, is updated every year, and is appropriate to cite. Instead of a stock specific paragraph for each SAR, she proposed a statement like the following:

Other fisheries overlap in time and space with this stock's distribution. Some of these fisheries have never been, or have not been recently observed, and the potential exists for serious injury and mortality in these fisheries.

Long said the statement could cite the LOF. Bettridge thought the proposal was consistent with the requirements of GAMMS 2016, which requires key uncertainties to be highlighted. Wynne said she appreciated NMFS' attempt at following through on the SRG's recommendation and thought that the proposed language described uncertainties regarding levels of fishery interaction in a satisfactory manner. She proposed the SRG discuss the proposal again later in the meeting.

USFWS Update

Patrick Lemons provided the SRG with an update on USFWS activities. He said the USFWS' Marine Mammals Management program is comprised of a polar bear branch, a walrus and sea otter branch, and a regulatory branch.

He said the northern sea otter population is comprised of three stocks; the Southwest Alaska stock which is listed as endangered under the ESA, the Southcentral Alaska stock, and the Southeast Alaska stock which was reintroduced several decades ago. The southeast stock has a rapidly growing population and is notable for an increase in fisheries conflicts. Sea otter SARs were last updated in 2014 and there is a considerable amount of effort underway to reassess the status of the stocks. There was a 2016 aerial based survey in the Bristol Bay region of the Southwest Alaska stock. Approximately 10,000 km of transects were flown and over 2,000 otters were observed. An increase in otters was observed compared to the last survey, and an analysis is underway to determine whether the increase was significant. A helicopter survey was also conducted south of the Alaska Peninsula in 2016, and 600 otters were observed, consistent with previous surveys. There are plans to conduct a combined aerial and boat based survey in the eastern Aleutians Islands. Goals of this project are to estimate the population size and to develop a boat-based correction factor to correct aerial surveys for observer bias and detection probability. That correction factor will then be applied to the 2016 aerial surveys. Results are anticipated from this project by 2018. Additional survey effort will take place in southern Cook Inlet, and data will be informative for permitting incidental take and incidental harassment. This survey effort will use the Intensive Search Unit (ISU) method and should allow for the estimation of detection probability and allow for the calculation of a true abundance estimate. Results are anticipated from this work by 2019.

There are two stocks of polar bears in the U.S. One is the Chukchi/Bering Seas stock and the other is the Southern Beaufort Sea stock. USFWS has incorporated the SRG's comments from the 2016 meeting and completed revising the polar bear SARs. These SARs will be available for public comment in spring 2017. Polar bears were listed as threatened range wide under the ESA in 2008. USFWS has been conducting a considerable amount of research to assist with the development of a Conservation Management Plan. This plan was recently finalized and published in January 2017. An ESA status review was also recently conducted, and it was determined that continued listing as threatened was warranted. In 2008, USFWS reinitiated research and capture activities in the Chukchi Sea. Research findings are presented in the SAR, and a population estimate should be available by the end of 2017. Numbers are not considerably different than previous estimates, but the potential redefinition of the boundary line separating the Chukchi/Bering Seas stock and Southern Beaufort Sea stock would impact abundance estimates for each stock. A collaboration with MML to conduct an instrument-based aerial survey was conducted in 2016. This survey will be used to calculate an abundance estimate for the Chukchi/Bering Seas stock. Research

efforts in the southern Beaufort Sea consist of fall coastal surveys conducted between 2000 and 2014. A paper on these surveys will be published in 2017.

The Pacific walrus population is comprised of a single large population with no population substructure. Walrus winter in the Bering Sea and summer in the Chukchi Sea. A SAR was last published in 2014. A large-scale genetic mark-recapture project was initiated in 2012 and is still underway. The study involves genetic identification of individual walrus using a biopsy dart and genetic fingerprinting is used for mark-recapture analysis. Over the last 4 years, 7,000 samples have been collected. Genetic analysis has been completed for 3 of the 4 past field seasons, and a preliminary abundance estimate using 3 years of data is underway. The estimate for 2014 will likely be between 250,000 and 400,000, but the CVs will be quite large. The CVs should tighten up as future years of sampling and genetic analysis are included. Five years of sampling should yield a CV of 25-30%. The USFWS is also in the process of making an ESA listing decision for the Pacific walrus, and a Federal Register notification on the decision is anticipated in June. For the first time in years there was also a fishery conflict with walrus. A land-based walrus haulout formed on the boundary of the Tier 2 Ugashik salmon district boundary. USFWS worked with the state of Alaska to move the fishery boundary to minimize fishery conflicts and avoid any disturbance to the haulout. There were no known takes, even though these types of haulouts can be very sensitive to disturbance.

Haflinger asked how many walrus hauled out in Ugashik. Lemons said the haulout numbered 1,000 to 2,000 walrus, a typical number for male dominated Bristol Bay walrus haulouts. Wynne asked if USFWS had any plans or resources directed at assessing increased vessel traffic in the Arctic and the consequences associated with increased vessel traffic. Lemons said USFWS is in contact with the U.S. Coast Guard (USCG) regarding vessel traffic, but does not have a mechanism in place to dictate vessel traffic. Wynne said NMFS has 100-yard vessel approach restrictions for marine mammals and asked if USFWS has similar guidelines. Lemons said USFWS has guidelines and works with the USCG to issue Notices to Mariners and the FAA to issue Notices to Airmen. USFWS is also creating Best Management Practices (BMPs) that will be provided to vessels and aircraft operating in the Arctic. Stafford asked if USFWS provided regulations to cruise ships and private vessels transiting the Arctic. She said she was on the USCG Cutter *Healy* in 2016 and observed that many ships would radio the *Healy* requesting information on walrus and polar bear locations. It seemed there was no awareness of separation requirements. USFWS should work with the USCG to develop clear guidelines for vessel operators. Lemons said he would consider asking the USCG to provide vessel operators with marine mammal BMPs.

O'Corry-Crowe asked if the mark-recapture study was complicated by walrus stock structure issues due to overlap of multiple stocks. Lemons said the genetic evidence for the overlap of the Laptev walrus stock was weak, and it needs to be re-examined with an appropriate sample size and markers. Doniol-Valcroze asked how walrus were counted before the genetic mark-recapture effort began. Lemons said visual aerial surveys were used until 2006, but this type of survey does not work well for walrus since walrus have a patchy distribution and their haul-out patterns are correlated with one another. Therefore, the standard errors associated with visual aerial surveys for walrus are massive. Doniol-Valcroze said he has observed similar issues with walrus in the eastern Arctic in Canada. He observed that there is huge variability in haul-out rates throughout the day, and asked if the old aerial surveys corrected for the proportion of walrus that were not hauled out. Lemons said USFWS did attempt to correct its aerial survey counts for variation in haul-out patterns, but the aerial survey efforts were abandoned due to huge variation in counts.

Doniol-Valcroze asked if someone could elaborate on the ISU. Michelle St. Martin said the method was developed in 1990s by Udevitz and Bakken and is being used for sea otters. The method involves line-transect surveys combined with intensive searches of a small area when a certain threshold or density of animals is sighted. This technique is frequently used in Southeast Alaska where many animals may be spotted in one location. Peterson asked if there have been USFWS actions to mitigate interactions between Southeast Alaska sea otters and fisheries. Lemons said the proper terminology would be fishery conflicts, because there are not many reported interactions. Sea otters are consuming dive fishery products. Crabs, geoduck, and abalone populations have been reduced substantially by otters, and dive fisheries are no longer productive in some areas.

Wynne asked if there were plans to conduct surveys of the Southeast Alaska sea otters. Lemons said the last surveys were conducted in 2010 and 2011, and he would like to reinitiate the surveys in 2018 or 2019. This will be dependent on funding. New survey techniques are also being developed because ISU is not effective in places like Glacier Bay where there are rafts of thousands of otters. Other possibilities include site monitoring to document trends while cutting costs. Wynne asked what the U.S. Geological Survey (USGS) had planned in terms of research. Lemons said USGS has a visual aerial polar bear survey planned in the southern Beaufort Sea in collaboration with Canada. USGS has investigations underway regarding ocean noise and walrus energetics. There are plans to survey sea otters in Prince William Sound and develop drones for surveying sea otters.

Haflinger asked if the Bristol Bay walrus haulouts are increasing in number or size and if the range was expanding to the south. Lemons said there are no systematic surveys, but the thought is that male dominated walrus haulouts in the Bering Sea are generally declining. This could be indicative of population decline or movement of animals north as sea ice retreats north. Lemons said the number of animals at Round Island used to be around 18,000. On average, there are now 2,000 to 3,000 animals observed at Round Island. Although there could be some redistribution of walrus occurring that could explain the decline at Round Island, the Russians are also seeing lower numbers at consistent haulout locations. Haflinger said it is odd to see walrus hauling out at Ugashik. Lemons said walrus have historically used Ugashik as a haulout, it just has not occurred in recent memory. Wynne said the SRG would like updates again from USFWS as well as USGS at the next meeting.

Update on Northern Fur Seal Research

Tom Gelatt provided the SRG with an update on MML's northern fur seal research. He said there are two stocks in North America, the Eastern Pacific stock and the California stock. There are also three stocks in Russia. It is estimated that there are 1.1 million northern fur seals in the North Pacific, but the Pribilof Island rookeries have experienced an ongoing and substantial decline. St. Paul Island rookeries have experienced a continuous decline in pup production since the mid-1990s and St. George Island rookeries have experienced a non-significant decrease in pup production since the late 1990s. In 2016, there were an estimated 80,000 pups on St. Paul and 20,500 pups on St. George.

Bogoslof Island comprises the other fur seal rookery in Alaska. The first pup production was documented around 1980 and, as of 2015, there were an estimated 28,000 pups on the Island. Since 1990, St. Paul's pup production has declined by 120,000, St. George's declined by 3,900, and Bogoslof's increased by 27,500. Bogoslof is a volcano that is undergoing significant volcanic activity which has altered the topography considerably, and the area of the island has increased. There could be more substrate available for northern fur seal use depending on the nature of future volcanic activity. A MML field team is hoping to visit Bogoslof this summer, but this will be dependent on the level of volcanic activity.

Jeremy Sterling presented an animation which depicted the movements of northern fur seals tagged at three different rookeries. Segregation in foraging locations by rookery occurs during summer, but in the winter all three populations overlap and are distributed equally throughout the North Pacific and Bering Sea. The animation represented an enormous amount of information obtained over the last 25 years from tagged male and female fur seals of all age classes. Haflinger asked how many tagged animals were represented in the animation. Sterling said that it included 847 animals tagged from 1991 to 2016. O'Corry-Crowe asked if there was similar Russian tag data. Sterling said Russian scientists have tagged adult females and pups. Those data need to be standardized prior to incorporating it into products like the animation.

Gelatt said his program incorporated a Saildrone, an autonomous vehicle that can be controlled remotely to collect environmental and oceanographic information, into the northern fur seal research program in 2016. The Saildrone was directed to sample areas where satellite-tagged northern fur seals were known to be foraging and with its echo sounder could identify forage fish distribution. The project goals were to:

- Quantify fish distribution and abundance within the northern fur seal summer foraging range
- Simultaneously track fur seal dive and movement patterns to examine foraging behavior in relation to variation in prey availability
- Determine specific prey characteristics (e.g., density, depth, fish size) that are associated with increased fur seal foraging success

The ability to collect real time foraging information is valuable, since prey information is typically obtained from scat samples. Data from last season still needs to be processed to spatially and temporally link foraging behavior parameters to echo sounder data and, in 2017, cameras will be added to seals to identify the types of prey being captured.

Wynne asked about the frequency the echo sounder used. Sterling said the echo sounder was a similar echo sounder to what is used on the NOAA Ship *Oscar Dyson* for midwater assessments. Gelatt said the Saildrone also had a passive acoustic instrument to listen for right whales; but, unfortunately, the sound of waves hitting the hull was at the same frequency as right whale calls. Haflinger asked if there were trawl data that could identify the age of the pollock detected by the Saildrone's echo sounder. Sterling said that a NOAA Midwater Assessment and Conservation Engineering (MACE) trawl survey would have sampled that area prior to the arrival of the Saildrone. An analysis of MACE survey data should be able to provide age structure information.

Stafford asked about the maximum depth the Saildrone was capable of sampling. Sterling said the Saildrone samples near the surface, and maximum sampling depth would be the depth of its keel. Stafford asked if any killer whales were detected by acoustics. The acoustics might be useful to look at fur seal / predator interactions. Sterling said MML's acoustics team is investigating the usefulness of the acoustics data that were collected. The use of moorings or gliders may be more effective in terms of reducing noise.

Gelatt said MML began flipper tagging northern fur seals in 2007. Since then, 15,000 animals, mostly pups and some adult females, have been tagged. The tag study showed that over half of female fur seals have their first pup at or before 5 years of age. This suggests that there do not appear to be any significant changes since the last similar study was conducted in the 1960s in terms of maturation of

breeding females. In addition, other research on tagged animals showed the adult pupping rates were high, between 0.87 and 0.92, with no significant difference between rookery sites sampled. In summary, there is no evidence that maturation rates or pupping rates are having a negative effect on Pribilof fur seal pup production. In fall of 2006 and 2007, satellite tags were deployed on 29 male and 36 female juveniles from St. Paul and Bogoslof Islands. Juveniles exhibited sexual segregation of habitat during the winter migration in both years, with the female seals concentrating in the eastern North Pacific.

Haflinger asked if there were any satellite tags placed on pups. Gelatt said MML placed 160 satellite tags on pups at St. Paul, St. George, Bogoslof, and San Miguel in 2005 and 2006. There is a paper published on this work. Bettridge asked what might be causing the decline in the Pribilofs. Gelatt said the pupping rates are high, so pupping rates cannot explain the decline in pup production. Knowing that fur seals mix and forage in the same areas during the winter and segregate by breeding area in the summer will help focus efforts on when and where to look for differences that may be causing increases or decreases at different rookeries. One metric that may be helpful is pup weight. Pups are typically born at the same weight, but wean at different weights. The Saildrone information, satellite tagging, and vital rates information will hopefully help identify the age class facing problems and the mechanisms behind the declines.

Update on Southeast Alaska Harbor Porpoise Research

Kim Parsons provided the SRG with an update on Southeast Alaska harbor porpoise stock structure work. She said Dahlheim's 2015 paper summarized harbor porpoise trend and abundance data generated from Southeast Alaska line-transect surveys conducted between 1991 and 2012. The paper divided Southeast Alaska inland waters into 6 geographic strata and estimated harbor porpoise density and abundance across those strata. There were significant changes in abundance throughout the surveyed period. Those changes were most significant around Wrangell and Zarembo. This suggested that Southeast Alaska may contain multiple populations of harbor porpoise, rather than a single population. AMMOP observed approximately 6% of the drift gillnet fleet in three Southeast Alaska fishing districts near Wrangell and Zarembo in 2012 and 2013, and 4 different harbor porpoise were observed entangled by observers during the program.

Currently Alaska has three harbor porpoise stocks. Nuclear and mitochondrial DNA from 100 samples obtained through strandings and bycatch programs throughout Alaska are being analyzed to gain a better understanding of stock structure. An analysis of the mitochondrial control region from these samples indicates significant genetic differentiation between the Bering Sea and Gulf of Alaska, as well as significant genetic differentiation within the eastern and western Gulf of Alaska. More genetic samples are needed, however, and they are difficult to obtain through conventional means. Environmental DNA (eDNA) is a possible solution to obtaining additional samples: eDNA consists of genetic material such as sloughed skin, hair, or mucus that is shed into the environment by living organisms.

Parsons conducted a pilot study in 2015 to see if it was possible to detect harbor porpoise genetically from seawater samples. Seawater samples were collected throughout Southeast Alaska near harbor porpoise. Seawater samples were filtered down through a filter manifold onto filter papers. Species-specific mitochondrial markers allowed Parsons to target the harbor porpoise DNA from other DNA that is extracted from the filter paper. This approach proved successful, and harbor porpoise were detectable in nearly all water samples. Signal strength was strongest in samples collected from the fluke print immediately after a harbor porpoise dove. In 2016, eDNA samples were collected in different

areas of Southeast Alaska from the fluke prints of harbor porpoise. The team met their goal of 50 samples from Icy Strait / Glacier Bay and 50 samples from Wrangell / Zarembo.

The amount of DNA collected per sample is much lower than from a tissue sample; therefore, it is important to target the part of the genome during analysis that provides the greatest yield possible. Since each cell contains hundreds of thousands of mitochondria, it offers the greatest genetic yield for each eDNA sample, and a 450 base pair fragment from the mitochondrial control region has been identified as an assay candidate. Traditionally, Sanger sequencing has been used for sequencing; however, this is problematic with eDNA since water samples may contain genetic material from multiple harbor porpoise, which can lead to ambiguous sequencing. Next Generation Sequencing (NGS) solves this problem, and allows massively parallel sequencing for each of the samples. NGS eliminates the problem of ambiguous bases and instead identifies multiple different sequences from each eDNA sample. The project's next steps include fine-tuning the assay, extracting all the eDNA from water samples collected last year, and then conducting NGS this spring. Another project involves quantifying the amount of harbor porpoise DNA in a water sample, which could be used to identify any correlation between abundance of harbor porpoise in a region and the amount of eDNA present. A harbor porpoise survey is not planned for 2017. The intent is to wait for the results of the genetic analysis expected in spring 2017 to better plan for 2018 fieldwork.

Teerlink asked about Parson's timeline for processing samples and what other species Parsons was applying the eDNA techniques to. Parsons hoped to have preliminary results in late April or early May 2017. She said she has also collected eDNA water samples from the vicinity of killer whales, minke whales, and Puget Sound harbor porpoise. She is also pursuing a project on beaked whales with the Office of Naval Research (ONR). Teerlink asked if tissue samples from stranded or bycaught harbor porpoise would be helpful to her work. Parsons said the Southeast Alaska harbor porpoise sample size is so small that any samples from that area are helpful. Wynne asked whether it was possible to discern stock structure from the Southeast Alaska harbor porpoise eDNA in 2017. Parsons said it would depend on the success of processing the eDNA samples and whether that proves effective.

Eastern Pacific Northern Fur Seal SAR Review

Haflinger said the PBR for this stock is 11,602 animals. Direct mortality from fisheries is quite low, and fur seals are not bycaught very often. Over the last 5 years of data, the flatfish trawl fishery was the only observed fishery that had observed takes. This is an interesting contrast to sea lions, which despite a much lower population, are taken more frequently by trawl fisheries. Entanglement-related injuries are more significant than bycatch and likely under-reported but are still low in comparison to PBR. Haflinger noted there is an authorized pup harvest on St. George, which has averaged ~50 animals per year.

Haflinger said the 'Habitat Concerns' section should be revised, especially the section regarding displaced fisheries due to Steller sea lion protection efforts. Those fisheries were displaced over 15 years ago. It would also be useful to include a statement about forage fish changes in the Bering Sea. He said there have been changes in herring distribution around the Pribilofs, and boats have had to change their fishing locations due to herring bycatch. That is not a common occurrence and indicates that changes are afoot in the Bering Sea.

Pendleton said there is a section on entanglements in the 'Fisheries Information' section that references a paper published by Zavadil in 2007 which noted entanglement rates for different age and sex classes of northern fur seals. It would be helpful to multiply the rates of entanglements by an appropriate

multiplier to obtain estimates of the actual numbers of entangled animals. Pendleton also suggested only using years in which there was a pup count when reporting entangled animals, since there is more effort dedicated to spotting and reporting entangled animals in these years. He said the 'Status of Stock' section states that the population is less than half of what it was in the 1950s and then follows up with a statement that there is no compelling evidence that carrying capacity has changed substantially since the 1950s. Pendleton said the evidence of a carrying capacity change is very strong and the current statement is not supported and proposed removing the sentence about carrying capacity change.

Western North Pacific Humpback Whale SAR Review

Haflinger said that humpback whales were being seeing in increasingly large numbers on fishing grounds. He said marine mammal populations, which have been historically low for some time are now growing and increasingly in conflict with human activity. Some herring fisherman are having difficulty fishing due to large aggregations of humpback whales on fishing grounds. Wynne said there are major concerns in many regions about herring biomass being reduced by whales.

Central North Pacific Humpback Whale SAR Review

Peterson said she did not have many comments due to the pending changes in stock structure. She said the Structure of Populations, Levels of Abundance and Status of Humpback Whales (SPLASH) data is on the verge of becoming outdated, and asked if there were ongoing studies or any other plans to replace the SPLASH survey data. Wade said SPLASH was expensive, and there was not funding for another survey like it. Teerlink said the NMFS lab in Juneau is partnering with humpback whale researchers throughout Southeast Alaska to conduct a survey called SPLISH. This will not be as broad of an effort as SPLASH, but it could be used to provide trend data. The plan is for 3-4 teams to survey for 2 weeks in August each year. Bettridge said the expiring SPLASH data was another reason that an approach for calculating PBR from outdated abundance estimates was an important project.

Peterson said the PBR section is divided by feeding aggregations and asked if that was foreshadowing of stock revision plans. Bettridge said that humpback whales are one of the only stocks for which NMFS provides a PBR for feeding aggregations. This information has been in the SARs for years and is not foreshadowing of where the agency is heading. Wade said there was a time when the agency considered basing humpback whale stocks on feeding areas, hence the inclusion of PBR calculations for feeding areas. That is no longer being considered, but the PBR information remains in the SARs because little effort has been put into the SARs since the decision was made to redefine the stocks. Humpback whales do not fit into the typical stock framework due to their migratory behavior and require slightly different treatment in the SARs. Peterson said it would be useful to see the feeding area calculations in future SARs.

Pendleton said his comments relate to both humpback whale stocks. He said there was no CV for N_{MIN}, thus a default CV of 0.3 was used, but for other stocks the default CV is 0.2. He asked why a CV of 0.3 was used. Wade said he was trying to be conservative with a CV of 0.3, and the CV will be updated when the SARs are revised. Pendleton said both humpback whale SARs contain outdated population estimates that are over 8 years old, but trends indicate the population is growing, and the population estimate is still assumed to be valid. The Western North Pacific humpback whale SAR also contains a statement that this practice is consistent with GAMMS. Bettridge said GAMMS specifically states:

When abundance estimates become many years old, at some point estimates will no longer meet the requirement that they provide reasonable assurance that the stock size is presently greater than or equal to that estimate. Therefore, unless compelling evidence indicates that a stock has not declined since the

last census, the N_{MIN} estimate of the stock should be considered unknown if 8 years have transpired since the last abundance survey.

Pendleton said if this provision is applied to a stock then a reference to this GAMMS provision should be included in the SAR. He said that in the Central North Pacific humpback whale SAR, any Southeast Alaska drift gillnet humpback whale interactions should be counted in addition to the AMMOP bycatch estimate, unless they occurred in one of the three regions that the AMMOP bycatch estimate covers.

North Pacific Right Whale SAR Review

Stafford said the right whale SAR suffered from *SAR Creep*, in that it contained unnecessary detail and material. She said that not every right whale call that was heard needs to be included in the SAR, even though the North Pacific right whale stock is small and highly endangered. The SAR authors should focus on the population size and transitioning personal communication and unpublished data citations to published data. There are two reports cited, Wright 2015 and Wright 2016, that Stafford said she could not locate. It would be useful to have those reports available to the SRG. The PBR of 0.05 has been deleted in Appendix 2, but the main body of the SAR still lists a PBR of 0.05. Muto said that PBRs considered unreliable are not included in Appendix 2, and a footnote refers the reader to the text of the SAR where the unreliable nature of the PBR can be explained. Clapham said he would ask Dana Wright to make the 2015 and 2016 reports available. He said Wright has made substantial progress on another paper regarding right whale acoustic analysis and that it would be published in a peer-reviewed journal soon. Stafford said much of the new material in the SAR is derived from acoustic data, and it is difficult to evaluate the SARs without the actual reports. Clapham said right whale work is reliant on acoustics data because funds are not available for anything else. There is no funding for right whales and no funding for surveys. All of the funding for acoustics has been from the Marine Mammal Commission and non-Federal sources.

Peterson said the PBR section was contradictory. It provides a PBR, but also states the PBR is unreliable. Pendleton said this has been a topic of SRG discussion before. He thought it was acceptable to have a PBR of 0.05, which translates to one take every 20 years. Peterson said she thought it was appropriate to include fishing vessel activity in the 'Habitat Concerns' section, since the activity increases the risk of entanglement. Stafford told Clapham she thought it was very important to collect more information on North Pacific right whales. Clapham said the problem with North Pacific right whale research is that they are located far offshore, and it takes big ships and a considerable amount of money to study them. Stafford said gliders have been used in the Atlantic to locate right whales. Once located, ships and aircraft can target that location. That might reduce research costs.

Doniol-Valcroze said PBR was not designed for populations that are at such a small fraction of their carrying capacity. It should not apply to North Pacific right whales given that there are only ~30 whales remaining. Peterson said PBR can be used as a trigger to manage fisheries, and there is no trigger if there is no PBR. Bettridge said a fishery exceeding PBR does not automatically trigger a management action, especially if the fishery was not a category I or category II fishery. She said PBR is also used when authorizing other activities, and not having a PBR would be challenging to the agency. Doniol-Valcroze said the PBR framework was not designed for populations of such a small size. For example, stochastic events can wipe out an entire small population, even without human takes. The PBR framework has not been tested for the risk that small populations can be wiped out just by chance and, therefore, it does not make sense to compute a PBR. Bettridge said the MMPA requires a PBR to be calculated, so the SARs include a PBR when possible, with the appropriate caveats. Clapham said he had a problem with any PBR for a population that consists of ~30 animals. There needs to be an exception for populations

that are so incredibly endangered, and there are stochastic effects in small populations that are not a threat to larger populations. Pendleton said the 'Status of Stock' section states that the observed rate of calving appears to be low. There are insufficient observations to support this statement, and this idea could be stated differently.

Southeast Alaska Harbor Porpoise SAR Review

Peterson said the PBR for this stock is being exceeded by quite a few animals, but no PBR is provided in Appendix 2, despite a PBR provided in the SAR text. Wynne asked if Dahlheim could comment on the stock's abundance estimate. Dahlheim said there is no correction factor available for recent survey data. A correction factor would increase the estimated abundance. She said it is most likely that the harbor porpoise population within inland waters was underestimated to some extent. Wynne asked if Parson's work on stock structure would be sufficient to determine whether separate stocks exist in Southeast Alaska. Dahlheim said Parsons should have an adequate sample size to identify any stock structure within Southeast Alaska, assuming the technique works.

Pendleton said the estimated mortality of this stock is more than three times greater than PBR. Unless abundance was underestimated by three times, PBR for this population will still be exceeded. Peterson recommended highlighting the potential conservation concern due to relatively high levels of take compared to estimated PBR. Measures should be taken to proactively address interactions between porpoise and gillnets. Haflinger said the level of interaction is being extrapolated based on two observed serious injuries over two years. This is one of the few cases where estimated mortalities exceed PBR and is a good candidate for more observer coverage. Wynne said some type of monitoring program for this stock is needed. Kurland said the ARO is requesting that fisherman report interactions. Teerlink said the ARO will be sending flyers to all category II fisherman and doing more outreach to encourage reporting by fishermen. NMFS does receive self-reports on harbor porpoise gillnet interactions that support the AMMOP data, and there are other indications aside from the extrapolations from a couple of interactions. Wynne said fisherman may also be able to collect tissue samples and anonymously provide samples to NMFS. Miller said there are harbor porpoise observed on the outside coast. He recommended sampling for eDNA outside of the inland waters. Miller said that in addition to the flyers, the ARO should encourage fishermen to take samples. Parsons said it would be extremely useful to obtain samples from other areas.

North Pacific Sperm Whale SAR Review

O'Corry-Crowe said he was surprised by how little was known about this stock. He asked if there are any samples obtained by historical whaling that can be tapped for genetic analysis. Clapham said there are not many samples available. The Soviets took many scientific samples, but those appear to be lost. O'Corry-Crowe asked why the North Pacific sperm whale stock was ever designated as a stock. The genetics seem ambiguous and little genetic differentiation from other populations was found. He asked Clapham if there were plans to conduct more genetic analyses. Clapham said he was not aware of any plans for more genetics work. Pendleton said the SRG has previously discussed the validity of this stock, given that it is composed of nearly all males. The consensus was that a population of males is not a stock. O'Corry-Crowe said there does not seem to be a well-reasoned case for the existence of the North Pacific stock. Clapham said he understood O'Corry-Crowe's point. There are not enough data to assess population structure, and stock structure is complicated with sperm whales since there is segregation by sex. Whaling data show females have been taken at surprisingly high latitudes and into the Bering Sea. The concept of a North Pacific stock came from mark-recapture work that showed extensive movements across the North Pacific, but there is an overall lack of data on this stock.

Teerlink said NMFS plans to form a working group to develop an N_{MIN} and improve the understanding of this stock. Peterson said it would be informative to address abundance in this SAR. Rone published a paper in 2017 that provides abundance estimates for the Gulf of Alaska, and Straley published a paper in 2016 that estimated there were at least 135 individuals interacting with fishing vessels in Alaska. Although regional in nature, this information from these papers could be added to the SAR.

Gulf of Alaska Harbor Porpoise SAR Review

Wynne said the first page of the SAR contains information that dates back to 1991. This information may be too old to continue citing. The last abundance estimate was derived from a 1998 survey, which produced an estimate of 31,046 harbor porpoise for this stock. Due to the age of those data, N_{MIN} and N_{EST} are both undetermined. Wynne said she appreciated the detail in the human-cause mortality section. Bycatch data that are 26 years old are being used in the fishery mortality section. Some of the wording in the SAR is hard to interpret, and Wynne volunteered to provide revised text to Muto. She said the rationale for identifying the stock as strategic was confusing. Muto said GAMMS 2016 did not allow the stock to be designated as strategic simply due to a lack of information about mortality, so some speculation regarding the levels of take and abundance was required. Bettridge said AFSC was trying to be conservative in labelling this stock as strategic. Wynne asked if there is a better way to make the case for identifying this stock as strategic. Muto said she would work on the language. O'Corry-Crowe said that assuming the worst case scenario of a decline in abundance and an increase in mortality to designate the stock as strategic was problematic.

Bering Sea Harbor Porpoise SAR Review

Miller said there are some big data gaps in this SAR. The SAR has a section on fishery mortality with only a single stranding report. A single fishery-related mortality does not reflect reality, and the number is so artificially low that it is not relevant. He said that reporting such an artificially low level of fishery interaction does not serve any realistic purpose. Wynne agreed the bycatch number was very low and bycatch was under-reported. She said any Native commissioned bycatch or harvest reports would be helpful. Miller said he would inquire about any such data at meetings. He said if there is ever a comprehensive review of fishery interactions, it would appear as if there is a large increase in fishery interactions when it was just a change in reporting. Pendleton agreed that the table and text in the mortality section did not reflect reality and asked if harbor porpoise fishery interactions are reported in any subsistence reports. Miller said no. Wynne said her comments on the previous SAR also applied to this SAR.

Northeast Pacific Fin Whale SAR Review

Wynne said this SAR does not have a plausible estimate of trend and an abundance estimate is not available, but surveys in 2013 and 2015 provide an N_{MIN}. The N_{MIN} is biased very low. The stock has a calculated PBR of 5.1, but this is considered unreliable for the entire stock. In addition, there have been a couple of mortalities that were questionably assigned to a fishery, one of which involved a fin whale entangled in the anchor cable of a fishing vessel. She said it was unreasonable to assign that mortality to a fishery. Teerlink said that legally, fishery interactions occur port-to-port, and include travel to fishing grounds, being anchored up for the night, and anything else while underway. Section 118 of the MMPA then confers coverage for any takes. Wynne said she prefers to evaluate the type of gear involved in an interaction. Ship strikes are a problem with this stock, and this is highlighted in 'Habitat Concerns.' This section also comments on ocean warming and algal blooms. Wynne said she suspected the recent Large Whale UME was due to a harmful algal bloom. O'Corry-Crowe asked if there were any

tissue samples processed during that UME. Wynne said one whale was sampled, and it was negative for domoic acid, saxitoxin, brevetoxin, paralytic shellfish poisoning (PSP), and Cs-137.

Doniol-Valcroze said fin whales are not an easy species to census, but he did have an issue with one of the abundance estimates used in the SAR. The Rone 2016 paper cites two surveys that occurred in the Gulf of Alaska: one occurred in 2013 and another in 2015. The areas of these surveys differed, but there was a core area of overlap. One survey resulted in an estimate of 916 whales, and another 3,168. The survey with the higher estimate is used for calculating N_{MIN} and thus PBR, but this is not appropriate. He said that he was not concerned with the abundance estimate used in the SAR, in terms of number of animals, but thought that choosing the higher of the two estimates was a bad practice. Wynne said even the larger of the two surveys represents just a fraction of the Northeast Pacific fin whale population. Wynne said Doniol-Valcroze's point was valid, but thought the estimate in the SAR was such a gross underestimate of abundance even with using the higher abundance estimate of 3,168 animals. Doniol-Valcroze said it is inappropriate from a statistical point of view to use the larger of the two estimates, unless there is a convincing reason to do so. Thus, adding a sentence to the SAR clarifying why the higher estimate was used would be helpful, and he volunteered to work with Pendleton to draft some new text.

Western Arctic Bowhead Whale SAR Review

Stafford said the SAR contained updated population and trend estimates. She suggested cleaning up the SAR, and removing some of the many estimates from Table 1. She said Geof Givens published a paper in 2016 that contains a new abundance estimate. His estimate is 16,820 animals, which is slightly lower than the SAR's current estimate. This will change N_{MIN} and PBR slightly.

Haflinger said he was surprised by the number of entanglement scars reported on bowhead whales. Given the rate of increase in abundance, this is clearly not an issue, but there is a high incidence of entanglement scars. Stafford said the paper that documents those entanglements is in press right now. Haflinger said the opilio crab fishery occurs near the ice edge and a strong northerly can push the sea ice over crab gear. Some boats have lost all their gear. He said that Appendix 3 does not list crab fisheries as potentially interacting with bowhead whales, but it should. He added that crab fisheries, as well as scallop fisheries, are also observed. Appendix 3 should note that these fisheries are observed.

Doniol-Valcroze said this stock has spectacular time series data, and he recommended conducting some population modeling for this stock. He said the abundance estimates in Table 1 increase exponentially, except for 1986, which was clearly an abundance estimate that was too high. A population model would have called that 1986 estimate into question and a population model would also allow for predicting future population size. This is one of the very few data series for large whales that could produce such a model. Doniol-Valcroze asked why the stock was considered endangered when the population was 16,000 animals and growing exponentially. Kurland said there are currently insufficient resources to conduct a status review. Humpback whales are undergoing a status review and it is best to see the results of the humpback whale status review before moving forward on bowheads. The bowhead whale is listed under the ESA as an endangered species, so the agency would have to conduct a global status review and break the population into multiple DPSs as with humpback whales.

Appendices Discussion

Pendleton said Appendix 5 lists fisheries, documented interactions, and the extent of observer coverage. Fisheries such as the Bering Sea Aleutian Island crab pot fishery has observer coverage and this should be noted. Teerlink said she thought a crab pot fishery could not be considered observed for marine

mammal interactions. Pendleton said the table needs to be edited so that it is clear there is observer coverage in, for example, the crab pot fishery but that the observers may not be able to detect marine mammal interactions.

Pendleton said Appendix 6, which presents observer coverage by fishery and year has a number of blank cells. Those cells should be filled in. There is also no explanation in the table for the use of "N/A" or how and when fisheries were split. Wynne said Appendix 3 and 4 were helpful, but Appendix 4 contains some questionable interactions, such as Pacific white-sided dolphin takes in the Southeast Alaska and Prince William Sound gillnet fisheries. That is not a realistic interaction. Pendleton said those species identifications were obtained from old logbook data. Wynne said poor species identification by fisherman motivated her to write a field guide for identifying marine mammals. Teerlink said she and Muto would work on making the table more useful and accurate.

Statement on Potential Marine Mammal / Fishery Interactions and Fishery Monitoring

The four options identified to present information on fishery interactions and monitoring in the SARs include:

The status quo: Rely on the 'Key Uncertainties' section to convey any concerns regarding fishery interactions
Boilerplate language: Add a general statement, like the proposed text provided by Kristy Long earlier in the meeting, to the SAR
Text explanation of potential interactions and monitoring: Add the proposed text developed by ARO and AFSC that lists potentially interacting fisheries based on gear type
Quantify and tally fisheries: Adopt the SRG's 2016 recommendation and tally and compare the number of fisheries that are known to interact, the number of fisheries with the potential to interact, and the number of fisheries that are monitored

Pendleton said he made his recommendation and would leave the implementation to NMFS. Wynne asked if a reference to the appendices would be helpful. Pendleton said citing the appendices is a step in the right direction but said he is concerned that any boilerplate language will not be updated. Teerlink said it would be difficult to complete an action plan on this topic without Angliss' input.

Purpose of the SARs

O'Corry-Crowe asked about the function of the SARs. Bettridge said the SARs are viewed from the management perspective as a one-stop compilation of all the best available information regarding the stock. TRTs rely on SARs when developing plans to reduce takes. SARs are also used to identify management issues, since it is the only publication where PBR is calculated. The Permits Office relies on SARs when issuing research permits, and when commercial fisheries incidentally take marine mammals the SARs are used to determine if the take was negligible. The SARs also serve as a compilation of all the stocks NMFS manages and are referenced during ESA consultations. Srinivasan said the SARs also help direct management and science. O'Corry-Crowe said the SARs should also contain information on what is known about a stock, what is not known, what research is underway, and what research needs to be conducted. This would be so much more helpful than just summarizing the problems. The SARs have not traditionally been that, but they could be. Kurland said there are other agency documents that contain more details and address O'Corry-Crowe's interests. O'Corry-Crowe asked if NMFS would consider adding a small section that articulated current research and data gaps. Bettridge said the agency reports on the status of the stocks in the SARs and tries not to stray from that.

PBRs and Small Populations

Doniol-Valcroze recommended identifying the situations where PBR ceases to be useful. He said the Wade (1998) paper laying out and testing the PBR framework is a gem, but some people have forgotten to refer to it and have forgotten what PBR is designed to do. In some cases, such as with Cook Inlet beluga whales or the North Pacific right whale, PBR is not an appropriate tool. PBR was not designed for populations of 30 animals. Bettridge said Doniol-Valcroze would find agreement on this topic among NMFS staff. The SARs already indicate the unreliability of PBR for small populations, such as North Pacific right whales, but this approach does fall short of a solution to defining a PBR for small population. Pendleton said it is confusing when the SARs include the calculations for a PBR, and then completely disregard it. Doniol-Valcroze said he thought the relationship between PBR and subsistence takes was unclear. In Canada, PBR is used to determine total allowable take. In the SARs, PBR is not used as a tool to manage subsistence takes, but subsistence takes are compared to PBR. In the U.S., it is possible to imagine a problematic scenario where subsistence takes alone exceed PBR, and any commercial fisheries takes will also exceed PBR. Bettridge said NMFS' objective is to recover populations. PBR is a tool for doing so, but there is nothing in the statute that says that takes cannot exceed PBR. O'Corry-Crowe asked if there have been any empirical data to determine the effectiveness of PBR. Bettridge said Andre Punt has done some work in that area and might be willing to give a presentation in the future.

Abundance Estimates

Doniol-Valcroze asked if it was worth the SRG's time to recommend updating out of date surveys. Wynne said those types of recommendations can be helpful, especially if there are specific recommended actions or priorities. Stafford said it was helpful to recommend courses of action, rather than just pointing out data gaps. Bettridge said the SRG's recommendations are important, even if the recommendation is repeated every year. She said the response might be that NMFS does not have the resources to meet the SRG's request, but the recommendations are reviewed by the Assistant Administrator. If there is a recommendation on observer coverage, the response will be vetted through the Observer Program and the Observer Program will be aware of the SRG's concerns. Doniol-Valcroze said he saw SRG recommendations as a form of support to the scientists rather than criticism. Recommendations can help scientists get the funding they need. Bettridge said recommendations were most helpful when they come in the form of priorities or alternative approaches.

She told the SRG about a new effort called the Pacific Marine Assessment Program for Protected Species (PacMAPPS), which is like the Atlantic Marine Assessment Program of Protected Species (AMAPPS). The program is a collaboration between NOAA, the Navy, BOEM, and USFWS to conduct surveys on marine mammals, seabirds, and other protected species over large areas. Srinivasan said the PacMAPPS plan is to rotate broad scale ship surveys through different regions of the Pacific Ocean over a 5-year period. The focus is on cetacean surveys and ecosystem data collection. PacMAPPS will include the main Hawaiian Islands, the Gulf of Alaska, and the California Current. BOEM is providing funding, and NOAA will be providing ship time. PacMAPPS is only in the planning stages, whereas AMAPPS is on its second 5-year rotation. AMAPPS has resulted in updated abundance estimates for approximately 20 Atlantic stocks. Stafford asked if the Bering Sea could be included in the PacMAPPS rotation. Bettridge said PacMAPPS' geographic scope was limited to areas of interest to BOEM and the Navy, and the Bering Sea is not included in the plan.

Proposed SRG Recommendations

AT1 killer whales - Wynne asked if the SRG should request that NMFS provide updated information on the age, sex, and inbreeding / outbreeding of AT1 killer whales. O'Corry-Crowe said he could obtain those details from Lance Barret-Lennard and provide the SRG with an update.

USFWS - Wynne said USFWS should continue with the development of BMPs for ships and aircraft operating near walrus and polar bears. She said USFWS and USGS should plan to attend the 2018 Alaska SRG meeting. Bettridge said NMFS has a rapport with USFWS but not USGS. Any SRG recommendation for more involvement from these agencies at the next meeting should be directed to both USFWS and USGS.

North Pacific Right Whales - Stafford said the North Pacific right whale is in danger of extinction, and research on this stock should be prioritized. Right whale survey costs could be reduced by using gliders to search for and locate right whale calls which can then direct ships or aircraft to the whales.

Southeast Alaska Harbor Porpoise - Wynne said focus on this stock should be a priority due to fishery interactions and uncertainties in population size and stock structure. There should be an emphasis on preventing and quantifying mortality, as well as gathering more data on stock structure and the outer coast population.

Bowhead Whale Population Modeling - Doniol-Valcroze said he has no concerns about the Western Arctic bowhead whale stock given the abundance and trends, but he recommended the development of a population model for the stock. A model would be interesting, educational, and informative on large whale population dynamics. He said it would also be an interesting precedent for NMFS to calculate a PBR from a population model rather than from survey data. Pendleton said that Fritz's proposal to model Steller sea lion abundance based on pup counts and mark recapture rates was similar in concept. Bettridge said other regions are starting to use models for abundance estimates.

Beluga Whale SAR Updates - Pendleton recommended that NMFS update non-strategic beluga whale SARs when new abundance estimates are available, rather than updating the stocks on a 3-year cycle.

Ocean Acidification – Pendleton said NMFS should conduct a review to determine which stocks merit the inclusion of threats caused by ocean acidification into the 'Habitat Concerns' section. Miller and Stafford proposed adding threats from harmful algal blooms to that section.

Gulf of Alaska Surveys - Stafford said the SRG should recommend broad surveys of the Gulf of Alaska, focused on multiple stocks instead of focusing additional recommendations on single stocks. Wynne said that recommendation would be helpful, especially if PacMAPPS needed scientific support in the future.

Future Membership

Wynne said the SRG Terms of Reference require a periodic rotation of SRG members. To prevent the entire SRG from turning over in a single year, a rotational schedule was set to limit annual turnover. This schedule is supposed to allow for continuity and the pass down of information. Wynne said she was willing to remain the SRG Chair for one additional year to ensure that continuity.

Bettridge said NMFS will review and possibly modify the SRG Terms of Reference in 2017. The current term length is 3 years, with a possibility of 3 consecutive terms. She asked if the term should be longer. Doniol-Valcroze said some people may be reluctant to commit to anything longer than a 3-year term.

2018 Alaska SRG Meeting

Pendleton said this meeting had the lowest involvement of USFWS and USGS staff of any Anchorage meeting that he attended. Hamilton said USFWS staff appreciate that the SRG meetings are held in Anchorage once every 2-3 years. He said the number of USFWS staff at the Anchorage office is smaller than it used to be, and many staff were required to attend other meetings during the 2017 SRG meeting. Haflinger suggested the SRG meet every third year in Alaska to allow for more consistent input from MML staff. The SRG agreed that the 2018 meeting should occur in Seattle, with USFWS and USGS participation.