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# Proceedings of the National Marine Mammal Peer-Review Meeting: Cumberland Sound Beluga

**April 6, April 20, May 10, 2016**
**Teleconference**

**Chairperson: Garry Stenson**
**Editor: Christine Abraham**

Fisheries and Oceans Canada
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Canada

**Foreword**

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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***Aussi disponible en français :***

*MPO. 2016. Compte rendu de la Réunion du Comité national d'examen par les pairs sur les mammifères marins : béluga de la baie Cumberland; les 6 avril, 20 avril et 10 mai 2016. Secr. can. de consult. sci. du MPO, Compte rendu 2016/050.*

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## SUMMARY

In 2004, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommended that Cumberland Sound Beluga (CSB) be designated as “Threatened” under the *Species at Risk Act* (SARA). Continued research and monitoring of this beluga population is required to ensure sustainability of the Inuit subsistence harvest. Fisheries Management and its Nunavut co-management partners are developing an Integrated Fisheries Management Plan (IFMP) with the community of Pangnirtung. An aerial survey of Cumberland Sound beluga was conducted in summer 2014. Based upon this survey, Fisheries and Oceans Canada (DFO) was asked to provide Science Advice that can be considered by the Nunavut Wildlife Management Board (NWMB) to evaluate the sustainability of the current quota, and the level of Total Allowable Harvest (TAH) and Basic Needs Level (BNL) to be established for this beluga population.

There were two components to the original request. First, an aerial survey estimate of CSB abundance in 2014 was reviewed by the National Marine Mammal Peer Review Committee during its October 2015 meeting. The second component was to develop a population model that incorporated the 2014 and previous aerial survey results, and if appropriate, provide advice on an updated population abundance estimate and recommend sustainable harvest levels (i.e., total allowable landed catch [TALC]) for this population. These proceedings report on the review of this second component.

In addition to these Proceedings, one Research Document and one Science Advisory Report will be published as a result of the meeting.

The review was held via three teleconferences (April 6, April 20, and May 10, 2016). The participants invited to this meeting included individuals from DFO (Ecosystems and Oceans Science, Ecosystems and Fisheries Management), National Oceanic and Atmospheric Administration (NOAA), Nunavut Wildlife Management Board, Nunavik Marine Region Wildlife Board, Makivik Corporation, and Nunavut Tunngavik Inc.

## SOMMAIRE

En 2004, le Comité sur la situation des espèces en péril au Canada (COSEPAC) a recommandé que le béluga de la baie Cumberland soit désigné comme étant « menacé » en vertu de la *Loi sur les espèces en péril* (LEP). Il faut poursuivre les recherches et la surveillance de cette population de bélugas pour assurer la durabilité de la chasse de subsistance des Inuits. La Gestion des pêches et ses partenaires de cogestion du Nunavut sont en voie d'élaborer un Plan de gestion intégrée des pêches (PGIP), de concert avec la communauté de Pangnirtung. Un relevé aérien des bélugas de la baie Cumberland a été effectué au cours de l'été 2014. À l'aide de ce relevé, Pêches et Océans Canada (MPO) doit fournir des avis scientifiques, que pourra utiliser le Conseil de gestion des ressources fauniques du Nunavut (CGRFN) afin d'évaluer la durabilité des quotas actuels, ainsi que le total autorisé des captures (TAC) et le contingent de base à fixer pour cette population de bélugas.

La demande initiale comportait deux volets. Le premier – une estimation par relevé aérien de l'abondance des bélugas de la baie Cumberland en 2014 – a été examiné par le Comité national d'examen par les pairs sur les mammifères marins lors de sa réunion d'octobre 2015. Le deuxième consistait à élaborer un modèle de population au moyen des résultats des relevés aériens de 2014 et des relevés précédents et, le cas échéant, à formuler un avis sur une nouvelle estimation de l'abondance de la population et à recommander de nouveaux niveaux de prises durables (total autorisé des captures débarquées [TACD]) pour cette population. Le présent compte rendu fait état de l'examen de ce deuxième volet.

En plus de ce compte rendu, un document de recherche et un avis scientifique seront publiés à la suite de la réunion.

L'examen s'est déroulé dans le cadre de trois téléconférences (le 6 avril, le 20 avril et le 10 mai 2016). Les participants invités à cette réunion comprenaient des représentants du MPO (Sciences des écosystèmes et des océans, Gestion des écosystèmes et des pêches), de la National Oceanic and Atmospheric Administration (NOAA), du Conseil de gestion des ressources fauniques du Nunavut, du Conseil de gestion des ressources fauniques de la région marine du Nunavik, de la société Makivik et de Nunavut Tunngavik Inc.

# WORKING PAPER 1: MODEL ESTIMATES OF CUMBERLAND SOUND BELUGA (*DELPHINAPTERUS LEUCAS*) POPULATION SIZE AND TOTAL ALLOWABLE REMOVALS

*M. Marcoux and M.O. Hammill*

**April 6 Discussion:**

- It was noted that the Pangnirtung HTO (Hunters and Trappers Organization) had committed to providing annual reports of landings and losses several years ago. However, complete annual reports have not always been provided, and therefore, it was assumed that the total catches in some years was equal to the quota.
- The authors were asked to clarify if they used the model estimate or the abundance estimate for the Potential Biological Removal (PBR) calculations. The authors used the model estimate because they felt it was more robust. The authors looked at this again during the teleconference, and the PBR value comes out almost exactly the same no matter what estimate is used. The authors will include this justification in the text.
- The authors used 4 survey estimates to fit the model; it was suggested that they mention using the $N_{min}$ from the survey estimate as well.
- There was high autocorrelation/cross correlation among some of the parameters of the model - do the authors think the model is sufficient? The authors prefer to use the model rather than just PBR, although there are some issues with the data. The model is providing a reasonable result given what we know about the uncertainty associated with previous beluga surveys.
- There is something in the model preventing it from achieving a "best fit". The authors tried to fix some of the model parameters, but there are challenges in dealing with 4 separate surveys and 100 years of catch data (e.g. the long series of catch data has a substantial influence on the model fit). The model is a straight logistic model, so it does provide some fit to the data, but there is a lot of noise in the system. The authors also tried fitting an exponential model (in addition to the density dependence model), but it did not fit well.
- It was suggested that the authors began the model later in the time series (e.g. starting ~1960-1980), thereby removing the influence of the historical catch data. The authors will look at alternate time periods for the models, but there are likely to be issues as they are still trying to fit a model with 4 points and a dozen parameters. The important point here is that no matter what method is used or evaluated, all are all coming to the same conclusion that the current quota is not sustainable.
- It was asked if there is any way to get a better estimate of murkiness during the surveys (e.g. in Clearwater Fiord), as this estimate will affect the correction factors used for the older surveys. The authors feel that the current value is an appropriate estimate. It was suggested that because Clearwater Fiord was covered in the 2013 narwhal survey, perhaps the authors can use those photos as a relative reference of murkiness? It was decided to figure out the murkiness in the 2014 survey and use a proportion rather than the mean, and then compare this value with that from the with 2013 narwhal survey. The authors should also define "murky" and "very murky".
- In previous studies, differences in survey coverage were incorporated (e.g. for NHB narwhal); it was suggested that the authors see if adjusting the oldest surveys will improve the overall fit of the model.
- Without using the 1999 survey in the model, the population trajectory would be much lower. We don't know much about the 1999 survey, but we do know that beluga population dynamics

cannot explain the 1999 estimates. It was suggested that the authors re-examine the 1999 survey results, (there were 2 high estimates and 1 low estimate produced, and the low estimate was thrown out) to determine if the estimate is appropriate

- It was also noted that all of the surveys could be biased. The 1999 estimate may not necessarily be positively biased, as the other estimates could just as easily be negatively biased due to the distribution challenges in surveying beluga.
- The authors will look at the 1999 survey estimates (as above), rerun the model starting at 1960 (catch data), and also look at murkiness. Given the amount of work that needs to be done, we will have to have another follow-up call to review these results.

**April 20 Discussion:**

- The authors described the suggested changes made to the analysis after the last call.
- There was no information on what the whole fiord looked like in terms of murkiness in the 1980s surveys, but rather a qualitative description of the percent of animals seen in murky vs. non-murky water, and this was applied as a correction.
- Murkiness should be better defined objectively. Perhaps this can be addressed in the discussion, as well as which bins were used. There was also a request to see an indication of the variation from the photo reader.
- Following the revisions to the analysis, the results and conclusions remain generally the same as on the previous call; the current quota is not sustainable to allow for recovery of this population to meet the management objective.
- The authors will show model runs using the catch data from 1960 onward in the Research Document and SAR, but include an appendix showing all model runs and explain the problems with using the older data.
- There was some discussion regarding what fixed value of theta to use. Whatever assumptions are made about theta, it makes absolutely no difference to our understanding of the current stock status. It would be best to say that we don't know what theta is, and provide both values used.
- Model runs all showed very similar results. It is clear that the population is much lower than previously thought, that the current quota will not allow the population to reach the management objective and is likely causing the population to decline. Generally, we would favor using the model estimate (versus survey estimate) of abundance, as it incorporates more information. However the results and conclusions from either are very similar. The authors will summarize the confidence in the model for current stock status, given the degree of correlation between parameters.
- The committee agreed to provide a range of PBR values using all models.

**May 10 Teleconference:**

- The draft SAR was reviewed. Some suggestions were provided which were incorporated into the final SAR.
- One participant felt that the model results should not be interpreted to say that the stock "may be declining". However, the remainder of the committee disagreed, and felt that the model results do in fact clearly indicate that the stock may be declining. Therefore, this statement remained in the SAR.

## APPENDIX A: LIST OF PARTICIPANTS

**DFO**

Christine Abraham – NCR Science

Steve Ferguson – C&A Science

Marianne Marcoux– C&A Science

Stefan Romberg – NCR Ecosystems and Fisheries Management

Don Bowen – Maritimes Science

Jean-François Gosselin - QC Science

Garry Stenson – NL&L Science

Lianne Postma – C&A Science

Arnaud Mosnier – QC Science

Mike Hammill – QC science

Patt Hall _C&A Ecosystems and Fisheries Management

Alejandro Buren – NL Science

Jack Lawson – NL Science

**External to DFO**

Danica Crystal - Nunavut Wildlife Management Board

Debra Palka - NOAA

David Lee - Nunavik Tunngavik Inc

Kaitlin Breton-Honeyman

** Note that the peer-review took place over three separate teleconferences, and not all those listed above were able to attend all calls. However, all participants were provided with the draft SAR for comment.

## APPENDIX B: TERMS OF REFERENCE

**National Marine Mammal Peer-Review Meeting: Cumberland Sound Beluga**
**National Peer Review - National Capital Region**

**April 6, 20 and May 10, 2016**
**By teleconference**

Chairperson: Garry Stenson

**Cumberland Sound Beluga (CSB) - population abundance estimate and sustainable harvest level recommendations**

### Context

In 2004, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommended that CSB be designated as "Threatened" under the *Species at Risk Act* (SARA). Continued research and monitoring of this beluga population is required to ensure sustainability of the Inuit subsistence harvest. Fisheries Management and its Nunavut co-management partners are developing an Integrated Fisheries Management Plan (IFMP) with the community of Pangnirtung. An aerial survey of Cumberland Sound beluga was conducted in summer 2014. Based upon this survey, Fisheries and Oceans Canada (DFO) will provide Science Advice that can be considered by the Nunavut Wildlife Management Board (NWMB) to evaluate the sustainability of the current quota, and the level of Total Allowable Harvest (TAH) and Basic Needs Level (BNL) to be established for this beluga population.

There were two components to the original request based on the recommendations contained in DFO (2013). The first, an aerial survey estimate of CSB abundance in 2014, was completed by the National Marine Mammal Peer Review Committee during its October 2015 meeting. The second was to develop a population model that incorporates the 2014 and previous aerial survey results, and if appropriate, provide advice on an updated population abundance estimate and recommend sustainable harvest levels (i.e., total allowable landed catch [TALC]) for this population.

### Objective

To complete a population model incorporating the 2014 and previous aerial survey results, and if appropriate, provide advice on an updated population abundance estimate and recommend sustainable harvest levels (i.e., TALC) for this population.

### Expected Publications

- Science Advisory Report
- Research Documents
- Proceedings

### Participation

- Fisheries and Oceans Canada (DFO) (Ecosystems and Oceans Science, Ecosystems and Fisheries Management, Species at Risk)
- National Oceanic and Atmospheric Administration (NOAA)
- Nunavut Wildlife Management Board
- Nunavik Marine Region Wildlife Board
- Makivik Corporation
- Nunavut Tunngavik Inc.

### References

DFO. 2013. Advice on size and trend of the Cumberland Sound beluga whale population, 1990 to 2009. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/003.