THIRD MEETING OF THE ALASKA SCIENTIFIC REVIEW GROUP
ANCHORAGE, ALASKA
16-17 February 1995

INTRODUCTION AND APPROVAL OF AGENDA

The third meeting of the Alaska Scientific Review Group (ASRG) was held in Anchorage, AK, at the RuralCap Office on 16-17 February 1995. A participants list is presented in appendix 1. The meeting was chaired by Lloyd Lowry; Doug DeMaster served as the rapporteur on the 16th, while Lowry and Robert Small served as rapporteurs on the 17th. It was noted that Denby Lloyd and Harold Sparck were unable to attend. The agenda for the meeting is presented in appendix 2.

Paul Wade noted that he was prepared to provide copies of the most recent version of the draft PBR guidelines to the ASRG. Lowry asked Wade to distribute the draft guidelines. He also responded that he appreciated the efforts of the NMFS and FWS to incorporate specific recommendations from the ASRG into the guidelines. Further, he recommended and the ASRG agreed that, where ever a particular statement in the draft Status Assessment Reports (SAR) was made that was inconsistent with the PBR guidelines, it should be so noted in the text of the SARs.

REVIEW OF DRAFT MINUTES FROM PREVIOUS MEETING

The first issue that was discussed concerned whether to append the comments of individual ASRG members to the draft minutes. Lowry commented that ASRG members may wish to refer to these comments during subsequent reviews and it would be useful having them appended to these minutes. DeMaster noted that some members during the previous meeting were concerned that their draft comments would be considered final comments by individuals outside of the ASRG. After some discussion, it was agreed that the draft comments would be a useful addition to the minutes and should therefore be appended.

DeMaster noted that simulations by Peter Boveng (National Marine Mammal Laboratory, Seattle, WA) and Sue Chivers (Marine Mammal Division, La Jolla, CA) indicated that the sustainable yield from a population with stable sex and age composition, given an on-going harvest, was independent of the sex ratio of the harvest. Based on these analysis, DeMaster recommended that the FWS revise their estimate of Rmax for walrus from 8% per year to 6%. However, it was agreed that this statement would be added to the minutes of this meeting and not incorporated as a correction to the minutes from the January meeting of the ASRG.

Regarding the section in the draft minutes on stocks, Lowry recommended that the words from the previous meeting regarding stocks be added to the text or as an appendix. It was also agreed that for the western stock of Steller sea lion, using the default Rmax of 12% per year was reasonable, given the recommended recovery factor for this stock. That is, the incorporation of conservatism in estimating the PBR was made by lowering the F(R) from the default value because of the knowledge that this stock is currently declining. Carl Hild raised an issue concerning the recommended recovery factors for beluga whales in Bristol Bay and Norton Sound. The ASRG confirmed their previous recommendation that they should be 1.0 and 0.5, respectively. Concerning killer whale stocks, the ARSG recommended including estimates of abundance of killer whales from Canadian waters to the estimate of abundance for each stock and to include acoustic data as a reason for separating stocks. Finally, the ASRG recommended that throughout the text, MPE should be replaced with Nmin, and RF with FR. With these changes and several specific editorial changes, the draft minutes were approved.

SUMMARY OF ACTIVITIES OF ATLANTIC AND PACIFIC SRG'S

Wade summarized the findings of the other two SRG's regarding stocks considered to be strategic. In the Pacific Region, the fishery causing the greatest mortality of marine mammals was the driftnet fishery. Removals of marine mammals exceeded the PBR for the following stocks: *Mesoplodon* spp., short-finned pilot whale, sperm whale, and Baird's beaked whale. He added that correction factors to estimates of abundance based on surface sightings were not available for any of these stocks. Further, Wade commented that there was concern regarding: 1) possible fishery interactions in Hawaiian waters, but data on abundance for almost all stocks of marine mammals were currently not available, and 2) the central California stock of harbor porpoise, which were declining, but where the removal level was currently only one-third of the PBR.

Concerning the Atlantic Region, the following species were recommended to be classified as strategic, based on removal levels and PBRs: manatee, right whale, harbor porpoise, and possibly several species of delphinids (e.g., common dolphin, Risso's dolphin, striped dolphin, pilot whale, and *Mesoplodon* spp.).

Wade further commented that the SARs for marine mammal stocks in the Atlantic and Pacific Regions were generally more conservative than the SARs appeared to be for the Alaska Region. This was primarily due to the strict adherence to the recommendation in the draft PBR guidelines to not use correction factors (CF) in estimating abundance, where the variance of the CF has not been estimated. Several members of the ASRG responded that the draft guidelines included language that allowed for the use of correction factors, where there was reasonable evidence to indicate that the CF's were negatively biased. Wade added that an exception to this generalization was the abundance estimate for harbor porpoise, where the other

Regions applied a correction for the probability an animal was underwater, while a CF for the Alaskan stock was not applied.

Brendan Kelly commented that he was concerned over the apparent inconsistencies in SARs between Regions within NMFS and between SARs prepared by NMFS and the FWS. After some discussion, there was agreement that the draft PBR guidelines included substantial flexibility and that SARs from different Regions could be different in the degree to which they incorporated risk adverse strategies. Lowry proposed that the ASRG prepare a letter, which would summarize the substantive recommendations of the ASRG to NMFS and FWS that were inconsistent with the draft PBR guidelines-- should there be any. Most of the ASRG members commented that this approach was not necessary at this time, but in the future, depending on the degree to which the ASRG's recommendations were adopted by NMFS, such an approach should be reconsidered. Sue Hills and Lowery added that a letter from the ASRG to NMFS and FWS would also be a useful vehicle for soliciting policy guidance from the Services (e.g., how to proceed in classifying a stock's status in the absence of reliable data).

REVIEW OF NMFS STOCKS

HARBOR SEAL. There was considerable debate regarding the most appropriate stock structure for harbor seals in Alaska. Kelly recommended that there were no data to support splitting harbor seals in Alaska into more than one stock. He further commented that given the relatively continuous distribution of harbor seals in Alaska and the relatively continuous pattern in various life history and morphometric data, harbor seals in Alaska should be managed at this time as a single stock. Lowry responded that, based on data on population trends from Bristol Bay, the Gulf of Alaska, and SE Alaska, three stocks of harbor seals should be the preferred classification of stocks for the purposes of managing fishery interactions under the MMPA. He added that the number of surveys to index trends in population size from Bristol Bay was insufficient to provide reasonable statistical power. Nonetheless, the available data were consistent with a stable population of harbor seals in Bristol Bay. Wynne supported Lowry's statement about population stability in Bristol Bay based on her experience in surveying harbor seals in Bristol Bay and her familiarity with the available literature. She added that the draft PBR guidelines indicated that in the absence of biological data, stocks structure could be defined based on the distribution of fisheries. Therefore, she supported the three stock proposal. Hills commented that from a management perspective, she favored splitting stocks over lumping in the absence of unequivocal biological data because of the ability to set unique recovery factors for different stocks. After additional discussion, consensus was not reached. However, there was agreement with the conclusions of Hoover-Miller (1994) that there are insufficient data to determine the boundaries, if any, of separte harbor seal stocks in Alaska. Nonetheless, the ASRG recognized that regional management concerns exist.

The above discussion led to a general discussion concerning the lack of adequate time for reviewing all of the available information for the 30 or more stocks under review. Wade responded that the other SRG's were similarly frustrated, but added that the time line established by Congress for finalizing the SARs was relatively invariant. He recommended that, as possible, members of the ASRG provide comments and recommendations on the SARs, but that if any member believed their scientific credibility was being compromised, there was nothing preventing individual SRG members or the entire team from refraining from commenting on any particular issue. However, it was noted that in the absence of input from the SRG, the Services were mandated to proceed with finalizing the SARs.

Concerning abundance estimates for the SE Alaska stock, Kelly commented that movement between haulouts could cause positive bias in the estimate of abundance. Kelly further recommended that the abundance data from Otter Island were unreliable and should therefore not be included in the SAR.

BELUGA. There was considerable debate regarding stock structure of belugas in western Alaska. Caleb Pungowiyi noted that separating belugas into three stocks in this area seemed most consistent with the Congressional mandate to the Services to manage species that are important to subsistence hunters through co-management agreements. Carl Hild commented that the residents of Bristol Bay had informed him that beluga whales are often resident year round in Bristol Bay, and, therefore, do not necessarily overwinter in the Bering Sea with belugas that summer in more northerly areas. Lowry responded that information on the fidelity of beluga whales to particular regions during the winter months was lacking. Kelly recommended that given the lack of data the stock structure of belugas in western Alaska should be considered unknown. After some discussion, there was agreement with the statement that "available data are insufficient to resolve differences" between various hypotheses regarding stock structure. DeMaster commented that given the PBR guidelines, the recommendations from the National Marine Mammal Laboratory and the residents of Bristol Bay, it was likely that belugas from Bristol Bay, Norton Sound, and the eastern Chukchi Sea would be managed as separate stocks. Therefore, the ASRG agreed to review the relevant information for each these putative stocks.

Hild reiterated the sentiments of many of the hunters from Norton Sound that beluga whales taken in Norton Sound in the summer were from a different stock those taken in the fall. Pungowiyi added that from his experience he thought the belugas that entered Norton Sound in the spring continued to migrate out of Norton Sound in the summer, whereas the belugas that entered Norton Sound in the summer, were more residential until freeze up in the fall. There was general agreement that additional research on genetic diversity of animals taken in the summer and fall in Norton Sound would help resolve this issue.

Regarding the abundance estimate of beluga whales in Norton Sound, there was

agreement that the estimates should be considered unreliable in the absence of area-specific correction factors. Regarding status, the ASRG recommended a "backwards" approach, whereby the number of animals in the Sound needed to support an average annual kill of 147 whales would be calculated. This was done and the results indicated that the estimate of Nmin would have to be between 7,000 and 14,000. There was no evidence to support such a large population estimate for this area. Therefore, the ASRG concluded that this stock should be considered strategic, as the current level of removals likely exceeds the most optimistic estimate of the PBR. However, the ASRG further agreed that, while the SAR for the Norton Sound stock should indicate that while 147 belugas per year were killed by subsistence hunters from villages in Norton Sound, it should not indicate that 147 whales were taken from the Norton Sound stock.

. Regarding the number of subsistence takes in Bristol Bay, Steve Zimmerman reported that a contract had been let to the Alaskan Department of Fish and Game for 1993 and 1994. For 1993, the estimated number of belugas landed was 33, while the number struck and lost was 6. He added that the data for 1994 were not currently available.

The ASRG then discussed the SAR for beluga whales in Cook Inlet. There was general agreement that the maximum count of animals (449) was an absolute minimum estimate of abundance. DeMaster noted that the literature supported correction factors of between 2.6 and 3.0. There was agreement that the approach described in Frost and Lowry, where the correction factor was estimated as a function of air speed and altitude, should be used in generating a best estimate of abundance for this stock. Regarding subsistence kills, it was noted that Stanek (ADFG) had estimated a removal rate of 29 animals for 1993. Marc Lamoreaux commented that the native elders from Cook Inlet thought that at least 40 animals per year were currently being taken. After some discussion, the ASRG recommended that the annual number of removals be considered unknown at this time, but that the stock be classified as strategic because the lowest reasonable estimate of annual removals likely exceeded the most optimistic estimate for the PBR.

KILLER WHALE. Straley commented that the draft SARs for killer whales relied too heavily on unpublished data or unpublished reports. She, therefore, recommended that all estimates of abundance based on unpublished data be considered provisional at this time. Further, Straley added that the information on stock structure differences between residents and transients should be expanded to include genetic and acoustic data and data on association patterns. Wade reported that the Pacific SRG was likely to consider killer whales in CA, OR, and WA (as far north as Cape Flattery, WA) as being from a single stock, and hoped that the ASRG would agree to include killer whales from inland waters in WA to belong to the stock(s) that include animals from Alaska and British Columbia. Finally, regarding fishery interactions, Wynne recommended dropping the reference to harassment of whales by fishermen.

HUMPBACK WHALE. Straley recommended that the stock structure section of the humpback

whale SARs should be consistent with a recent report by Barlow on the status of large cetaceans. Wynne added that the same comment that applied to killer whales regarding fishery harassment applies to humpback whales.

HARBOR PORPOISE. Wynne recommended that because of the lack of information on fishery interactions (i.e., a lack of observer data), fishery interactions should not be considered insignificant (i.e., less than 0.1PBR) at this time. The other members agreed with this recommendation.

REVIEW OF FWS STOCKS

SEA OTTER. Carol Gorbics reviewed the changes made to the SAR for sea otters. Most of the changes recommended by the SRG had been made. The principal exception was that the minimum population estimate had not been changed to unknown as recommended at the previous meeting. Carol noted that some confusion remained in the fishery takes that would be worked out, and could result in some small changes to the numbers.

The ASRG made the following comments and recommendations: 1) a discussion of sea otter mortality that resulted from the Amchitka nuclear test and USFWS/ADF&G takes during 1960-1972 should be included in the other activities section, 2) the report should be careful in its discussion of Alaska Native take and should not imply that there has been overharvest unless there is evidence to support this claim, 3) in the section on minimum population estimate there should be some discussion of methods used to count or estimate sea otter numbers in the various studies, 4) in the section on annual human caused mortality there should be mention of recovery of sea otters following the Exxon Valdez oil spill, 5) the title of the harvest section should be changed to 93 Subsistence Harvest, 6) the section on stock identity should provide some rationale for treating Alaska sea otters as a stock separate from animals in British Columbia and southward , 7) fishery take data should include only mortalities and serious injuries, 8) it would be good to have a line showing the estimated PBR on the graph that shows harvest levels.

In regard to the population estimate, the ASRG reaffirmed its belief that it is not possible to make a reliable statewide abundance estimate at this time because: 1) survey coverage of the sea otter range has been incomplete; 2) some counts are more than 10 years old, and they have not been adjusted for probable population growth; and 3) methods that were used in various studies were not standardized, and may not always have been appropriate.

POLAR BEAR. Scott Schliebe summarized changes that had been made to the polar bear SAR. A fundamental change is that separate SARs have been prepared for the Beaufort Sea and

Chukchi/Bering Sea stocks. The ASRG recommended that in the Beaufort Sea SAR, the references to MSY should be removed from the sections on productivity rate and PBR, and that in both SARs, information on subsistence harvests and other harvests should be presented in separate sections.

The ASRG discussed the fact that the most recent draft of PBR guidelines propose a default maximum net productivity of 0.04 for polar bears. The group recommended that the guidelines should either have no default Rmax for polar bears, or that a default of 0.06 should be used.

PACIFIC WALRUS. Dana Seagars summarized changes that had been made to the Pacific walrus SAR. Hills described the data available that could be used for survey correction factors. For female walrus on the ice, available telemetry data show that animals are hauled out about 33% of the time. However, this figure is based on a small sample size and assumes that there is no synchrony in hauling out patterns. Because it is known that synchrony does exist, it is uncertain whether use of this figure as a correction factor would be conservative. Telemetry data indicate that an appropriate correction factor for male walrus on terrestrial haulouts would be 1.2 times the maximum count. Using the correction factor of 1.2 would be conservative if it were applied to counts that were not the seasonal maximums.

The ASRG recommended that in the population estimation section, no correction factor should be applied to the counts of walrus in the ice and a correction factor of 1.2 should be applied to counts of males on terrestrial haulouts. Further, it was recommended that the title of the harvest section be changed to 93 Subsistence Harvest and that in the stock identity section there should be additional description of the genetics studies that have been done.

RESEARCH NEEDS

Under this topic, the ASRG had a general discussion about how to determine research needs for Alaska marine mammals. Wade indicated Atlantic and Pacific SRGs also prioritized by stock based on the following criteria: (1) incidental take relative to PBR, (2) other available information (e.g., trends in abundance), and (3) missing information - what is most needed. It was noted that the CMC proposal for prioritizing was based primarily on ZMRG, and could be used as a guideline/template with adjustments.

The group agreed that the greatest attention should be focused on those stocks with the greatest take relative to PBR. It was recommended that research recommendations on the Steller sea lion be deferred to the Steller sea lion Recovery Team, though Joe Blum expressed concern that Recovery Teams have a different mandate than SRGs. Similarly, Straley noted that, while the humpback whale Recovery Plan was valid regarding its content, it has never been

implemented. It was noted that recommendations from an SRG could help initiate research for species on the List of Endangered and Threatened Wildlife, where Recovery Plans had been developed, but not implemented.

It was agreed that the first criteria in determining research needs should be assigned to those stocks where incidental mortality due to commercial fisheries is likely to exceed 10% of the PBR. Stocks that might meet this criteria were:

1. Harbor Porpoise; take is greater than 10% of PBR.
2. Bristol Bay Beluga; take is possibly greater than 10% of PBR.
3. Cook Inlet Beluga; take is possibly greater than 10% of PBR.
4. Harbor Seals; Gulf of Alaska stock is most likely harbor seal stock to have take near 10% of PBR, due to relatively lower PBR, some known takes, and potential for significant take in fisheries currently without observer programs.
4. Killer Whale; both stocks, residents possibly impacted more than transients.
5. Humpbacks; both stocks possibly.

In discussing what should be the secondary criteria for establishing research needs, the idea of including subsistence take to calculate those stocks that had a total human-caused mortality greater than PBR was considered. However, the idea was rejected because it would 'flag' subsistence harvests, when the concern about take should be directed towards commercial fisheries. Instead, it was accepted by the ASRG that the secondary criteria would be a qualitative statement as to whether significant takes were currently occurring, where some of the information needed to estimate a PBR was unknown. All four ice seal (ribbon, spotted, bearded, and ringed) stocks fit this criteria.

Lowry then generated a table that delineated the main research parameters required for a stock assessment (e.g., stock identification, population abundance, incidental take, etc.) for each of the stocks mentioned above under the two criteria (see Table 1). Each research parameter for each stock was then ranked from 1 to 3: 1 - very important/critical, 2 - important, 3 - less important.

Table 1. Rank of research parameters for Alaskan marine mammals with greatest research needs, based on incidental take from commercial fisheries above or likely near 10% of PBR (1st priority, above double line) and known incidental take with unknown PBR (2nd priority, below double line). Ranking of parameters is from 1 to 3: 1 - very important/critical, 2 - important, 3 - less important.

Stock	Research Parameter					
	Stock Identification	Population Abundance	Correction Factor	Trend/Status	Incidental Take	Subsistence Harvest
Harbor Porpoise	1	2	3	1	1	-
Bristol Bay Beluga	1	2	3	3	1	1
Cook Inlet Beluga	-	2	2	1	1	1
Harbor Seals	1	3	2	1	1	3
Gulf of AK Harbor Seals	1	3	2	1	1	3
Western N. Pac. Humpbacks	1	1		2	2	-
Central N. Pac. Humpbacks	2	1		2	1	-
Resident Killer Whale	1	2		2	1	-
Transient Killer Whale	1	2		2	1	-
Ribbon Seals	1	1	1	1	3	2
Spotted Seals	2	1	1	2	2	1
Bearded Seals	3	1	1	1	3	1
Ringed Seals	2	3	2	1	3	1

A general discussion concerning how the research need for population abundance should be presented within the table; specifically, the difference between point estimates as required for N_{min} versus indices (i.e., trend counts). The general consensus was that there should be more of an emphasis on trends rather than absolute numbers, but that such recommendations would be expressed explicitly in the proposed research summaries for each stock written by individual SRG members (see below).

After the table was completed, it was decided that the entire group would discuss the details of the research needs for each stock listed within the table. Wynne began to lead the discussion for harbor porpoise; however, after 15-20 minutes only stock ID and population abundance had been discussed. To expedite the process, the ASRG decided to spend the next 30 minutes having individual SRG members draft "research proposals" for each of the stocks listed in the table. The draft proposals would cover each research parameter and any other information the members believed were pertinent.

There was unanimous agreement that the Services should use the expertise of the ASRG to comment on research programs concerning marine mammal species in Alaska. Specifically, members expressed an interest in the evaluation and review of proposals related to marine mammal assessment and subsistence monitoring programs.

DRAFT RESEARCH PRIORITIES BY INDIVIDUAL SRG MEMBERS:

Harbor Porpoise - Kate Wynne

Stock ID (1): Genetic studies are underway and results should be available soon. Yet, there are many gaps in the distribution of where samples have come from. Most samples have been collected from stranded animals in Bristol Bay, southeast Alaska, Kodiak, Copper River Delta. Effort has been directed to where animals are most often beached. Additional stratified sampling is needed for genetic studies. Tagging and subsequent tracking is not very feasible, with a moderate probability and low success ratio, thus should receive a low priority.

Population Estimate (2): Past estimates of abundance may be biased due to seasonality of past survey efforts in southeast Alaska and heterogeneity in distribution (i.e., animals are clumped in groups of 100s or 1000s at a time). Effort should be made to examine previously collected data and local knowledge to evaluate survey design in relation to life history characteristics of harbor porpoise. Thus, the following recommendations should be considered: 1) refine the timing and area surveyed, develop comparative seasonal survey (1-3 line transect surveys per year), 2) do not repeat statewide aerial survey without refined timing and correction factor work, 3) put more effort into monitoring trends in areas of concern rather than estimating statewide minimum

abundance. Wade mentioned that in the Northeast region a quick aerial survey is conducted first to find concentrations of animals, followed quickly by vessel surveys.

Trends/Status (1): The following research activities are recommended: 1) long-term monitor of incidental take mortality where possible (beaches, observer programs, etc.), 2) determine areas of concern, 3) determine feasibility and conduct line transect trend count surveys (at least 1 per year unless distribution changes unknown), 4) identify existing standardized traffic transects on ferry system, and 5) identification alternative sources, such as refuge surveys, etc. that would be qualitative, long-term indicators of trend.

Incidental Take (1): The following research activities are recommended: 1) monitor take in previously unobserved fisheries, 2) through use of observers or counts of beached animals, monitor mortality at least once every 5 years, 3) initiate long-term monitoring of mortality via beach surveys (Bristol Bay, copper River Delta, wherever possible), and 4) collect information on age, sex, genetics, contaminants, and diet.

Habitat (not prioritized): The following research activities are recommended: 1) monitor water quality, 2) monitor contaminants (e.g., pesticide levels) by sampling stranded animals, 3) monitor oil development (Cook Inlet, Prince William Sound, Kodiak), 4) monitor disturbance caused by vessels in areas of heavy traffic, 5) monitor prey abundance due to potential competition with herring fishery and with groundfish fisheries due to bycatch of forage fish.

Beluga Whale, Bristol Bay - Lloyd Lowry

Stock ID (1): Existing analyses are not sufficient to determine stock structure relationships between belugas in Bristol Bay and those that occur in Norton Sound and intervening areas. Additional samples need to be collected and analyzed from these areas. Sources are subsistence hunts, observers on fishery vessels, and beach-cast animals. Biopsy methods may also prove useful.

Population Estimate (2): N_{min} was most recently determined from counts in 1993-94. Counts should be continued at intervals sufficient to monitor trends in abundance. If stock ID studies result in changes to stock boundaries, design of surveys may need to be modified. Correction factor data are available, but limited and more information would be useful (i.e., to allow stratification by habitat type, sex/age of whale, whale behavior, etc.).

Trends/Status (3): Data are available to show relative population stability since 1950s. Trend monitoring should continue at low level, but it should be a low priority unless other studies indicate take levels are not sustainable.

Incidental Take (1): Existing information is somewhat contradictory. Extensive drift net and set net fisheries for salmon overlap with areas used by whales so interactions are likely. Boats are small and fisheries are fast-paced; therefore observers or reporting programs are not likely to give valid estimates of kill. The best method may involve beach surveys for carcasses, prior to the start of the fishery (May), after peak (mid July), and at the end of a season (Sept.). Helicopters may be necessary to allow examination of whales for cause of death (samples can also be collected). [NOTE - last line of page not copied completely, unable to read]

Subsistence Take (1): Complete monitoring/estimation of take should be done. Estimates of take should include all villages that take from this stock, and struck and lost.

Habitat: In summer this stock shares habitat with intensive fishery for salmon (fishing boats, nets, processors, aircraft, etc.), which may also be an important food item (i.e., interactions may be both direct and indirect). To date, this situation hasn't seemed to be problematic. Contaminant levels have not been monitored to date, but should be. Also, habitat use patterns during October-April are not well known.

Beluga Whale, Cook Inlet - Lloyd Lowry

Population Estimate (2): Some recent survey work 1992-94 has identified concentration areas and produced counts throughout summer months. Counts should be continued at sufficient intensity to monitor trend with reasonable power. Correction factor data specific to Cook Inlet would be useful for improving reliability of total abundance and PBR estimates.

Trends/Status (1): Because this stock is relatively small and takes are thought to exceeded PBR, careful monitoring of trends in abundance is essential. The best approach is probably to continue counts of summer concentration areas using standardized methods.

Incidental Take (1): Considerable gillnet fishing effort in Cook Inlet has potential to take belugas. It is unclear presently the extent to which fishing effort overlaps with whale distribution. Data should be reviewed to identify possible high interaction fisheries/areas. Observer programs, interviews, or aerial surveys for beach-cast animals should be used to check for takes in areas of potentially high interaction.

Subsistence Take (1): Complete monitoring and estimation of annual take levels should be done. It is essential to include all takes, both by Cook Inlet area residents and Natives from elsewhere. Estimates of the number of animals struck and lost should also be included.

Habitat: This group of whales summers near Alaska's largest city. Boat and aircraft traffic, general pollution, and oil/gas development are all substantial in the summer range. One of their

principal foods (salmon) is fished commercially. Habitat use during Oct-April is largely unknown.

Beluga Whale, Bristol Bay and Cook Inlet - Carl Hild

Local Alaska Native organizations should be allowed to propose methods to monitor incidental takes of subsistence species. They should be contacted regarding ways to identify how or where animals are taken incidental to a commercial fishery harvest. This information could then be used to focus on types of gear used, timing, spacing or other points which could provide insight to reducing incidental take. Since there is need to gather information on both subsistence harvest as well as fishery incidental take, local resident should be involved with this effort. Hunters should be trained to take tissue samples to assist in stock identification through genetics as well as contaminant and natural isotope ratios. Tissues, including hard tissues, should be evaluated for trace elements and pollutant levels as a indicator of changes in habitat/environment. This work should be done according to the standards which have been established under the 8 nation Arctic Environmental Protection Strategy. Although these areas are not within the defined U.S. Arctic, the comparability of data to other areas which harvest this species is quite valuable.

Harbor Seals - Beth Mathews

Stock ID (1): The completion of genetic analysis of existing samples should be accelerated. Also areas where more samples are needed should be identified. Finally, increased and more efficient utilization of animals available from subsistence hunters and the stranding network is needed.

Population Estimate (3): The development and publication of information on area-specific correction factors (e.g., southeast AK from D. Withrow work) needs to be completed. If these cannot be applied to the counts reported by Loughlin (Sept 93), additional studies should be developed and implemented (i.e., correction factors by area, time of year, substrate type). If N_{min} to be estimated every 4 years, optimal survey times need to be determined (maximum numbers and minimum variance, incorporate correction factor determination into study design, and consider tidal influence). Also, improvement in the estimate of abundance for Bristol Bay/Bering Sea stock(s) is needed. Finally, a preliminary study or survey of local researchers and natives to assess distribution and haulout patterns should be undertaken.

Trends/Status (1): Gulf of Alaska - One particular approach that should be considered is to use information from trend counts to "trigger" rangewide counts. Further existing trend site monitoring should be continued. However, the following activities should also be considered: 1) a review of new trend sites, 2) standardization of all methods, 3) consideration of monitoring one or more ice haulouts, 4) development of correction factors specific to areas (replace correction factor from Huber (1994) with site-specific value), 5) consider alternate assessment of status of population by measuring /monitoring pup production, age/weight data, and recruitment (via

tagging). These studies would have to be designed to include comparative studies in areas where population dynamics differ (i.e., stable versus increasing versus decreasing).

Incidental Take (1): Estimates of take should be improved (e.g., improve monitoring of beach-cast carcasses, expand observer program of fisheries considered to interact most extensively with harbor seals, and form networks with other agencies for reporting in areas of low coverage (e.g., NPS Yakutat)). The Long-term goal of these efforts should be to reduce incidental take by supporting changes in gear and through education of fisherman regarding the impacts of incidental kills and the status of harbor seal stocks in Alaska.

Subsistence Take (3): Existing monitoring studies should be continued. Further, struck and lost rates should be determined through cooperative work with native groups. Also, additional information on the sex ratio of harvested animals should be collected. Finally, through co-management agreements, encourage collection of samples suitable for genetic analyses and pollutant analyses.

Habitat: Fisheries: An assessment of the amount of biomass of prey species removed in last 5-10 years should be conducted. Also, studies to determine the effects of disturbance at haulouts by fisheries activities and other human disturbance should be undertaken (e.g., displacement by other species (e.g., walrus), persistent pollutants/contaminant loads, studies of diet over time, are their historic studies for comparison from beach-cast specimens, ice habitat -global changes, oil, logging - effects on prey species, food stress).

Humpback Whale, Western North Pacific - Jan Straley

Stock ID (1): The information needed to establish the specific mating /calving areas used by whales that feed in this area (photo ID and genetics) should be determined and the appropriate research should be implemented. Further, there is a need to determine if this is a discrete feeding population (photo-ID, longitudinal sightings, individual histories).

Population Estimate (1): Currently there are no estimates of abundance for this population. If it is determined that humpbacks that feed along the Aleutian chain migrate to waters off Japan for mating/calving area, estimates of abundance based on photo-identification studies during the mating/breeding season in the western Pacific would provide information on the number of animals feeding to the east of the Gulf of Alaska.

Trends/Status (2): The information needed to establish whether this population is recovering need to be determined and the appropriate research implemented. If this population is determined to be increasing following exploitation, the following population parameters should be determined: 1) population size, 2) long-term sighting histories, 3) calf survival and rates of recruitment to the

adult population, and 4) the reproductive rate of mature females.

Incidental Take (2): A determination as to the extent to which fisheries interact with this stock is needed. If the potential for adverse interactions is significant, consideration of conducting written surveys of various fisheries is recommended. If the survey data indicate a significant interaction, observers should be placed on a reasonable sample of vessels in the appropriate fishery.

Humpback Whale, Central North Pacific - Jan Straley

Stock ID (2): It is important to establish whether there is genetic distinction within and between Prince William Sound and Southeast AK (& northern British Columbia). In addition to genetic studies, this evaluation would be aided by a completion of an analysis of existing fluke photographs. .

Population Estimate (1): A reliable estimate of current abundance is not available. Therefore, an estimate of the number of animals that use southeast AK and Prince William Sound and possibly offshore Gulf of Alaska whales is needed. Currently, research directed at producing an estimate of total abundance for this stock is in progress, based on mark-recapture data from humpbacks in the wintering area near and around the main Hawaiian Islands. In the future, the results (that is, the record of sightings of uniquely identified individuals) of this within season M/R study in Hawaii should be compared to the available data on presence and absence of individual whales reported from Prince William Sound/southeast Alaska. The purpose of this analysis would be to determine whether there were (and if so, the magnitude) of "missing" part of this stock (this would "flag" other currently unknown feeding areas).

Trends/Status (2): There is a clear need to establish whether this stock is recovering. This could be accomplished in a variety of ways: 1) time series of population estimates (capture-recapture) 2) time series of calf production, 3) times series of calf survival and recruitment, and 4) time series of reproductive rates (long-term sighting histories).

Incidental Take (1- not in priority): There is a need to determine the nature and magnitude of fishery interactions with this stock. Further, strandings and entanglements of whales should be monitored. In addition, there is a need to identify the magnitude of collisions between whales and vessels and possible effect of vessel disturbance (acoustic). Finally, it would be valuable to determine the migratory route used in going from feeding areas to mating/calving area via satellite tagging. Once these data were available, it would be possible to evaluate the extent to which fishery interactions during the migration are problematic (i.e., which fishing grounds to the whales migrate through in the winter and summer). Where incidental mortality is considered significant, methods to mitigate these interactions should be investigated.

Habitat: (for both stocks- not in priority) The following activities should be considered: 1) evaluate the extent to which vessels are disturbing (acoustical) whales in southeast AK and how this disturbance might be manifest at the population level (e.g., displacement from habitat critical for feeding), 2) evaluate the extent to which water quality may be adversely affecting critical habitat (e.g., pulp mill effluent in Sitka/Ketchikan). This evaluation would require information on contaminant levels, which would presumably require tissue samples and an analysis for chemicals that effect reproduction/immune system/toxicity, 3) an evaluation of prey availability by area and season, 4) Identify and quantify principal prey species seasonally, 4) assess life histories of prey species and commercial fish and potential for habitat degradation of primary prey species of humpback whales, and 5) evaluate the potential for habitat degredation due to logging, road construction, etc. and the extent to which oceanography/intertidal conditions could mitigate or exacerbate these impacts.

Killer Whale, Residents - Jim Branson

Stock ID (1): There is a need for additional information on stock separation (if any) within and between regions. That is, additional studies on genetic diversity, movement patterns of individual whales as determined by photo-identification studies, differences in vocalization or other behavior (e.g., diet).

Population Estimate (2): The existing information on N_{min} and appropriate correction factors are important, but well enough known at this time to have some degree of confidence. Additional photo-identification studies to determine stock structure would likely provide additional information on minimum population abundance.

Trends/Status (2): Existing monitoring programs in Alaska should be continued. In addition, new methods for determining trends (i.e., other than aerial surveys) should be developed. It is possible that time series data on genetic diversity could be used to index trends in abundance. Further, times series data on abundance will also provide information on trends in abundance.

Incidental Take (1): It is important to identify those fisheries that interact with killer whales in Alaska and determine the significance of these interactions to both killer whale populations and the fisheries. There is speculation that current take levels may be higher than recorded judging from losses (unexplained) of individuals from pods being monitored via long-term, photo-identification. Further, if animals were taken, there is a need to develop a technique for prorating incidental mortality to the appropriate population (i.e., resident or transient).

Killer Whale, Transients - Jim Branson

Stock ID (1): Additional information on stock separation (if any), is needed. There is current speculation that transient animals have a greater home range than resident animals, but this hypothesis has not been confirmed to date. In addition, there is some evidence that a third stock (i.e., offshore stock) should be recognized in Alaskan waters. The techniques required to address this information deficiency are the same as those listed for the other stock of killer whales in these minutes.

Population Estimate (2): Estimating total abundance for this stock is important because it is likely that if an unbiased estimate of abundance were used to estimate the PBR, the resulting ZMRG (i.e., 0.1PBR) would be met.

Trends/Status (2): Same rational as for resident population.

Incidental Take (1): The current wisdom is that transient animals are less likely to interact with fisheries. However, research on this population is perhaps more important than research on the resident population because less is known about the distribution/range/numbers and their (at least) perceived interaction with Steller sea lions, a species listed as threatened on the List of Endangered and Threatened Wildlife.

Ribbon Seal - Brendan Kelly

Stock ID (1): Craniological data seem to indicate that ribbon seal management should recognize at least two stocks (one in the Sea of Okhotsk and one in the Bering Sea). However, distributional data indicate that at least moderate genetic exchange is likely. At a minimum, the genetic diversity among and between seals from these two areas needs to be determined. Phenotypic differences also should be investigated.

Population Estimate (1): A comprehensive survey has never been made and may not be practical. Russian and U.S. literature and reports should be reviewed throughly and the possibility of such a survey should be investigated.

Trends/Status (1): Aerial surveys are an unlikely method of obtaining reliable information on trends in abundance. Alternative indices (life history, harvest data) should be investigated.

Incidental Take (3): Incidental takes in commercial fisheries should be monitored to the extent possible, but it seems unlikely that the actual rates of interactions are significant.

Subsistence Take (2): Kelly (1988) concluded that harvests in the 1970s and 1980s were likely about 100 per year. No information suggests that the rate has changed significantly. Annual

harvest levels should be monitored under a cooperative agreement between NMFS and the native community.

Habitat (3): Competition for prey with commercial fisheries needs to be reviewed and potential population level effects should be monitored. Special attention should be given to pollock.

Spotted Seals - Sue Hills

Some work is ongoing or has recently been done on spotted seal movement, genetics, and counts in some areas. The main data needs are a population size estimate and the magnitude, distribution, and composition of the subsistence take. Small numbers of spotted seals have been recorded as taken in fisheries but concerns about species ID make interpretation of these data difficult. All fisheries in the range of spotted seals included in state waters should be examined for potential interaction with spotted seals. Counts of animals over the last decade have from one of the major haulouts in the Chukchi Sea, Kasegaluk Lagoon, indicate that there is no reason to believe that the population status/trend is decreasing; however, this needs to be evaluated in other areas of the range. Given the extensive movements of spotted seals documented with radio telemetry and local observations, the existence of one spotted seal stock seems unlikely, however this also should be confirmed. Radio telemetry data indicate that spotted seals frequently move between Russian and the U.S. Therefore, research on spotted seals needs to be done in cooperation with Russian scientists. If future rangewide surveys are planned when spotted seals are hauled out on land (such as the autumn haulout survey of 93&94), they should include haulouts along the Russian coast as well as the entire US range. In addition, concurrent radio telemetry studies at several sites to get survey-specific correction factors should be undertaken.

Bearded Seal - Sue Hills

Although Bearded seals are very important subsistence species, no recent work has been done on them. The primary data needs are for population size estimates and trends and the magnitude, distribution and composition of the subsistence take. Some bearded seals have been recorded as having been taken in Bering Sea ground fish trawl fisheries, but it is likely that most of these animals were misidentified elephant seals. That is, fisheries interactions are unlikely to be a major mortality source for this species in Alaska. A subsistence harvest monitoring program in all villages taking bearded seals should be initiated, where the following information or samples would be collected: 1) number killed (including struck and lost rates), 2) tissue samples for genetic analysis and sex determination, 3) tissue samples to determine contaminant levels and possible for stable isotope analyses to determine stock structure and trophic relationships, and 4) various life history data such as age, reproductive rate, and diet. Because of concerns related to sampling bias caused by the limited geographic distribution of kills related to the geographic distribution of the stock, samples from subsistence harvest should be supplemented by directed

collections and observation in other parts of the range. Data are also needed on movements and haulout patterns. As with other ice seals, aerial surveys are unlikely to give useful estimates of population size. The main interaction of fisheries and bearded seals may be prey depletion by the northern Bering Sea crab fishery. However, the distribution of the crab fishery has only a small area that is also utilized by bearded seals, and this occurs only in late winter-early spring.

Spotted and Bearded Seals - Carl Hild

Due to importance of this species in the diet of coastal residents in central and northern Alaska, the local communities should be intimately involved in both the harvest data collection and the evaluation of "effort made" to give insight as to trend/status. Likewise for N_{min} and correction factor, local information on behavior and habitat utilization should be incorporated into the assessment of these stocks.

Ringed Seal - Brendan Kelly

Stock ID (2): Ringed seals have a circumpolar distribution and many stocks have been proposed in the literature; however, there is no consensus. Alaskan ringed seals presumably are a single stock but confirmation is needed. Furthermore, the relationship to ringed seals in other regions of the Arctic has important implications for other management issues, such as population estimation and human removals.

Population Estimate (3): Published estimates of world-wide population size vary by an order of magnitude and all are based on inadequate data. While it would be desirable to have data for estimating the number of ringed seals in Alaska, a practical survey method is unavailable.

Correction Factor (2): See above.

Trends/Status (1): No information is available on which to base even a tentative conclusion as to population status or trend. Catch-per-unit-effort data and life history data should be collected from the subsistence harvest in cooperation with Native organizations and evaluated as indices of population trend. Possible index counts using aerial surveys or seal hole surveys should be explored as methods of monitoring population trend.

Incidental Take (3): Minimal interactions with fisheries are expected, but available data sources should be monitored.

Subsistence Take (1): The annual level of subsistence take has apparently declined in recent decades (Kelly 1988), but the harvest has not been monitored since the mid 1980s. As mentioned above, the harvest should be monitored through cooperative agreements.

Habitat (2): The NMFS currently is accepting meaningless reports in lieu of data required for incidental take permits issued to geophysical companies prospecting offshore of Alaska. Genuine seal hole surveys should be required as permit conditions. Potential ATOC disturbances should be investigated.

Ringed Seal - Carl Hild

Understanding the trend/status should utilize local knowledge. Residents should be asked about seal behavioral and habitat use practices. A survey of 'effort made' in order to harvest animals could provide trend information for local populations. Further, it should be recognized that this species has been selected as an "essential indicator" marine mammal species for Arctic Environmental Protection Strategy.

RESEARCH PRIORITIES FOR FWS SPECIES

Based on the criteria agreed upon by the ASRG, the only USFWS species that would have a priority would be sea otters. Sea otters would be category B priority because the PBR is unknown and some incidental takes by fisheries are known to occur.
Priorities for the various types of information were: stock identity--1; Nmin--1; correction factors--1; status/trend--3; incidental take--2; and subsistence harvest--3. Habitat issues that were identified for sea otters included oil spills, other pollution, competition for prey, logging, mariculture, and general coastal development.

OTHER BUSINESS

The SRG discussed possibilities for future activities. It was noted that the Bering Sea ecosystem meeting that is scheduled for April 1995 could be of interest. Also, some members are interested in NMFS plans for categorizing fisheries and developing plans for monitoring incidental take levels (e.g., observer programs). No further meetings were scheduled. The possibility of holding a meeting in Orlando, Florida in conjunction with the December 1995 Society for Marine Mammalogy meetings was discussed, and some SRG members considered this a good idea.

The meeting was adjourned at 1700 on 17 February 1995.

APPENDIX 1. LIST OF PARTICIPANTS

Scientific Review Group Members

Lloyd Lowry
Joe Blum
Beth Mathews
Kate Wynne
Brendan Kelly
Carl Hild
Sue Hills
Jan Straley
Jim Branson
Caleb Pungowiyi
(Unable to attend: Denby Lloyd and Harold Sparck)

National Marine Fisheries Service participants

Steve Zimmerman
Robert Small
Doug DeMaster
Jim Balsiger

U.S. Fish and Wildlife Service participants

Dana Seagars
Scott Schliebe
Carol Gorbics
Dave McGillivary

Observers

Warren Matumeak
Marc Lamoreaux