Designation of Critical Habitat for the Arctic Ringed Seal: Critical Habitat Evaluation

Peer Reviewer Comments

On January 8, 2021, the National Marine Fisheries Service (NMFS) published a revised proposed rule to designate critical habitat for the Arctic ringed seal under the Endangered Species Act (ESA) (86 FR 1452). 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 three peer reviewers: Donna Hauser, Lori Quakenbush, and Alex Whiting.

The peer reviewers were asked to review the evaluation of available data on habitat uses and needs of Arctic ringed 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:

In regards to the Federal Register Proposed Rules document **"Evaluation of the Designation of Critical Habitat for the Arctic Subspecies of the Ringed Seal,"** I was able to review and consider: l. 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.

After reviewing the document based on the above criteria, I did have a concern relating to what appears to be the minimizing of the Bering Sea ice edge habitat requirements for young ringed seals (YOY/subadult) or in language related to critical habitat designation - not identifying this habitat use as an ***essential feature***. As demonstrated in the practically sole focus on denning habitat for defining the southern boundary, as stated above, and as it relates to this statement: "*Crawford et al. (2012b) suggested that southern ice edge habitat in the Bering Sea near the shelf break south of the southern boundary specified above may be important for overwintering of subadult ringed seals, including for foraging. But aside from the limited data on subadult movements and dive behavior during winter near the ice edge and shelf break in the Bering Sea, we lack specific information on the significance of this habitat to the conservation of the species.*

We therefore conclude that it is appropriate to delineate the southern boundary as described above." I would submit that this ice edge habitat *is significant* as an essential feature.

The entire life history of a species is important to the survival of individuals and perpetuation of the species. As it relates to ringed seals and the proposed critical habitat designation, I would point out that - while denning, pupping, and molting habitat is very important - the first few years of life of a species after birth and weaning, should not be ignored as a point of protection (this time period is essential to survival of the individuals). While I agree the data on Bering Sea ice edge use by subadult ringed seals is limited, what data is available does in fact demonstrate the pattern of subadult ringed seals traveling to the Bering Sea ice edge in the fall for winter feeding. The partitioning of habitat across age classes is in keeping within the context of general life history principals for a wide variety of species. It would seem by encompassing my suggestion of co-emphasizing the habitat required for denning, basking, molting, along with the habitat required for YOY /subadult winter feeding habitat (which again should be defined as an *essential feature)* it will be easier to defend.

This would also allow for the use of the Bering Sea April median southern ice edge for the most recent 30 years as the southern boundary, providing maximum habitat protection for ringed seals into the future, given the uncertainty surrounding the future of the presence or absence of this habitat in relation to the continuous warming of the climate. The effects and impacts to take authorizations and federal permitting burdens/requirements, for those activities applicable, would seem nominal since a majority of those would very likely be subject to these same requirements using the proposed critical habitat boundary (i.e., most of the permitted activities are likely to be non-stationary in nature and will transect either of the boundaries).

In conclusion, I suggest recognizing and incorporating the use of the Bering Sea ice edge by YOY and subadult ringed seals as an essential feature and using the most recent 30-year Bering Sea median ice edge for the month of April, for the ringed seal.

Reviewer 2:

I have reviewed the evaluation of available data on habitat uses and needs of Arctic ringed seals 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 reports and publications that may not have been available during the drafting of the document. I have provided comments regarding where I felt information was lacking, misinterpreted, and misleading 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 multiple and overlapping 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 ringed 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 Arctic ringed seal as threatened under the ESA.

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 ringed seal life span reported as 15–25 years (Kelly et al. 2010a) is low relative to sample collections from the subsistence harvest in Alaska for ringed seals harvested between 2000 and 2019. ADFG data show that the ringed seal life span, as well as their reproductively active age is likely longer than 25 years. The oldest ringed seal sampled was a 42-yr-old male (Quakenbush et al. 2020). Four females between the ages of 25 and 37 were all pregnant when harvested and the oldest, at 37 years, had a fetus. For ringed seals older than 25 years we have sampled 28 seals between the ages of 26–29, 20 between the ages of 30–34, and 11 between the ages of 35–42 (ADFG unpubl. data).

Distribution and Habitat Use

The description of the open-water "foraging period" defined as from break-up in spring to freeze-up in the fall as "when feeding occurs most intensively" is misleading as it implies that this is the most important period for feeding; this is not correct. The reference for this is Kelly et al (2010b), who defined the foraging period as the time "from ice break-up to the subsequent freeze-up in fall, ringed seals forage more intensively than at other times (Lowry et al. 1980, Ryg et al. 1990, Weslawski et al. 1994) and are less frequently observed out of the water…"

As summarized in Lowry et al. (1980), however, ringed seals have a seasonal feeding cycle. Ringed seals are thinnest in spring and summer. They lose weight from March to September, gain weight beginning in October, and are fattest in winter. This pattern is also reported by McLaren (1958), Fedoseev (1965) and Johnson et al. (1966). Ringed seals harvested near Pt. Hope had the highest mean weight and the thickest blubber in February (Johnson et al. 1966). ADFG blubber thickness data also show that ringed seals are fattest in February, lose blubber during May–August, are leanest in July–August, and gain blubber during September–February (Quakenbush et al. 2011, 2020), indicating that the feeding period in which seals regain weight lost during spring and summer occurs ***after*** the open-water season, or at least begins at the end of the open-water season and continues into mid-winter.

It is true that ringed seals make long-distance movements during the open-water season and that they spend most of their time in the water. ADFG satellite telemetry dive behavior data indicate seals make foraging dives during this time. However, dive rate, an index of foraging effort, is lower during July–September than during October–February (Crawford et al. 2019, see Online Resource 3; ADFG unpubl. data). Overall, dive rate for all ringed seals was highest in fall (September to November), followed by winter (December to March) and spring (April to June

for subadults only). When we summarized these data by month, dive rate of both adult and subadult ringed seals was lowest during June, July, and September (no data in August) and highest from October to February. The reason why ringed seals are moving more and feeding less, or at least gaining little weight during the open-water period, may be due to what prey are available. Lowry et al. (1980) found a seasonal switch from Arctic cod in winter to invertebrates (benthic crustaceans like hyperiid amphipods and euphausiids) in late summer. Invertebrate prey that are numerically more available but patchy in their distribution may explain an increase in movement and foraging intensity in summer without a corresponding weight gain. Regardless, calling the open-water period the "open-water foraging period" is misleading without further explanation.

Subnivean Period:

Paragraph 1, second sentence. Crawford et al. 2012b should be 2012a.

The third sentence that reads: "However, some adult males have been found to make long-distance movements in the Chukchi and Beaufort seas during January to March (Quakenbush et al. 2019)" needs to be corrected. These movements were made in the Chukchi and Bering (not Beaufort) seas (see Figure 15 of Quakenbush et al. 2019).

The bulk of movements made by 13 tagged ringed seals during December–May occurred between Kotzebue Sound and as far south as Nunivak Island (between Nunivak and Nelson islands), but the core use-area was in southern Kotzebue Sound (see Fig. 31 in Quakenbush et al. 2019), which should be included here.

The last sentence of this paragraph should be changed as edited here to read "In contrast, subadult ringed seals have been observed to travel relatively long distances ~~in winter~~ to remain near the ice edge in the Bering Sea in winter (Crawford et al. 2012, 2019)." They are not traveling there in winter but spending the winter there.

Paragraph 3, first sentence. This paragraph would be more informative if the first part of the first sentence were changed to: "Once mature, females give birth annually to a single pup…

Basking Period:

Paragraph 1. A new paper that compares ringed, bearded, and spotted seal molting strategies and patterns in metabolism (Thometz et al. 2021) should be reviewed for this section. Thometz et al. (2021) tracked resting metabolic rate in three ringed seals over a four-year period. Of the three species, ringed seals had the lowest absolute resting metabolic rate and the highest mass-specific resting metabolic rate as expected given they have the smallest body size. The ringed seal molting period lasted 28 ± 6 days and there were significant, but short-term, increases in resting metabolic rate during molt (Thometz et al. 2021), which is in contrast with Ashwell-Erickson et al.'s (1986) findings that resting metabolic rate decreased during molt in spotted seals. In addition, by studying captive ringed seals in California and Alaska, Thometz et al. (2021) observed that the ringed seal held at the photoperiod in California molted earlier than the two ringed seals held at the photoperiod in Alaska, suggesting some flexibility in the timing of molt within individuals.

Correct the Ashwell-Erickson et al. 1986 reference in the References Cited document to add D. Wartzok as the final author.

Open-Water Foraging Period:

Paragraph 1. As stated above, ADFG blubber thickness data for ringed seals harvested in Alaska shows that seals are fattest in February, lose blubber during May–August, and gain blubber during September–February (see Figure 3 in Quakenbush et al. 2020). Gaining blubber during September–February indicates that the important "foraging period" is not restricted to the open-water season as implied by the name given to this period. Calling the open-water season the "foraging period" is misleading given that ringed seals harvested in Alaska lose the most blubber during the open-water months of July and August (Quakenbush et al. 2020). The name for this period should be changed.

Diet

Stomach content analysis of ringed seals harvested in Alaskan waters of the Bering and Chukchi seas during 2000–2019 show that ringed seals primarily prey on four species of fish: two species of cod (Gadidae: saffron and Arctic) and two species of smelt (rainbow smelt and capelin). The smelt were primarily consumed during recent years (2016–2020) and rainbow smelt were consumed more often than capelin. Since 2000, ringed seals ate more saffron cod than Arctic cod even during the ice-covered season, which was different from earlier periods (Quakenbush et al. 2020). This change was most prevalent for non-pup ringed seals during 2016–2020 (see Table 1 in Quakenbush et al. 2020). Primary invertebrate prey includes crustaceans, mostly gammarid amphipods and crangonid shrimp (Quakenbush et al. 2020).

Critical Habitat Identification

Geographical Area Occupied by the Species

Physical and Biological Features Essential to the Conservation of the Species

(1) *Snow-covered sea ice habitat suitable for the formation and maintenance of subnivean birth lairs used for sheltering pups during whelping and nursing, which is defined as areas of seasonal landfast (shorefast) ice and dense, stable pack ice, excluding any bottom-fast ice extending seaward from the coastline (typically in waters less than 2 m deep), that have undergone deformation and contain snowdrifts of sufficient depth, typically at least 54 cm deep.*

No comments.

(2) *Sea ice habitat suitable as a platform for basking and molting, which is defined as areas containing sea ice of 15 percent or more concentration, excluding any bottom-fast ice extending seaward from the coastline (typically in waters less than 2 m deep).*

Paragraph 1. Although we do not have satellite-linked tag data that indicate ringed seals haul out on land during the molt, they likely do not need to, because sea ice is available during the molting period. We have, however, documented four tagged ringed seals (three adults and one pup) hauling out on land: one in July near Ice Cape, Alaska; one in October on the north shore of Chukotka, Russia (the pup); and two in November on the north shore of the Seward Peninsula, Alaska (Quakenbush et al. 2019) suggesting ringed seals could haul out on land to molt, if it were necessary.

Last sentence. Add references to support the statement that "If Arctic ringed seals were unable to complete their annual molt successfully, they would be at increased risk from parasites and disease." I am not aware of research that has reached this conclusion.

(3) *Primary prey resources to support Arctic ringed seals, which are defined to be Arctic cod, saffron cod, shrimps, and amphipods.*

ADFG data suggest adding rainbow smelt (*Osmerus mordax*) to the list of primary prey resources for Arctic ringed seals in Alaska (Quakenbush et al. 2011, 2020; Crawford et al. 2015) is warranted. This fish species has increased in importance in ringed seal diet in the 2000s.

Specific Areas Containing the Essential Features

Paragraph 7. Calling the southern boundary of the ringed seal critical habitat that is based on the median ice edge in May 1990–2019 a "contour line" is somewhat confusing because contour lines in marine environments usually refer to bathymetric contours. It might be more straightforward to equate the median ice edge in May with the nearest bathymetric contour to define a more natural boundary. Alternatively, calling it something other than a contour line, such as "the southern boundary" should be considered.

Paragraph 10. Details about rainbow smelt should be added to this paragraph given their importance to ringed seal diet in recent decades.

Paragraph 11. Change Crawford et al. (2012b) to (2012a) and add Crawford et al. 2019. The description of the findings of Crawford et al. (2012a and 2019) should be better stated to represent the data provided. Almost all of the tagged subadult ringed seals (11 of 12) wintered in ice edge habitat in the Bering Sea. Therefore, saying that:

> "But aside from the limited data on subadult movements and dive behavior during winter near the ice edge and shelf break in the Bering Sea, we lack specific information on the significance of this habitat to the conservation of the species. We therefore conclude that it is appropriate to delineate the southern boundary as described above."

understates data showing substantial habitat use by subadults in winter (Crawford et al. 2012a, 2019). Although these studies do not address the importance of subadult survival for the conservation of the species, subadult survival is obviously important for maintaining the population.

Paragraph 12, sixth sentence. Add southern Kotzebue Sound to the list of shallow nearshore waters used by tagged seals, same reference (i.e., Quakenbush et al. 2019)

Special Management Considerations or Protection

We analyzed tagged ringed 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. 2019). These analyses could be used to describe the temporal overlap of ringed seals and these human activities.

Of the four listed potential threats (climate change, oil and gas activity, marine shipping and transportation, and commercial fisheries) to the habitat features identified as essential to the

conservation of the Arctic ringed seal that may require special management considerations, only two of them appear to have the federal nexus required for 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 ringed seals now or in the future. Unless for the purposes of oil and gas activities or federally funded research, marine traffic is also not subject to the Section 7 consultation process, suggesting that the critical habitat designation does not provide habitat protection for ringed seals. Although these threats are identified under the proposal to designate critical habitat for ringed 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 bearded seals. For example,

> "At this time, on the basis of how protections are currently implemented for Arctic ringed seals 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 Arctic ringed 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 degree of overlap in protections substantially diminishes the need to designate critical habitat for ringed seals. It is unfortunate that the funding used to designate critical habitat could not have been directed instead toward research and monitoring to better understand the population's response to ongoing environmental changes.

Unoccupied Areas

Agree, there are no unoccupied areas within U.S. jurisdiction that are essential to Arctic ringed 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 ringed 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 and 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, ringed 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.

Proposed Exclusion Based on National Security Impacts

Although the U.S. Navy requested that the northeast Beaufort Sea be excluded from critical habitat designation for training exercises, even without a critical habitat designation the Navy is obligated "to consult with NMFS under section 7(a)(2) of the ESA to ensure the activities it funds or carries out are not likely to jeopardize the continued existence of the Arctic ringed seal, regardless of whether or where critical habitat is designated for the species." This is another example of redundancy that does not add protection to the listed species.

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 redundant. It is not clear how this critical habitat designation will provide habitat protection for ringed 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 Arctic ringed seal as threatened under the ESA.

Literature Cited

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Reviewer 3:

I am writing to contribute a peer review of the scientific information evaluated in the revised proposed rule to designate critical habitat of the Arctic ringed seal under the Endangered Species Act. This review centers on the habitat use and needs of Arctic ringed seals, focused especially on three directives related to the scope, uncertainties, and rationale of the scientific information considered in the revised proposed rule to designate critical habitat for the Arctic ringed seal under the Endangered Species Act. My review is organized below to respond to three overarching directives. Please also notes that citations correspond to those listed in the proposed rule, unless otherwise noted.

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

Overall, the revised proposed rule provides an accurate, complete and relevant assessment of the scientific information that was considered. However, I note a few more recent studies (e.g. Crawford et al. 2019. Seasonal and diel differences in dive and haul-out behavior of adult and subadult ringed seals (*Pusa hispida*) in the Bering and Chukchi seas. *Polar Biol* 42**,** 65–80. https://doi.org/10.1007/s00300-018-2399-x), which could be useful to more fully address the winter-spring foraging habitat of the sub-adult life history stage, specifically use of the southern Bering Sea ice edge habitat.

The proposed Critical Habitat relies heavily on Kelly et al. (2010a) to establish three "periods important to Arctic ringed seal seasonal movements and habitat use" that: 1) focus on the winter-spring subnivean behavior of adult reproductive activities, 2) late spring to early summer basking and molting period, and 3) foraging during the open water period. These periods reflect scientific information particularly relevant to reproductive adult seals and newborn pups (birth-weaning stage). While there is some mention of available information on subadult life stages in the proposed rule, it seems there could be greater consideration of habitat partitioning of the subadult life stages during winter.

While breeding adults occupy landfast ice or dense ice habitat away from the ice edge during winter, with relatively small home ranges (e.g. Kelly et al. 2010b), sub-adult seals are common in the pack ice and especially show habitat preference for the southern edge of the ice pack in the Bering Sea during winter (Crawford et al. 2012, Crawford et al. 2019, and other references cited in the proposed rule). Despite small sample size, Von Duyke et al. (2020) also found that subadult seals occupied lower ice concentrations in the Bering Sea than adult seals. I would agree with the scientific evidence presented for the 'subnivean period' described in the proposed rule that adult ringed seals particularly need stable ice platforms, particularly landfast ice, to maximize reproductive potential. Subadults, however, can minimize predation from polar bears and foxes while maximizing foraging success at the productive ice edge zone (Crawford et al. 2019 and references therein). Subadults tagged in Kotzebue Sound during fall, winter, and spring

seasons are found in lower ice concentrations than adults (Crawford et al. 2019), and their movements indicated proximity to the annual ice edge in 2007-2010 winter period as well as the spring (April-June) period (Crawford et al. 2012, 2019). The southward extent of observations extended farther south of the proposed southern boundary of the critical habitat delineation by several hundred kilometers. Furthermore, maximum recorded dive depths of subadults during winter (December- March) are between 300-350 m, but most typically <200 m, and diving behavior was indicative of active foraging by subadults during winter (Crawford et al. 2019). The diving behaviors of subadult ringed seals near the ice edge in the southern Bering Sea, as reported in Crawford et al. (2019) in particular, lead me to wonder if this habitat is indeed critical for foraging during this important life stage.

Recognizing that these data are still somewhat limited, it seems that winter-spring at the ice edge is clearly an important foraging habitat and period critical to the subadult age class, which is distinct from the important periods for adults outlined in Kelly et al. (2010a). I would argue the subadult stage and their winter foraging habitat is not simply an area occupied by ringed seals, but that it is indeed critical to the conservation of the species in the Pacific Arctic region. At the very least, it seems additional justification is required if it is determined that the subadult life stage is not important in the determination of critical habitat.

2. Whether scientific uncertainties are adequately identified and characterized.

The proposed rule adequately identifies and characterizes many questions about Arctic ringed seal habitat, including many of the uncertainties in the spatial and temporal variability in whelping habitat extent and, to some degree, seasonality. I would argue that the *quality* of that habitat under climate change could be further considered in the proposed rule. In particular, what is the **sufficient depth of snowdrifts** for birth lairs? As the proposed rule notes, few studies have measured snow depth at pupping lairs, including only two in Alaska that were completed ~3.5 decades ago before the modern period of extreme declines in sea ice extent, thickness and duration of seasonal cover. The majority of this field work was conducted in the month of April. Data from other regions, although collected over a broader 11 year time period, were also collected over 27 years ago. These baseline studies were also not designed to measure snow depth requirements for successful pupping *per se*, and so are not necessarily the best sources to answer the question of "sufficient" snow depths for birth lairs. I am unaware of comparable published data on more modern snow depths on sea ice at ringed seal lairs. However, there is some very limited information cited that indicate at least some pup mortality occurs when snow depths were 5-10 cm or less (i.e. Lukin and Potelev 1978, Hammill and Smith 1991, Stirling and Smith 2004). Indeed, it could be surmised that pup survival is variably affected by a continuum of snow depths, and I would argue that insufficient information is available to establish a specific threshold snow depth considered "sufficient" for ringed seal birth lairs (such as 54 cm used in the proposed rule).

Furthermore, snow accumulation on sea ice is affected by several factors that have dramatically changed in recent years, some of which are outlined in the proposed rule. Of note, the timing of sea ice advance and retreat in recent years is particularly relevant to snow accumulation on ice as well as the availability of stable ice that will endure the entire whelping period. Late formation of stable sea ice platforms in fall limits snow accumulation, because there is less time for snow to accumulate that will contribute to lair construction and maintenance. Early sea ice break up in spring could also potentially cause the platform upon which a lair is located to prematurely melt,

which could result in pup mortality of lanugual pups unable to adequately thermoregulate or pups in poor body condition that become separated from their mothers and adequate resting/nursing habitat. Ultimately, in recent years, it is possible that somewhat marginal whelping habitat is already found in the Pacific Arctic region, particularly in the Bering and southern Chukchi Seas, due to rapid changes in sea ice and snow conditions under climate change.

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

I believe the proposed rule provides a well-reasoned rationale for the northern, eastern, and western boundaries of the proposed critical habitat. However, additional information, such as I discuss above, may lead to reconsideration of the southern boundary. In particular, I wonder whether the use of a *May* median ice edge is the most appropriate time period to constrain the southern edge of the proposed Critical Habitat delineation.

I appreciate the use of the recent 30 yr period for the median ice edge calculation, as it does incorporate more inter-annual variation and the unprecedented low ice conditions in 2018 and 2019. Yet, given the importance of a sea ice platform in addition to the deposition of snow (as discussed above under [2]), I would argue that delineation of the essential snow and ice habitat for whelping habitat is dependent on conditions prior to May. Rather, pupping occurs mid-March through April when stable ice is required. Similarly, based on my comments under (1) above, use of the March or April southern ice edge would also more appropriately correspond the foraging habitat used by subadult ringed seals in winter. Lastly, the proposed rule noted that some essential whelping habitat could be excluded when using the May ice edge due to the dramatic inter-annual variability in the May ice edge (particularly in recent years). This variability could become somewhat muted if the March or April ice edge is used instead.