Designation of Critical Habitat for the Beringia Distinct Population Segment of the Bearded Seal: Critical Habitat Evaluation

Peer Reviewer Comments

On January 8, 2021, the National Marine Fisheries Service (NMFS) published a proposed rule to designate critical habitat for the Beringia distinct population segment (DPS) of the Pacific bearded seal subspecies (*Erignathus barbatus nauticus*) under the Endangered Species Act (ESA) (86 FR 1433; corrected at 86 FR 7242). During the comment period on the revised proposed designation, the evaluation of critical habitat set out in the preamble of the revised proposed rule (specifically, sections titled "Background" through "Unoccupied Areas") was reviewed by four peer reviewers: Charmain Hamilton, Brendan Kelly, Lori Quakenbush, and David Yurkowski.

The peer reviewers were asked to review the evaluation of available data on habitat uses and needs of Beringia DPS bearded seals and the use and interpretation of this information in making conclusions regarding what areas meet the definition of critical habitat under the ESA, and to provide comments on the following topics:

1. The accuracy, completeness, and relevance of the scientific information considered; particularly whether there is any relevant information available that was not considered.
2. Whether scientific uncertainties are adequately identified and characterized.
3. Whether the document provides a well-reasoned rationale for the proposed critical habitat based on the best scientific information available.

Comments received from the peer reviewers are compiled below. These comments are not presented in the order of reviewers listed above.

Reviewer 1:

I have reviewed the evaluation in the proposed rule to designate critical habitat for the Beringia distinct population segment of the bearded seal under the Endangered Species Act. Evaluating critical habitat needs for this species is especially daunting given the many gaps in our knowledge of the species biology and the rapid and unprecedented change in the habitat. Nonetheless, I found the evaluation accurate, complete, and based on the best available information. The scientific uncertainties were clearly described, and the case for the proposed critical habitat was well reasoned and clearly presented. More details of my assessment follow.

Accuracy, completeness, and relevance of the science

Scientific knowledge of bearded seal biology is substantially less than for species inhabiting more accessible environments, but NOAA has mostly considered and appropriately applied the scientific knowledge that is available. In several places, the evaluation underscores data gaps and requests additional information from other sources. Better use could have been made of Indigenous Knowledge despite its dispersed nature and the challenges of accessing it. Hopefully, Indigenous experts will be able to share their knowledge to fill in some of the gaps.

The description of bearded seal natural history and biology reflects the scientific literature well, although the interpretation of the significance for critical habitat determination is strained in some places. For example, under "General Seasonal Distribution and Habitat Use," observations of bearded seals remaining at sea for prolonged periods during the ice-free season is interpreted as "evidence that bearded seals might not **require** the presence of sea ice for hauling out other than during the critical life history periods related to reproduction and molting" (emphasis added). An alternative interpretation may be more plausible and, at least, deserves consideration. Prolonged periods without resting out of water might reflect seals forced by habitat loss to remain at sea. Observing such bouts does not tell us the fitness consequences and, hence, what the seals "require." It is a feature of habitat loss that species occupy suboptimal habitats but most often with reductions in survival and/or reproduction. The logical flaws seem to be (1) equating the observation of a behavior with what the species requires (more appropriately measured in terms of reproductive fitness) as well as (2) not considering the degraded habitat in which the behavior was observed.

Under "Specific Areas Containing the Essential Features," NOAA correctly points out—although without attribution—that variability in the extent and timing of sea ice cover is expected to increase as the climate warms. A good reference for that prediction is *Kay, J. E., M. M. Holland, and A. Jahn (2011), Inter-annual to multi-decadal Arctic sea ice extent trends in a warming world, Geophys. Res. Lett., 38, L15708, doi:10.1029/ 2011GL048008*. The diminishing extent of sea ice cover, coupled with increasing interannual variability, supports NOAA's designation of bearded seal critical habitat within "Alaska and offshore Federal waters of the Bering, Chukchi, and Beaufort seas within the geographical area presently occupied by the Beringia DPS of the bearded seal." The restriction to the "area presently occupied" seems to be required by the ESA, and I note that such a requirement challenges conservation of a species whose habitat is rapidly diminishing. Indeed, later in the same section, NOAA cites recent reductions in sea ice in Kuskokwim Bay as a rationale for excluding that area from critical habitat.

It is not clear why NOAA excluded from critical habitat "tidally-influenced channels of tributary waters of the Bering, Chukchi, or Beaufort seas" given that in a 2013 report to the BOEM, NOAA cited scientific observations from Russia and Alaska indicating that some bearded seals "are found in bays, brackish water estuaries, and river mouths, and have been observed to travel up some rivers" (*Boveng, P.L. and M.F. Cameron. 2013. Pinniped movements and foraging: seasonal movements, habitat selection, foraging and haul-out behavior of adult bearded seals in the Chukchi Sea. Final Report, BOEM Report 2013-01150. Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region, Anchorage, Alaska, USA. 91 Pp + Appendix*). Indigenous hunters also report bearded seals feeding in estuaries in numerous locations along the Alaska coast (e.g., Arey Lagoon adjacent to Kaktovik).

Scientific uncertainties

NOAA appropriately identified scientific uncertainties throughout their evaluation. For example, under "Specific Areas Containing the Essential Features," they noted the coarse scale of data available for delineating specific areas and made the prudent decision to delineate "a single specific area that contains the sea ice features essential to the conservation of the Beringia DPS" of bearded seals.

NOAA also described the impact on habitat delineation of limited information on ice distribution. They made good use, however, of the National Snow and Ice Date Center's Sea Ice Index to estimate the median position of the ice edge.

Similarly, NOAA listed 11 areas where additional data or other information would better inform delineation of critical habitat, and they explicitly requested such information from scientific, Indigenous, and other sources. In that regard, NOAA presumably will consider new analyses of juvenile bearded seal movements (*Olnes, J., G. A. Breed, M. L. Druckenmiller, J. J. Citta, J. A. Crawford, A. L. Von Duyke, and L. Quakenbush. 2021. Juvenile bearded seal response to a decade of sea ice change in the Bering, Chukchi, and Beaufort seas. Marine Ecology Progress Series 661:229-242*) and responses to noise (*Fournet MEH, Silvestri M, Clark CW, Klinck H, Rice AN. 2021 Limited vocal compensation for elevated ambient noise in bearded seals: implications for an industrializing Arctic Ocean. Proc. R. Soc. B 288: 20202712*) in its revision of the evaluation. Olnes et al. suggest that juvenile bearded seals "are adjusting" to changing ice conditions, and NOAA should consider the significance of the behavioral adjustments in terms of expected impacts on life-time reproductive success. Fournet et al. demonstrated vocal compensation by bearded seals in response to anthropogenic noise, which speaks to NOAA's request for information on ''acoustic conditions that allow for effective communication by bearded seals for breeding purposes.''

Rationale for the proposed critical habitat

NOAA clearly laid out the rationale for identifying four major threats to the Beringea bearded seal population: climate change; oil and gas exploration, development, and production; marine shipping and transportation; and commercial fisheries. They recognized that the significance of many habitat threats will be augmented by climate change impacts on the ocean, especially the ongoing loss of sea ice. More explicit attention to the impacts of ocean acidification would be appropriate. Nonetheless, the focus on sea ice was necessary given its importance to the life history of bearded seals and the unprecedented loss of ice as the climate warms. Thus, it would be hard to imagine that special management considerations or protection will not be necessary, "either now or in the future" even if "the exact focus and nature of that management is presently undeterminable." For example, many forces will influence the future of oil and gas development in the Arctic Ocean, but BOEM's estimates, cited by NOAA, of the probabilities of significant oil spills in coming decades (26% in the Beaufort Sea and 40% in the Chukchi Sea) underscore the importance of designating critical habitat. NOAA correctly points out that such threats are amplified by the diminishing ice cover, an essential habitat feature.

I found NOAA's case for indirect benefits of designating critical habitat compelling, especially in terms of informing governmental agencies and the public of activities that might impact essential habitat features. Agencies with authorities and activities in the Arctic Ocean are populated with experts in energy development, defense, law enforcement, public safety, and more, but they cannot be expected to have much knowledge of critical habitat features. NOAA astutely pointed to the opportunity for detailed and informative consultations afforded by the ESA listing and critical habitat designations.

The economic and national security impacts of the proposed critical habitat delineation were well considered and articulated. The analysis of monetary costs, understandably, was coarse, but it served to make clear that those costs would be quite small (on the order of $1 million over the

next 10 years). Moreover, NOAA recognized the concern that critical habitat delineation might impact subsistence economies and cultures. It is important that NOAA was explicit that "no restrictions on subsistence hunting are associated with this designation."

Reviewer 2:

I believe that the authors did a good job summarizing the available information on bearded seals and accounting for the existing uncertainties when proposing the critical habitat for this species in the Bering, Chukchi and Beaufort seas. Although I identify a few issues below which should be accounted for in the summary of available data on this species and might help address some of the uncertainties identified, I doubt its inclusion will greatly change the proposed critical habitat for Beringia bearded seals.

1. **The accuracy, completeness and relevance of the scientific information considered; particularly whether there is any relevant information that was not considered.**

The information provided was generally accurate, complete and relevant. There are a few areas I identified where more information could be provided.

In terms of sea ice considered suitable for whelping and moulting, only areas with drifting sea ice with greater than 25% (whelping) and 15% (moulting) concentration were included. It's true that bearded seals don't occupy areas with landfast ice, even though they can make holes in thin ice. But they do use the edges of landfast ice for whelping and moulting in Svalbard (see Kovacs and Lydersen 1996, Journal of Mammalogy 77: 1085-1091). Are edges of landfast ice also used in the Beringia area? If so, the definition of sea ice suitable for whelping and moulting should be expanded to include these areas.

In terms of identifying foraging areas, differences in diet among age classes have been observed in bearded seals (e.g. Crawford et al. 2015, Progress in Oceanography 136: 133-150; Young et al. 2010, Polar Biology 33: 153-162). This is mentioned very briefly in the text on page 1436. I suggest that you consider expanding this section, especially as it is applicable for defining foraging habitat as part of the critical habitat designation. Diet may also be influenced by interannual variations in sea-ice extent (e.g. Hindell et al. 2012, PLoS ONE 7: e38307).

On point 2 in the "public comments solicited" section concerning the acoustic conditions that allow for effective communication by bearded seals for breeding purposes. Is it possible to analyze "background" acoustic noise from AURALs (moorings) where bearded seal trills during the breeding seasons have been heard and where whelping has been observed? These conditions would arguably be where effective communication is possible. It might also potentially be possible to analyze how climate change will alter this. Less sea ice will increase abiotic noises from wind and precipitation, lead to changes in the acoustic environment as its absence will potentially change refraction of sound waves and potentially lead to increases in anthropogenic noises such as boats. There are long time series of AURAL data from several mooring locations in the Beringia area. I'm assuming that changes in sea-ice extent and concentration during the bearded seal breeding period have occurred in these areas. Is it possible to use the AURAL time series data to quantify how less sea ice has changed background acoustic noise during the bearded seal breeding period? This might give an idea on the water needed for effective acoustic communication and how it is changing. It should also be possible to quantify how much of the

noise from increased abiotic (wind, precipitation) and anthropogenic (ships, ice breaking activity, oil and gas activity) sources overlap with the frequency ranges used by male bearded seals during the breeding period.

Some of the AURAL moorings in this area have also documented bearded seal vocalizations at other points in the year than during the breeding period. It would be interesting to also include this information in this report as bearded seal vocalizations may also be used for communication outside of the breeding period. There are a few more recent papers that looked at bearded seal acoustic communication other than those referenced which might provide relevant data for the acoustic section (e.g. Madan et al. 2020, Polar Science 26: 100604; Heimrich et al. 2020, Marine Mammal Science 37: 173-192; Sills et al. 2020, Polar Biology 43: 1681-1691; Boye et al. 2020, Polar Biology 43: 1493-1502; Chou et al. 2019, Marine Mammal Science 36: 522-547; Jimbo et al. 2019; Polar Biology 42: 1953-1958, Parisi et al. 2017, Journal of the Acoustical Society of America 142: 3104-3115).

To better define foraging locations, it might be possible to use existing data from benthic samples and fish trawls to create an index of bearded seal prey, similar to Jay et al. 2017 (Journal of Mammalogy, 98: 386-396).

In terms of shoreward limit, I believe you need a better definition of "mean lower low water boundary." This is the first time I've heard this term and I believe that a lot of people won't know what this is. I also wondered why you did not include any rivers in your critical habitat. A portion of the tagged juveniles in this region have been captured up rivers, as described in this document. The scientists doing this work will know which rivers these seals were captured in and there's potentially other information available on other rivers systems used from Native American tribes in the area. Bearded seals have also been observed hauling out on land in Svalbard during summer in areas with no drifting sea ice (see Methods in Merkel et al. 2013, PLoS ONE 8: e67576) and in the BCB, as described on page 1435 under "general seasonal distribution and habitat use" in this document. It is possible that the use of land may expand in the future so I agree with the authors that it is important to include the areas up to the "mean lower low water boundary" as critical habitat.

In terms of the southward limit of critical habitat, I wonder if you should consider extending this to the continental shelf break. Some of the tagged juvenile bearded seals have foraged in this area. As not many bearded seals have been tagged, it is hard to accurately know the proportion of juvenile bearded seals that use the southern continental shelf break as a foraging area. Also, as pointed out in this document the extent of seasonal movement depends on tagging location and I'm assuming that the locations where bearded seals have been tagged are not evenly distributed throughout the BCB. As this species is threatened, it might be worthwhile to consider also including this area in your proposed critical habitat.

When discussing potential risks to bearded seals of oil spill/discharge from vessels, I think it might be useful to reference studies from the Exxon Valdez spill in 1989 that found oil persisting in the Arctic environment long after the spill occurred. The authors referenced the Deep Horizon blowout when discussing risks of oil production in the Arctic and I was missing a similar comparison to the Exxon Valdez spill when discussing the risks of oil spill/discharge from vessels.

Page 1434, General seasonal distribution and habitat use: It says sea ice provides bearded seals some protection from predators. What predators are you referring to here? At least for polar bears, their main predator, sea ice makes bearded seals much more accessible.

2. Whether scientific uncertainties are adequately identified and characterized

I believe that the scientific uncertainties were adequately identified and characterized in the proposed critical habitat for bearded seals. There is not a lot of information known about bearded seals compared to other seal species. I believe that using the median sea-ice edge and areas with less than 200 m depth in combination does an adequate job of identifying the probable habitat for this species.

3. Whether the document provides a well-reasoned rationale for the proposed critical habitat based on the best scientific information available

I believe the document provides a well-reasoned rationale for proposed critical habitat. The authors do a good job of summarizing available information on bearded seals (which is limited compared to other species) and accounting for uncertainties to arrive at this proposed delineation of critical habitat. Although I identify some data sources that are missing from the summary and recommend a few areas where it's possible to make better use of the available data and potentially account for some of the uncertainties, I doubt that the inclusion of this data (to the extent that it is possible) will greatly change the proposed critical habitat for this species.

Reviewer 3:

I have reviewed the evaluation of available data on habitat uses and needs of the Beringia DPS bearded seal and the use and interpretation of this information in making conclusions regarding what areas meet the definition of critical habitat under the ESA.

In general, I find that the scientific information considered was relevant and interpretations were reasonable. Most of the relevant information that was not considered occurs in recent publications that may not have been available during the drafting of the document. I have provided comments regarding where I felt information was lacking, or was misinterpreted, and I have provided references for scientific information that should be considered.

In most cases, scientific uncertainties were adequately identified and characterized. I have made specific comments where they were not.

Although the document provides the rationale for proposed critical habitat as required by the ESA based on the best scientific information available, the overlap in protections between the Marine Mammal Protection Act (MMPA) and the ESA and the overlapping of multiple critical habitat designations make the current designation appear to be mostly redundant. It is not clear how this critical habitat designation will provide habitat protection for bearded seals beyond what is already provided by the MMPA and existing polar bear critical habitat. In addition, and unfortunately, the designation of critical habitat cannot offer protection against the loss of sea ice habitat caused by climate change, which was the primary reason for listing the Beringia DPS of bearded seal.

Specifically, regarding the following topics:

1. **The accuracy, completeness, and relevance of the scientific information considered; particularly whether there is any relevant information available that was not considered.**

Description of Natural History

Paragraph 1. The bearded seal life span reported as 20–25 years (Kovacs 2002) is low relative to sample collections from the subsistence harvest in Alaska for bearded seals harvested between 2003 and 2019. Alaska Department of Fish and Game (ADFG) data show that their life span in Alaska is likely longer. The oldest bearded seal we have sampled was 40 years old and three of three 30-year-old females sampled were reproductively active (Quakenbush 2020a; ADFG, unpublished data).

General Seasonal Distribution and Habitat Use

Paragraph 2. The sentence "Sea ice provides bearded seals some protection from predators …" is vague and possibly misleading relative to predators. Sea ice does not provide protection from polar bears, which are the primary predator of bearded seals when they are resting on the ice (Burns 1981). Sea ice does provide some protection from killer whales, however, the magnitude of predation on bearded seals by killer whales is unknown.

In addition to the description of sea ice used by bearded seals, a recent study compared habitat used by juvenile bearded seals satellite-tagged during 2004–2009 and 2014–2018 and found that seals selected intermediate ice concentrations of 50–60% during both periods, however, during the later period the selected ice concentrations occurred farther from the ice edge than during the earlier period (Olnes et al. 2021).

Paragraph 3. This paragraph regarding haul-out behavior and seasonal movements is missing some new information. The first sentence may no longer be true: "Adult bearded seals have rarely been seen hauled out on land in Alaska (Burns 1981, Nelson 1981, and Smith 1981)." Note, Smith (1981) may not be an appropriate reference for seals in Alaska as it is a technical report regarding bearded seals in the Canadian Arctic. In September 2019, two adult bearded seals were captured for tagging when found hauled out on land near Utqiaġvik, Alaska, one in Dease Inlet and another on a slough near the city (ADFG unpublished data).

As stated, juvenile bearded seals are known to regularly haul out on land, including miles up rivers that enter Norton Sound. In addition to the Huntington et al. traditional knowledge reports that are cited, maps in Figures 2–5 of Huntington et al. (2017) provide a published account. Although juvenile bearded seals are commonly seen up these rivers, they are solitary and not present in large numbers. It is not likely that this behavior is practiced by all juvenile bearded seals.

During summer when sea ice was minimal, 7 of 13 tagged juvenile bearded seals hauled out on land in Kotzebue and Norton sounds. The other 6 tagged seals remained near and continued to haul out on sea ice. Two tagged seals used both strategies in different years (Olnes et al. 2020), suggesting flexibility within individuals. Regardless of haul-out substrate, juvenile bearded seals hauled out more in spring and summer than fall and winter (see Figure 5 in Olnes et al. 2020).

North-south movements by tagged juvenile bearded seals, relative to sea ice advance, differed by where seals were tagged, and some did not track sea ice at all. Five of 24 (21%) tagged seals did not move relative to the north-south ice movements (Olnes et al. 2020). One juvenile female (BS17-01-F) tagged in the Beaufort Sea overwintered in the vicinity of Barrow Canyon in two consecutive winters (Quakenbush et al. 2019). An adult male bearded seal (BS19-01-M) tagged in the Beaufort Sea also spent two consecutive winters near Barrow Canyon (Quakenbush 2020b, ADFG unpublished). Another juvenile seal tagged in the Chukchi Sea (Kotzebue Sound) did not move south into the Bering Sea for winter but wintered in Kotzebue Sound (Olnes et al. 2020).

Bearded seal vocalizations are known to be produced by adult males (Ray et al. 1969, Van Parijs and Clark 2006), therefore recordings throughout winter and spring of vocalizations in the Chukchi and Beaufort seas indicate that some male bearded seals overwinter in those areas. As mentioned above, from tagging data we documented one juvenile female spending two consecutive winters at the boundary of the Chukchi and Beaufort seas (Barrow Canyon) (Quakenbush et al. 2019, Olnes et al. 2020) and an adult male spending two consecutive winters in the same vicinity (Quakenbush 2020b, ADFG unpublished). It is currently unknown if adult females overwinter here. While many of these details are included in the critical habitat proposed rule document and referenced by reports and unpublished data, Olnes et al. (2020) provides a peer-reviewed published reference.

Reproduction

No comments.

Molting

A recent paper comparing ice seal molt among ice seal species, corroborates that the bearded seal molt is protracted compared to that of ringed and spotted seals and documents that this behavior requires less energy than the shorter molting period of ringed and spotted seals (Thometz et al. 2021).

Paragraph 1. Add Olnes et al. (2020) to the references in the 3rd sentence. Juvenile bearded seals haul out more in spring and summer than fall and winter (see Figure 5 in Olnes et al. 2020).

Diet

The description of diet is too general to understand what the Beringia DPS of bearded seals eat. It would be more useful to give examples of the species of "schooling pelagic (non-demersal) fishes," demersal fishes, and the invertebrates that are eaten. This lack of detail along with sentences such as "A wide variety of prey species have been reported for bearded seals of the Beringia DPS, though the bulk of their diet appears to consist of relatively few major prey types" implies there are few common prey items and gives a very different impression about bearded seal diet than what we see for bearded seals harvested in Alaska. ADFG stomach content analyses suggest that although bearded seals primarily eat benthic prey many prey items are consumed at frequencies >20%, suggesting that bearded seals would more accurately be described as "benthic generalists."

The proportion of benthic dives made by tagged juvenile bearded seals (n=14) ranged from 0.66 to 0.93, indicating that most, but not all foraging is done near the bottom (Olnes et al. 2020).

Stomach content analysis of bearded seals harvested in Alaskan waters of the Bering and Chukchi seas during 2000–2019 show that bearded seals eat many species of fish and invertebrates, mostly near or on the bottom. Bearded seals eat cod (Gadidae: Arctic and saffron), sculpin (Cottidae: *Gymnocanthus* and *Myoxocephalus* sp.), pricklebacks (Stichaeidae), and flatfish (Pleuronectidae: *Limanda aspera*) at a frequency of occurrence of >20% (Quakenbush 2020a). During a recent 5-year sampling period (2016–2020), non-pup and pup bearded seals ate Pacific sand lance during winter at a frequency of occurrence of 42.6% and 27.8%, respectively, which was higher than during 2000–2015 (Quakenbush 2020a) or what has been observed in the past (Quakenbush et al. 2011). Bearded seals also eat a wide variety of invertebrates including marine worms (Annelida, Polychaeta, including echiurids), snails, clams, amphipods, shrimp (especially Hippolytidae and Crangonidae, including *Crangon alaskensis*, *Sclerocrangon boreas*, *Argis lar*), and crab (especially Brachyura, *Telmessus cheiragonus*; Oregoniidae, *Hyas* sp, and *Chionoecetes* sp.) at a frequency of occurrence of >20%. Differences in diet occur by season, between pups vs. non-pups, and have occurred over time (Quakenbush et al. 2011, Crawford et al. 2015, see Table 4, pages 195–196 in Quakenbush 2020a). Given the wide array of fish and invertebrate prey eaten by bearded seals, virtually the entire shallow Bering and Chukchi shelf provides feeding habitat.

Critical Habitat Identification

Geographical Area Occupied by the Species

No comments.

Physical and Biological Features Essential to the Conservation of the Species

(1) Sea ice habitat suitable for whelping and nursing with waters 200 m or less in depth containing pack ice of at least 25 percent concentration and providing bearded seals access to those waters from the ice.

No comments.

(2) Sea ice suitable as a platform for molting, which is defined as areas with waters 200 m or less in depth containing pack ice of at least 15 percent concentration and providing bearded seals access to those waters from the ice.

Given new information about the extended molt and lower energetic cost of molting for bearded seals compared to ringed and spotted seals (Thometz et al. 2021), and greater evidence of bearded seals hauling out on land (Olnes et al. 2020, Quakenbush et al. 2019, ADFG unpublished data), sea ice may not be as critical to bearded seals for molting as previously thought.

Although increased disease transmission is often cited as a potential threat to ice-associated pinnipeds, it has not been realized and there are many examples of pinnipeds using large terrestrial haulouts without serious disease transmission issues. Walruses, Steller sea lions, and northern fur seals regularly haul out on land without disease transmission that threatens the populations. Bearded seals are less gregarious and would likely haul out on land in low densities during molt, making disease transmission even less likely.

(3) Primary prey resources to support bearded seals in waters 200 m of less in depth: benthic organisms, including epifaunal and infaunal invertebrates, and demersal and schooling pelagic fishes.

The first sentence of this section is circular. Calling bearded seals "benthic specialists" is misleading. Although bearded seals specialize by primarily feeding on the bottom, they consume a wide variety of benthic prey taxa and therefore would be more accurately considered "benthic generalists." As stated in the document, the diversity of prey consumed makes identification of essential prey species impracticable, which supports their predator status as generalists eating a wide array of prey types and species across the continental shelf of the Bering and Chukchi seas.

(4) Acoustic conditions that allow for effective communication by bearded seals for breeding purposes within waters used by breeding bearded seals.

A recently published paper addresses the limited capability of male bearded seals to compensate for elevated ambient noise during the breeding season by calling louder (Fournet et al. 2021).

Specific Areas Containing the Essential Features

The last sentence in the fourth paragraph seems incomplete. Do you mean "Therefore, we considered where drifting sea ice occurred, essential features also occurred in all three seas?"

Paragraph 5. One of the key factors that influences the presence and quality of sea ice is wind; it should be added here.

Paragraph 12, 13, and 14. Add Olnes et al. (2021) to references regarding inferred locations of foraging activity for bearded seals tagged with satellite-linked transmitters.

Special Management Considerations or Protection

We analyzed tagged bearded seal movements relative to the oil and gas lease areas in the Chukchi and Beaufort seas and relative to shipping traffic in the northern Bering and Chukchi seas (Quakenbush et al. 2020). These analyses could be used to describe the temporal overlap of ringed seals and these human activities.

Of the four listed potential threats to the habitat features identified as essential to the conservation of the Beringia DPS of the bearded seal that may require special management considerations, only two of them appear to have the federal nexus required for a Section 7 consultation, those being oil and gas activities through BOEM as the lease manager and commercial fisheries through NMFS. Climate change, although the most serious habitat threat, does not appear to lend itself to management that would benefit bearded seals now or in the future. Marine traffic is also not subject to the Section 7 consultation process, unless for the purposes of oil and gas activities or for federally funded research, suggesting that the critical habitat designation does not provide habitat protection for bearded seals. Although these threats are identified under the proposal to designate critical habitat for bearded seals, the reality is that relatively little protection is provided with this designation beyond what the species is already afforded by the MMPA and the previously designated critical habitat for polar bears.

Later in the document under **Analysis of Impacts Under Section 4(b)(2) of the ESA,** dredge mining, navigational dredging, in-water construction, oil spill response, and certain military

activities were also identified as Federal activities that would require Section 7 consultation if conducted in critical habitat. In this section (first paragraph under *Economic Impacts*), points are made that describe the overlap with the protections already provided by the MMPA and overlap with existing critical habitat for polar bears and ringed seals. For example,

> "At this time, on the basis of how protections are currently implemented for bearded seals of the Beringia DPS under the Marine Mammal Protection Act (MMPA) and as a threatened species under the ESA, we do not anticipate that additional requests for project modifications will result specifically from this designation of critical habitat. In other words, the critical habitat designation is not likely to result in more requested project modifications because of section 7 consultations on potential effects to bearded seals and our incidental take authorizations for Arctic activities under section 101(a) of the MMPA both typically address habitat-associated effects to the seals even in the absence of critical habitat designation."

The high degree of overlap in protections substantially diminishes the need to designate critical habitat for bearded seals. It is unfortunate that the funding used to designate critical habitat could not have been directed instead toward research and monitoring the DPS to better understand its response to ongoing environmental changes.

Unoccupied Areas

Agree, there are no unoccupied areas within U.S. jurisdiction that are essential to bearded seal conservation.

Application of ESA Section 4(a)(3)(B)(i)

No comments.

Analysis of Impacts Under Section 4(b)(2) of the ESA

Benefits of Designation

The main direct benefit of critical habitat designation is the requirement that all federal agencies ensure that their actions are not likely to destroy or adversely modify the designated habitat or jeopardize the species' continued existence.

Other benefits are indirect and thus less tangible. Although they sound substantial as stated, it is hard to imagine how they would materialize. For example, how will the designation of critical habitat result in "enhanced conservation" of bearded seals over time? How will a subsistence user "experience indirect benefits?"

Although listed as a benefit, the overlap of critical habitat and its protections for polar bears, bearded seals, and ringed seals seems purely redundant without the benefit of any additional protections.

Unfortunately, there are relatively few, if any, activities that will be mitigated by this designation of critical habitat given that the biggest threats (i.e., shipping) are exempt from the process (i.e., not regulated by a federal agency, except possibly the U.S. Coast Guard in regulating shipping lanes). Little commercial fishing exists in the northern Bering Sea and there is none in the Chukchi and Beaufort seas. Although oil and gas activities, in-water construction, and dredging

are included, bearded seals are already protected from such disturbance by the MMPA and by polar bear critical habitat. Therefore, it is not clear how this critical habitat designation adds any substantive protection.

2. Whether scientific uncertainties are adequately identified and characterized.

In most cases scientific uncertainties were adequately identified and characterized. I have commented above in cases where they were not.

3. Whether the document provides a well-reasoned rationale for the proposed critical habitat based on the best scientific information available.

Although the document provides the rationale for proposed critical habitat as required by the ESA, based on the best scientific information available, the overlap in protections by the MMPA and the ESA and multiple overlapping critical habitat designations appear to be mostly redundant. It is not clear how this critical habitat designation will provide habitat protection for bearded seals above what is already provided by the MMPA and polar bear critical habitat. Unfortunately, the designation of critical habitat cannot offer protection against the loss of sea ice habitat caused by climate change, which was the primary reason for listing the Beringia DPS of bearded seal as threatened under the ESA.

Literature Cited

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Reviewer 4:

I have finished reviewing the comprehensive and well-written assessment on the **Designation of Critical Habitat for the Beringia Distinct Population Segment of the Bearded Seal.** I have no major comments as this is a very thorough compilation of bearded seal research in Alaskan waters and assessment on bearded seal ecology, habitat and potential threats. I agree with the large size of the proposed critical habitat for bearded seals, given their higher affinity for waters shallower than 200m and ice concentrations above 15% to support their critical life-history stages. The proposed large size is also supported given the future unpredictability of sea ice dynamics (extent, concentration and thickness) in the Exclusive Economic Zone of the United States around Alaska.