CIE Independent Peer Review Report on the

"Status review and extinction assessment of Cook Inlet Belugas".

Professor Paul Thompson

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I. Executive Summary

Information on underlying datasets, analyses and extinction modeling were evaluated based upon the contents of the 2006 Status Review of Cook Inlet Belugas, a broad range of previously published papers and documents, and the revised Tables and Figures presented in Hobbs & Sheldon 2007. This information was also discussed in detail with other members of the review panel and NMFS scientists during a 3 day meeting at the NMML in Nov 2007, allowing all terms of reference for the CIE review to be satisfied.

The Cook Inlet beluga population inhabits a complex and remote area that presents biologists with enormous challenges when collecting the data required for assessing the population's status and viability. In response to this challenge, NMFS scientists have developed novel survey methods, analytical procedures and population modeling frameworks that are fit for purpose and represent best available science. Seven recommendations are made for actions that could further strengthen the final review document. Nevertheless, even without these modifications, it is clear that the best available scientific data support the major conclusions presented in the 2006 review. The Cook Inlet beluga population has not shown appreciable signs of recovery since 1999 when hunting restrictions were introduced, with the time-series of abundance estimates instead suggesting that numbers have declined significantly since then. The use of two different modeling approaches strongly supports the finding that there is a significant likelihood that the Cook Inlet beluga population will continue to decline or go extinct over the next 300 years. Furthermore, genetic studies, widespread surveys, and evidence of range contraction range suggest that Cook Inlet is unlikely to be re-populated if this population goes extinct.

II. Terms of Reference

The terms of reference for the independent review, and a statement on how each of these criteria was satisfied, are as follows:

1. ***Evaluate whether the adequacy, appropriateness, and application of data used in the assessment represents the best available science.***

   Information on the available datasets was evaluated based upon the contents of the 2006 Status Review, a broad range of previously published papers and documents, and the revised Tables and Figures presented in Hobbs & Sheldon 2007. The available data sets, and the methodology

underlying these data, were also discussed in detail with NMFS scientists, and assessed in relation to the strengths and weaknesses of alternative methods.

2. ***Evaluate whether the adequacy, appropriateness, and application of analytical methods and modeling represents the best available science.***

Information on the analytical methods and modeling were evaluated based upon the 2006 Status Review, the revised Tables and Figures presented in Hobbs & Sheldon 2007, and scientific literature on Population Viability Analysis. Papers within Marine Fisheries Review Vol. 62(2) were particularly important for evaluating analytical methods for survey data, and these methods were further elucidated through presentations to the review group by Dr Rod Hobbs.

3. ***Do the biological data, population data, model structure and assumptions, and the analysis methods applied to the extinction risk assessment represent the best available data and methodology for sound science?***

I had some difficulty in understanding how this TOR differed from the sum of TOR 1 and TOR 2. For example, population data, model structure and assumptions are all components of the data collection and modeling approaches used in the review. This TOR has therefore been met through evaluation of the materials outlined under TOR1 and TOR 2 above.

4. ***Does the status review provide an adequate assessment of the current knowledge regarding the biology of belugas in general and the Cook Inlet beluga population in particular?***

This TOR has been satisfied through review of the 2006 Status Review and a search of published scientific articles within the ISI database on Beluga whale ecology. Assessment of information from other literature, and unpublished sources, was facilitated through detailed discussion with Dr Tom Smith and Dr Michael Kingsley during the review process, as both these panel members had extensive experience of research on other Beluga populations.

5. ***Comment on the strengths and weakness of the status review in regard to this question.***

This TOR has been met through work under TOR 4, as this required an assessment of the strengths and weaknesses of the review before a decision could be made on whether this represented an adequate assessment of current knowledge.

6. ***Do the population models adequately represent the processes within the population? Comment on the strengths and weakness of the models in regard to this question.***

This TOR has been met through an evaluation of the material in the 2006 Status Review, Hobbs & Sheldon 2007, Wade 2007, and a further unpublished manuscript by Wade & Slooten. The strengths and weaknesses of these approaches have been assessed in relation to the available biological data for this population, my own experience in modeling the dynamics of other marine top predators, and the extensive published literature on this subject.

7. ***Are the analysis methods valid and sufficient to estimate the extinction risk? Comment on the strengths and weakness of the analysis methods in regard to this question.***

This TOR has been met through an evaluation of the materials highlighted under TOR 6, review of published literature on Population Viability Analyses (PVA) and discussion on the use of PVA to estimate extinction risk with NMFS scientists and other reviewers during the panel meeting.

8. ***Are the conclusions of the status review supported by the scientific information presented?***

The status review concludes that Cook Inlet Belugas are a genetically distinct population, and that survey data and modeling work indicate that there is a significant likelihood that the population will continue to decline and go extinct within the next 300 years unless factors determining its growth and survival are altered in its favour. Evaluation of materials outlined under TOR 1-7 above, together with discussion within the review panel and with NMFS scientists, lead me to conclude that this conclusion is supported by the best available science.

III. Peer Review Findings

Evaluation and application of data used in the assessment (TOR 1 & 3)

The Cook Inlet beluga population inhabits a complex and remote area that presents biologists with enormous challenges when collecting the data required for assessing a population's status and viability. The data used for this assessment can be considered in three broad categories.

1. Data used to assess whether Cook Inlet belugas are a "distinct population segment" (DPS).

Based on an earlier assessment, Cook Inlet belugas were designated a DPS in 2000. Published data on genetic variability (O'Corry-Crowe et al. 1997) and broad-scale distribution (Laidre et al. 2000), together with the more recent information on range contraction presented to the review panel, indicate that **the existing designation as a DPS remains strongly supported by the best available science.**

2. Data used as input parameters for the population model and extinction assessment, primarily data underpinning assessments of abundance trends, historic harvest levels, and life-history data.

The 1994-2006 time-series of abundance data are particularly important for this assessment, as they demonstrate a lack of recovery in the population following the 1999 reduction in harvests, and represent the key biological data from this population used in the extinction assessment. These data were collected using an aerial census technique that was specifically designed for the Cook Inlet belugas. This technique was required because the underlying assumptions of alternative standard sampling methods for cetacean populations are likely to be violated. Notably, the complex topography of Cook Inlet, together with the beluga's clumped distribution and highly variable group sizes mean that standard boat- or plane-based line transect surveys are not suitable for this

species. Another alternative approach might be to use photo-identification techniques to estimate abundance using mark-recapture techniques. However, the lack of distinct long-lasting markings on belugas risks serious biases due to false negative matches, and would require rigorous grading of photo-quality and a very narrow sampling period to avoid problems due to mark loss. Experience undertaking boat-based photo-ID within much smaller groups of cetaceans raises concerns that the extreme variability in beluga group size would result in strong heterogeneity in capture probabilities, also biasing abundance estimates. Furthermore, there are concerns that the intensive close-range boat survey work required to minimize this problem may itself represent a significant disturbance to the population when encountering large groups. Given the problems associated with the application of these standard approaches, and the differences between the habitats used by this and other beluga populations, **I am confident that NMFS scientists are using the most appropriate survey methodology for estimating abundance of belugas in Cook Inlet.**

Importantly, these techniques have been adapted in recent years to take advantage of developments in digital photography and video technology that allow improvements in the correction factors applied to group estimates, and the extension of these surveys to provide additional data on group structure (see below). One consequence of this is that survey efficiency may have subtly improved through the time series. In this case, this may be exacerbated by documented changes in the distribution of belugas, which indicate that there has been a decline in the likelihood of recording whales further offshore in the lower Cook Inlet (where detection probabilities are likely to have been lower than in the areas most commonly used in recent years). It may be impossible to fully assess the extent of any such bias. However it should be recognized that the most likely consequence of such a bias is that earlier surveys would have underestimated abundance, and the population's rate of decline may therefore have been underestimated. **I recommend that the revised status review explicitly discuss the potential for any bias due to a trend in survey efficiency.** It would also be useful to see information on trends in observed group sizes presented to help assess the potential for bias.

Data on historic harvests represent another key input parameter for the population model. In combination with earlier abundance estimates, these data inform our understanding of the extent of the decline during the period of unsustainable harvest, and the extent to which perturbation of population age structure may have constrained recovery. **The data available remain highly uncertain, but nevertheless appear to be the best available for this purpose.**

The small size of this population, the reduction in harvests, and the desire to minimize capture-release operations have meant that there are few opportunities to collect data on life-history parameters for this population. In most cases, therefore, the population model uses data on life history parameters gained from studies of other populations. The exception is a local estimate of the upper bound on survival, based on numbers of recorded strandings in Cook Inlet in relation to estimates of abundance. Following discussion during the review panel, it became clear that the model has drawn upon the best available data for this purpose. Importantly, these data have been updated when more appropriate data have become available, notably in response to the recent re-evaluation of the beluga's age at first breeding and calving interval (Stewart et al. 2006). However, whilst Table 2 of Hobbs & Sheldon 2007 clearly presents available data on beluga life history parameters, it is not as easy to identify which data have been used as input parameters in the model. Also, given potential population differences in life-history parameters, the model sensibly uses relatively un-informative priors for these key life-history parameters. **I recommend that the final**

review includes an additional Table which more clearly presents the model's key input parameters and associated data used as priors for these values, together with a set of figures that illustrate the posterior distributions for each parameter.

3. Other data that provide important context for assessing abundance data, or the appropriateness of different modeling frameworks.

Two particularly important data sets provide additional insights into status and extinction risk in this population. First, the review panel was presented with data showing the contraction of the Cook Inlet beluga's range over the last 3-4 decades. Even in the absence of associated abundance data, these data provide a powerful indication that the status of the population is changing, and that the increasing concentration of animals in such a small area further increases extinction risk. Second, this potential problem is exacerbated by the beluga's tendency to strand, sometimes in large groups, occasionally leading to multiple mortalities. Data on the magnitude and frequency of these stranding events confirm that they are far from rare. Together, these data illustrate that the ecology of this population of belugas has traits that are likely to result in a higher likelihood of occasional mass mortality events, whether these result from unusual changes in environmental conditions resulting from natural or anthropogenic factors. Ideally, if data permit, PVA models for this population should incorporate effects of extreme environment fluctuations that equate to catastrophic mortality events.

Evaluation and application of analytical methods and modeling (TOR 2 & 3)

The primary data underpinning the modeling exercise within this assessment are the time-series of annual abundance estimates. The most critical analyses within the review therefore relate to the methods used to extrapolate from annual survey data to assess abundance, and the way in which these have been used to assess abundance trends. The incorporation of these data into the population modeling framework are dealt with in more detail under TOR 6 below.

Two fundamental problems exist when using the aerial survey to estimate abundance. First, how do you deal with the fact that not all groups are detected? Second, how do you account both for counting errors and the fact that not all whales are at the surface when groups are encountered? **The survey program has incorporated best practice from beluga surveys in other areas, with the development of novel techniques for obtaining suitable correction factors.** Surveys have included multiple observers both to assess detection probability of different sized groups and to assess inter-observer counting errors. More recent surveys have also developed state of the art video techniques to provide more robust estimates of group size from the number of whales counted at the surface. Uniquely, this has also been validated through repeat observations of one group of whales; once when actively diving and once when stranded.

Recent improvements in the quality of video equipment mean that the survey techniques also provide data that can also be used to assess the proportion of white adults, grey sub-adults and calves in each group. The additional information available through the further development of these techniques and analyses of existing photographs offers enormous benefits to the program's ability to assess both the model's performance and to improve model-independent estimates of status. **I recommend that effort is put into using these survey data to provide additional information on population structure and, particularly, the lower-bound of female reproductive success.**

These data will be especially important for comparison with posterior values produced from the current model, which appear to be dominated by relatively high survival and low reproductive values. In time, these new data on calving rates could also be used to inform model priors.

Currently, data from the time-series of abundance estimates has primarily been used as input into the population model. However, the population model inevitably involves additional assumptions and uncertainty over model structure and input parameters. In particular, the use of such models to provide long-term predictions is open to some criticism (see below). **I therefore recommend that the status review includes one crucial and informative additional analysis; a trend analysis that gives a clear indication of whether the time-series of abundance estimates made since the cessation of harvesting are most likely to represent an increasing or decreasing population.** Based on the data in Table 2 of Hobbs & Sheldon 2007, abundance declined by >4% per annum between 1999 and 2006; a decline that was significant at the 5% level using linear regression. NMFS should determine the most appropriate method for analyzing this time series, which may instead require a weighted regression to account for inter-annual variation in the CV of the abundance estimate, or a Bayesian regression analysis that presents the relative probability of an increase or a decline in abundance. Whichever is chosen, I am convinced there is utility in including this simple measure of population status in the assessment.

Quality of the status review in relation to current knowledge of Cook Inlet and other Beluga populations (TOR 4 & 5)

The 2006 Status Review provides a useful overview of the information available on Cook Inlet belugas. However, as someone new to most of this material, I found it essential to obtain earlier publications (particularly the series of papers in Marine Fisheries Review 62(3)) to obtain a sufficiently detailed understanding of current knowledge. If the aim of the revised status review is to have a stand alone document that can provides an overview of the best available science available to support the listing, **I recommend that additional information is provided, particularly on the methodology underlying the abundance surveys and the correction factors underpinning annual abundance estimates.**

The other area where I thought additional detail could also be provided was in relation to current understanding of the extent to which other coastal cetacean populations have recovered following a reduction in hunting or by-catch. One of the issues that we discussed in the review panel was the likely timing of recovery for these perturbed populations. Other panel members highlighted parallels with the St Lawrence beluga population, and a summary of recent findings and abundance trends in that population would provide useful background for assessing the potential for recovery.

Strengths and weaknesses of the population models' representation of processes within the population? (TOR 6)

Population modelers are faced with the problem of developing mathematical models that realistically represent complex ecological processes. At the same time, there is little advantage in producing a model that is so complex that it becomes impossible to collect the biological data required to parameterize that model. Consequently, a balance is required that represents the best compromise between the likely complexity of a particular population's dynamics and the availability of suitable data. As highlighted above, there are really rather few data available from

the Cook Inlet beluga population, such that the primary datasets available for the model are the time-series of abundance estimates and harvest levels. Given this, **Hobbs' approach of using a Bayesian population model appears entirely appropriate, and can be considered best available science in this situation.**

At the same time, it must be remembered that this lack of biological data is, by necessity, constraining the complexity of the model, and this is likely to have consequences for the model's predictive power. Importantly, the paucity of data is not something that can easily be addressed by a few additional years' research and data collection. These are uncertainties that will remain, and it is therefore entirely appropriate that a key feature of the population models used in this assessment is that they can incorporate these uncertainties.

That additional complexity may result in higher extinction rates is illustrated by comparison of the Hobbs model with the model produced by Wade. Wade's model introduced additional complexity by including (I believe) more realistic Allee effects. However, whilst intuitively more realistic, it is difficult to parameterize, particularly given our lack of understanding of the population level at which Allee effects become important. Given this, Hobbs model probably provides a more appropriate basis for the assessment. However, I do think it is important to explore the consequences of incorporating age-specific survival into the model structure. In the review panel's exploration of the model's posterior values, it became clear that the model tends to select combinations of low reproductive rates and high survival rates. I suspect that this may be partly due to the constraint imposed by the lack of age-specific survival. In terms of extinction risk, I doubt that this will change the observed patterns (especially as similar patterns result from Wade's model that uses different reproduction and survival rates). However, determining whether the population's poor prospects result from poor reproduction rates or poor juvenile survival would have important implications for the development of appropriate recovery plans. Following the review panels discussion with Dr Rod Hobbs and Dr Paul Wade, **I therefore recommend that NMFS explore the sensitivity of the result to the inclusion and exclusion of age-specific survival.** As we discussed, to reduce the problem of increasing the number of parameters, juvenile survival could be represented as a percentage of adult survival. The range for this percentage value could initially be based upon a literature review comparing differences in juvenile and adult survival in other long-lived vertebrates, but the model's sensitivity to variations in this value should also be explored.

Strengths and weaknesses of using population models to estimate the extinction risk? (TOR 7)

Even in the most intensively studied of populations, the development of deterministic population models that can accurately model historic population change, let alone predict future population changes in an age-structured populations is unrealistic. Best scientific practice, as followed by NMFS, is therefore to develop stochastic models that attempt to capture uncertainty in key biological parameters. Even so, these predictive models are constrained because they are parameterized using data collected during relatively short term studies. For example, whilst we accept that field data collected over a 10-20 year period provide only uncertain estimates of key population parameters, we then predict population changes (and extinction risk) over 300 yr periods that are more than an order of magnitude longer than this. At the same time, we have extremely limited understanding of how this population's local environment may change over such long timescales. Particularly for arctic and sub-arctic marine mammal populations, best scientific opinion is that we will see major changes in ice cover and oceanographic conditions that are, in turn, likely

to influence populations of the beluga's predators and prey. The nature and extent of these changes remain impossible to predict, but change is inevitable. Despite this, NMFS estimates of extinction risk are based on the key assumption that environmental conditions remain unchanged in the future. This is a clear weakness when using such population models to estimate extinction risk. Indeed, these problems have led to much debate in the scientific literature over whether or not it is sensible to even attempt to predict extinction rates in this way. On balance, it is generally accepted that such models remain useful for comparing the magnitude of future change under different scenarios (eg. alternative management strategies or different levels of predator pressure or prey availability), but one should be extremely cautious in drawing inferences about absolute levels of extinction risk.

In my view, given that NMFS have been asked to provide an assessment of extinction risk, the models used in the status review represent best science given the extent and nature of the data available from this population. The additional modeling work by Wade 2007, whilst not totally independent of the Hobbs model, provides similar predictions despite using a different modeling approach. Again, presenting these two set of predictions to confirm that similar conclusions can be drawn from different model frameworks and computer code also represents best scientific practice.

My two caveats are as follows. First, the necessary reduction in model complexity and limited incorporation of environmental variability may underestimate levels of extinction risk. In this respect, I note that the model's predictions are consistently more optimistic than the recent observed decline in abundance suggests. As such, it appears to be conservative and this should be remembered when considering predictions. Second, as discussed above, I am uncomfortable about drawing too much inference from model predictions that extend over a 300 year time frame. Instead, **I recommend that higher profile should be given to data in Figure 6 in Hobbs & Sheldon 2007,or the posterior distribution of the annual growth multiplier**. This shows that, in the absence of Allee effects or additional killer whale mortality, there is a 78% chance that the population is declining. This is a stark statistic that does not suffer from the difficulties of projecting unrealistically into the future, yet provides strong support of the status reviews key conclusions.

Are the status review's conclusions supported by the scientific information presented? (TOR 8)

The first conclusion in the status review, that the Cook Inlet beluga population has not shown appreciable signs of recovery since 1999 when hunting restrictions were introduced, is clearly support by the scientific data. Indeed, a significant decline in the time-series of abundance estimates suggests that the situation is far worse than this.

The second conclusion is that population viability analyses indicate that even with the most optimistic scenarios, 65% of simulated populations declined and 29% were extinct within 300 years. Similar results were obtained using two different modeling frameworks. Furthermore, uncertainty over environmental change and way in which model structure has been constrained by the biological data available mean that estimates of extinction risks are likely to be optimistic. Whilst slight changes in model structure or parameterization will produce subtly different estimate of extinction risk, the general conclusion that there is a significant likelihood that the Cook Inlet beluga population will continue to decline or go extinct over the next 300 years is well supported by the scientific data. Indeed, if abundance continues to decline at the deterministic rate observed since 1999, there could be less than 10 animals in the population within another 75 years.

Finally, the review concludes that given that the Cook Inlet population is genetically distinct and exhibits strong site fidelity, it is unlikely that the area would be re-populated should the population go extinct. This conclusion is also supported by the available scientific data.

IV. Further Analyses and Evaluations - No additional analytical requests that are not previously addressed.

VI. Additional Comments - No further comments

V. Recommendations

Overall, I am satisfied that the best available science has been used in this status review, and that the reviews conclusions are supported by the scientific information presented. Suggestions for how the status review and extinction assessment could be modified to clarify this further are as follows:

1. The revised status review should explicitly discuss the potential for any bias due to a trend in survey efficiency.

2. The revised status review should include an additional Table that more clearly presents the model's key input parameters and associated data used as priors for these values, together with a set of figures that illustrate the posterior distributions for each parameter.

3. Effort should be put into using video-data from aerial surveys to provide additional information on population structure and, particularly, the lower-bound of female reproductive success.

4. The revised status review should include a trend analysis that gives a clear indication of whether the time-series of abundance estimates made since the cessation of harvesting are most likely to represent an increasing or decreasing population.

5. Additional information from papers in the Marine Fisheries Review special volume should be included in the revised status review, particularly on the methodology underlying the abundance surveys and the correction factors underpinning annual abundance estimates.

6. The population model should be adapted to incorporate different values for juvenile and adult survival.

7. The status review should focus less on extremely long-term projections, and instead place more emphasis on the posterior distribution of the annual growth multiplier, or the percentage of simulations showing declines over shorter (eg. <100yrs) time-frames.

VI. Reviewer Statement

The contents of this Independent Peer Review Report provide an accurate and complete independent summary of my views on the issues covered in the documents provided to me, and in discussion during the review panel meeting.

28th Nov 2007

Appendix I: Background documents

1. Status Review and Extinction Assessment of Cook Inlet Belugas, November 2006.
2. Revised and updated model result tables of the existing model in the status review by Dr. Rod Hobbs including the abundance estimate for 2006
3. Report on an alternative model by Dr. Paul Wade

Appendix II: Statement of Work

Consulting Agreement between NTVI and Peter Olesiuk

October 17, 2007

Statement of Work

Overview

The National Marine Mammal Laboratory (NMML) of the Alaska Fisheries Science Center (AFSC) requires an independent review of scientific documents, analysis, and the resulting conclusions which support the proposed listing of the Cook Inlet beluga (CIB) as endangered under the Endangered Species Act. Specifically, a review of the background biological data, population data, model structure and assumptions and the analysis methods applied to the extinction risk assessment and the conclusions resulting from that assessment. A revised and updated status review will be published in February 2008 as an AFSC processed report. This revised status review will address scientific issues raised during the public comment period (that closed on August 3, 2007) and update the November 2006 report, Status Review and Extinction Assessment of Cook Inlet Belugas, to account for scientific data and other information that has become available in the interim including abundance estimates from 2006 and 2007. The recommendations from the peer review, including updated and auxiliary analysis, will be addressed in the final revisions prior to publication of the status review in February 2008.

The requested peer review will be conducted by four appointed reviewers from the Center for Independent Experts (CIE), one of which will be selected as the CIE chair for the panel review meeting. The panel will convene at the NMML in Seattle, Washington during November 13-16, 2007 to review the extinction risk assessment for CIB according to the Terms of Reference specified herein. Each reviewer will be provided with the report on Status Review and Extinction Assessment of Cook Inlet Belugas and other documents for review prior to the panel review meeting scheduled in Seattle during November 13-16, 2007. The three independent CIE reviewers and CIE chair will participate during the panel review meeting and provide their peer review reports as stated in the Terms of Reference and Schedule specified herein. The CIE reviewer's primary responsibility is to determine whether the best available science has been utilized, and to provide recommendations for improving the science for the Status Review and Extinction Assessment of Cook Inlet Belugas.

CIE Reviewer Responsibilities

The CIE's deliverables shall be provided according to the schedule of milestones listed below in this statement of work. Three CIE reviewers shall review and provide an independent peer review each, and the CIE chairperson will provide a summary report. CIE reviewers will review material provided before the panel review meeting, attend the panel review meeting, and prepare final reports according to the scheduled outlined below. The three independent CIE peer review reports

and the CIE chair's summary report shall be an accurate representation of the discussions, conclusions and recommendations from the review process.

The three independent CIE reviewers' duties shall occupy a maximum of 14 days per person (i.e., several days prior to the meeting for document review; travel and participation at the panel review meeting in Seattle; and preparation of their review reports after the meeting according to the schedule specified below in this statement of work). The CIE chair's duties shall occupy a maximum of 16 days (i.e., the same schedule as above with the addition of two days to finalize the summary report).

Pre-meeting Documents for CIE Peer Review

The CIE review panel, consisting of three independent CIE reviewers and one CIE chair, shall conduct a peer-review of the following three manuscripts:

4. Status Review and Extinction Assessment of Cook Inlet Belugas, November 2006.
5. Revised and updated model result tables of the existing model in the status review by Dr. Rod Hobbs including the abundance estimate for 2006, available by October 30, 2007.
6. Report on an alternative model by Dr. Paul Wade, available October 30, 2007.

The CIE reviewers are not responsible for any of the above mentioned reports that are distributed to them later than November 2, 2007.

NMML Contact person for pre-meeting review material:
Dr. Roderick Hobbs, email: Rod.Hobbs@noaa.gov, telephone: (206) 526-6278

Terms of Reference for CIE Peer Review

The CIE reviewers shall conduct a peer review of the pre-meeting documents specified above, participate during the panel review meeting, and complete their CIE reports according to the Terms of Reference as stated below:

1. Evaluate whether the adequacy, appropriateness, and application of data used in the assessment represents the best available science.
2. Evaluate whether the adequacy, appropriateness, and application of analytical methods and modeling represents the best available science.
3. Do the biological data, population data, model structure and assumptions, and the analysis methods applied to the extinction risk assessment represent the best available data and methodology for sound science?
4. Does the status review provide an adequate assessment of the current knowledge regarding the biology of belugas in general and the Cook Inlet beluga population in particular? Comment on the strengths and weakness of the status review in regard to this question.

5. Do the population models adequately represent the processes within the population? Comment on the strengths and weakness of the models in regard to this question.
6. Are the analysis methods valid and sufficient to estimate the extinction risk? Comment on the strengths and weakness of the analysis methods in regard to this question.
7. Are the conclusions of the status review supported by the scientific information presented?

The CIE panel should evaluate and indicate as to whether the presented models, analysis, and conclusions are the best available science at this time. The CIE reviewers shall not provide specific management advice. If the panel rejects the models or any components, analysis, results or conclusions, the panel should explain the rejection and provide recommendations for suitable alternatives. According to the schedule outlined below, three CIE reviewers shall submit independent peer review reports and the fourth CIE reviewer acting as Chair during the panel review meeting shall submit a peer review summary report.

Review Panel Meeting Supplementary Instructions for CIE Reviewers

(1) Prior to the meeting

CIE reviewers shall review the three documents (specified above) and any other supporting documents, background documents or reference documents provided before November 2, 2007. It is permissible to request additional information if it is needed to clarify or provide further background.

(2) During the panel meeting

The CIE reviewers shall participate during the panel review meeting and conduct their peer review according to the above Terms of Reference. Three of the CIE reviewers shall provide independent peer reviews, while the fourth CIE reviewer appointed as Chair for the panel review meeting shall provide a peer review summary report. The CIE Chair's duties shall include guidance of the meeting, coordination of presentations and discussion, and facilitation of discussions making sure each Term of Reference is addressed. It is permissible to request additional materials from the authors, if it is deemed necessary to accomplish the goals of the peer review.

The CIE panel, lead by the CIE chair, will then work through the documents provided and discuss the comments of each reviewer and the points in the documents to complete the review. It is anticipated that the peer review can be completed during the three day panel review meeting, providing the fourth day to complete the draft reports.

(3) After the Panel Review meeting

After the panel meeting, the CIE independent reviewers are responsible for completing their independent peer-review reports with submission of the reports to the CIE program manager according to the schedule specified in the following table. The draft CIE reports will be sent to the CIE Chair who will compile a concise summary report for submission to CIE according the schedule specified below. The CIE reports shall be reviewed by the CIE Steering Committee

and forwarded to the COTR at the NMFS Office of Science and Technology for approval according to the schedule specified below.

Schedule

The milestones and schedule are summarized in the table below.

Milestone	**Date**
Pre-meeting documents provided to CIE reviewers no later than	November 2, 2007
CIE reviewers participate during panel review meeting in Seattle WA	November 13-16
CIE independent peer review reports provided to CIE and Chair	November 30
CIE Chair's summary report provided to CIE	December 12
Final CIE reports provided to COTR	December 21
Final CIE reports approved and distributed by COTR to NMML	January 4, 2008

Upon approval of final CIE independent peer-review reports by the COTR, the reports will be distributed to the NMML. The NMML will utilize the reports for updating the revised status review as part of the document package presented for the evaluation of the proposed listing of the CIB as endangered under the ESA.

Submission and Acceptance of CIE Reports

According to the schedule and deadline outline above, the CIE shall provide via e-mail the final CIE independent peer review reports and the CIE chair's summary report to the COTR William Michaels (William.Michaels@noaa.gov) at NOAA Fisheries. The COTR and alternate COTR Dr. Stephen K. Brown (Stephen.K.Brown@noaa.gov) will review the CIE reports to determine that the Terms of Reference are met, notify the CIE program manager via e-mail regarding acceptance of the reports, and then distribute the reports to the NMML contact person.

Review of Extinction Risk Assessment for Cook Inlet Beluga
Tentative Agenda (Seattle, WA, 13-16 November 2007):

Tuesday November 13

9:00 Introductions, Review Terms of Reference Coordinator, R. Hobbs

Break

10:30 -12:00 Closed session Panel discussions CIE Chair

12:00-13:30 Lunch

13:30-15:00 Hobbs presentation and Q&A session on PVA model CIE Chair.

Break

15:30-17:30 Further discussion on PVA model CIE Chair

Wednesday November 14

9:00-10:30 Wade presentation and Q&A session on Alternative model CIE Chair.

Break

11:00 -12:00 Further discussion on Alternative Model CIE Chair

12:00-13:30 Lunch

13:30-17:30 Other requested presentation and Q&A session CIE Chair

Break as needed

Thursday November 15

9:00-17:30 Summary discussions or Closed session at discretion of panel. CIE Chair
Report preparation. Break as needed

Friday November 16

9:00-17:30 Report preparation at discretion of panel. Break as needed CIE Chair

ANNEX 1:

Contents of CIE Independent Peer Review Reports

I. Executive Summary

An abstract of the independent peer review report.

II. Terms of Reference

List each Term of Reference, and include a clear statement indicating whether or not the criteria in each element of the Terms of Reference are satisfied.

III. Peer Review Findings

Independent peer review findings for each criteria of the Terms of Reference, including recommendations for improvement.

IV. Further Analyses and Evaluations

Analytical requests not previously addressed in TOR discussion above.

VI. Additional Comments

Provide a summary of any additional discussions not captured in the Terms of Reference statements.

V. Recommendations

Provide an independent statement as to whether the best available science was utilized in regard to each of the Term of Reference criteria, including suggestions to improve the Status Review and Extinction Assessment of Cook Inlet Belugas.

VI. Reviewer Statements

Each individual reviewer should provide a statement attesting whether or not the contents of the Independent Peer Review Report provide an accurate and complete independent summary of their views on the issues covered in the review. Reviewers may also make any additional individual comments or suggestions desired.

ANNEX 2:

Contents of CIE Chair's Summary Peer Review Report

I. Executive Summary

An abstract of the summary peer review report.

II. Terms of Reference

List each Term of Reference, and include a concise summary from the panel review discussions and independent CIE reports indicating whether or not the criteria in each element of the Term of Reference are satisfied.

III. Peer Review Findings

Concise summary of *peer review findings from the panel review discussions and independent CIE summary reports for each criteria of the Term of Reference, including recommendations for improvement.*

IV.. Further Analyses and Evaluations

Summary of a*nalytical requests not previously addressed in TOR discussion above.*

IV. Additional Comments

Provide a summary of any additional discussions not captured in the Terms of Reference statements.

V. Recommendations

Provide a summary statement as to whether the best available science was utilized in regard to each of the Term of Reference criteria, including suggestions to improve the Status Review and Extinction Assessment of Cook Inlet Belugas.

VI. Reviewer Statements

Provide *a statement attesting whether or not the contents of the Summary Peer Review Report provide an accurate and concise summary of the panel review discussions and independent reviewer's reviews on the issues covered in the review. Reviewer may also make any additional individual comments or suggestions desired.*