Peer Review Report: Data Considered in the Draft RIR/ 4(b)(2) Preparatory Assessment/RFA of Critical Habitat Designation for the Arctic Ringed Seal

Introduction

On December 9, 2014, the National Marine Fisheries Service (NMFS) published a corrected proposed rule to designate critical habitat for the Arctic ringed seal and opened a 90-day public comment period on the proposal (79 FR 73010; December 9, 2014). Subsequently, on February 2, 2015, NMFS extended the public comment period through March 30, 2015 (80 FR 5498). During the comment period on the proposed designation, NMFS requested review of the data considered in the draft *Regulatory Impact Review (RIR)/ 4(b)(2) Preparatory Assessment/ Initial Regulatory Flexibility Act (IRFA)* report that supports the proposed designation by the following three independent peer reviewers with expertise in natural resource economics:

- Christopher Anderson, Ph.D., University of Washington;
- Richard Johnston, Ph.D., Oregon State University (retired); and
- David Kling, Ph.D., Oregon State University.

The reviewers were specifically asked to provide comments on the following topics:

1. The quality, thoroughness, and relevance of the data; particularly if any are any additional relevant data available that were not considered, but should be.
2. Whether the data are accurately presented.
3. Whether uncertainties in the data are adequately identified and characterized.

Responses submitted by each reviewer are included in the following section (in random order), with each reviewer identified by a number. Responses to substantive peer review comments and public comments will be provided in the final rule to designate Arctic ringed seal critical habitat, which will be published in the *Federal Register*.

Peer Review Responses

<u>Reviewer 1:</u>

I found the report to be well-written and, for the most part, clear. (I have made some minor editorial suggestions below. I hope they are helpful.) The analysis informs the reader of the scope and requirements of the report, especially as they pertain to discussing the costs and benefits of critical habitat designation of the Arctic ringed seal. They make it clear throughout that only those incremental costs and benefits attributable to CHD can be considered.

My responses to the specific review questions are:

1. Data: quality, thoroughness and relevance. The data presented and used seem appropriate. I know of no relevant data that were not considered except for those that are more current.
2. Data accurately presented? The data are accurately presented, to the best of my knowledge.
3. Uncertainties in the data? In many cases, relevant costs and benefits cannot be quantified; in some cases this is due to uncertainty. The authors go to great length to identify and discuss the uncertainties and other factors that limit quantification (such as non-market goods). The reader is left with an appreciation of the nature of those costs and benefits and can infer something about magnitude from the discussions.

Below are some comments for use by the authors. They are primarily editorial in nature and are offered for the authors' consideration. Thank you, again.

General Comments

- Perhaps an Executive Summary?
- Much of the information given, including some data, is dated. Maybe give a sense of when the various sections of the report were written? Indicating where the reader can find updated information is helpful (e.g., BOEM website re Table 5-14 data).
- Has the critical habitat already been degraded? One could interpret the discussion in subsection 6.5.2 p. 6-5, to suggest that it has, so that CHD will generate benefits (e.g., to subsistence communities) beyond what already exist. Am I correct here? If so, possibly mention this at the outset?
- Some references are cited in footnotes; others, in the reference list at the end. Maybe place all in the reference list?

1. Introduction

1.1, p. 1-1. In my judgment it is both appropriate and important to introduce this report by stressing the role of climate change in the future of the seal's sea ice habitat, as you have done. To the extent that climate change results from human actions, perhaps future analyses will be capable of estimating the relationships among critical habitats, climate change, and specific human activities. You make this point in 2.4.2

Figure 1-1, p. 1-7. Would it be possible to describe in general terms the various blue areas of the map? I think that would help understanding of your later discussion, especially in Chapter 5, of offshore drilling and OCS.

1.5, p. 1-5. The "with versus without" CHD approach seems appropriate.

2. Methodology and Framework for Analysis

2.2, p. 2-2, line 5. "…measure costs and benefits…to the extent a Federal Nexus exists…" It might be helpful to present either here or earlier in the document, perhaps in a footnote, the following (stolen from the NOAA Document "Arctic Ringed Seals Questions and Answers."): *A critical habitat designation does not set up a refuge or sanctuary for the species, and has no specific regulatory impact on activities that do not require a permit, funding, or other action from a federal agency.* (emphasis added).

2.2, beginning on p. 2-1. I think introducing the reader to the cost-benefit approach is helpful here. However, I wonder if it would assist the discussion by distinguishing a bit more clearly between costs and benefits associated with market goods and services and those associated with non-market goods and services. I assume the "opportunity costs" of economic efficiency are those that are measurable through use of market prices (or demand and supply curves that can be measured by market-determined parameters). Welfare gains, on the other hand, measure the sum of market-determined net benefit measures and changes in consumer and producer surpluses associated with "non-market" goods. Am I correct? If so, perhaps you could tweak the discussion a bit?

2.2, p.2-2, paragraph beginning, "This analysis.…" In the last sentence of this paragraph you speak of "economic efficiency measures (i.e., consumer and producer surpluses)…" Since you have defined economic efficiency measures to be "opportunity costs" do you need to insert "reductions in" or "changes in" between " i.e." and "consumer"?

You use "net benefits" at various points of the document. In this section they seem to be the difference between "welfare gains" and "economic efficiency costs" - am I right? But on p. 4-5 you speak of "net benefits (consumer surplus)," suggesting it is purely consumer demand related. It may help to express the relationships among the various measures in equation form, where possible.

2.4.1 You speak of project modifications. Could you define and/or give an example of a project in this context?

2.5, p. 2-9, second sentence. Need to revise in view of the changes in dates? In that paragraph you also say the 10-year interval is "…widely employed in the policy analysis arena…" Perhaps support this with examples?

3. Types of Economic Costs….

3.1.1, p. 3-2. For Table 3-1, instead of "Example Range" in the heading, perhaps use just "Examples" and, then, in a footnote to the table point out, as in the text, that figures in the table are the midpoints of estimated cost ranges? Perhaps even give the ranges themselves? I assume "third party" costs are those incurred by a private organization? Perhaps explain briefly why their costs differ from their NMFS and Federal Agency counterparts?

Maybe end – or begin – Section 3 with the observation that, except for those associated with consultation, the costs outlined in this section – especially project modification and indirect costs - are difficult to measure and involve much uncertainty. Furthermore, as reported in Section 6, NMFS does not expect that CHD will result in more project modification costs beyond those required due to the threatened status of the species. For these reasons, no estimates of these costs were provided, although this does not necessarily mean they are small.

4. Types of Economic Benefits…

4.1, p. 4-2, line just below Figure 4-1. Am I correct in assuming that dividing economic benefits into "consumptive" and "nonconsumptive" uses would be an alternative to the structure of Fig. 4-1? Or would it involve additions to that figure? If the latter, maybe make the additions?

4.2.1.1, first para., p. 4-3. Economic analysis of the costs of the Exxon-Valdez oil spill led to estimates of the (direct use) value of subsistence harvest, ranging from $4 to $280 (per pound?). The discussion indicates that a "replacement cost" method was used for some of the estimates. I am unfamiliar with that approach but wonder how "replacements" were selected. Are they determined by market prices of "substitute" products? Are there substitutes on the market for an animal, like the seal, that provides such a variety of use and nonuse benefits to the subsistence community?

4.2.1.1 and 4.2.1.2, beginning p. 4-3. Are there benefits to the Nation from the knowledge that subsistence communities exist in Alaska? Indeed one could argue that, in the absence of CHD, Alaska's indigenous people could become "threatened." To the extent that CHD would increase the likelihood of the continuing survival of those communities, should those benefits be mentioned?

4.2.2, p. 4-7, line 5. Perhaps define "public good?"

5. Contextual Information

Perhaps begin this section with something like "What are the geographical areas and human activities that may affect or be affected by the proposed CHD?"

5.2.1, p. 5-4, paragraph just below Table 5-2, line 4. Check the 42% figure?

5.2.5, p. 5-11, Figure 5-2. Label the vertical axis?

5.2.5, starting on p. 5-12, Tables 5-7 to 5-11. In what units are the "Compensation of Employees Received" figures (col. 5) expressed? If in thousands of dollars, they seem high relative to the per capita income figures in Table 5-5. Also, that column contains quite a few "0" entries. Does that mean the individuals received no compensation? Maybe mention that the "totals" figures are the sums of the available figures and that actual totals could be higher?

5.3.1.2, p. 5-22. Delete "to" from first line of third paragraph?

5.3.1.3, p. 5-25. Have any international discussions taken place? Could the results affect or be affected by Arctic Ringed Seal CHD?

5.3.1.5, p. 5-27, Fig. 5-5. Does the EFH area pertain mostly or exclusively to Opilio Arctic Crab?

5.4.1, p.5-34, second para. from the top. Aren't plans for a natural gas pipeline, with a gas treatment plant at Prudhoe Bay, pretty far along (see http://www.arcticgas.gov/alaska-lng-project)?

5.4.1.1, p. 5-35, Fig. 5-7. The "leasing consideration" area in this map extends Northward beyond the CH in the Chukchi and Beaufort seas. But doesn't CH reach to the northern limit of the US EEZ?

5.4.1.1, pp. 5-37 and 38. You point out that net benefits from production of oil and gas take environmental costs into consideration and you provide BOEM estimates of net benefit ranges for the Beaufort and Chukchi seas. Do these figures pertain to the entire 2012-2017 period or are they annual? How are the environmental costs determined? If there is a spill that impacts critical habitat and reduces net benefits from seal-watching, etc. are those reflected in the calculations of net benefits from drilling? Of course at this point there is uncertainty about the likelihood of a spill or other environmental disaster, but there are probabilistic estimates around (see estimates given on p. 73017 of the Federal Register "proposed rules" document). Perhaps mention again that, to the oil and gas industry, there are associated costs, some of which may not have been incurred in the absence of CHD? Consultations may be costly. However, as you point out in subsection 9.1.1, third paragraph (pages 9-1 and 9-2), if they head off behavior that would result in losses to industry through oil spills, etc. (due to both CH degradation and loss of marketable oil) they generate benefits to both industry and the consumers of the "services" of the Arctic Ringed Seal.

5.4.1.3, p. 5-44. Ice-breaking activities are mentioned in the cases of explorations for oil, expanded shipping and commercial transportation due to global warming, and the military. Yet only one consultation, under Military, is identified in Table 5-19. Perhaps ice-breaking activities associated with oil exploration, etc. will be treated in the one consultation? I realize many of the activities identified may not occur over the 10-year period but won't there be some discussion of the issue and possible Federal regulations during that period?

5.4.3, p. 5-50 and 5-51. Are no consultations expected with respect to the proposed deep draft ports or is that accounted for in the discussion of Nome Harbor in Table 5-19?

5.4.4.1, p. 5-52, top line: replace "transferal" with "transferable"?

5.5, p. 5-69. I found the discussions of Section 5.4 to be interesting and helpful but would have appreciated a summary statement at the end of each subsection (5.4.1 to 5.4.10) explaining what you found there regarding costs and benefits associated with CHD, even where there were none. On the other hand, in a sense, that is the role of Section 6. You may want to point that out at the end or beginning of this section.

Actually, you also did that, especially with respect to consultation costs in Table 5-19 and, in the case of natural gas and transportation, reported under Consultations and Modifications that "none(is) anticipated over 10 year period." Could that be done for subsections 6, 9, and 10 so that the reader will better understand why they are included in this report but involve no consultations?

5.5, Table 5-19, p. 5-71. Identify the "Economic and Social Activity" for last row in that part of the table?

6. Costs and Benefits…

Footnote 213, p. 6-1. It might be helpful to remind the reader once more of the following (stolen from the NOAA Document "Arctic Ringed Seals Questions and Answers."): *A critical habitat designation does not set up a refuge or sanctuary for the species, and has no specific regulatory impact on activities that do not require a permit, funding, or other action from a federal agency.*

6.1.1, p. 6-3. The first sentence of paragraph 3 is unclear.

6.11, footnote 221, p. 6-9. Do you mean to refer to Table 5-19, not 5-18? Also, I think it would be helpful to show the actual numbers that were used to generate the figures in Table 6.1. This is, after all, a summary of the only quantifiable costs.

7. Expected Net Benefit….

Would it be correct/appropriate to point out that, while the benefits from CHD accrue forever, potentially, because of the *renewable* nature of the seal and fish resources, the costs, though they may be incurred over time, pertain primarily to *exhaustible* resources (fossil fuels) and, in the case of at least one oil field, are already showing signs of exhaustion? If so, I think this strengthens the argument that the present value of benefits exceeds the present value of costs.

<u>Reviewer 2:</u>

This document presents my review of (Cardno ENTRIX 2014) (*hereinafter* CE). I was instructed to comment on […]: 1) [t]he quality, thoroughness, and relevance of data […]; 2) [w]hether the data are accurately presented; and 3) [w]hether uncertainties in the data are adequately identified and characterized." In my review of item #1, I was also asked to provide comments as to whether there are any additional relevant data available that are not considered in the report, but should be.

I address these three items below. Note that I do not consider myself to be an expert on the study area or the majority of the individual economic and social activities identified by CE (e.g., Section 5.4: oil production, commercial fishing, subsistence harvest, etc.). As such, in most cases my review approaches items #1-#3 with a focus on general considerations surrounding the conduct and presentation of an economic impact assessment.

1. Quality, thoroughness, and relevance of the data

Overall, the data considered by CE appears to be of high quality. Conditional on the report objectives (10 year time horizon, and focus on incremental effects of arctic ringed critical habitat designation (CHD)), the assembled data is to the best of my current knowledge thorough, for the most part. Objective #3 of the report is to "[d]etermine the incremental economic and other relevant impacts of the proposed CHD relative to the baseline without CHD" (CE 2014, p. 1-3). CE acknowledges that "the benefits of CHD are likely to be primarily those associated with education/outreach, subsistence, and nonuse/passive-use value" (9-2). Taken together, this would seem to suggest that quantifying nonuse and passive-use values (non-market benefits) of CHD using nonmarket valuation methods should be a primary contribution of this report. Original survey work is apparently beyond the scope of the report. The authors also state that they were unable to find any pre-existing studies valuing habitat protection in their study area. For reasons that are not satisfactorily explained, they are also unwilling to explore using benefit transfer methods to apply habitat protection values from other contexts to CHD (Rosenberger and Loomis 2003). Because CE fail to explore this option, or provide a convincing rationale for why it is not feasible, their assessment of non-market benefits of CHD is not as thorough as it could be in principle, even if it is allowed that original survey work for the report is not feasible.

Also, I found their review of the literature related to potential non-market benefits of CHD to be underdeveloped. CHD is a policy that defines the boundary of protected habitat for the arctic ringed seal, a species that may provide the public with non-consumptive benefits. The majority of the studies that CE cite in Section 4.3 appear to estimate willingness-to-pay (WTP) to protect one or more species (e.g., a unit of population increase). I was expecting CE's literature review to focus on studies that estimate WTP specifically for habitat. Also, to the extent that CE focus on WTP for population status, they neglected several recent and highly-relevant studies. Here are a couple of key papers CE should probably acknowledge (this small sample is not exhaustive):

- Lew, Daniel K., David F. Layton, and Robert D. Rowe. 2010. "Valuing enhancements to endangered species protection under alternative baseline futures: the case of the Steller sea lion." *Marine Resource Economics* no. 25 (2):133-154.
- Wallmo, Kristy, and Daniel K. Lew. 2011. "Valuing improvements to threatened and endangered marine species: an application of stated preference choice experiments." *Journal of Environmental Management* no. 92 (7):1793-1801.

If benefit transfer analysis is off the table for this report, I think CE's assessment would be strengthened by a more expansive and more current review of the relevant non-market valuation literature, particularly as it relates to protection of habitat itself.

2. Data Presentation

I found CE's presentation of the data to be mostly clear. A minor comment I have is that in some cases too much information is provided, often to the point where it comes across as filler that is

only weakly related to Section 6 of the report. For example, although the details provided in Section 5.2 are interesting, it seems like CE could slim this part of the text down to the data and discussion that is essential for their primary goal of quantifying economic impacts of CHD. Also, the ubiquitous maps included in the report are not appropriately formatted for their purpose. They are often unnecessary and tend to include too much information (e.g., topography).

3. Identification and characterization of uncertainties

Overall CE do an adequate job in the text of discussing uncertainty around the costs they do quantify (and benefits they do no – see above) over the time frame they consider. Evaluating the costs of a permanent policy over a relatively short time frame allows them to avoid addressing many of the uncertain factors that could influence the welfare effects of CHD (e.g., climate change). It is not clear to me whether doing so would result in an economically-significant change to their results, but I do think that more could be done to account for uncertainty quantitatively. For example, rather than maintaining a single set of assumptions, they could introduce plausible "low" and "high" cost scenarios, and present these alongside results for their preferred set of assumptions in Table 6-1 (p. 6-9). Again, I think it is unlikely that variation across these three plausible scenarios given the parameters of the assessment would be very large. On the other hand, it would provide a transparent way of characterizing the range of uncertain costs.

References

Cardno ENTRIX. 2014. Draft RIR/4(b)(2) Preparatory Assessment/IRFA of Critical Habitat Designation for the Arctic Ringed Seal.

Rosenberger, Randall S., and John B. Loomis. 2003. "Benefit transfer." In *A Primer on Nonmarket Valuation*, edited by Patricia A. Champ, Kevin J. Boyle and Thomas C. Brown, 445-482. Springer Netherlands.

<u>Reviewer 3:</u>

This letter is in response to your office's request that I provide an independent peer review of the draft economic report (RIR/PA/IRFA) on the proposed rule of critical habitat designation (CHD) for the Arctic ringed seal in the northern Bering, Beaufort and Chukchi seas.

The report concludes that likely costs from CHD are small, with a present value of about $1.5 million depending on the discount rate, and arise entirely from private and government costs associated with engaging in Section 7 consultations, predominantly by the oil industry. The cost projections are carefully reasoned and accounted based on the experience with consultation rates by the various affected industries in prior CHD actions in the same area; no changes in the cost of any activity are anticipated. Sources of benefits are described, and it is broadly argued that it is likely that benefits of knowledge and coordination gained through consultations will exceed

the minimal costs. I find this plausible, if not convincing: the data available to apply within a structured analysis are minimal, so this conclusion must be viewed as based on the opinions of experienced experts rather than on an analysis using the methods of economic science.

Two key factors contribute to why projected costs and benefits are so small, and they are important to understanding this report. First, the action being considered is the *new* Arctic ringed seal CHD. Economists ascribe to an action only costs and benefits generated *beyond the status quo*. In this case, actions affecting ringed seals and their habitat are already governed by the MMPA, and the ESA already requires consultation and changes in behavior required by the jeopardy standard for Arctic ringed seals, and for critical habitat of several other ESA-listed species within the proposed CHD region. Second, this analysis considers only costs and benefits that may accrue in the next ten years. Because the ESA listing of the Arctic ringed seal was based on long-term climatic threats, a relatively small amount of change will occur before 2023, and thus there is limited opportunity for any effects of the CHD to manifest and benefit seal populations. The analysis is admirably fastidious about maintaining the appropriate counterfactual and adhering to the state timeline for impacts.

The data used to assess the costs of CHD are relevant and of the best quality that I know to exist. The report predicts that CHD is unlikely to lead to any changes in behavior, or at least costly changes in behavior (page 4-1). This is a surprising argument, as economists conceptualize regulations as imposing costs, because firms and agencies choose the least-cost ways to do things, and thus any regulation that results in a behavior change must lead to more costly practices. However, the benefits identified here are primarily knowledge (which may increase the likelihood of requiring costly behavior change beyond the ten-year horizon), and immediate behavior change is not necessary to generate knowledge benefits. The frequency of Section 7 consultations, especially formal ones, is well tracked, and thus I expect them to accurately reflect consultations on similar CHD actions. It is credibly argued that this is the best basis for the extent of consultations to expect from the Arctic ringed seal CHD.

The data available for assessing benefits is much scarcer, because the limited scope of impact of CHD over the next ten years. Since no changes in behavior or impacts on Arctic ringed seals populations are anticipated before 2023, the benefits identified will be from current increases in utility from habitat protection *per se*, and having more knowledge such that we might be better positioned to limit the impact of Arctic ringed seal habitat degradation that will happen beyond the ten-year timeframe. The analysis summarizes these as “enhanced education, scientific knowledge, and intrinsic non-use benefits associated with habitat protection” (page 7-1). The expectation is that this knowledge will lead to behaviorally consequential actions after 2023, but the analysts are careful not to ascribe the net present value of those changes to values actually arising within the ten-year horizon. Benefits of these distant future actions might include enhanced existence value from healthier populations of Arctic ringed seals, and surplus from

activities that we then-know to not threaten Arctic ringed seal populations but would curtail in the current state of knowledge out of precaution. Valuation studies (nonmarket or otherwise) do not generally value such knowledge in isolation, focusing instead on estimating the present value of impacts of the actions themselves. Therefore, there is minimal scientific information on which to base an estimate of these "state of knowledge" benefits, leaving expert assessment as the best available source of information (as distinct from data) about likely benefits.

The data used as a basis for cost estimation are clearly presented, and easily understood through Table 8.1. I expect stakeholders will find it easy to identify whether their industry's projected cost is consistent with their internal assessment, and thus they will be able to provide targeted public comment. The benefit assessment is not so transparent, because the absence of data means any quantification of benefits, and thus any decomposition of those by industry, would be speculative. While Section 6 of the analysis explains to which sectors substantive benefits might accrue (i.e., commercial fisheries; subsistence users; other protected species; educational, scientific and non-consumptive use), the critical—and not necessarily obvious—conclusion that this might amount to more than the projected costs is presented in just one sentence at the end of a paragraph in the following section: "NMFS is of the opinion that the proposed Arctic ringed seal CHD can be expected to result in a net benefit to the Nation." (page 7-1)

The analysis is clear about uncertainty arising from specific gaps in its cost data, and it is clear to the reader that the primary cost estimates are based on past experience with similar CHD actions; these numbers could be different for Arctic ringed seals. The analysis is also clear that particular types of costs, such as third-party litigation, are excluded from the analysis due to uncertainty. However, it is not clear whether costs are too uncertain (surely there information about expenditures on such litigation over similar CHD), or the probability of such litigation is unknown so that it is difficult to calculate an expected value to integrate into the analysis.

Benefits are characterized as uncertain implicitly, by not being quantified. It would be additionally helpful to have this cost- and benefit-specific uncertainty discussion extended to uncertainty about the ratio of costs and benefits, since the ratio is the basis for the conclusion. This is particularly important because the level of likely costs is small, relative to the uncertainty. The analysis implies the possibility that there are no consultations and thus no (nonadministrative) costs (or benefits). At the other extreme, it is acknowledged that uncertain costs—treated as zero here—such as litigation may arise. If litigation arose, would its cost far exceed the estimate of likely costs presented, and if so, swamp likely benefits? Even if likely benefits exceed likely costs, how likely is it (even qualitatively) that realized benefits exceed realized costs?

Overall, I find this analysis to be well and carefully done, albeit with very limited data. It conveys the impression that this is an action of very modest consequence, whose ultimate effect

will be dominated by scientific, economic, natural and regulatory uncertainty that cannot be effectively quantified. Not quantifying or ascribing benefits puts a skeptical reader in the difficult position of having no supporting analysis of the concluding claim against which to engage in constructive disagreement by offering additional information, alternative methods, or reinterpretation of the same information. While there are no simple ways to improve the precision of the analysis, the document highlights accurately who is likely to be affected and that a cost-benefit basis for the policy decision will likely rest on the acceptability of designating critical habitat, only to have eventual realized costs to exceed realized benefits.