**Report of the Cook Inlet Beluga**
**Long Term Harvest Regime Working Group Meeting**

National Marine Fisheries Service, Alaska Fisheries Science Center
25-26 September 2003

A meeting of the Cook Inlet Beluga Whale Long Term Harvest Regime Working Group was held at the National Marine Fisheries Service (NMFS), Alaska Fisheries Science Center, Seattle, Washington from 25 - 26 September 2003. The agenda (Appendix 1) and the List of Participants are provided (Appendix 2). The meeting was chaired by Paul Wade.

The meeting was called to order by Wade who gave a brief introduction and stated that the goal of the working group is to create a long term harvest regime for Cook Inlet (CI) beluga stock and that the goal of this workshop was to make decisions regarding the modeling approach in order for the analyses to progress. Following the introduction, participants introduced themselves along with a description of their respective affiliations. Sky Starkey raised concerns regarding the agenda and it was agreed that the agenda would be revised after the presentations were complete and topics warranting further discussions were identified.

Rod Hobbs gave a presentation entitled "Cook Inlet Beluga: Abundance and Distribution " (Appendix 3). Hobbs provided an overview of NMFS' aerial survey protocol which consists of annual surveys in June/July by a four person observing team in which 6-7 surveys are flown at low tide (one flight is conducted in the lower Inlet and 5-6 flights are flown in the upper Inlet). Once each group of whales is located, several passes are flown in order to ensure that the entire extent of the group is identified. Several passes are counted by observers and recorded on videotape to be used for analysis. The plane is equipped with two video cameras (wide and narrow settings) and 8-12 counts per group are recorded, weather and air traffic permitting. Although the observers make counts during the aerial surveys, the primary counts are based on analyses of the video data. (The observer counts are corrected for each individual observer because historically, the individual counts are approximately 54 percent lower than the video counts.) These counts are corrected for whales that are missed below the surface using dive interval data and for whales missed by the counting video by using a higher magnification (4 to 8 X) video of a portion of the visual field captured on the wide angled counting video.

Hobbs presented abundance estimates for the past nine years. Discussion was raised regarding the large confidence intervals surrounding the estimates of abundance for 1994-1996. Hobbs explained that this is a result of 1) fewer surveys being conducted in the earlier years, 2 ) the 1995 survey occurred in July, after the beluga harvest, and 3) newer camera technology in recent years has increased confidence in the video analysis. Hobbs explained that the Bristol Bay correction factor for missed whales was derived from an aerial survey in which there was only a single observer, the plane was flying at a slower speed, and there was no circling effort in order to get a more accurate visual count. Since current video survey protocol has different assumptions and data, the Bristol Bay correction factor is not appropriate. Questions were also raised regarding the carrying capacity (K) of 1300. The group designated these as topics of concern that needed to be addressed on Friday.

Dave Rugh gave an update on the 2003 aerial survey. The aerial surveys were flown for six days. However, only five days of the surveys were used because of video quality, due to poor weather on the one day. Rugh discussed that the index slipped below what it was in 2002, but does not feel that there is need for concern.

Hobbs described the changes in distribution of belugas in the Inlet based on June aerial survey data. He showed that the June distribution of the CI beluga extended south of the Kenai River on the east side and Kalgin Island on the west side during the 1970's. However, the distribution has become restricted to the upper Inlet in the last two decades where belugas are rarely seen south of Point Possession on the east side and Beluga River on the west side. Charlie Edwardson questioned the effects of industrialization in the southern portion of the Inlet and Joel Blatchford added information pertaining to an oil spill in the 1990's in the middle part of the Inlet. There was discussion regarding the effects of these factors on distribution and Hobbs stated that there is insufficient data to determine the cause of this change in distribution. Hobbs went on to explain that the tagging data showed that the whales were still utilizing some of the lower parts of their observed range in the fall, winter and spring. Thus, tagging data is important since it can provide data on the movements of the CI beluga during the winter. The group agreed that the change in distribution is an issue that warrants further research.

Barbara Mahoney presented information on the known harvest in Cook Inlet (Appendix 4). The data prior to 1994 are not accurate since few hunters were interviewed, but in 1994 the Cook Inlet Marine Mammal Council (CIMMC) submitted detailed reports to NMFS for 1994 and 1995. Data from 1997-99 were gathered from reports from individual hunters that were submitted to NMFS. Mahoney discussed impacts from commercial whaling. From whaling records it is known that 151 whales were harvested from 1917-1920. There are no written records from the whaling effort in the 1930's, but interviews of Native elders were conducted in the 1980's and 1990's and these indicate that there was a commercial harvest during the 1930's. In May 1999, Senator Stevens passed a law stating that CI belugas could only be harvested through a co-management agreement. The current arrangement directed by the Administrative Law Judge (ALJ) calls for six whales to be harvested between 2000 and 2004. Discussion was raised regarding the numbers presented for struck and lost. Mahoney explained that the struck and lost numbers for 1995 are the actual numbers provided by CIMMC, and that the numbers for 1996-1998 are estimates. These estimates result in a struck and lost rate of one animal for every harvested whale. J. Blatchford commented that using estimates, rather than actual numbers, has hurt the Native community and by saying the hunters are solely responsible for the decline is prejudiced and inaccurate.

Mahoney also discussed strandings in the Inlet, and live mass strandings, which constitutes any stranding of more than one whale (Appendix 5). When possible, samples are collected from stranded animals. Samples from live belugas are skin, and sometimes blood and a biopsy (skin and blubber). Samples from dead belugas include teeth, skin, blubber, muscle, female reproductive tracts, stomachs and other organs.

Andre Punt presented a talk “Model Basics” (Appendix 6) which described the background to the modeling approach. He stated that models are used to predict the future size of the population given assumptions about its dynamics, and historical and future harvests.

Mathematical (rather than conceptual) models are used to make predictions for CI beluga because the same results will be obtained from a mathematical model given the same data and assumptions. These models can be used to combine the information from a variety of sources. Mathematical models make assumptions. However, all approaches for making predictions about the future are predicated on assumptions and it is usually possible to determine how sensitive the results of a model are to its assumptions by changing the assumptions. A simple model can be produced and made more complicated as needed or when more data become available. The assumptions on which previous modeling work for CI belugas are: priors for the historical population size, all individuals behave in the same way, belugas in CI are closed to immigration and emigration, the impacts of the environment are inconsequential, ane there is no population size below which birth rate collapse.

Punt continued with a presentation entitled "Evaluating Alternative Management Policies: Projections, Multiple Simulations."

Dan Goodman gave a presentation entitled "Decision Analysis for Cook Inlet Beluga" (Appendix 7). He began by presenting seven key facts with regard to the decision analysis for CI beluga: 1) this is a small population (<500), 2) this population has been censured since 1994, 3) this population was heavily harvested from 1994-1998, 4) there has been little reported harvest from 1999 to present, 5) there has been no obvious population trend since 1999, 6) the historic population size is uncertain, and 7) the density dependant parameters are unknown.

After the presentations were completed, there was a consensus to have time for each of the parties to meet independently to discuss the information that was presented and decide what topics of concern they wished to discuss on Friday.

Friday morning, it was agreed by the group to go around the room to allow each party to express their concerns regarding the information that was presented on Thursday. Starkey presented the following concerns of CIMMC: 1) there is noise in the aerial survey data (i.e., uncertainty in data points) which could result in limiting the harvest, and 2) since only three animals were harvested in the last four years, which the Native community believes to be accurate, the harvest is not the reason behind the lack of an increasing trend in population size. Therefore, there is a need to determine the significance of the harvest and investigate what else is affecting this population. Since significant new information has not been presented, he suggested having an interim harvest regime in which two belugas could be harvested by the Native community, one beluga annually by Tyonek, until more information is gathered at which time the numbers can be shifted upwards.

Lloyd Lowry presented the position of the Marine Mammal Commission (MMC) as follows: 1) desire to recover the population to optimum sustainable population (OSP) and help guide NMFS and the ALJ, 2) recognize Native exemption and support the harvest as long as the mandate is met, 3) use the precautionary principle which states if there are not enough data to make a decision, then err in favor of the animals, 4) desire to see clearly defined principles that are easily understood by all parties. The MMC is also concerned with impacts to CI belugas other than the harvest and believes that this is an issue that should be researched.

Michael Gosliner stated the need to have a more long-term framework (>5 years) to present to the ALJ. J. Blatchford agreed that five years was not enough time, but is not sure what better time frame would be. He commented that 10 years might not be long enough to provide drastically more data than we currently possess due to the lack of funding. He expressed concerns over the health of this population and discussed noticing a difference in skull morphology over the past several decades. Wade informed the group that the lack of funding is a result of the decreased funding for Steller sea lions and NMFS in general, and stated that this trend is likely to continue, which limits the ability to expand research efforts.

Mahoney commented that the Region had not anticipated going into an interim harvest regime. The Region did anticipate reviewing whatever decision was made in five years, but want a long-term harvest plan with the understanding that it will be reviewed at a determined time or if trigger mechanisms are present.

Gosliner noted that a long term plan could mean a step by step plan **(Mike, what is this plan?).** Although this is not what was agreed upon at the end of the hearing process, the ALJ has shown a predilection to accept a decision if all parties are in consensus. Several members of the group agreed that a step by step plan is a plausible solution.

Tom Meyer was asked to remind the group of the ALJ process and what is needed. He noted that the ALJ stipulated that the 2005 harvest and beyond would be based on more data and that the ALJ will want to know if a consensus among all parties has been reached. If not, he will provide a forum to resolve differences and to reflect on the basis for the stipulation if that's what we decide. The Agency has to have a rational basis for whatever regime is developed. Meyer informed the group that the Final Environmental Impact Statement (EIS) will be released shortly and that any decision that is made should fit into this.

Punt gave another presentation entitled "Comparing Different Rules" (Appendix 8) in which he created additional models based on discussion that occurred the previous day. He modeled several decision rules to see what effect each one would have on the population.

Wade proposed modeling for three population trends - increasing, stable or uncertain, and decreasing. Discussion followed regarding when the harvest would be reduced to zero. Would this occur if there was an absence of information or only if there is evidence of a decline? Eagle stated that NMFS is not looking to reduce the harvest unless there is explicit information indicating that it is necessary. Edwardson questioned whether the harvest would be increased if there is an increase in the population and if it would be possible through an emergency order or would it have to wait until the review period? Lowry answered by saying that if the population recovers to a point where it is no longer depleted, the ALJ process is complete and the MMPA exemption goes into effect. Lowry continued by saying that the likelihood of making the wrong decision is highest in the first few years which is why an interim quota may be best until more data are available. Goodman agreed that the regime should remain the same until there is convincing data to alter it. However, he questioned what the appropriate management actions would be if it appears as though the harvest is not the cause of the decline or lack of an increase. Edwardson expressed that he would like the harvest regime to stipulate that the harvest will not be reduced even if there is a decline in the population. The group agreed that these questions

could best be answered at the next meeting after Goodman, Punt and Hobbs had a chance to run more models.

J. and D. Blatchford expressed concerns regarding the time frame for acquiring population trend data in the absence of funding. Without appropriate funding it will be difficult to detect changes in the population, therefore, it could take decades to increase the harvest.

Merryman asked if NMFS has researched whales assumed to have died of natural causes. He expressed concern regarding the industrialization of the Inlet and the effect that it is having on the beluga population. The group acknowledged these concerns. Hobbs informed the group that Mahoney has been investigating the health of whales that have been found. Mahoney explained the difficulty in assessing the health of some belugas due to the fact that several days may have passed before the whale was discovered. However, she acknowledged that the increase in public awareness and reporting has improved efforts to find the whales in a shorter time frame.

Starkey asked if there is an explanation for "missing" whales -, i.e., whales that we should expect to see in the population based on the rate of increases, etc. that aren't accounted for in the abundance estimates. Goodman explained that there is a difference of 12-14 whales between what we think is the normal range of growth for a beluga population and what the data is showing us for Cook Inlet. This could be explained by such things as a reduction in reproduction rates or a natural increase in the death rate.

Starkey continued by asking whether NMFS has considered developing a conservation plan through co-management with the Native community to address issues facing this population, such as critical habitats. He mentioned that the Native communities could help find funding for this by asking Senator Stevens directly. He acknowledged that funding might not be possible for FY04 budget, but could be possible for FY05. Wade confirmed that it would be too late for FY04 since the Senate has already passed its budget and is currently in a joint session with the House to reach a final budget in the near future. Currently, the beluga budget appears to be the same as last year at $272K.

Eagle addressed Starkey's concerns by stating that NMFS is currently working on a conservation plan with Mahoney taking the lead. Mahoney reported about the recent process to get this population listed as depleted and to finish the Environmental Impact Statement. The conservation plan is next on the list of priorities for the Region. She stated that when the process to develop this conservation plan begins, all interested parties will have an opportunity to participate. The public meetings are anticipated to begin in November.

Lowry noted that implementing a conservation plan could take several years and that it would be important to identify research priorities to be addressed in the meantime. The group agreed and recognized the following list of research priorities (in no particular order):
1. Studies of important habitats, including reasons for contraction of range and effects of industrialization
2. Detection and retrieval of carcasses. The group would like to see more cooperation between the Region and the local community to respond to strandings and collect the appropriate samples.

3. Investigate ways of ground-truthing the aerial surveys, involving the hunters
4. Studies looking at diet, ecosystem changes to the diet, and the significance of finding several whales with empty stomachs. It was agreed that the fatty acid studies should continue.
5. Ecosystem changes in the Inlet.
6. Using acoustics to estimate abundance and examine distributions within the Inlet.
7. Issues related to bias in the estimates of calves and juveniles and a correction factor for calves.
8. Dive time information, to assess the use of the Inlet and foraging behavior, and to improve the correction for animals below the surface.
9. Studies for estimating abundance through mark-recapture techniques.
10. Genetic studies to investigate the possibility of inbreeding depression.
11. Increasing knowledge of life history parameters.
12. Using side scan sonar to understand the underwater feeding behavior. Questions were raised whether this is a viable option for the Inlet due to the high noise level.
13. Reproduction rate and age analysis.

Meyer asked if satellite technology can be used to monitor beluga movements in the Inlet. Hobbs stated that it may be possible. Hobbs has been looking into the potential to use satellite technology to locate belugas. Wade said that satellite technology is limited due to military security issues. Some NMFS personnel have been working with the military to gain security clearance, but this process is long and involved. Gosliner asked if the Fish and Wildlife Services techniques for walruses using heat sensors would work for belugas. Mahoney answered that there have been attempts to use this technique with belugas, but the temperature difference between the whales and the waters is not detectable by the current technology. Hobbs added that this technique has been successful for gray whales only in the fact that the blows are tall. The blows for belugas are too small to be detectable.

The group discussed the time frame that was necessary to make the recommendation to present to the ALJ. Mahoney stated that the Region would like the recommendations from this working group by the first of the year since it will need to be submitted to the ALJ by 15 March 2004. Tom Eagle stated that after the recommendation is submitted to the ALJ, there will need to be a clearance time before it can go into effect. It will take 6-8 weeks to gain clearance through NMFS and then will require public comment. Gosliner reminded the group that the hunting season does not begin until July, so there should not be any problems getting the co-management agreement in place before then. Meyer noted that the judge might call for a hearing after March 15 that could effect the time line for the regulation to take effect, but stated that there is a possibility of getting an extension if it appears that there might be a problem. In addition, the group discussed and agreed that the quota should be for a block of years rather than for each year individually to allow for carry over between years.

Goodman expressed confusion regarding the goal of this management plan. He stated that it is impossible to maximize the harvest and guarantee that the population will not go extinct or have a delay in recovery. Since there are a multitude of options, he wanted the group to help narrow the possibilities in order to help the modeling process.

The group asked Punt, Goodman, and Hobbs to express their concerns or questions regarding additional information needed for them to continue their assessments.

Punt presented four points to discuss:

1) the management goals (e.g., a 95 percent probability of no more than a 25 percent delay in recovery compared to no harvest).
2) a "backstop" if continued population decline was evident - this would involve trend analysis and a decision regrading the probability of not identifying a decline if there really was one. This could be examined using additional simulations.
3) how to differentiate between stable and uncertain in a decision rule - this relates to the probability of over- and under- protection error.
4) can the existing software and models adequately address the questions being asked?

Goodman asked for a call regarding the definition of recovery. Should K be 780 belugas regardless of the uncertainty of K and other parameters?

Hobbs had four questions:
1) What weight should be applied to the status quo?
2) Examples of rules to increase the harvest
3) Examples of rules to decrease the harvest
4) Would there be a rule that would allow the harvest even if the population is declining?
Hobbs also asked if the percentage of males in the harvest was relevant. Punt pointed out that the current model does not include percentage of males, therefore, it is not relevant at this point.

The group discussed the uncertainty of K and how this should be handled. Starkey asked if it was possible to research more into K, but Goodman stated that given the records, it would be difficult to get a better estimate, therefore, we need to use what we already have. Eagle noted that 780 belugas were decided as a benchmark to estimate the impact of the harvest on the delay to recovery. Eagle asked if the group if the belugas should no longer be considered depleted if they reach 780. Wade stated that for the purposes of examining the harvest regime, 780 could serve as MNPL (maximum net productivity level) for modeling, but when more data are available .6K could be used. Lowry added that we are limited by the data available for this population and when more information is available, we should have a more biologically realistic model to include such things as environmental factors, sex ratio, and adaptive management. Goodman stated that there will not be any significant new information before December, therefore, the current models must be used. The group agreed that the current models are sufficient, but will add more details when data become available.

Starkey then asked if the models could be run with a wide range of K with a sensitivity analysis. The group discussed this point and agreed that although multiple runs of the model would be interesting, given the current time frame, only a small range would be possible to model. There was also discussion regarding the process if a decrease in the harvest was necessary. Starkey stated that he would like to see an incremental step-down process rather than completely eliminating the harvest. The group agreed that this step-down and its effect to the population would be beneficial to model. The results of this model should be discussed at the next meeting.

Jess Landman noted that several stakeholders were not present at this meeting. There are 229 villages that are recognized in the Federal Registry and only a couple are being represented here even though they will be impacted by the decision rule. He also stated that these communities

have information regarding strandings and resources such as freezers to store carcases and boats to help respond to strandings, all of which would be useful to NMFS. He expressed desire to see more cooperation in this respect.

It was agreed that another meeting is necessary. Potential agenda items for this meeting are:
1) presentation of the aerial survey techniques by NMFS
2) the new (2003) abundance estimate
3) show models of potential harvest regimes
4) attempt to form co-management agreement to present to the ALJ.

It was recognized by the group that the next meeting would be the last, before the negotiated harvest plan would be submitted to the ALJ. The next meeting was planned to occur on 6-7 December in Anchorage, to allow for the hunters to attend.

The meeting adjourned at 12:40pm.