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Proceedings of the Central and Arctic Regional Advisory Process on Cumberland Sound Beluga

Arctic College, Pangnirtung, NU
6-7 March 2002

Susan Cosens, Chairperson

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Abstract

A workshop was held in Pangnirtung, Nunavut, on 6-8 March 2002 to review four presentations and draft a Regional Advisory Process (RAP) Stock Status Report (SSR) on Cumberland Sound belugas, and to start drafting a Recovery Strategy for the population. A total of twenty-one people participated in the workshop: seven from DFO, ten from four Inuit wildlife co-management organisations and government departments within Nunavut, an external scientific expert, a local workshop assistant and two translators. This report summarises the activities and discussions that took place and opinions presented during the RAP portion of the workshop. The proceedings of the recovery-planning portion of the workshop will be published elsewhere.

The four presentations presented during the workshop summarised recent research on seasonal movements and habitat use, genetic and contaminant profiles, population size and trend, and population modelling and risk analysis of Cumberland Sound belugas. The presentations provided pertinent information and served as a basis for discussion to aid in drafting the SSR.

The genetics and contaminants study and the movements study concluded that most belugas hunted in Cumberland Sound are distinct from those hunted near Iqaluit and Kimmirut and remain in or near the mouth of Cumberland Sound throughout the year. The results of the 1999 survey suggest the Cumberland Sound population is increasing in size. Hunters also report an increase in population size over the past decade. The population modelling study showed that the current and proposed beluga quotas (35 and 41 respectively) pose a relatively low risk to the sustainability of the population assuming that few additional animals are killed-and-lost during the hunt. The overall consensus of the workshop participants was the Cumberland Sound beluga population appears to be recovering from historical commercial whaling and the current subsistence hunt is sustainable.

Résumé

Du 6 au 8 mars 2002, on a tenu un atelier à Pangnirtung, au Nunavut, afin de réviser quatre exposés, de rédiger un Rapport sur l'état des stocks (RES) dans le cadre du Processus de consultation régionale (PCR) sur les bélugas de la baie Cumberland, et de commencer la rédaction d’une stratégie de rétablissement de la population. Vingt et une personnes ont participé à l’atelier : sept personnes du MPO, dix personnes représentant quatre organismes inuits de cogestion de la faune et des ministères du Nunavut, un expert scientifique externe, une personne de la collectivité qui a aidé au déroulement de l’atelier et deux traducteurs. Le présent rapport résume les activités et les discussions qui ont eu lieu et les opinions présentées pendant la portion de l’atelier portant sur le PCR. Le compte rendu de la portion de l’atelier portant sur la planification du rétablissement sera publié ailleurs.

Les quatre exposés présentés dans le cadre de l'atelier résumaient la recherche récente sur les bélugas de la baie Cumberland, en ce qui concerne les déplacements saisonniers et l'utilisation de l'habitat, les analyses génétiques et les profils de contaminants, la taille et les tendances de la population, ainsi que la modélisation de la population et l’analyse des risques. Les exposés ont fourni de l'information pertinente et ont orienté la discussion visant à faciliter la rédaction du RES.

L’étude des analyses génétiques et des profils de contaminants, ainsi que l’étude des déplacements, ont permis de conclure que la plupart des bélugas chassés dans la baie Cumberland sont différents de ceux qui sont chassés près d'Iqaluit et de Kimmirut et qu'ils demeurent dans l’embouchure de la baie Cumberland, ou près de l’embouchure, pendant toute l'année. Les résultats de l'enquête réalisée en 1999 indiquent que la population de bélugas de la baie Cumberland augmente. Les chasseurs aussi signalent que la population a augmenté au cours des dix dernières années. La modélisation de la population montre que les quotas de bélugas actuel et proposé (35 et 41, respectivement) ne posent qu’un risque plutôt faible pour la durabilité de la population, en présumant que peu d’autres animaux seront abattus et perdus pendant la chasse. Les participants à l’atelier s’entendaient pour dire que la population de bélugas de la baie Cumberland se remet de la chasse commerciale des baleines et que la chasse de subsistance actuelle assurera la durabilité de la population.

Introduction

A Regional Advisory Process meeting was held in Pangnirtung, Nunavut, on 6-8 March 2002, to evaluate the status of Cumberland Sound beluga. The meeting was held in support of the transition toward a community-based management system and in support of forming a Recovery Team and developing a Recovery Strategy for the population. The goal of the meeting was to conduct a review of scientific information and local and traditional knowledge for Cumberland Sound beluga, according to the Terms of Reference (Appendix 1). Participants (Appendix 2) included DFO personnel from Science sector (in Winnipeg) and Resource Management and Aboriginal Affairs (in Winnipeg and the Area Office in Iqaluit), and representatives from the Nunavut Wildlife Management Board (NWMB), Qikiqtaaluk Wildlife Board (QWB) and Pangnirtung Hunters and Trappers Association (HTA). The Pangnirtung wildlife officer (Department of Sustainable Development, Government of Nunavut) participated for part of the meeting. Bill Doidge, Executive Director of Wildlife, Makivik Corporation (Kuujjuak, Nunavik), attended the meeting as the external scientific expert.

The RAP chair opened the meeting with a description of RAP and the general goals of the meeting. The agenda (Appendix 3) was reviewed and accepted as written.

A draft Stock Status Report (SSR) was prepared and distributed to all workshop participants prior to the workshop. During the meeting, the Chair presented the drafted text for each section of the SSR and then a group discussion took place. Four presentations were presented during relevant sections of the SSR to ensure that current, as yet unpublished, pertinent information was included in the Report. Each presentation was presented by one of the contributing authors and then followed by group discussion. Hunters contributed information based on their observations.

This Proceedings summarises the presentations and discussions that took place during the workshop. The structure of the Proceedings follows the format of the SSR. Due to time considerations during the workshop, however, the **Sustainable Hunting Rate** section followed the **Other Considerations** section, and the **Summary**, **Sources of Uncertainty** and **Outlook** sections were covered during overall discussions not as separate sections.

Background

It was noted the NWMB has approved the HTA's request to increase the Cumberland Sound beluga quota from 35 to 41 whales for the 2002-03 hunting season. The SSR was amended to reflect this change in quota.

A change in wording was suggested to better reflect the results obtained from genetic and contaminant profiles that most, if not all, belugas hunted in Cumberland Sound are distinct from those hunted near Iqaluit or Kimmirut.

Species Biology

Belugas are found in some temperate waters (e.g., St. Lawrence River), as well as in arctic and sub-arctic waters so the SSR was revised to reflect this pattern of distribution.

Moe Keenainak asked that the SSR include both imperial and metric measurements for beluga length and weight because many resource users are more familiar with imperial units.

Presentation #1: Seasonal movements and habitat use of Cumberland Sound beluga (P.R. Richard, J.R. Orr and M.P. Heide-Jørgensen)

Pierre Richard presented a synopsis of the known seasonal distribution and habitat use of Cumberland Sound belugas based on a local knowledge study (Kilabuk 1998) and data from satellite-linked time-depth recorders. The local knowledge study describes the use of the western shores of Cumberland Sound by some belugas to migrate towards the head of the Sound in spring. Other belugas concentrate at the floe edge in spring and feed under the ice in the Imigen Island area. After break-up, they move into Clearwater Fiord where they concentrate in summer. They are also found in smaller numbers in adjacent bays of the head of the Sound and along the west coast. It is thought that the ones on the west side are different than those which occupy Clearwater Fiord and adjacent bays. Satellite-linked transmitters and time-depth recorders were attached to 14 belugas (7 females, 7 males) in Cumberland Sound in late August and early September in 1998 and 1999. The tags on three of the whales were lost within two days of the animal's capture so their location data were not used in the analysis. The remaining 11 whales were tracked for up to several months. During the autumn, the belugas used the offshore portion of the western part of the Sound and dove frequently to depths of several hundred meters. The belugas whose transmitters continued into December and January remained on the southeast side of the Sound indicating the population may remain in Cumberland Sound throughout the winter.

Following the presentation, the author answered a number of questions about the habitat study. The results of the tagging study seem to indicate that Cumberland Sound belugas remain in the Sound year round. This conclusion agrees with the results of the genetics study. The habitat study also showed that belugas use a range of water depths, including deep depths, especially in the late fall and early winter, perhaps to feed on Greenland halibut.

Jaypetee Angmarlik asked a number of questions about the aerial surveys that took place in the 1990's: why the surveys were conducted, and when and how often they occurred. The author indicated that DFO conducted the surveys to monitor population size and that the HTA was asked about where and when to survey and for help to

conduct the surveys. The next survey will probably be flown in summer 2004. The survey information is intended to complement, not substitute for, Inuit knowledge.

Sakiasie Sowdlooapik noted that belugas move around in Cumberland Sound throughout the year to feed but are now also using different areas than they did in the past. For these reasons he believes the author's survey estimate is low, an opinion supported by most or all of the resource users. The resource users also felt that the best time to conduct surveys is during the spring migration when belugas come into Cumberland Sound and congregate in one place. They also pointed out that Inuit knowledge needs to be better incorporated into research projects such as aerial surveys.

The author replied that a committee composed of two HTA appointees and the author had planned the survey together and that the areas the belugas are using according to Sakiasie Sowdlooapik had been covered by the survey.

Livee Kulluarlik explained why he did not support the use of surveys to estimate population size. His view was that as hunters live in the region year-round and are intimately familiar with the animals they hunt, they have an inherent knowledge of the numbers of belugas present at any time. He also disagreed with controlling the beluga hunt through the use of quotas. He felt that without quotas, hunters would take only the numbers of belugas they need, whereas the imposition of a quota system causes negative behaviour in hunters.

The Hunt

The quota and catch table in the draft SSR generated some discussion. Karen Ditz noted that the landed catch for 2001 was 39 not 37. A hunter countered that 41 belugas were taken that year. Karen Ditz explained that the last 2 whales were taken during the September entrapment and, therefore, were not included in the quota catch because they would likely have died anyway as they were trapped in the ice. Livee Kulluarlik thought the 1993 catch of 15 belugas, as reported in the draft SSR, was low. Karen Ditz will review and verify the catch records.

Some discussion took place about the events that led up to the change in hunt quota for the 2002 season. At the request of the Pangnirtung HTA, in 2001 the Minister of DFO agreed to increase the hunt quota for Cumberland Sound beluga if the HTA met several conditions. These included the HTA developing hunting rules and the community agreeing to collect specific hunt information (e.g., numbers of whales struck-and-lost and wounded-and-escaped). The HTA also developed a plan to deal with entrapped belugas.

Sakiasie Sowdlooapik said that more belugas are becoming entrapped in ice and attacked by killer whales now than before. When trapped, the whales die slowly and their *maktaq* deteriorates. He felt the current system of dealing with entrapped belugas does not work well because of the length of time it takes to consult with the HTA, NWMB and DFO to decide whether or not the whale(s) should be harvested.

Jaypetee Angmarlik asked how DFO determines the number of belugas that are wounded-and-escape versus the number that are struck-and-lost. Karen Ditz answered that it is the Pangnirtung hunters that will determine, during the hunt, which animals are struck-and-lost versus those that are wounded-and-escape. Each hunter will report on what occurred after he/she shot a beluga: (1) if the beluga was successfully landed, (2) if

it sank, or (3) if it swam away. These are the same hunt statistics collected by Iqaluit and Kimmirut beluga hunters.

Resource User Perspective

Resource users discussed the issue of whether people living in outpost camps around Cumberland Sound should be given a separate quota. More people live in outpost camps in this region than elsewhere. Residents of the smaller camps are frequently left with no belugas to hunt because soon after the hunting season begins hunters from Pangnirtung and larger established camps fill the quota. It was indicated by DFO that a separate quota could be put in place for the outpost camps if this was the wish of most people in the community and the HTA. Jooeelee Papatsie noted that the outpost camps have not yet asked the HTA for a separate quota.

Historically, commercial whalers killed large numbers of belugas. In spite of variation in the numbers of belugas seen by hunters from year to year, more whales are seen now than in the past.

Lazarusee Ishulutaq presented photographs and information on beluga hunting techniques. He said that prior to the imposition of the quota system, hunters took only what they needed and distributed whale parts among the people in the community. During bad weather or a full moon, or when the tidal currents are strong, more belugas are seen because more whales dive or form bigger groups. Jooeelee Papatsie observed that there used to be more ice in Cumberland Sound and that belugas used to stay closer to the ice edge than in recent years.

Resource Status

Stock Delineation

Presentation #2: Studies of genetics and contaminants on belugas hunted in Pangnirtung, Iqaluit and Kimmirut (B.G.E. de March, G.A. Stern, R.E.A. Stewart and S. Innes)

Brigitte de March presented the results of her study that examined both the genetic and contaminant profiles of belugas hunted by the three southeast Baffin communities to determine if there is evidence of different beluga populations. Most samples were collected by hunters through the DFO Whale Sampling Program. Genetic and contaminant profiles were examined in 270 and 124 belugas, respectively; samples from 97 of these whales were used for both types of analysis.

Genetic analyses showed that a beluga taken by a Pangnirtung, Iqaluit, or Kimmirut hunter had more relatives that were hunted by the same community than relatives that were hunted by the other two communities. While it is not possible to say with certainty exactly where a beluga was hunted using only genetic information, it is frequently possible to guess correctly which community an individual whale came from because we know where the most belugas related to the unknown individual were hunted.

Genetic analyses also showed that belugas taken by Pangnirtung hunters before 1986 had slightly different genetic characteristics from those hunted in later years. Belugas were hunted in Clearwater Fiord until about 1986, then a ban on hunting in the Fiord was put in place. The change in genetic characteristics of hunter-killed whales before and after 1986 suggests that the whales that use Clearwater Fiord may belong to a different population than the whales that do not use the Fiord.

Concentration levels of approximately 100 organochlorine contaminants were also measured in the beluga samples. In beluga fat or *maqtaq*, the concentrations of many contaminants were lower than 1 part per billion (ppb). In general, the belugas taken by Pangnirtung hunters had lower concentrations of contaminants than belugas taken by Iqaluit and Kimmirut hunters. The differences in levels and types of contaminants among beluga populations may reflect differences in their diet. For example, belugas hunted near Kimmirut contained more chemicals that are normally found in animals that live on the bottom or fish that eat those animals suggesting the Kimmirut whales eat more benthic prey than whales that live near Iqaluit or Pangnirtung. Overall, our ability to use contaminant profiles to identify correctly what community harvested a particular beluga was similar to, but a little better than, the results obtained using genetic profiles.

Using both genetic and contaminant profiles together does not improve our ability to make correct identifications. Neither the genetics nor contaminant profiles identified any sharp population boundaries among the belugas of southeast Baffin. Either there are three beluga populations that are somewhat similar or the belugas from the three areas belong to one population that is mixing slowly. It is also possible that some belugas move around while others are sedentary.

In response to questions following her presentation, the author said that there may be one or more reasons why it is not possible to determine with complete certainty which population an individual animal belongs to. Firstly, belugas in southeast Baffin have many different genetic haplotypes. Some haplotypes occur only in the belugas hunted by Pangnirtung hunters while other haplotypes occur in belugas hunted by all three communities. If a beluga killed by a Pangnirtung hunter has one of the haplotypes shared with the belugas from Iqaluit and Kimmirut, it would not be possible to say which population the whale belonged to. Secondly, according to local Inuit knowledge two or three different groups of whales are found in Cumberland Sound. Yet, the author's analysis of the haplotypes obtained from beluga samples provided by Pangnirtung hunters did not clearly distinguish between these different groups of whales.

Livee Kulluarlik asked the author whether her research indicated that Cumberland Sound beluga habitat is different from beluga habitat in other parts of southeast Baffin Island. She answered that it looks like there are habitat differences but her research does not explain where or how they differ.

Some discussion followed about belugas in neighbouring populations. The author said that Kimmirut whales were similar to Hudson Bay whales while the Pangnirtung whales were not. Cumberland Sound belugas are very different from both western and eastern Hudson Bay whales. To date, only one beluga has been analyzed for genetics from James Bay so comparision with the southeast Baffin whales is not yet possible. Belugas from West Greenland appear to be different from the Cumberland Sound whales.

DFO asked the resource users about the groups of belugas they have seen in Cumberland Sound and their seasonal distribution. The resource users indicated that two types of belugas can be identified by size and the taste of the *maktaq*. The longevity and age structure of the two types of whales is not known. The smaller-sized whales arrive first at the floe edge and do not travel to the western side of Cumberland Sound like the larger and later-arriving whales do. The smaller animals are seen in the spring at the same time as when hunters are hunting narwhals. Although they are easier to hunt than the larger whales usually only a few of the smaller belugas are hunted. The texture of their *maktaq* is soft. Pods consisting of larger belugas start arriving at the floe edge in April and May and then eventually move to Clearwater Fiord to spend the summer

months. These larger animals are better at avoiding hunters. The Inuit Knowledge study of belugas in southeast Baffin (Kilabuk 1998) reported there is a third group of belugas, that are also smaller in size, that occurs in small groups on the western side of Cumberland Sound in summer. The resource users do not know whether these western whales are the same animals as the ones they see at the floe edge in spring but their *maktaq* tastes the same. These western whales are not seen every year. The resource users also noted that in the past three years large numbers of smaller whales have been seen in Netilling Fiord in summer. As these whales have only been observed, not measured, it is difficult to compare their sizes with the smaller whales hunted at the floe edge in spring. The numbers of smaller whales seem to be increasing in Cumberland Sound, perhaps because people don't hunt them as much now as they did in the past.

Livee Kulluarlik noted again that Pangnirtung beluga hunters do not want a quota. Karen Ditz replied that DFO Fisheries Management plans to meet with the HTA, as well as NWMB and QWB, in the near future to develop a management plan for the Cumberland Sound beluga population. The issue of quotas will be discussed at that time.

Stock Size

Presentation #3: Size and trend of the Cumberland Sound beluga population (P.R. Richard and M.S. Baratin)

Pierre Richard presented the results of aerial photographic and visual surveys he conducted in the 1990s to index the size and trend of the Cumberland Sound beluga population. Aerial surveys of the known summer range were flown in August 1990 and again in 1999. In August 1990, three photographic surveys of Clearwater Fiord produced counts that ranged between 454 and 501 belugas. In August 1999, another three photographic surveys were completed but one was excluded from the analysis because of disturbance by boat traffic. The remaining two surveys produced counts of 720 and 777 belugas.

Two systematic visual strip-transect surveys were flown across northern Cumberland Sound in August 1990 and another two in August 1999. In total, 4 and 2 belugas were seen on- and off-strip during the two strip-transect surveys in northern Cumberland Sound in 1990 whereas 46 and 13 belugas were in the same areas during the two surveys in 1999. The two 1999 surveys produced survey estimates of 213 belugas (95% confidence limits: 119-382) and 60 belugas (95% confidence limits: 21-103) for that survey region.

In 1999, systematic visual strip-transect surveys were also flown in the offshore waters of the middle third of Cumberland Sound, extending eastward from the western coast to a point two-thirds of the distance across the Sound. This survey area covered the region where belugas equipped with satellite-linked radio transmitters had been tracked in September 1998 and 1999. During those two surveys, 4 and 5 belugas were seen on-transect, producing estimates of 37 belugas (95% confidence limits: 17-82) and 46 belugas (95% confidence limits: 21-103), respectively, for that survey region.

In both survey years, reconnaissance surveys were also flown along the coastline from Nettiling Fiord to Chidliak Bay on the western side of the Sound. These areas were surveyed because local people identified them as areas where belugas are also known to occur in August. Little difference was found in the numbers of belugas observed between the 1990 and 1999 surveys.

Comparison of all the photographic and visual survey data collected in 1990 and 1999 revealed a substantial increase in the numbers of belugas from 1990 to 1999. The 1999 numbers were higher in the aggregation area of Clearwater Fiord as well as in the other areas surveyed. These data suggest that the downward trend in population size that was documented in the 1970s and early 1980s has reversed and the number of Cumberland Sound belugas is now increasing. Additional surveys will be needed in the future to determine if this increase is continuing and to estimate the rate of population recovery more precisely.

Following the presentation, Bill Doidge asked that the SSR report the specific surface counts of whales visible at the water surface during the 1999 survey. This discussion led to clarification of the apportioning of survey numbers between the different strata within the survey area (e.g., Clearwater Fiord versus northern Cumberland Sound versus western Cumberland Sound).

The author answered questions about the design of the aerial surveys and responded to concerns raised about potential sources of bias with each method. The author provided a more thorough explanation of the survey methods and addressed each of the concerns raised. The author noted that while the DFO surveys do not allow us to count every whale, using the same survey method each time allows us to know whether the numbers of belugas are changing and proportionally by how much. DFO also corrects for the numbers of animals missed. Livee Kulluarlik said that belugas would dive when the survey plane went overhead and therefore the surface counts would be biased downward. The author pointed out that it was for that reason the plane was flown 1500' above sea level. When the plane was at that altitude, the whales did not react to an overhead plane except when the plane's shadow passed over a whale and startled it.

Several questions were also raised about the counts made in 1991 and 1999 from a cliff overlooking Clearwater Fiord. The author noted that during a discussion between DFO and the general assembly of Pangnirtung hunters in spring 2000, consensus was reached that the cliff-top counts were unreliable because Shilmilik Bay was not visible from the counting perch, hence many belugas were probably missed. Many of the cliff-top counts were also affected by boat traffic in Clearwater Fiord. (The one aerial survey affected by boat traffic was left out of the analysis.) The hunters felt the aerial surveys produced more reliable results.

Stock Trend

Based on the results of the 1999 survey, Bill Doidge suggested a change in wording that would strengthen the conclusion presented in the Stock Trend section.

Sustainable Hunting Rate

Presentation #4: Risk analysis of the continued recovery of the Cumberland Sound beluga population (P.R. Richard)

Pierre Richard presented the results of his population modelling and risk of extinction analyses. He began by noting there are several uncertainties about the population size and growth rate of Cumberland Sound belugas. The estimate of the number of whales at the surface in the surveyed area is uncertain which, in turn, leads to uncertainty about the adjusted or total population estimate. The population's growth rate is uncertain, as is the number of animals killed-but-lost compared to the number of animals killed-and-

recovered. Because of these uncertainties, we are uncertain about what the population will do in the future. Nevertheless we can use a computer model to calculate the many possible future sizes of the population that would result from different hunting quotas and then determine the level of risk each hunting scenario poses to the continued recovery of the population. Pierre Richard presented the results of his preliminary modelling and showed how the model can be used to investigate further various management options.

Considerable discussion was generated by the modelling presentation. Livee Kulluarlik disagreed with the author's assumption that the Cumberland Sound beluga population increases at a rate of 2-6%. He stated that Inuit know four calves accompany each female and, therefore, the rate of population increase must be higher. When belugas first appear in Cumberland Sound the females are usually seen without calves. Later, in summer, many more cows are accompanied by calves suggesting a much higher birth rate than the author suggests. The author noted that it has been estimated that between 8 and 14 newborn calves accompany every 100 (male and female) belugas but that it is difficult to estimate how many of them will survive to become adults. If the population estimate of 1547 belugas is correct and the annual rate of recruitment is as low as 2%, then 30 whales are added to the adult population each year. If the annual rate of recruitment is as high as 6%, then 90 adult whales are added to the population each year.

The author showed how different management scenarios (e.g., no hunting versus high hunting mortality) changed the probability of the population declining over time. The resource users had some difficulty understanding the modelling presentation and some felt that local knowledge offered the best information on which to base decisions about the hunt. DFO countered that it would be wisest to base management decisions on all knowledge available, both local and scientific.

The author's modelling results showed that the current quota (of 35 belugas) does not pose a problem for the population. Bill Doidge noted that this result agrees with the 1990 and 1999 survey results, which indicate the beluga population has increased over the past decade in spite of the quota. The modelling results also showed that the new 2002 quota (of 41 belugas) presents only an 18% risk of the population declining, assuming no additional hunting mortality occurs.

DFO was asked about what effect those communities without quotas are having on their beluga populations. Susan Cosens explained that for those communities, DFO conducts surveys and population modelling and incorporates hunter knowledge to produce a population estimate and suggestions for harvest levels for the HTA and NWMB. Most communities accept the DFO advice and conduct their hunts accordingly. "Recommended" or "sustainable levels" of hunting describe the number of belugas that can be taken without causing a population decline. Unfortunately the term "quota" refers only to a single number and does not explain the underlying concept of sustainability. Livee Kulluarlik responded by saying that resource users rely on belugas for country food and understand beluga biology and population status so they should set the sustainable level of harvest. However, he also saw the value of using all available information for assessing management options.

The author redrafted the Sustainable Hunt section to better summarize the information presented in his modelling paper. The meeting participants reviewed the revised section and then asked several questions related to his survey and modelling presentations. The author noted that female belugas first give birth at 6 years of age. He also indicated that the 1999 survey estimate of 1547 whales represented a 46% increase in the number of

Cumberland Sound belugas since 1990. Lazarusee Ishulutaq asked if the survey accounted for the fact that that during calm weather with no waves belugas will only expose their backs at the water surface. The author answered that survey observers can see belugas down to 15' below the surface of the water from a plane.

Jaypetee Angmarlik asked whether the Iqaluit and Kimmirut beluga populations are higher or lower than the Cumberland Sound population. The author said that there are no known concentrations of belugas near Iqaluit and Kimmirut in summer. In winter approximately 60,000 belugas from Hudson Bay travel through the Kimmirut area and spill over into Davis Strait. Some of those animals may remain in Frobisher Bay and in the vicinity of Kimmirut during the summer. Others may travel to the western side and along the floe edge of Cumberland Sound. These animals may be what local hunters call the "small" whales. Jaypetee Angmarlik then asked if there are ways to distinguish whether a beluga belongs to the Cumberland Sound population or the Hudson Bay–Kimmirut–Frobisher Bay population. The author replied there is no certain way to distinguish what population a live beluga belongs to.

The DFO and NWMB approved a new quota of 41 belugas after the HTA developed community hunting rules. DFO will meet with the HTA soon to discuss the hunting rules to ensure everyone understands them. No concerns were expressed by the workshop participants that the new quota may be too high. Nevertheless, Livee Kulluarlik felt the SSR should indicate that a quota of 41 has been proposed but the current quota of 35 should remain in force until a public meeting has been held to discuss the proposed change. Other resource users indicated that the letter of approval has been received and read over the community radio several times already. They felt the community would support the increase. Livee Kulluarlik said that a public meeting would allow the community to discuss all aspects of the quota and give strength to the conclusions reached.

Sources of Uncertainty

When the RAP portion of the workshop exceeded the allotted time, DFO offered to draft the Sources of Uncertainty and Outlook sections based on comments made during the meeting.

The following sources of uncertainty were identified:

- current reproductive rates and age-specific survivorship;
- winter distribution;
- total annual harvest (as struck-and-lost rates are not currently reported);
- rates of natural mortality (e.g., predation and ice entrapments not observed by hunters);
- impacts of environmental variables (e.g., changes in climate and ice conditions) on belugas, their prey and predators; and,
- potential impacts of increases in vessel traffic that may occur as a result of commercial activities (e.g., commercial fisheries, industrial development or whale-watching).

Outlook

DFO drafted this section based on the population modelling and survey results presented and discussions that took place during the meeting.

The overall conclusion reached during the RAP meeting was that both local Inuit knowledge and recent survey results suggest the beluga population is increasing in size and recovering from the severe depletion caused by historical commercial whaling. Based on the results of Pierre Richard's population modelling and risk analysis, the quota of 41 belugas proposed for 2002 poses only an 18% risk of the population declining, assuming that no additional mortality occurs.

Management Considerations

The Chair redrafted the Management Considerations section to better reflect comments that had been raised during the meeting. Jon McCotter and Bill Doidge proposed small changes to clarify information about past and proposed quotas.

Other Considerations

Contaminants

Pierre Richard and Bill Doidge noted that while organochlorine contaminants levels in Southeast Baffin belugas may be the highest reported to date in the Canadian Arctic, they are still very low relative to levels found elsewhere such as those reported for St. Lawrence belugas. A general discussion followed about the sources, transport, and bioaccumulation of contaminants. Not enough studies have been conducted to date to assess the implications of the current levels of contamination on the health of belugas that reside in Cumberland Sound. Currently it appears that the belugas are not noticeably affected by their current contaminant loads and do not pose a risk to human health.

The Inuktittut translation commonly given for the word "contaminant" is powerful and may affect people's perception about whether country meat is safe to eat. Resource users felt that a public education program is needed in Pangnirtung to explain that the contaminant levels present in Cumberland Sound belugas do not pose a risk to those that consume country foods. Brigitte de March mentioned that a report entitled "Highlights of the Canadian Arctic Contaminants Assessment Report: A Community Reference Manual", prepared by the Northern Contaminants Program in 1997, was distributed to health practitioners in Nunavut. She offered to send copies of the report to the community.

Concerns were raised by resource users about a few changes they have noticed in their environment in recent years. They have seen evidence of contaminants travelling through water as well as through air. For example, a film of particles now appears on the sea ice melt water in the spring. Hunters have also noticed the bones of animals show more signs of deformity now than in the past.

Disease

As disease is not a known threat to the Cumberland Sound beluga population, the Disease section was reworded to make it more concise.

Commercial Fisheries

The Chair re-wrote the Commercial Fisheries section to include information about the Greenland halibut fishery and increased traffic within Cumberland Sound. Beluga entanglement may also occur if gill nets are used to fish for Greenland halibut.

Livee Kulluarlik pointed out that vessels fishing for turbot near the mouth of Cumberland Sound are catching only small fish because that area is a turbot nursery area.

Noise and Disturbance

The Inuit Knowledge study of the southeast Baffin beluga (Kilabuk 1998) reported that noise from motorized boats was considered to be the main factor causing a decline in the numbers of belugas seen in Cumberland Sound and changes in their distribution. The RAP workshop resource users identified large ships, snowmobiles and aircraft as additional contributors of noise to the waters of Cumberland Sound. Inuit know that belugas are sensitive to sounds in their environment and use that knowledge when hunting. For example, when at the floe edge hunters will not attempt to hunt during calm waters because the whales can hear them on the ice surface. Instead, hunters wait until waves form and lap onto the ice to muffle the noise created by their movements.

The Kilabuk study also reported that boat traffic is causing whales to travel farther and faster to avoid boat noise and disturbance and this has resulted in a slight decrease in the thickness of the belugas' fat. The resource users at the RAP meeting suggested that the decline in oiliness of the blubber in summer is not the result of boat disturbance but is a natural seasonal fluctuation that occurs normally in belugas. They argued that belugas come into Cumberland Sound to lose some fat and moult and that the decrease in blubber thickness coincides with the time when the whales start rubbing on the bottom.

Killer Whales

A pod of killer whales used to frequent the waters of Cumberland Sound but these animals were killed. Just recently, killer whales have been seen again in the Sound and they appear to be preying on belugas. Lazarusee Ishulutaq reported seeing about ten killer whales coming from Clearwater Fiord. Livee Kulluarlik reported seeing evidence of killer whale predation on both beluga and bowhead whales. Another local hunter saw a dead beluga with a chunk removed from it by a killer whale. Karen Ditz noted that most communities in the eastern Arctic have reported a higher incidence of killer whales in recent years.

Resource users can recognize immediately when killer whales are hunting belugas because of the way the belugas act. Marine mammals communicate among themselves even if separated by considerable distance. Most will try to leave the area or move very close to shore. Killer whales prey on all marine mammals except, perhaps, walrus.

Industrial Development

No concerns were raised about current or potential industrial developments in the vicinity of Cumberland Sound.

Appendix 1. Terms of Reference

Cumberland Sound Beluga Regional Advisory Process and Recovery Planning Workshop
6-8 March 2002
Arctic College, Pangnirtung, Nunavut

Background

Historically, belugas in Cumberland Sound were hunted both commercially and for subsistence. In 1990 the Southeast Baffin – Cumberland Sound beluga population was designated as "Endangered" by Canadian Committee on the Status of Endangered Wildlife in Canada (COSEWIC) following declines in beluga numbers estimated from aerial survey data.

Until recent years, Cumberland Sound belugas were thought to belong to a Southeast Baffin Island population that was hunted by the communities of Iqaluit and Kimmirut as well as by Pangnirtung. Growth measurements, genetic and contaminants profiles, and satellite tracking data collected since the late 1980's have confirmed that belugas residing in Cumberland Sound are genetically distinct from those hunted near Iqaluit and Kimmirut. Local hunters, however, report that there are three different types of belugas hunted in Cumberland Sound.

The community of Pangnirtung hunts Cumberland Sound belugas under a quota system. The hunt is co-managed by the Nunavut Wildlife Management Board (NWMB) and Fisheries and Oceans Canada (DFO). Hunting regulations are implemented under the Fisheries Act and the Marine Mammal Regulations by DFO. A quota of 35 belugas has been in force for this population since 1991. As of the 2002/03 hunting season, the quota has been increased to 41 as part of a community-based management system. This RAP is being done in support of this management requirement.

Proposed Terms of Reference for the RAP portion of the workshop

The overall goal of the workshop is to develop a Recovery Strategy for belugas in Cumberland Sound. In support of that goal, the first half of the workshop will be devoted to conducting a review of the scientific information and traditional knowledge known about the beluga population. This part of the workshop is referred to as a "RAP" (Regional Advisory Process) and the end product will be a **Stock Status Report.** Many topics will be discussed in order is to produce the Stock Status Report, which follows a set format. The following outline shows the topic headings that will appear in the Report and a brief description of the type of information each section will contain.

1. **Background**
   - *Description of context for the review (the reason for a stock status evaluation) brief overview of the population (description of it's distribution and importance and use as a resource).*

2. **Species Biology**
   - *Short description of the species (morphology, growth and size).*
   - *Brief overview of relevant life history traits and vital rates (e.g., distribution, movements, reproduction, sources of mortality, feeding, habitat requirements).*

3. **The Hunt**
   - *Brief description of the hunt, including reviews of estimates of the landed catch over time and information on loss rates.*

4. **Resource User Perspective**
   - *Description of the cultural and traditional importance of the population.*
   - *Description of perspective of resource users about the status of the population.*

5. **Resource Status**

   Stock delineation
   - *Review of population structure, seasonal distribution and habitat use of the population.*

   Stock size
   - *Review of the knowledge of size and trend data related to the population.*

   Sustainable hunting rate
   - *Review of the data and models for calculating sustainable hunting rates.*

6. **Sources of Uncertainty**
   - *Identification of any uncertainties in stock identity, abundance estimates, changes in distribution, vital rates, hunt statistics, and sustainable hunting rate that may contribute to uncertainty in the status of the population.*

7. **Outlook**
   - *Description of the outlook for the population based on a review of its current status, trend, and any foreseeable events.*

8. **Management Considerations**
   - *Review of factors that may affect the management of the hunt, including a review of current hunting and management practices, as well as implications of Hunting or Co-Management Plans already in place (e.g. Southeast Baffin Beluga Co-management Plan).*

9. **Other Considerations**
   - *Description of other factors that may affect the future health and status of the population, such as predators, ice entrapment, commercial fisheries, contaminants, and disease.*

Appendix 2. Participants List

Name	Affiliation	Location
Jaypetee Angmarlik	HTA	Pangnirtung
Louisa Angmarlik	Contractor (workshop assistant)	Pangnirtung
Holly Cleator	DFO, Science	Winnipeg
Susan Cosens	DFO, Science	Winnipeg
Brigitte de March	DFO, Science	Winnipeg
Karen Ditz	DFO, Fisheries Management	Iqaluit
Bill Doidge	Makivik Corporation	Kuujjuak
Josée Galipeau	Nunavut Wildlife Management Board	Iqaluit
Patt Hall	DFO, Fisheries Management	Winnipeg
Lazarusee Ishulutaq	HTA	Pangnirtung
Leetia Janes	Contractor (translator)	Iqaluit
Abraham Kaunak	Qikiqtaaluk Wildlife Board	Hall Beach
Moe Keenainak	HTA	Pangnirtung
Jonah Kilabuk	Contractor (translator)	Pangnirtung
Livee Kulluarlik	HTA	Pangnirtung
Mathewsie Maniapik	HTA	Pangnirtung
Jon McCotter	DFO, Conservation & Protection	Iqaluit
Laimee Nakashuk	HTA	Pangnirtung
Jooeelee Papatsie	HTA	Pangnirtung
Pierre Richard	DFO, Science	Winnipeg
Sakiasie Sowdlooapik[1]	Government of Nunavut, DSD	Pangnirtung

[1] attended Wednesday only

HTA Hunters and Trappers Association
DFO Fisheries and Oceans Canada
DSD Department of Sustainable Development

Appendix 3. Cumberland Sound RAP meeting – Proposed Agenda

Proposed Agenda

Wednesday, 6 March 2002

9:00 Opening prayer

9:02 Welcome and opening remarks by Susan Cosens

9:10 Introductions, comments by participants, and review of agenda

9:25 Review of background and context for review (refer to Terms of Reference)

9:35 Begin review of draft SSR
- *Background*
- *Species biology*

9:55 Presentation by Pierre Richard
- ***Seasonal movements and habitat use of Cumberland Sound beluga***

10:10 Break ----------

10:30 Continue review of draft SSR
- *The Hunt*
- *Resource user perspective*

11:45 Presentation by Brigitte de March
- ***Studies of genetics and contaminants on belugas hunted in Pangnirtung, Iqaluit and Kimmirut***

12:00 Break for lunch ----------

1:15 Continue review of draft SSR
- *Resource Status: Stock delineation*

1:50 Presentation by Pierre Richard
- ***Size and trend of the Cumberland Sound beluga population***

2:05 Continue review of draft SSR
- *Resource Status: Stock size*

3:00 Break ----------

3:20 Continue review of draft SSR

- *Resource Status: Stock trend*

3:55 Presentation by Pierre Richard
- ***Risk analysis of the continued recovery of the Cumberland Sound beluga population***

4:10 Continue review of draft SSR
- *Resource Status: Sustainable hunting rate*

5:00 Adjourn until tomorrow

Thursday, 7 March 2002

9:00 Opening prayer

9:02 Update of process and review of agenda; updates and comments by participants

9:15 Continue review of draft SSR
- *Sources of Uncertainty*
- *Outlook*

9:45 Continue review of draft SSR
- *Management Considerations*

10:05 Break ----------

10:25 Continue review of draft SSR
- *Other Considerations: Contaminants*
- *Other Considerations: Disease*
- *Other Considerations: Commercial fisheries*
- *Other Considerations: Industrial development*

11:00 Continue review of draft SSR
- *Summary*

11:15 Wrapping up loose ends
- *Summary of editorial and approval process for Stock Status Report, Proceedings and Presentations*
- *Assigning of revisions*