BEFORE THE SECRETARY OF COMMERCE

Petition to Revise the Critical Habitat Designation for the North Pacific Right Whale (*Eubalaena japonica*) Under the Endangered Species Act

Photo: NOAA Fisheries

Center for Biological Diversity
Save the North Pacific Right Whale
Petitioners

March 10, 2022

NOTICE OF PETITION

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The Center for Biological Diversity (the Center) is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has more than 89,000 members and more than 1.7 million online supporters. The Center and its members are concerned with the conservation of endangered species, including the North Pacific right whale, and the effective implementation of the Endangered Species Act.

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Save the North Pacific Right Whale is dedicated to increasing protections and awareness of the world's rarest whale. Through education, film, and community engagement, STNPRW hopes to establish North Pacific right whales as mascots for the North Pacific Ocean and promote conservation measures to ensure the species' survival.

ACTION REQUESTED

This petition seeks to revise and expand the critical habitat designation (codified at 50 C.F.R. § 226.215) for the eastern population of the North Pacific right whale—the most endangered whale population in the world today. Specifically, this petition seeks to connect two existing critical habitat units by extending the Bering Sea unit boundary westward and southward to the Fox Islands, through Unimak Pass to the edge of the continental slope, and eastward to the Kodiak Island unit—encompassing a key migratory point and providing connectivity between two essential foraging grounds (*see* Figure 2).

The Center for Biological Diversity and Save the North Pacific Right Whale submit this petition pursuant to section 4 of the Endangered Species Act, its implementing regulations, and the Administrative Procedures Act. 16 U.S.C. § 1533(b)(3)(D); 5 U.S.C. § 553(e); 50 C.F.R. § 424.14(a). These provisions trigger deadlines to respond to our requested action, requiring that "[t]o the maximum extent practicable," NMFS must issue an initial finding within the next 90 days as to whether this petition "presents substantial scientific information indicating that the revision may be warranted." 16 U.S.C. § 1533(b)(3)(D)(i). If NMFS determines the petitioned action may be warranted, it must issue a final determination within 12 months of receiving the petition.

As the following information demonstrates, the best available science shows the proposed, revised designation is prudent, determinable, and warranted—containing physical and biological features that are essential to the species' conservation and survival. This information also shows that threats to these essential physical and biological features are increasing, making special management considerations necessary to protect the essential features these areas support. As such, NMFS must promptly make a positive initial finding on the petition and commence a proposed rulemaking to revise critical habitat for the North Pacific right whale.

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I. Introduction

The North Pacific right whale is one of the largest and longest-living animals on earth, but despite its size and longevity, it is also one of the least understood animals today. There are only about 30 individuals currently surviving in its eastern population, making it the smallest known whale population and one of the most endangered marine mammals in the world. This petition seeks to expand the critical habitat designation by encompassing and connecting a key migratory point and crucial feeding grounds—areas that are essential to the conservation of the species and require special management protections due to the growing threats confronting them.

Right whales are slow swimming animals, and they float to the surface when they die due to their high amounts of blubber, baleen, and oil. This gave them the misfortune of being easy targets for whalers, and hence their name, being the "right whale" to hunt. Hunting decimated right whales across the globe from the 1800s to 1970s, and while some global populations are showing promising signs of recovery, the North Pacific right whale remains perilously close to extinction.

A recent genetic study found the eastern population of North Pacific Right whales is at extreme risk of immediate extirpation, with an effective population of only a dozen individuals. And while its cousins in the North Atlantic are individually named and celebrated as the East Coast's "urban whale," North Pacific right whales were relatively unstudied until recently, and much of their life history remains a mystery. Their mating grounds, migration routes, winter habitat, and calving areas are all still largely unknown and unmapped today, and only a small fraction of its critical habitat is currently designated under the Endangered Species Act.

Fortunately, concerted survey and research efforts in Alaska and elsewhere increased in recent years, leading to important information on the movement and behavior of these exceedingly rare whales. This research confirms two key habitat areas that are essential to its survival but are not currently designated as critical habitat: (1) a major migratory point through the Fox Islands in the Aleutian chain, concentrating through Unimak Pass, and (2) vital foraging grounds along the Albatross Bank and Barnabas Trough near Kodiak Island that extend beyond those previously documented.

Unfortunately, new research and information also documents increasing, significant threats to these whales and habitats. For example, passive acoustic monitoring not only revealed the presence of North Pacific right whales in these areas, but it also revealed that right whales sing in distinctive patterns and songs—meaning they are likely much more susceptible to shipping and other anthropogenic noise than previously realized. Shipping traffic is dramatically increasing in these areas—funneling through Unimak Pass—which elevates shipping noise and puts the whales at a heightened risk of vessel strikes. Other threats are also increasing and compounding these impacts, including climate change; entanglements in fishing gear; and risks of oil and gas spills.

Comments submitted to NMFS on the 2006 critical habitat designation specifically advocated for the inclusion of Unimak Pass and eastward to Kodiak Island, saying "[t]hese

waters also contain important features or serve important biological needs and should be added to the areas proposed for designation."[1] NMFS declined to do so at the time, responding that there were "few data describing the migratory movements," and "we cannot determine at this time which passes right whales use. We will continue to collect information on the right whale's habitat use to identify migration corridors and determine whether [primary constituent elements] are found within these areas."[2]

This information has now been collected, and it confirms Unimak Pass and eastward to Kodiak Island contain essential migration and foraging grounds. Given the extremely precarious status of the North Pacific right whale, the death or serious injury of a single individual "would be a major blow to this small population."[3] This makes it imperative to employ all conservation measures possible to prevent the extinction of this majestic species, and the Center for Biological Diversity and Save the North Pacific Right Whale urge NMFS to revise the critical habitat designation to encompass and connect these important habitats as proposed.

II. Natural History of the North Pacific Right Whale

A. Description

North Pacific right whales are also known as black whales due to their dark skin, though they often have white areas on their heads from whale lice that cover rough patches of skin, called callosities, and some also have white patches on their undersides.[4] They are large mysticetes, or baleen whales, reaching 45 to 64 feet in length, with females growing slightly larger than males.[5] While right whales are comparable in length to humpback, sperm, and fin whales, they are much more massive than all three in terms body weight[6]—known to exceed 100

[1] 71 Fed. Reg. 38,277, 38,279 (July 6, 2006) (Comment 8).

[2] *Id.* (Response to Comment 8).

[3] Wright, D. L., Castellote, M., Berchok, C. L., Ponirakis, D., Crance, J. L., & Clapham, P. J. (2018). Acoustic detection of North Pacific right whales in a high-traffic Aleutian Pass, 2009–2015. *Endangered Species Research*, 37, 77–90, at 88; *see* Muto, M., Helker, V., Delean, B., Angliss, R., Boveng, P., Breiwick, J., Brost, B., Cameron, M., Clapham, P., Dahle, S., Dahlheim, M., Fadely, B., Ferguson, M., Fritz, L., Hobbs, R., Ivashchenko, Y., Kennedy, A., London, J., Mizroch, S., . . . Zerbini, A. (2020). Alaska marine mammal stock assessments, 2019. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-TM-AFSC-404, at 251 [2019 Stock Assessment] ("Given the very small estimate of abundance, any mortality or serious injury incidental to commercial fisheries would be considered significant.")

[4] NMFS. North Pacific Right Whale, https://www.fisheries.noaa.gov/species/north-pacific-right-whale (last updated Feb. 14, 2022).

[5] *Id.*

[6] Humpback whales can reach 60 feet and weigh up to 40 tons (https://www.fisheries.noaa.gov/species/humpback-whale); sperm whales can reach up to 52 feet and weigh up to 45 tons (https://www.fisheries.noaa.gov/species/sperm-whale); and fin whales can reach 85 feet and weigh up to 80 tons (https://www.fisheries.noaa.gov/species/fin-whale).

tons.[7] This makes right whales the second largest living animal today, just behind blue whales, in terms of their sheer body mass.[8]

North Pacific right whales have a distinctive spout and other unique characteristics:

> [North Pacific] right whales have two blowholes each and when they exhale, they produce a V-shaped spout that shoots up to an impressive 5 meters in the air. Helping with proportion, right whales have heavy, rotund bodies that blend black and dark grey tones . . . . Whilst atop their bodies North Pacific right whales have no dorsal fin, to their sides they have long, broad flippers notched with small ridges. These ridges follow the bone structure inside their flippers and are quite like our own human 'finger bones.'[9]

Until recently, no right whales were known to "sing," "[b]ut new findings suggest that the rarest whale of them all, the eastern North Pacific right whale, is breaking into song."[10] While other right whale species seem "to restrict their vocalizations to individual calls," North Pacific right whales are the only ones known to vocalize their calls in distinct patterns, which were recorded in multiple locations and "remained remarkably consistent over eight years."[11]

The maximum dive depth among North Pacific right whales is unknown, but Southern right whales are commonly reported diving to 300 meters, and closely related bowhead whales can dive more than 400 meters.[12] The life expectancy of right whales is also unknown, "but one female was believed to be at least 70 years old based on photo documentation over a 60-year period."[13]

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[7] Shelden, K. E. W., & Clapham, P. J. (2006). Habitat requirements and extinction risks of eastern North Pacific right whales. *AFSC Processed Report 2006-06*, at 1; 71 Fed. Reg. 77,694 (Dec. 27, 2006); NMFS. North Pacific Right Whale, https://www.fisheries.noaa.gov/species/north-pacific-right-whale (last updated Feb. 14, 2022).

[8] Blue whales can weigh up to 330,000 pounds, or 165 tons. NOAA. Blue Whale, https://www.fisheries.noaa.gov/species/blue-whale.

[9] Whale and Dolphin Conservation, North Pacific Right Whale *Eubalaena japonica*, https://us.whales.org/whales-dolphins/species-guide/north-pacific-right-whale/ (last visited Mar. 8, 2022).

[10] NOAA, First Recording of North Pacific Right Whale Song (June 19, 2019), https://www.fisheries.noaa.gov/feature-story/first-recording-north-pacific-right-whale-song (discussing Crance, J. L., Berchok, C. L., Wright, D. L., Brewer, A. M., & Woodrich, D. F. (2019). Song production by the North Pacific right whale, Eubalaena japonica. *The Journal of the Acoustical Society of America*, *145*(6), 3467–3479).

[11] NOAA, First Recording of North Pacific Right Whale Song (June 19, 2019), https://www.fisheries.noaa.gov/feature-story/first-recording-north-pacific-right-whale-song (quoting Jessica Crance, NOAA Fisheries Alaska Fisheries Science Center).

[12] Gregr, E. J., & Coyle, K. O. (2009). The biogeography of the North Pacific right whale (Eubalaena japonica). *Progress in Oceanography*, *80*(3-4), 188–198, at 190.

[13] Shelden, K. E. W., & Clapham, P. J. (2006). Habitat requirements and extinction risks of eastern North Pacific right whales. *AFSC Processed Report 2006-06*, at 1.

B. Taxonomy

Right whales are part of the family Balaenidae, which also includes their close relatives, bowhead whales.[14] Classified in the genus *Eubalaena*, there are three species of right whales recognized today: Southern (*E. australis*), North Atlantic (*E. glacialis*), and North Pacific (*E. japonica*).[15] However, as discussed in section III.C below, right whales in the North Atlantic and North Pacific were classified as one species, *E. glacialis*, until genetic studies confirmed they are distinct.[16]

Right whales in the eastern and western North Pacific are currently both classified as *E. japonica*, but whaling and sighting records indicate they are "largely discrete populations" with separate ranges,[17] and it has long been theorized that the populations are distinct.[18] Recent mitochondrial DNA (mtDNA) comparisons support this hypothesis, confirming "striking genetic differences between western and eastern North Pacific right whales, which is consistent with the population specific genealogies observed in the haplotype network which appear to evolve independently in each population."[19]

C. Distribution and Range

Scientists are still debating the precise boundaries of the North Pacific right whale's historic and current distribution, but records and data indicate the species now occurs in a fraction of its historical range.[20] Its summer range has been relatively well studied and documented over time and in recent years. However, neither historic whalers nor modern

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[14] 71 Fed. Reg. at 77,698.

[15] Bowhead whales are classified in a different genus, *Balaena*.

[16] *See e.g.*, Rosenbaum, H. C., Brownell Jr, R. L., Brown, M. W., Schaeff, C., Portway, V., White, B. N., . . . & DeSalle, R. (2000). World-wide genetic differentiation of Eubalaena: questioning the number of right whale species. *Molecular Ecology*, *9*(11), 1793–1802; 73 Fed. Reg. 12,024, 12,025 (Mar. 6, 2008).

[17] Ferguson, M. C., Curtice, C., Harrison, J., & Van Parijs, S. M. (2015a). Biologically Important Areas for Cetaceans Within U.S. Waters – Gulf of Alaska Region. *Aquatic Mammals, 41*(1), 65–78, at 72.

[18] *See e.g.*, James E. Scarff, Historic and Present Distribution of the Right Whale (*Eubalaena glacialis*) in the Eastern North Pacific South of 50°N and East of 180° W, in RIGHT WHALES: PAST AND PRESENT STATUS, 43, 45 (Robert L. Brownell, Jr. et al., eds., 1986), at 57; Clapham, P. J., Good, C., Quinn, S. E., Reeves, R. R., Scarff, J. E., & Brownell Jr, R. L. (2004). Distribution of North Pacific right whales (*Eubalaena japonica*) as shown by 19th and 20th century whaling catch and sighting records, *J. Cetacean Res. Manage. 6*(1), 1–6, at 5 ("Overall, the north-south migratory movements . . . provide support for the idea that two largely discrete populations of right whales exist in the eastern and western North Pacific.").

[19] Pastene, L., Taguchi, M., Lang, A., Goto, M., and Matsuoka, K. (2018). Population Genetic Structure and Historical Demography of North Pacific Right Whales. Washington, D.C: International Whaling Commission, at 6; *and see* LeDuc, R. G., Taylor, B. L., Martien, K. K., Robertson, K. M., Pitman, R. L., Salinas, J. C., Burdin, A. M., Kennedy, A. S., Wade, P. R., Clapham, P. J., Brownell Jr, R. L. (2012). Genetic analysis of right whales in the eastern North Pacific confirms severe extirpation risk. *Endangered Species Research*, *18*(2), 163–167, doi:10.3354/esr00440.

[20] *See e.g.*, Shelden, K. E., Moore, S. E., Waite, J. M., Wade, P. R., & Rugh, D. J. (2005). Historic and current habitat use by North Pacific right whales Eubalaena japonica in the Bering Sea and Gulf of Alaska. *Mammal Review*, *35*(2), 129–155; Shelden & Clapham, 2006.

researchers have been able to locate the whale's mating, birthing, or calving grounds, and its winter distributions and migratory route(s) between high and low latitudes are still a mystery today.

Previous analyses of 19th and 20th century sighting and whaling data concluded North Pacific right whales ranged throughout the entire basin north of 30ºN latitude, with the species spending summer months in all pelagic areas north of 40ºN.[21] However, researchers have identified possible geographic transcription and species identification errors in the original summaries used in earlier analyses.[22] In reexamining the data while taking these errors into account, scientists concluded that rather than being widely distributed throughout the basin, North Pacific right whales historically "had a pronounced, longitudinal bimodal distribution, and were less abundant in the central North Pacific than commonly believed."[23]

In the eastern North Pacific, the summer range generally extends from the Bering Sea and Aleutian Islands to the Gulf of Alaska and British Columbia. The highest number of contemporary detections are concentrated in the Bering Sea—though that is also where the highest number of survey efforts have taken place in recent years.[24] In addition to the Bering Sea, recent acoustic and visual summer surveys have detected right whales (1) near the entrances and in Unimak Pass; (2) near Kodiak Island on the Albatross Bank and Barnabus Trough; (3) off the coast of British Columbia; and (4) off the Washington coast near Quinault Canyon (one sighting in May 1992).

There was concern until recently that North Pacific right whales were extirpated from areas near British Columbia, as none were confirmed there from 1951 until 2013, when two different individuals were identified four months apart (June and October 2013), one by Haida Gwaii and one about 15 kilometers off the southwest coast of Vancouver Island.[25] Several other sightings have occurred since, including in June 2018 near Haida Gwaii,[26] May 2020 near

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[21] Clapham et al. 2004.

[22] Josephson, E., Smith, T. D., & Reeves, R. R. (2008). Historical distribution of right whales in the North Pacific. *Fish and Fisheries*, *9*(2), 155–168; Reeves, R. R., Josephson, E., & Smith, T. D. (2004). Putative historical occurrence of North Atlantic right whales in mid-latitude offshore waters:'Maury's Smear'is likely apocryphal. *Marine Ecology Progress Series*, *282*, 295–305.

[23] Gregr & Coyle 2009, at 189 (discussing Josephson 2008; Reeves 2004).

[24] *See* Širović, A., Johnson, S. C., Roche, L. K., Varga, L. M., Wiggins, S. M., & Hildebrand, J. A. (2015). North Pacific right whales (*Eubalaena japonica*) recorded in the northeastern Pacific Ocean in 2013. *Marine Mammal Science, 31*(2), 800–807; Matsuoka, K., Crance, J. L., Taylor, J. K., Yoshimura, I., James, A., & An, Y. R. (2021). North Pacific right whale (Eubalaena japonica) sightings in the Gulf of Alaska and the Bering Sea during IWC-Pacific Ocean Whale and Ecosystem Research (IWC-POWER) surveys. *Marine Mammal Science*, 1–13, at 1 ("[T]here has been little (survey) effort outside of (the Bering Sea) region.").

[25] Ford, J. K., Pilkington, J. F., Gisborne, B., Frasier, T. R., Abernethy, R. M., & Ellis, G. M. (2016). Recent observations of critically endangered North Pacific right whales (*Eubalaena japonica*) off the west coast of Canada. *Marine Biodiversity Records*, *9*(1), 1–7.

[26] Bethany Lindsay, *Coast guard crew makes rare sighting of right whale off Haida Gwaii*, CBC News, June 20, 2018, https://www.cbc.ca/news/canada/british-columbia/coast-guard-crew-makes-rare-sighting-of-right-whale-off-haida-gwaii-1.4714956; Justine Hunter, *Hunted to the brink of extinction, the return of North Pacific Right whales to*

Vancouver Island,[27] and June 2021 near Haida Gwaii.[28] Notably, the individual seen in June 2021 had never previously been identified, and the same individual was observed feeding along the Barnabas Trough in the Gulf of Alaska in August 2021[29]—providing an exceedingly rare glimpse into the movement and habitat of these rare whales.

It is generally understood that North Pacific right whales migrate south for the winter, but as noted, the location of their winter and calving habitat has never been identified. Some have theorized the whales give birth and winter in far offshore areas,[30] but this is at least partly based on historical records and summaries that have since been brought into question.[31]

Since 1990, nine individuals were confirmed in eight sightings during the winter and spring in the southeastern North Pacific, all off the coast of California from February to May except two: one off the southern tip of Baja California, Mexico, in February 1996; and one at the Hawaiian Islands Humpback Whale National Marine Sanctuary in April 1996. The sighting in Baja California is the southernmost confirmation in the eastern North Pacific in recent decades. The Hawaii sighting is noteworthy because the same individual photographed there in April was sighted in the southeastern Bering Sea less than four months later, 4,111 kilometers away, becoming the first and only time an individual has been documented in high and low latitudes.[32] This same whale was also photographed in the Bering Sea in 2000 and 2008–2010.[33]

The paucity of documented sightings in the southeastern North Pacific is likely not only due to their low population numbers, but also because right whales are incorrectly identified as other species.[34] "This was the case with a right whale sighted off La Jolla, California in 2017; originally misidentified as a gray whale, it wasn't until drone footage circulated around social media that it was correctly identified as a right whale."[35]

B.C. waters brings hope, The Globe and Mail, July 31, 2021, https://www.theglobeandmail.com/canada/british-columbia/article-hunted-to-the-brink-of-extinction-the-return-of-north-pacific-right/.

[27] Declaration of Richard Goings (July 6, 2020) (marine merchant discussing a sighting that marine scientists, including an expert from NOAA, confirmed through video footage).

[28] NOAA (2021). Four Endangered North Pacific Right Whales Spotted in the Gulf of Alaska (Sept. 9, 2021), https://www.fisheries.noaa.gov/feature-story/four-endangered-north-pacific-right-whales-spotted-gulf-alaska

[29] *Id.*

[30] Clapham, P. J., Good, C., Quinn, S. E., Reeves, R. R., Scarff, J. E., & Brownell Jr, R. L. (2004). Distribution of North Pacific right whales (*Eubalaena japonica*) as shown by 19th and 20th century whaling catch and sighting records, *J. Cetacean Res. Manage. 6*(1), 1–6, at 6.

[31] Josephson, E., Smith, T. D., & Reeves, R. R. (2008). Historical distribution of right whales in the North Pacific. *Fish and Fisheries, 9*(2), 155–168.

[32] Kennedy, A. S., Salden, D. R., & Clapham, P. J. (2012). First high-to low-latitude match of an eastern North Pacific right whale (*Eubalaena japonica*). *Marine Mammal Science*, *28*(4), E539, at 2.

[33] Kennedy 2012, at 2.

[34] Crance, J. (2022). Right on the Edge: Can Their Pacific Cousins Be Saved? *In* Right Whales at Risk. *Whalewatcher*, *44*(2), at 51.

[35] Crance 2022, at 51.

D. Feeding and Prey

Right whales feed by capturing and filtering prey through their baleen. They have been observed skimming the ocean surface for up to four to six minutes at a time, slowly moving through patches of zooplankton with open mouths.[36] North Atlantic right whales have also been observed feeding on diapausing copepods up to 174 meters below the surface.[37] It is estimated they need to consume between 407,000 and 4,140,000 calories each day.[38] However, as high as that number seems, it may be much higher: scientists recently found previous studies "underestimated baleen whale prey consumption by threefold or more."[39]

Based on field observations and stomach content analyses, scientists believe North Pacific right whales "forage almost exclusively on zooplankton, principally calanoid copepods."[40] Stomach content analyses and biomass surveys identified three species of prey, which included *Neocalanus plumchrus*, *N. cristatus*, and *Calanus marshallae*.[41] Canadian researchers also observed a right whale feeding on *N. plumchrus* near Haida Gwaii in June 2013, describing the feeding behavior as follows:

> Each day, the whale's predominant behaviour was feeding on visibly dense aggregations of zooplankton prey at the surface. On 9 June, it was feeding over the steep continental slope with bottom depths of about 450 m. On 12 and 13 June, it was feeding over shallower parts of the slope with bottom depths of 150–250 m. On 2 days, small samples of prey were collected at the surface using a fine-meshed net about 30 m behind the feeding whale. These were identified as late-stage copepods *Neocalanus plumchrus* (C5: n = 13; C4: n = 1).[42]

E. Reproduction

North Pacific right whales reach sexual maturity around eight to 10 years of age,[43] with best estimates showing females reach sexual maturity when they are between 14.1 and 15.0

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[36] Gregr & Coyle 2009, at 189.

[37] Gregr & Coyle 2009, at 189–90.

[38] Gregr & Coyle 2009, at 190.

[39] Savoca, M. S., Czapanskiy, M. F., Kahane-Rapport, S. R., Gough, W. T., Fahlbusch, J. A., Bierlich, K. C., ... & Goldbogen, J. A. (2021). Baleen whale prey consumption based on high-resolution foraging measurements. *Nature, 599*(7883), 85–90, at 85 (abstract).

[40] Gregr & Coyle 2009, at 189.

[41] Gregr & Coyle 2009, at 190.

[42] Ford, J. K., Pilkington, J. F., Gisborne, B., Frasier, T. R., Abernethy, R. M., & Ellis, G. M. (2016). Recent observations of critically endangered North Pacific right whales (*Eubalaena japonica*) off the west coast of Canada. *Marine Biodiversity Records*, *9*(1), 1–7, at 4.

[43] Shelden, K. E. W., & Clapham, P. J. (2006). Habitat requirements and extinction risks of eastern North Pacific right whales. *AFSC Processed Report 2006-06*, at 1.

meters and males between 14.1 and 15.5 meters in length.[44] Females are pregnant for about 12 to 13 months[45] and give birth to a single calf on an average of every three to four years, which is lower than other large baleen whales, including fin, humpback, and blue whales.[46] NMFS describes the close bond between mothers and calves:

> Calves are born able to swim, and mothers and calves form a very close attachment. Calves stay close to their mothers, swimming up on their backs or butting them with their heads. Mother may roll over on their backs and hold their calves in their flippers. Calves are usually weaned toward the end of their first year.[47]

As with calving and wintering habitat, the mating grounds of North Pacific right whales are unknown. Mating strategies are also largely unknown, but scientists may have discovered one important mating behavior: North Pacific right whales not only produce "gunshot" calls and other sounds, but they produce these in rhythmic, consistent, and recognizable patterns to comprise a song.[48] Both males and females produce gunshot calls, but scientists have only confirmed males piece sounds together into a song.[49] And while it is currently only a hypothesis, scientists believe these songs most likely are an acoustic reproductive display based on current knowledge about other mysticetes.[50]

The songs may play a role in several reproductive strategies, including social ordering and hierarchy among males. They may serve as a display of dominance and competitive function, or as an element of male-to-male cooperation and way to recognize close associates, as has been suggested for humpback whales.[51] "Alternative functions include to stimulate ovulation . . . or as an indicator of size, and thus suitability, of males as a mate."[52]

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[44] Ivashchenko, Y. V., & Clapham, P. J. (2012). Soviet catches of right whales Eubalaena japonica and bowhead whales Balaena mysticetus in the North Pacific Ocean and the Okhotsk Sea. *Endangered Species Research*, *18*(3), 201–217, at 214.

[45] NMFS, North Pacific Right Whale, https://www.fisheries.noaa.gov/species/north-pacific-right-whale#conservation-management (last updated Feb. 14, 2022).

[46] Clapham, P. J., Young, S. B., & Brownell Jr, R. L. (1999). Baleen whales: conservation issues and the status of the most endangered populations. *Mammal Review*, *29*(1), 35–60, at 42.

[47] NMFS. North Pacific Right Whale, https://www.fisheries.noaa.gov/species/north-pacific-right-whale (last updated Feb. 14, 2022).

[48] Crance, J. L., Berchok, C. L., Wright, D. L., Brewer, A. M., & Woodrich, D. F. (2019). Song production by the North Pacific right whale, *Eubalaena japonica*. *The Journal of the Acoustical Society of America*, *145*(6), 3467–3479.

[49] Crance et al. 2019, at 3476.

[50] Crance et al. 2019, at 3476.

[51] Darling, J. D., Jones, M. E., & Nicklin, C. P. (2006). Humpback whale songs: Do they organize males during the breeding season?. *Behaviour*, 1051–1101.

[52] Crance et al. 2019, at 3476.

All songs analyzed in the acoustical study were recorded in the whale's summer feeding grounds in the eastern Bering Sea, not any known breeding areas. However, courtship and breeding may not be restricted to lower latitudes and may extend into feeding grounds, as is documented with humpback whales.[53] A NMFS survey crew also observed possible courtship behavior among a group of three to four whales in the eastern Bering Sea in July 1996:

> In the current sighting the whales occasionally dived in synchrony. Between dives they were at the surface for long periods of time. Members of the group were often in physical contact and stayed together throughout the observation period. They rolled frequently, sometimes putting pectoral fins into the air. Two adult whales were very close together. On at least two occasions, one of the pair rolled onto its back and urinated into the air with penis extended. This behavior is associated with courtship but not necessarily with mating.[54]

F. Abundance and Population Trends

There are no reliable historical population estimates for the North Pacific right whale, but researchers believe the eastern and western stocks together numbered in the tens of thousands,[55] and today's numbers represent "only a small fraction" of their abundance before commercial whaling began.[56] Commercial whaling for the eastern population started in the Gulf of Alaska in 1835, and like other species of right whales, it quickly devastated the population. An estimated 26,000 to 37,000 individuals were killed before 1900,[57] including 21,000 to 30,000 from 1840 to 1849 alone.[58]

All right whales were protected under the 1946 International Convention for the Regulation of Whaling, which went into force in November 1948, but illegal hunting continued for decades.[59] Soviet whaling fleets illegally killed the highest number of right whales during

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[53] Crance et al. 2019, at 3476.

[54] Goddard, P. D., & Rugh, D. J. (1998). A group of right whales seen in the Bering Sea in July 1996. *Marine Mammal Science*, *14*(2), 344–349, at 346.

[55] NMFS (2013). Final Recovery Plan for the North Pacific Right Whale, at I-2.

[56] Cooke, J. G., & Clapham, P. J. (2018). Eubalaena japonica (northeast Pacific subpopulation). *The IUCN Red List of Threatened Species*, https://dx.doi.org/10.2305/IUCN.UK.2018-1.RLTS.T133706A50385246.en.

[57] Ivashchenko, Y. V., & Clapham, P. J. (2012). Soviet catches of right whales Eubalaena japonica and bowhead whales Balaena mysticetus in the North Pacific Ocean and the Okhotsk Sea. *Endangered Species Research*, *18*(3), 201–217, at 202.

[58] Cooke, J. G., & Clapham, P. J. (2018). Eubalaena japonica (northeast Pacific subpopulation). *The IUCN Red List of Threatened Species*, https://dx.doi.org/10.2305/IUCN.UK.2018-1.RLTS.T133706A50385246.en.

[59] Ivashchenko & Clapham 2012, at 202; Ivashchenko, Y. V., & Clapham, P. J. (2014). Too much is never enough: the cautionary tale of Soviet illegal whaling. *Marine Fisheries Review, 76*(1-2), 1–22. Right whales were also protected under the 1935 Convention for the Regulation of Whaling, but the Soviet Union did not ratify that agreement. Clapham, P. J., Young, S. B., & Brownell Jr, R. L. (1999). Baleen whales: conservation issues and the status of the most endangered populations. *Mammal Review*, *29*(1), 35–60, at 41.

this time, including an estimated 765 individuals in the North Pacific between 1948 and 1979.[60] This "likely removed the bulk of what may have been a small but slowly recovering population," leading to "the current precarious state and lack of recovery of this population, which was probably driven to extremely low numbers with only a few surviving mature whales."[61]

The eastern population of North Pacific right whales is the smallest known whale population in the world today, with fewer than 50 individuals estimated to be surviving. A 2011 study estimated the population includes only 28 to 31 individuals based on genotype and photographic data,[62] and a 2012 study estimated the effective population size (Ne) is exceedingly low—just 11.6 total whales.[63] Although these estimates may only relate to a Bering Sea subpopulation, recent data indicate individuals in the Gulf of Alaska and Bering Sea are part of the same population, and it is unlikely its population is any larger than these estimates given the limited number of sightings in the eastern North Pacific in recent years.[64] A total of 29 individuals were photographically identified between 2008 and 2018,[65] and two additional whales were identified for the first time in 2021.[66]

The "alarmingly low" number of reproducing right whales raises significant concerns regarding inbreeding and genetic diversity, and analyses also indicate there is a high male-to-female ratio, heightening concerns regarding population growth and viability even more. A genetic study published in 2011 estimated the ratio is two-to-one male biased,[67] but biopsy samples collected in 2017 and 2018 found five of six whales were male, "suggest[ing] this ratio may be more skewed toward males than previously thought."[68] According to NMFS, the minimum population estimate is just 26 individuals, with a potential biological removal (PBR) level of one take every 20 years.[69] "However, the male bias likely results in lower than expected calf production and, thus, this PBR could be overestimated."[70]

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[60] Rocha, R. C., Clapham, P. J., & Ivashchenko, Y. V. (2014). Emptying the oceans: a summary of industrial whaling catches in the 20th century. *Marine Fisheries Review, 76*(4), 37–48, at 39 (noting the estimate was revised after additional catches came to light, updating the numbers reported in Ivashchenko & Clapham (2012) and Ivaschchenko, Y. V., Clapham, P. J., & Brownell, J. R. (2013). Soviet catches of whales in the North Pacific: revised totals. J. Cetacean Res. Manage, 13, 59–71).

[61] Ivashchenko & Clapham 2012, at 213, 215

[62] Wade, P. R., Kennedy, A., LeDuc, R., Barlow, J., Carretta, J., Shelden, K., . . . & Clapham, P. J. (2011a). The world's smallest whale population? *Biology Letters*, *7*(1), 83–85.

[63] LeDuc et al. 2012.

[64] Wade et al. 2011a; LeDuc et al. 2012, at 166 ("The genetic test [of a whale biopsied in the Gulf of Alaska] did not exclude that whale from the Bering Sea population, suggesting that the small numbers of whales found in the Gulf of Alaska may be a part of the same population found in the Bering Sea."); NMFS 2013, at I-11 (Recovery Plan).

[65] Muto et al. 2020, at 249 (2019 Stock Assessment).

[66] NOAA, Four Endangered North Pacific Right Whales Spotted in the Gulf of Alaska (Sept. 9, 2021), https://www.fisheries.noaa.gov/feature-story/four-endangered-north-pacific-right-whales-spotted-gulf-alaska.

[67] LeDuc et al. 2012, at 165.

[68] Matsuoka et al. 2021, at 9.

[69] Muto, M. M., Helker, V. T., Delean, B. J., Young, N. C., Freed, J. C., Angliss, R. P., . . . & Zerbini, A. N. (2021). Alaska marine mammal stock assessments, 2020, NOAA-TM-AFSC-421, at 257, 258 [2020 Stock Assessment]; *see*

III. Legal and Factual Background

A. Legal Framework of Critical Habitat Designations

Congress enacted the ESA in 1973, recognizing that "untempered" economic growth and development was rapidly eliminating or imperiling many species that are "of esthetic, ecological, educational, historical, recreational and scientific value to the Nation and its people."[71] The statute aims "to provide a program for the conservation of . . . endangered species and threatened species," as well as "a means whereby *the ecosystems upon which [these] species depend* may be conserved."[72]

The legislative history of the ESA demonstrates that Congress believed habitat preservation is an essential component of conservation:

> [C]lassifying a species as endangered or threatened is only the first step in insuring its survival. Of equal or more importance is the determination of the habitat necessary for that species' continued existence. . . . If the protection of endangered and threatened species depends in large measure on the preservation of the species' habitat, then *the ultimate effectiveness of the Endangered Species Act will depend on the designation of critical habitats*.[73]

Thus, upon listing a species as threatened or endangered, the Secretary of Commerce (through her agent, NMFS) must designate any areas "then considered to be critical habitat" "to the maximum extent prudent and determinable."[74] Designations must be based on "the best scientific data available" and account for economic, national security, and other impacts.[75] These standards also govern subsequent revisions of critical habitat designations, which may occur "from time-to-time . . . as appropriate."[76]

The ESA defines critical habitat to include "the specific areas within the geographical area occupied by the species, at the time it is listed [as threatened or endangered], on which are found those physical or biological features (I) essential to the conservation of the species and (II)

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16 U.S.C. § 1362(20) "'[P]otential biological removal level' means the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.").

[70] Muto et al. 2021, at 258 (2020 Stock Assessment).

[71] 16 U.S.C. § 1531(a)(1), (3).

[72] *Id.* § 1531(b) (emphasis added).

[73] H.R. Rep. No. 94-887, at 3 (1976).

[74] 16 U.S.C. § 1533(a)(3).

[75] *Id.* § 1533(b)(2).

[76] *Id.* § 1533(a)(3)(A)(ii); *see also* 50 C.F.R. 424.12(f) ("The Secretary may revise existing designations of critical habitat . . . as new data become available.")

which may require special management considerations or protection."[77] When identifying such "physical and biological features," NMFS may consider "the appropriate quality, quantity, and spatial and temporal arrangements of such features in the context of the life history, status, and conservation needs of the species."[78, 79] ESA regulations further define these essential features as follows:

> The features that occur in specific areas and that are essential to support the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, sites, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.[80]

The ESA allows individuals to petition NMFS to revise critical habitat designations.[81] Within 90 days of receiving a petition for critical habitat revision, NMFS "shall make a finding as to whether the petition presents substantial scientific information indicating that the revision may be warranted" and "promptly publish such finding in the Federal Register."[82] If NMFS finds the revision may be warranted, it must "determine how [it] intends to proceed" within 12 months of receiving the petition and "promptly publish" this decision in the Federal Register as well.[83]

B. The Importance of Critical Habitat Designations

Critical habitat designations provide endangered and threatened species with several important protections. Pursuant to section 7 of the ESA, federal agencies must consult with NMFS to ensure they do not authorize, fund, or carry out any action likely to either "jeopardize

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[77] 16 U.S.C. § 1532(5)(A)(i).

[78] 50 C.F.R. § 424.12(b)(1)(ii).

[79] All regulations cited herein include revisions that went into effect on September 26, 2019, and January 15, 2021. 84 Fed. Reg. 45,020 (Aug. 27, 2019); 85 Fed Reg. 81,411 (Dec. 16, 2020). Revision of critical habitat is required under both the old and revised regulations, and most likely will be maintained through any forthcoming revision or reversion. The Center and other conservation organizations are currently challenging the revised regulations in federal court. *Conservation Council for Hawai'i v. Haaland*, No. 1:21-CV-00040; *Ctr. for Biological Diversity v. Haaland*, No. 1:21-CV-00041. Additionally, the Biden administration has proposed to rescind a portion of the regulations that became effective in January 2021—specifically, removing the new definition for "habitat"—and has signaled it will propose to rescind or revise other portions of the 2019 and 2021 regulations as well. 86 Fed. Reg. 59,353 (Oct. 27, 2021); Press Release, NMFS, NOAA Fisheries and U.S. Fish and Wildlife Service to Propose Regulatory Revisions to Endangered Species Act, https://www.fisheries.noaa.gov/press-release/noaa-fisheries-and-us-fish-and-wildlife-service-propose-regulatory-revisions (June 4, 2021).

[80] 50 C.F.R. § 424.02.

[81] 16 U.S.C. § 1533(b)(3)(D)(i); *see also id.* at § 1533(a)(3)(A)(ii) (After designating critical habitat, NMFS "may, from time-to-time . . . as appropriate, revise such designation); 5 U.S.C. § 553(e) ("each agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule").

[82] 16 U.S.C. § 1533(b)(3)(D)(i).

[83] *Id.* § 1533(b)(3)(D)(ii).

the continued existence" of a protected species or "result in the destruction or adverse modification" of its critical habitat.[84] Thus, critical habitat designations assist federal agencies in determining whether consultation is required for actions beyond those that result in direct mortality or injury to members of a protected species. In addition, critical habitat designations highlight geographic areas that require special considerations, allowing agencies to identify and avoid conflicts between protected species and proposed projects early in the planning process. Critical habitat designations also help focus federal, state, and private conservation and management activities—including recovery efforts—on places that most need protection.

The benefits stemming from critical habitat designation are not merely speculative. Evidence suggests that species with critical habitat designations are more than twice as likely to show improving population trends compared to those without designated critical habitat.[85] The North Pacific right whale will benefit from the protection of the areas proposed in this petition, namely, protection of (1) a vital feeding area and (2) a key travel corridor connecting its habitat in the Bering Sea to large portions of its range. These protections are crucial for ensuring the conservation and survival of this critically endangered species.

C. Listing of the North Pacific Right Whale Under the Endangered Species Act

The United States officially recognized right whales were "threatened with worldwide extinction" in 1970, adding them to an "Endangered Species List" that pre-dated the ESA.[86] This "endangered" status was extended when Congress established the ESA in 1973, but the two U.S. populations of right whales—North Atlantic and North Pacific—were listed as a single species until 2008, eight years after scientists confirmed they are separate and distinct.[87] Conservation efforts suffered as a result, and it was only after the Center petitioned for listing[88] and filed legal action[89] that NMFS enacted a final rule to recognize and protect North Atlantic and North Pacific right whales as two separate species under the ESA.[90]

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[84] *Id.* § 1536(a)(2).

[85] Taylor, M. F., Suckling, K. F., & Rachlinski, J. J. (2005). The effectiveness of the Endangered Species Act: a quantitative analysis. *BioScience*, *55*(4), 360–367.

[86] 35 Fed. Reg. 8491, 8495 (June 2, 1970) (adding all baleen whale species worldwide to the "Endangered Species List" under the Endangered Species Conservation Act, the precursor to the ESA).

[87] The North Pacific right whale was recognized as a distinct species in 2000. Rosenbaum, H. C., Brownell Jr, R. L., Brown, M. W., Schaeff, C., Portway, V., White, B. N., . . . & DeSalle, R. (2000). World-wide genetic differentiation of Eubalaena: questioning the number of right whale species. *Molecular Ecology*, *9*(11), 1793–1802.

[88] *See* Center for Biological Diversity, Petition to List the North Pacific Right Whale (*Eubalaena japonica*) as an Endangered Species Under the Endangered Species Act (Aug. 16, 2005).

[89] *See* Complaint for Declaratory and Injunctive Relief, *Ctr. for Biological Diversity v. Gutierrez*, No. 06-7786 (N.D. Cal. Dec. 20, 2006).

[90] NMFS published a final rule to list the North Atlantic and North Pacific right whales as two distinct species in 2003. 68 Fed. Reg. 17,560 (Apr. 10, 2003). However, NMFS rescinded that decision in 2005, citing procedural deficiencies, 70 Fed. Reg. 1830 (Jan. 11, 2005), and it did not publish a subsequent final rule until 2008. 73 Fed. Reg. 12,024 (Mar. 6, 2008).

D. History of the Critical Habitat Designation for the North Pacific Right Whale

NMFS noted the importance of designating critical habitat in the Pacific Ocean in its original recovery plan for right whales, which was issued in 1991.[91] At the time, the recovery team said it did not yet know which areas in the Pacific were critical to the whales' survival, but it recommended such areas be protected when they were identified, setting a timeline to do so by 1996. NMFS designated critical habitat for right whales in the Atlantic Ocean in 1994, but it did not finalize a designation in the Pacific until 2006—a decade after the 1996 target date—and only after the Center filed a petition and lawsuit to finally compel the action.

The Center filed a petition to revise the critical habitat designation for right whales to include areas in the Bering Sea in October 2000, when right whales in the Northern Hemisphere were still listed under the ESA as a single species.[92] NMFS published an initial positive 90-day finding on the petition in June 2001,[93] but it denied the petition in its final determination in February 2002, stating, "the extent of critical habitat [could] not be determined at this time . . . ."[94]

The Center challenged NMFS's refusal to designate critical habitat on October 25, 2004,[95] filing a lawsuit after twice noticing the agency that it would face litigation if it did not take action. A federal district judge found the best available science supported a critical habitat designation, specifying that while the precise boundaries of critical habitat were not "knowable with geographic exactitude," "Congress did not contemplate paralysis while critical habitat issues were studied to death."[96] The Court ordered NMFS to complete all rulemaking for a critical habitat designation by June 30, 2006, stating, "there are a few precious right whales left in the Pacific and even fewer females, [and thus] delay—of any length of time—brings the species closer to extinction."[97] NMFS issued its final rule to revise the critical habitat designation on July 6, 2006, and with it included areas in the Pacific Ocean for the first time.[98]

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[91] NMFS (1991). Final Recovery Plan for the Northern Right Whale (*Eubalaena glacialis*). Prepared by the Northern Right Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, MD. 86 p.

[92] Center for Biological Diversity, Petition to Revise the Critical Habitat Designation for the Northern Right Whale (*Eubalaena glacialis*) Under the Endangered Species Act (Oct. 4, 2000).

[93] 66 Fed. Reg. 29,773 (June 1, 2001).

[94] 67 Fed. Reg. 7660 (Feb. 20, 2002).

[95] *Ctr. for Biological Diversity v. Evans*, No. 04-4496-WHA (N.D. Cal.).

[96] *Ctr. for Biological Diversity v. Evans*, No. 04-4496-WHA, 2005 U.S. Dist. LEXIS 44984, *18 (June 14, 2005).

[97] *Id.* at *14.

[98] 71 Fed. Reg. 38,277 (July 6, 2006). The same areas included in this designation were formally designated for the North Pacific right whale after NMFS recognized and listed it as a distinct species. 73 Fed. Reg. 19,000 (Apr. 8, 2008).

E. Current Critical Habitat Designation

The current critical habitat designation for North Pacific right whales includes two areas: one in the Gulf of Alaska near Kodiak Island and one in the southeastern Bering Sea (*see* Figure 1).[99] Both areas were designated due to their importance as feeding grounds to right whales, with physical and biological oceanic conditions that "promote high productivity and aggregation of large copepods"—their primary prey.[100] Specifically, these areas support large congregations of the copepods *Calanus marshallae*, *Neocalanus cristatus*, and *N. plumchris*, and the euphausiid *Thysanoessa raschii*, which NMFS identified as "primary constituent elements" for the species.[101]

In addition to these zooplankton, NMFS determined the whale's feeding areas are characterized by "nutrients, physical oceanographic processes, . . . and a long photoperiod due to the high latitude."[102] NMFS based the current critical habitat designation on recent right whale sightings, using these "as a proxy for the existence of suitably dense copepod and euphausiid patches" due to the lack of data on densities and presence of such areas.[103]

[99] 50 C.F.R. § 226.215.

[100] 73 Fed. Reg. at 19,003.

[101] 50 C.F.R. § 226.215(a).

[102] 73 Fed. Reg. at 19,003.

[103] 73 Fed. Reg. at 19,005.

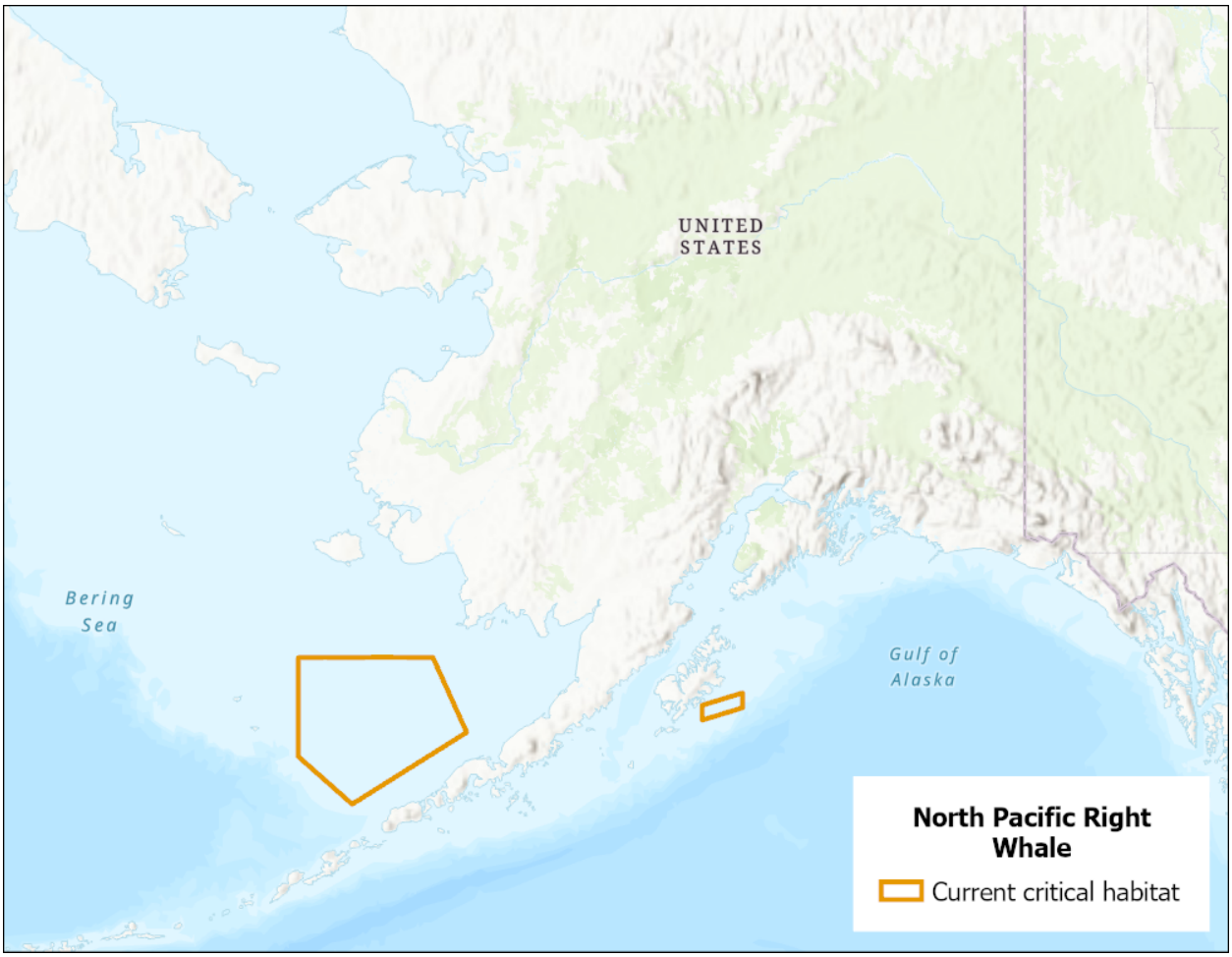

Figure 1. Current critical habitat designation for the North Pacific right whale. Map by Kara Clauser, Center for Biological Diversity (critical habitat shapefiles from NMFS).

F. Revision of Critical Habitat Is Necessary

NMFS has recognized the need to identify and protect North Pacific right whale critical habitat for decades, yet only a small area is currently designated. NMFS and others have invested resources to study and identify its habitats in recent years, and while there is much left to be understood, these efforts are beginning to pay off. Importantly, research now confirms a vital migratory point through the Fox Islands in the Aleutian chain, concentrating through Unimak Pass. New research also confirms that essential feeding grounds along Albatross Bank and Barnabas Trough near Kodiak Island expand beyond the small critical habitat unit that is currently designated. The proposed revision would encompass and connect these important habitats.

Revising the critical habitat designation to include these areas is necessary because existing regulatory measures are ineffective in protecting the essential physical and biological features they support. New information makes the petitioned, revised designation prudent and

determinable, and new information shows the threats of ship strikes, entanglements, and other anthropogenic impacts are increasing in these habitats. We are at a critical juncture with respect to right whale conservation, and these major, increasing threats make special management considerations and protections urgently necessary. Given the precarious status of the North Pacific right whale, NMFS must employ an "all hand-on-deck" approach if it is to prevent the species' demise, which includes using the best available science to protect this critical habitat as proposed.

IV. Requested Revision of Critical Habitat

A. Areas Proposed for Designation

The Center for Biological Diversity and Save the North Pacific Right Whale petition NMFS to revise the critical habitat designation by expanding the current boundaries to include a documented migratory passageway and a vital feeding area. Specifically, we request that NMFS extend the Bering Sea boundary westward and southward to the Fox Islands, through Unimak Pass to the edge of the continental slope, and eastward to Kodiak Island—encompassing a key migratory point and connecting two essential feeding grounds (*see* Figure 2).

As discussed below, the proposed expansion contains "physical and biological features" that are "essential to the conservation of the species," and these features "may require special management considerations or protection."[104] Connecting the two existing critical habitat units into an expanded, single unit as proposed meets the criteria for designation and will help protect the fundamental physical and biological needs of this gravely endangered whale.[105]

[104] 16 U.S.C. § 1532(5)(A)(i).

[105] *See, e.g.* 50 C.F.R. § 424.12(d) ("When several habitats, each satisfying the requirements for designation as critical habitat, are located in proximity to one another, the Secretary may designate an inclusive area as critical habitat.")

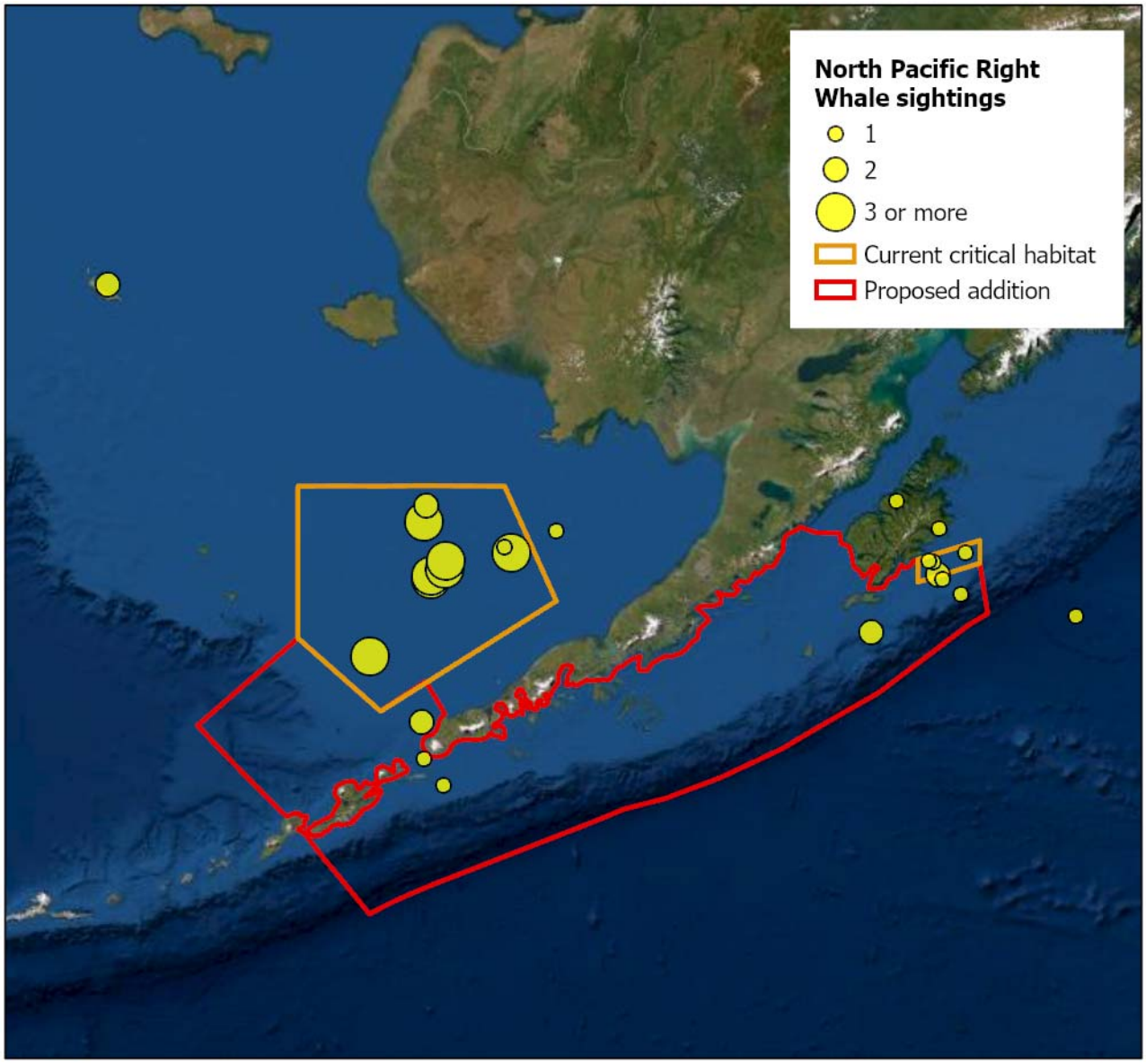

Figure 2. The proposed revision to critical habitat is outlined in red, the current critical habitat designation is outlined in orange, and North Pacific right whale sightings since 1970 are shown in yellow. In addition to visual sightings, there were 480 acoustic detections of right whales in Unimak Pass on 37 days between 2009 and 2015.[106] Map by Kara Clauser, Center for Biological Diversity (sighting data compiled by Save the North Pacific Right Whale, https://www.northpacificrightwhale.org/recent-sightings).

[106] Wright et al. 2018, at 82.

B. The Proposed Area Contains Physical and Biological Features That Are Essential to the Conservation of the Species

Since the initial critical habitat designation, researchers have confirmed a key, primary travel corridor in the Pacific: the Fox Island passes on the eastern Aleutian chain, concentrated through Unimak Pass. These passes connect the whale's habitat in the Bering Sea with that in the Gulf of Alaska and its southern wintering range, providing physical and biological characteristics that are essential for its life-history needs. The proposed designation also connects to and expands the existing Kodiak Island unit to encompass vital feeding grounds along the Albatross Bank and Barnabus Trough—"the only location within the Gulf where this species has been consistently identified for the last four decades."[107] The areas in the proposed expansion are essential to the survival of the North Pacific right whale, containing unique features necessary for its movement, feeding, and other fundamental life functions.

1. Fox Islands and Unimak Pass

The Aleutian Islands are a unique ecosystem, forming "the world's only longitudinally oriented, high-latitude island archipelago."[108] Spanning nearly 1,100 miles (1,740 km), the archipelago includes thousands of islands but only a few dozen passes between them, effectively dividing the Bering Sea from the Pacific Ocean.[109] Unimak Pass is one of the most significant of these passes, and though it is only about 10 miles wide at its narrowest point, it is the largest of the Fox Island passes and "only major, direct conduit between the [continental] shelves of the North Pacific and eastern Bering Sea."[110]

The flow through Unimak Pass contains a mixture of water from the North Pacific and Bering Canyon, bringing an important source of nutrients to the southeastern Bering Sea shelf.[111] These nutrients enhance the production of phytoplankton and zooplankton on the shelf's edge, leading to high concentrations of fish and squid, and in turn, huge numbers of seabirds and marine mammals.[112] This rich "Green Belt" is one of the most biologically productive and diverse places on earth.[113]

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[107] NMFS, North Pacific Right Whale (*Eubalaena japonica*) Five-Year Review: Summary and Evaluation (Dec. 2017), at 13 (citing Wade et al. 2011a).

[108] Logerwell, E. A., Aydin, K., Barbeaux, S., Brown, E., Conners, M. E., Lowe, S., . . & Spencer, P. (2005). Geographic patterns in the demersal ichthyofauna of the Aleutian Islands. *Fisheries Oceanography*, *14* (Suppl. 1), 93–112.

[109] Zimmermann, M., & Prescott, M. M. (2021). Passes of the Aleutian Islands: First detailed description. *Fisheries Oceanography*, *30*(3), 280–299.

[110] Stabeno, P. J., Reed, R. K., & Napp, J. M. (2002). Transport through Unimak Pass, Alaska. *Deep Sea Research Part II: Topical Studies in Oceanography*, *49*(26), 5919–5930.

[111] Stabeno et al. 2002.

[112] Springer, A. M., McRoy, C. P., & Flint, M. V. (1996). The Bering Sea Green Belt: shelf-edge processes and ecosystem production. *Fisheries Oceanography*, *5*(3-4), 205–223.

[113] *Village of False Pass v. Watt*, 565 F. Supp. 1123, 1130 (D. Alaska 1983); Stabeno, P. J., Schumacher, J. D., & Ohtani, K. (1999). The physical oceanography of the Bering Sea. *Dynamics of the Bering Sea*, 1–28, at 3. (citing Walsh et al. 1989); LGL Alaska Research Associates, Marine Birds and Mammals of the Unimak Pass Area:

The importance of Unimak Pass to migratory and seasonal movements has long been known. A review of information 35 years ago highlighted its significance:

> Unimak Pass is one of the major migration corridors for mammal populations entering and leaving the Bering Sea. Unimak Pass and the eastern Aleutian Islands are clearly shown to have high use by whales relative to neighboring areas. Most large cetacean species appear to enter the Bering Sea in greatest numbers in June between eastern Aleutian Islands. *The diversity and seasonal abundance of marine mammals in and adjacent to Unimak Pass and along the continental slope can be found in no other part of Alaska and perhaps the world.* The ecological significance of this region to marine mammals (as well as to other wildlife and fishes) is not yet fully understood, but in sheer numbers and multitude of species it is a region of primary importance because of the concentration of major portions of regional populations of several species.[114]

Marine mammals that travel through Unimak Pass include northern fur seals; Steller's sea lions; Dall's porpoise; and humpback, fin, sei, minke, sperm, and gray whales. Millions of seabirds also use Unimak Pass[115]—including Steller's eiders, crested auklets, black-legged kittiwakes, short-tailed shearwaters, and short-tailed albatrosses, to name just a few—as do many species of fish and zooplankton.[116]

Scientists have long suspected that North Pacific right whales also migrate through Unimak Pass.[117] This was drawn from observations, assumptions, and the fact that right whales were taken by commercial whalers who were based on Akutan Island near Unimak Pass, with two whaling records from Unimak Pass itself.[118] This suspicion was substantiated in a long-term acoustical analysis, which used data from a recording devise that was deployed annually in the center of Unimak Pass from 2009 to 2015.[119] Right whales "were acoustically detected in low, but persistent number throughout the dataset, confirming their presence in the high-traffic Unimak Pass."[120]

Abundance, Habitat Use and Vulnerability. MMS Contract 14-35-0001-3056 (Aug. 1991), at 6-6 (citing Brahan et al 1982).

[114] Truett, J. C., & Craig, P. C. (1986). Final Report: Evaluation of Environmental Information for the Unimak Pass Area, Alaska. LGL Ecological Research Associates, at 23 (citations omitted).

[115] Truett & Craig1986, at 54 ("The abundance of birds in the Unimak area is so large and regionally important that potential impacts of ocean transportation in this area are listed as being of concern for [oil and gas] developments as far away as the Navarin Basin. An estimate of 1.1 million shearwaters has been recorded in the pass in the fall. The mean density of all species using the pass in summer was estimated by Strauch and Hunt (1982) to be 224 birds/km^2 or 720,000 birds in the pass area." (citations omitted))

[116] Truett & Craig 1986, at 3–5, 89.

[117] *See, e.g.,* Truett & Craig 1986, at 28 ("[T]his species may still use the Unimak Pass area during migration"); LGL 1991, at 6-16 (same).

[118] LGL 1991, at 6-16.

[119] Wright et al. (2018), at 78.

[120] Wright et al. 2018, at 85.

In all, data from 1,778 days were analyzed, with a total of 480 right whale vocalizations detected on 37 days.[121] This included 31 individual "upcalls" on 7 days and 449 "gunshot" calls on 32 days.[122] This is a high number of detections given the rarity of the population, and it was "most likely underreport[ed]" "given the pervasiveness of vessel noise" in Unimak Pass, which undoubtedly masked both types of right whale call types (upcalls and gunshots).[123]

Aside from the high number, the timing of the detections is also significant: right whales were detected in Unimak Pass "in all years and seasonal timeframes," but they were also "clustered in time and intermittent throughout the study period." Specifically, the highest number of detections occurred from December through February, followed by March through May,[124] "confirming that [North Pacific right whales] use this Aleutian Pass during the assumed migratory period from the Bering Sea."[125] However, the study also confirmed that right whales use Unimak Pass both "during and outside of the assumed migratory period," making it important habitat for much of the year.[126]

In addition to these acoustic detections, there have also been three visual sightings of four North Pacific right whales in or adjacent to Unimak Pass in recent decades, within the proposed critical habitat revision (*see* Figure 2). Most recently, two whales were sighted just northeast of Unimak Pass in February 2022, which a fishing boat captain captured on video that NMFS scientists reviewed and confirmed.[127] Notably, this 2022 sighting was the first ever visual confirmation of North Pacific right whales in the Bering Sea during the winter season.[128] Additional sightings include one inside Unimak Pass in April 1993[129] and one at the southern end of Unimak Pass in September 2004.[130]

Recent detections, sightings, and data make it clear that the Fox Island passes, concentrating through Unimak Pass, provide a critical link between habitats and are essential for the life functions and conservation of the species. This information shows that designation of this habitat is both prudent and determinable, and as discussed in sections IV.C and V. below,

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[121] Wright et al. 2018, at 82.

[122] Wright et al. 2018, at 82.

[123] Wright et al. 2018, at 87.

[124] Wright et al. 2018, at 83 (Figure 5).

[125] Wright et al. 2018, at 87; *and see id.* at 85 (seasonality of detections "supports the hypothesis that Unimak Pass is a migratory corridor").

[126] Wright et al. 2018, at 88.

[127] NOAA, New Photos May Be First Visual Evidence Of North Pacific Right Whales Feeding In Bering Sea In Winter (Feb. 11, 2022), https://www.fisheries.noaa.gov/feature-story/new-photos-may-be-first-visual-evidence-north-pacific-right-whales-feeding-bering-sea.

[128] NOAA, New Photos May Be First Visual Evidence Of North Pacific Right Whales Feeding In Bering Sea In Winter (Feb. 11, 2022), https://www.fisheries.noaa.gov/feature-story/new-photos-may-be-first-visual-evidence-north-pacific-right-whales-feeding-bering-sea.

[129] Shelden et al. 2005.

[130] Wade 2011a.

increasing threats make special management considerations necessary to protect this vital physical and biological feature.

2. Barnabas Trough and Albatross Bank

The continental shelf in the northern Gulf of Alaska is a complex marine environment, with shallow banks separating multiple canyons and troughs.[131] These features are pronounced around the Kodiak Archipelago, particularly on its seaward side, where they interact with strong flows from the Alaska Coastal Current (ACC) to cause deep tidal mixing, bringing nutrient-rich slope waters into the water column and photic zone.[132] Unlike other areas on the shelf that become nutrient limited after spring, the tidal mixing and resulting nutrient introduction sustain post-bloom phytoplankton production throughout the summer months, creating "a highly productive ecosystem . . . [that] supports large populations of fish, mammals, and invertebrates."[133]

Detections of North Pacific right whales in the Gulf of Alaska "have been consistently reported . . . south of Kodiak Island in the waters of and near Barnabas Trough and Albatross Bank."[134] This includes four sightings and one acoustic detection in the Barnabas Trough region from 2004 to 2006, which tripled the number of visual sightings in the Gulf since the 1960s.[135] Most recently, two pairs of North Pacific right whales were sighted on the Barnabas Trough in August 2021: one pair on the southern edge of the Kodiak Island unit and one pair about 100 miles outside the critical habitat boundary.[136] There were also "a handful of acoustic detections near Barnabas Trough" in 2013 and 2015.[137]

These right whale detections correspond with areas containing the highest densities of zooplankton, and a fecal sample obtained from an immature male in 2005 indicated recent feeding, supporting the belief "that Barnabus Trough is an important feeding habitat for right whales in the Gulf of Alaska."[138] And while a portion of this area is currently designated as critical habitat for the North Pacific right whale, sightings and data show a broader area is used and essential to the species.

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[131] Mordy, C. W., Stabeno, P. J., Kachel, N. B., Kachel, D., Ladd, C., Zimmermann, M., . . . & Doyle, M. J. (2019). Patterns of flow in the canyons of the northern Gulf of Alaska. *Deep Sea Research Part II: Topical Studies in Oceanography*, *165*, 203–220.

[132] Mordy et al. 2019.

[133] Mordy et al. 2019 (citations omitted).

[134] Ferguson, M. C., Curtice, C., Harrison, J., & Van Parijs, S. M. (2015a). Biologically Important Areas for Cetaceans Within U.S. Waters – Gulf of Alaska Region. *Aquatic Mammals, 41*(1), 65–78, at 74.

[135] Wade, P. R., De Robertis, A., Hough, K. R., Booth, R., Kennedy, A., LeDuc, R. G., . . . & Wilson, C. (2011b). Rare detections of North Pacific right whales in the Gulf of Alaska, with observations of their potential prey. *Endangered Species Research, 13*(2), 99–109, at 105.

[136] NOAA, Four Endangered North Pacific Right Whales Spotted in the Gulf of Alaska (Sept. 9, 2021), https://www.fisheries.noaa.gov/feature-story/four-endangered-north-pacific-right-whales-spotted-gulf-alaska.

[137] Matsuoka et al. 2021, at 2.

[138] Wade et al. 2011b, at 103, 105, 107.

The current critical habitat designation was based on the "primary constituent elements" known at the time, and specifically, dense areas of zooplankton that make up important feeding grounds. Because data on the densities of zooplankton needed to support North Pacific right whales were unavailable, visual sightings in the Gulf of Alaska "were used as a proxy to determine the location of these areas,"[139] with five of 14 sightings through 2005 occurring in the designated Kodiak Island unit.[140] "[W]hile sporadic sightings of right whales in such small numbers generally would not be considered a reliable indication of a feeding area, consistent sightings of right whales—even of single individuals and pairs—in a specific area in spring and summer over a long period of time is sufficient indication that the area is a feeding area containing suitable concentrations of copepods."[141]

A 2015 NMFS study identified an extended area around Kodiak Island as a biologically important area (BIA) for feeding for North Pacific right whales.[142] The identification of this BIA was "[b]ased on the repeated detections of right whales in the Barnabas Trough and Albatross Bank area, including animals that are known to have been recently feeding due to the observation of feces."[143] And while "not everything identified as Critical Habitat [meets] the BIA criteria and vice versa," BIAs represent "the best available science to help inform regulatory and management decisions . . . to achieve conservation and protection goals."[144]

[139] Wade et al. 2011b, at 108.

[140] 73 Fed. Reg. at 19,005.

[141] 73 Fed. Reg. at 19,005.

[142] Ferguson, M. C., Curtice, C., Harrison, J., & Van Parijs, S. M. (2015a). Biologically Important Areas for Cetaceans Within U.S. Waters – Gulf of Alaska Region. *Aquatic Mammals, 41*(1), 65–78, at 74.

[143] Ferguson et al. 2015a, at 74.

[144] Ferguson, M. C., Curtice, C., Harrison, J., & Van Parijs, S. M. (2015b). Biologically Important Areas for Cetaceans Within U.S. Waters – Overview and Rationale. *Aquatic Mammals, 41*(1), 2–16, at 4, 7.

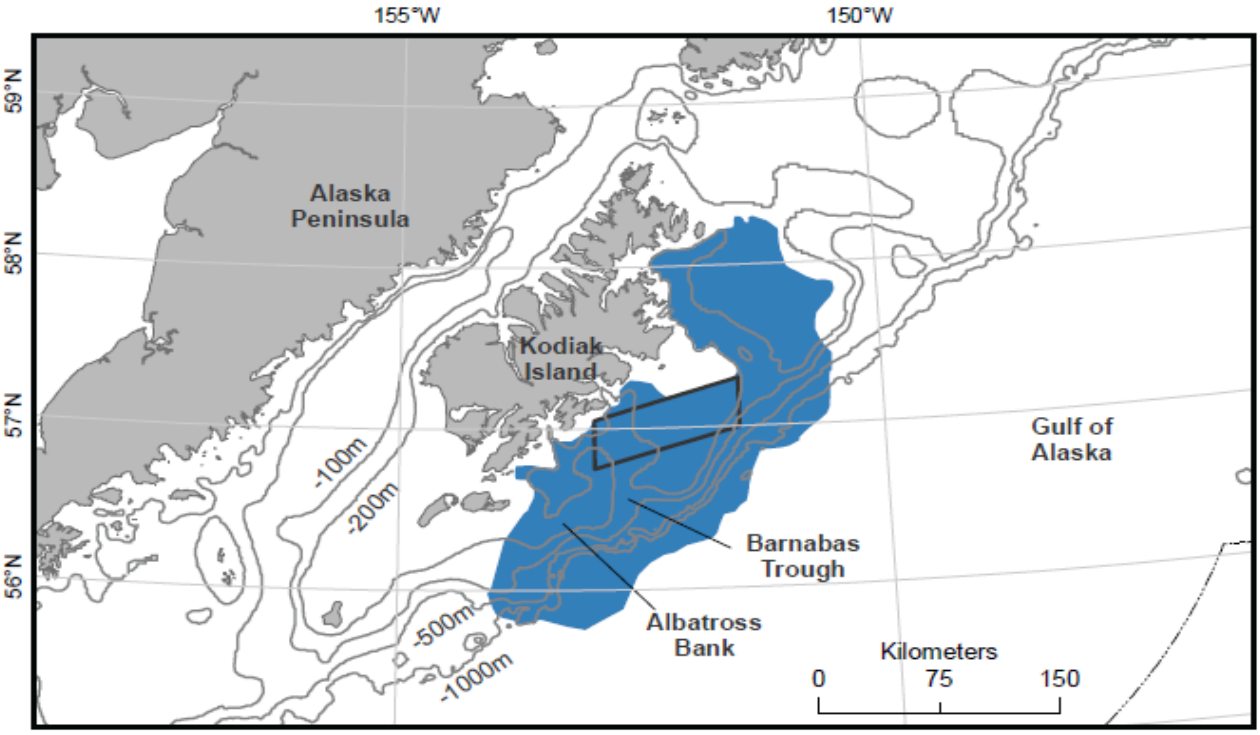

Figure 3. The current critical habitat unit near Kodiak Island is shown with a solid black line, the U.S. economic exclusion zone with a dashed line, and a Biologically Important Area (BIA) for feeding for the North Pacific right whale in blue. The BIA is "where the highest densities of animals are thought to occur from June through September. This BIA was substantiated through opportunistic sighting data, acoustic recordings, fecal samples, and historical whaling data." Source: Ferguson et al. 2015a, Figure 6.5.

Recent detections, observations, and data make it clear that the whale's essential foraging grounds near Kodiak Island extend beyond the current critical habitat designation, reaching across Albatross Bank and Barnabas Trough. This information shows that designation of this habitat is both prudent and determinable, and as discussed in sections IV.C and V below, increasing threats make special management considerations necessary to protect this vital physical and biological feature.

C. The Proposed Areas Require Special Management Considerations and Protection

The essential physical and biological features in the proposed critical habitat revision are at great risk of harm from human activities, including activities that prevent safe passage between important habitats; decrease prey availability; and/or increase water pollution, noise pollution, entanglement, and the effects of climate change. These activities are managed under a variety of legal mandates, and special management considerations and protections are necessary to protect the essential features in these areas and help prevent the extinction of this critically endangered whale.

NMFS defines "special management considerations or protection" as those "[m]ethods or procedures useful in protecting the physical or biological features essential to the conservation of listed species."[145] For example, "[a]ctivities producing sound that impact . . . prey availability (including access to prey and impacts to communication for prey sharing) or safe and unrestricted passage (including passage necessary for social behavior) are considered activities that may require special management considerations under section 7 of the ESA."[146] Special management considerations are crucial in the proposed critical habitat revision due to elevated, growing threats to the physical and biological features that are essential to the North Pacific right whale's conservation and survival. Scientists have highlighted the need for special management considerations to address these threats:

- [E]xtensive use of the international Unimak Pass and Bering Sea route by large vessels, along with activities of the spatially diffuse commercial fishing industries, may have significant consequences for biological communities occurring in this region[,] . . . including . . . highly depleted North Pacific right whales . . . . As such, inter-continental vessel routes near the Aleutian Islands should also be candidates for imposing conservation measures to minimize impacts to marine mammals and sensitive ecosystems near the archipelago.[147]

- It is . . . imperative that management strategies be implemented for [North Pacific right whales], especially in high vessel traffic areas such as Unimak Pass, to provide the population a chance to recover.[148]

- "A plan needs to be developed to reduce or mitigate current and future threats to [North Pacific right] whales from ship strikes, disturbance from seismic activities and entanglement in fishing gear."[149]

The threats confronting the essential physical and biological features in the proposed critical habitat revision and the need for special management considerations to address these threats are discussed more in the following section.

V. Known Threats to the North Pacific Right Whale

A. Ship Strikes

Collisions with vessels is a major threat and impact to North Pacific right whales. By analogy, impacts from ship strikes to North Atlantic right whales are well documented, and until

[145] 50 C.F.R. § 424.02.

[146] 86 Fed. Reg. 41,668, 41,669 (Aug. 2, 2021).

[147] Silber, G. K., & Adams, J. D. (2019). Vessel operations in the Arctic, 2015–2017. *Frontiers in Marine Science*, 573, at 14.

[148] Wright et al. 2018, at 88.

[149] Wade et al. 2011a, at 85.

recently, were the leading cause of mortality, causing 38 of 87 documented deaths, or 44 percent, between 1970 and 2009.[150] Ship strikes caused an average of 1.6 North Atlantic right whales deaths per year between 2005 and 2009—double the potential biological removal (PBR) level scientists believe needed for recovery.[151] In spite of measures to reduce ship speeds and collisions, ship strikes have killed at least 11 North Atlantic right whales since 2017, when NMFS declared an Unusual Mortality Event due to the high number of deaths.[152] Additionally, two whales seen alive in 2020 and 2021 were seriously injured from a vessel strike and likely died or will die from these impacts.[153] There are undoubtedly many ship strikes of both North Atlantic and North Pacific right whales that go undocumented, as only a portion of vessel collisions with marine mammals are noticed or reported.[154]

Collision victims are often calves or juveniles, or mothers with newborn calves. For example, 75 percent (6 of 8) North Atlantic right whales struck off the U.S. Atlantic coast between 1975 and 1996 were calves or juveniles.[155] Additionally, six of eight killed by vessel strikes between 2004 and April 2009 were known to be female, three being pregnant with near full-term calves at the time of their death.[156]

Although there is a lack of documented cases of ship strikes with North Pacific right whales, this is only due to their extremely low population numbers and lack of necropsy reports, not because there is no such threat.[157] Indeed, whales are particularly vulnerable to ship

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[150] Harcourt, R., Van der Hoop, J., Kraus, S., & Carroll, E. L. (2019). Future directions in Eubalaena spp.: comparative research to inform conservation. *Frontiers in Marine Science*, 530, at 7.

[151] Thomas, P. O., Reeves, R. R., & Brownell Jr, R. L. (2016). Status of the world's baleen whales. *Marine Mammal Science*, *32*(2), 682–734, at 686 (citing Waring et al. 2011).

[152] NMFS, 2017–2021 North Atlantic Right Whale Unusual Mortality Event, https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2021-north-atlantic-right-whale-unusual-mortality-event (last updated Sept. 3, 2021) (chart showing North Atlantic Right Whale Causes of Death for Confirmed Carcasses); Harcourt et al. 2019, at 7.

[153] NMFS, 2017–2021 North Atlantic Right Whale Unusual Mortality Event (chart showing North Atlantic Right Whales Determined to be Seriously Injured (Last Seen Alive)); *see also* Ransome, N., Loneragan, N. R., Medrano-González, L., Félix, F., & Smith, J. N. (2021). Vessel Strikes of Large Whales in the Eastern Tropical Pacific: A Case Study of Regional Underreporting. *Frontiers in Marine Science*, 1130, at 9 (discussing a case study of a North Atlantic right whale who "survived for 12 years after a severe ship strike, but died after pregnancy caused the re-opening of an old healed propeller wound." This highlights the fact that even when some whales initially survive a ship strike, "they may suffer ill health, lower fitness or ultimately die from injury related complications.").

[154] *See, e.g.,* Ransome et al. 2021, at 1 ("Vessel strike is recognized as a major modern threat to the recovery of large whale populations globally, but the issue is notoriously difficult to assess. Vessel strikes by large ships frequently go unnoticed, and those involving smaller vessels are rarely reported.")

[155] Stevick, P. T. (1999). Age-length relationships in humpback whales: A comparison of strandings in the western North Atlantic with commercial catches. *Marine Mammal Science, 15*(3), 725–737.

[156] Moore, M. J., McLellan, W. A., Daoust, P. Y., Bonde, R. K., & Knowlton, A. R. (2007). Right Whale Mortality: A Message from the Dead to the Living. *In* Kraus, S.D. & Rolland, R.M. (eds.). The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press, Cambridge, MA.

[157] *See, e.g.*, Wright et al. 2018, at 88 ("Although there is limited evidence for [ship strike threats], the remote habitat makes detections of anthropogenic mortalities unlikely. Right whales in other parts of the world with high vessel activity are vulnerable to ship strike. . . ."); Muto et al. 2020, at 250 (2019 Stock Assessment) ("[G]iven the remote

collisions if they are slow swimmers, spend a lot of time at the surface, or use areas near shipping lanes—and like its cousin in the North Atlantic, the North Pacific right whale "qualifies in all three categories."[158] This makes it highly susceptible to ship strikes, particularly since its population is already so critically low and there is high shipping traffic in the region, making ship strikes an "acute" threat.[159]

Unfortunately, this threat is expected to exponentially increase as "dramatic, ongoing decline of sea ice in the Arctic [leads] to more ship traffic" through the Bering Sea.[160] This creates a major concern for ship strikes in Unimak Pass, which is only about 10 miles (~16 km) wide at its widest point, creating a migratory bottleneck and "increasing the likelihood of interaction."[161]

According to NMFS, "Unimak Pass is a choke-point for shipping traffic between North America and Asia, with shipping density . . . highest in the summer (Renner and Kuletz 2015), a time when right whales are believed to be present (Wright et al. 2018)."[162] There is also a significant risk of ship strikes in the winter season given that vessel noise is loudest in Unimak Pass from December to February, meaning vessel traffic is also high during this time—when right whales are consistently detected and coinciding with the assumed migratory period.[163] This high volume of shipping traffic in the winter is due to poor weather, which forces ships "to take a sheltered route through the passes of the eastern Aleutian Islands," "further increasing the likelihood of collision. *A single death of a [North Pacific right whale] (especially a reproductive female) from ship strike would be a major blow to this small population*."[164]

A study examining vessel traffic found that in one year alone (2012), deep-draft vessels involved in international trade made 4,615 transits through Unimak Pass—the majority of those

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nature of the known and likely habitats of North Pacific right whales, it is very unlikely that any mortality or serious injury in this population would be observed. Consequently, it is possible that the current absence of reported mortality or serious injury due to entanglement in fishing gear, ship strikes, or other anthropogenic causes (e.g., oil spills) is not a reflection of the true situation"); Harcourt et al. 2019, at 7 ("[D]ue to their rare occurrence and poorly known distribution, there is a "low likelihood of observing anthropogenic mortality or serious injury to North Pacific right whales in the eastern population").

[158] Clapham, P. J., Young, S. B., & Brownell Jr, R. L. (1999). Baleen whales: conservation issues and the status of the most endangered populations. *Mammal Review*, *29*(1), 35–60, at 38.

[159] Wright et al. 2018, at 88 (emphasis added).

[160] Thomas et al. 2016, at 686–687; *and see* Harcourt et al. 2019, at 7 ("The threats from vessels will only increase as Arctic shipping increase[s] in the near future and the shipping lanes will be through the summer feeding habitat in the southeastern Bering Sea, as it will for their cousin the bowhead whale.")

[161] Wright et al. 2018, at 88; *see* Thomas et al. 2016, at 686–687 ("Of particular concern are shipping and migratory chokepoints such as . . . Unimak Pass, Alaska.").

[162] Muto et al. 2021 (2020 Stock Assessment).

[163] Wright et al. 2018, at 88 (documenting "[c]onsistently higher vessel noise during Dec−Feb.[,] . . the assumed migratory period.").

[164] Wright et al. 2018, at 88 (emphasis added).

being cargo and container ships, at 60 and 24 percent, respectively.[165] Importantly, this does not count trips through Unimak Pass by fishing, military, ferry, tugs, barges, or other smaller vessels.[166] In all, "nearly 75% of the individual [deep-water] vessels operating in the Aleutian Islands archipelago were ships traveling between North America and Asia."[167] And "[w]hile most of the substantial ship traffic along this route passes south of the Aleutian Islands, much of it utilizes the Unimak Pass through the Aleutians and passes into waters north of the archipelago."[168]

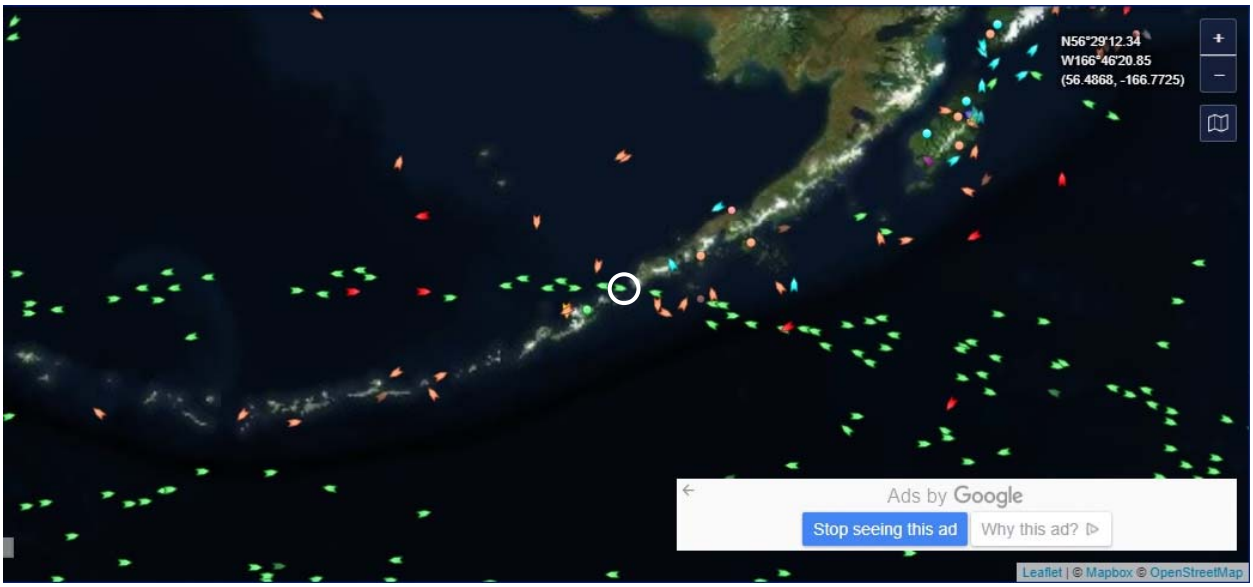

FIGURE 4. Screenshot showing crowded shipping traffic through Unimak Pass on an average day. Unimak Pass is circled in white; cargo and container ships are shown in green; tankers in red; tugs in blue; and fishing vessels in orange. Source: MarineTraffic.com (Image taken on November 15, 2021, at 11:20 a.m. PST).

Researchers estimate container and bulk dry cargo traffic to and from U.S. Pacific Northwest ports will increase *between one and nine percent each year* through 2030.[169] Shipping traffic to and from British Columbia is also forecasted to steeply climb in the next decade:

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[165] NMFS, New Study Sheds Light on Mysterious Movements of Rarest Great Whale (Oct. 1, 2018), https://www.fisheries.noaa.gov/feature-story/new-study-sheds-light-mysterious-movements-rarest-great-whale; Nuka Research & Planning Group (2015). Aleutian Islands Risk Assessment – Recommending an Optimal Response System for the Aleutian Islands: Summary Report, at 12.

[166] NMFS, New Study Sheds Light on Mysterious Movements of Rarest Great Whale (Oct. 1, 2018), https://www.fisheries.noaa.gov/feature-story/new-study-sheds-light-mysterious-movements-rarest-great-whale.

[167] Nuka Planning & Research Group (2016). Bering Sea Vessel Traffic Risk Analysis, at 15.

[168] Silber & Adams 2019, at 10.

[169] BST Associates & MainLine Management (2011). Pacific Northwest marine cargo forecast update and rail capacity assessment: Final report. Pacific Northwest Rail Coalition, at 8, 11.

> Projected growth rates for the Port of Vancouver, BC, have been estimated at between 1–2% per year for tankers, cargo carriers, and container ships from 2012 through 2030. A review of potential vessel movements associated with northern British Columbia ports, where there are several major cargo and energy terminal projects proposed or in development, shows that vessel transits *may triple* over the next several decades, from approximately 400 transits per year in 2011–2012 to more than 1,200 transits in 2030.[170]

"There is general agreement that vessel speed is a significant factor in ship strikes," and the risk also increases with the vessel size.[171] An analysis of vessel traffic around the Aleutian Islands found the average speed of container ships was about 22 knots—well above the speed at which "lethal or severe" injuries from ship strikes are likely to occur, which is 14 knots or more.[172] The average speed of car carriers and passenger vessels was greater than 12 knots, the speed at which there is a 50 percent or more likelihood of mortality from a ship strike.[173]

Revising the critical habitat as proposed would reinforce NMFS's authority to implement measures and protections that are urgently needed to address the risk of ship strikes through these essential habitat areas. For example, if designated as critical habitat, NMFS could restrict ship speeds through Unimak Pass and/or the U.S. Coast Guard could require large approaching vessels to call into a station that activates a message alert system on right whales. Both management provisions are mandated in North Atlantic right whale critical habitat[174] and have helped reduce ship strikes.[175] Such measures are not only warranted to protect the areas contained within the proposed revision, but they are also urgently necessary because (1) these areas are essential to the right whale's life-history, including foraging, migration, and connectivity between habitats; (2) the volume of shipping traffic and risk of vessel strikes in these areas is already high and dramatically increasing; and (3) even a single fatal encounter "*would be a major blow to this small population*."[176]

B. Entanglements

Along with ship strikes, entanglement in fishing gear is the greatest threat to baleen whales, particularly for those with critically low numbers like North Pacific right whales.[177]

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[170] Nuka 2015, at 14 (emphasis added).

[171] Nuka 2016, at 27.

[172] Nuka 2016, at 27–28.

[173] Nuka 2016, at 27–28.

[174] *See, e.g.,* Mullen, K. A., Peterson, M. L., & Todd, S. K. (2013). Has designating and protecting critical habitat had an impact on endangered North Atlantic right whale ship strike mortality? *Marine Policy*, *42*, 293–304, at 295 (Figure 2), 296 (discussing mandatory ship reporting system), 297 (discussing mandatory speed restrictions).

[175] Laist, D. W., Knowlton, A. R., & Pendleton, D. (2014). Effectiveness of mandatory vessel speed limits for protecting North Atlantic right whales. *Endangered Species Research, 23*(2), 133–147.

[176] Wright et al. 2018, at 88 (emphasis added).

[177] Thomas et al. 2016, at 712 (citing Clapham et al. 1999).

Indeed, "[g]iven the very small estimate of abundance, *any mortality or serious injury [of North Pacific right whales] incidental to commercial fisheries would be considered significant*."[178]

Entanglements are known to have serious impacts on other species of right whales and became the number one cause of documented deaths of North Atlantic right whales from 2010–2015,[179] with "known population-level consequences."[180] There have been at least 25 documented cases of North Pacific right whales becoming entangled or stranded from fishing gear in Japan, South Korea, and Russia between 1996 and 2019, including 10 confirmed mortalities.[181] Documented entanglements include the following:

> February 2015: A young right whale became entangled in aquaculture gear off the coast of South Korea, "the first sighting of this species in Korea waters since 1974."[182] Though much of the fishing gear reportedly was removed, it is unknown if the whale survived the ordeal.[183]
>
> October 2016: A female right whale died after becoming entangled in fishing gear in Volcano Bay, Hokkaido, Japan. The whale was reportedly about 31 feet long (9.5 meters), and she was processed and sold, presumably as whale meat.[184]
>
> July 2018: "[F]ishermen in the Sea of Okhotsk took video of a right whale that was entangled in the rope of a crab pot but later freed itself."[185]

[178] Muto et al. 2020, at 251 (2019 Stock Assessment) (emphasis added).

[179] Ship strikes and entanglements respectively caused 44 and 35 percent of documented North Atlantic right whale deaths from 1970 to 2009. However, entanglements were responsible for 85 percent of the documented mortalities from 2010 to 2015, while ship strikes were attributed to 15 percent during the same time. Harcourt et al. 2019.

[180] Thomas et al. 2016, at 686 (citing Johnson et al. 2007, Knowlton et al. 2012).

[181] Harcourt et al. 2019, at 7.

[182] International Whaling Commission. (2016). Report of the Scientific Committee. *J. Cetacean Res. Manage.*, *17* (Suppl.), 1–92, at 14.

[183] Muto et al. 2020, at 251 (2019 Stock Assessment); *and see* Thomas et al. 2016, at 707.

[184] Stranding Network Hokkaido, SNH16037 [Bycatch] Mori-cho, Kayabe-gun, Hokkaido (Volcano Bay) Right Whale (Oct. 17, 2016), http://kujira110.com/?p=2175.

[185] Muto et al. 2020, at 251 (2019 Stock Assessment).

This female North Pacific right whale died after becoming entangled in fishing gear near Volcano Bay, Hokkaido, Japan, in October 2016. The whale was processed and sold, presumably as whale meat. Source: Stranding Network Hokkaido, SNH16037 [Bycatch] Mori-cho, Kayabe-gun, Hokkaido (Eruption Bay) Right Whale, http://kujira110.com/?p=2175.

"Despite the low likelihood of observing anthropogenic mortality or serious injury to . . . the eastern population [of North Pacific right whales], some live individuals show scars as evidence of fisheries interactions."[186] This includes a right whale that was observed near British Columbia in October 2013: "[t]his animal had a distinctive healed wound that extended from its lower left jaw over its rostrum, where the tissue had once been deeply incised. It is probable that this wound, and scars evident on the animal's dorsal surface and caudal peduncle, resulted from a past entanglement in fishing gear."[187] The North Pacific Right Whale Photo-Identification Catalogue shows scarring on a different individual that is likely also due to fishing gear entanglement.[188]

[186] Harcourt et al. 2019, at 7.

[187] Ford, J. K., Pilkington, J. F., Gisborne, B., Frasier, T. R., Abernethy, R. M., & Ellis, G. M. (2016). Recent observations of critically endangered North Pacific right whales (Eubalaena japonica) off the west coast of Canada. *Marine Biodiversity Records*, *9*(1), 1–7, at 4.

[188] Muto et al. 2020, at 251 (2019 Stock Assessment) ("two photographs from the North Pacific Right Whale Photo-Identification Catalogue show potential fishing gear entanglement" (citing A. Kennedy, NMFS-AFSC-MML, pers. comm., 21 September 2011; Ford 2016).

NMFS has highlighted the fact that the low number of reported deaths or serious injuries from entanglement in the eastern population is likely "not a reflection of the true situation" but due only to the extremely low numbers of individuals:

> Entanglement in fishing gear, including lobster pot and sink gillnet gear, is a significant source of mortality and serious injury for North Atlantic right whales. Although there are no records of mortality or serious injury of Eastern North Pacific right whales in any U.S. fishery, given the remote nature of the known and likely habitats of North Pacific right whales, it is very unlikely that any mortality or serious injury in this population would be observed.[189]

Because fishing gear adversely modifies migratory habitat, an expanded critical habitat designation could help prevent high risks of entanglement. For example, it could strengthen mitigations when authorizing fishing permits that impact these areas, providing additional opportunities to reduce deadly obstacles by prohibiting or promoting fishing methods, timing, and gear. These kinds of special management protections are urgently necessary, as "*any mortality or serious injury incidental to commercial fisheries would be considered significant*.[190]

C. Climate Change

Many marine mammals are increasingly threatened by climate change, but a recent global assessment found the North Pacific right whale and walrus are the most vulnerable of all.[191] The study used a trait-based approach to assess vulnerabilities under high and low carbon dioxide emission rates to the end of the 21st century, concluding the North Pacific right whale is the most at risk under both scenarios.[192]

The study noted the North Pacific is already "a hotspot of human threats," including marine traffic, pollution, and offshore oil and gas activities. In a "key finding," the study concluded that when combined with climate change, these threats put North Pacific right whales at risk of "double jeopardy," "with potential additive or synergetic effects and . . . irreversible consequences for marine ecosystem functioning."[193] The study emphasized that North Pacific right whale conservation efforts should be prioritized "given their high levels of vulnerability to climate change, their high functional originality[,] and the current threats that they are facing."[194]

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[189] Muto et al. 2020, at 251 (2019 Stock Assessment) (citation omitted); *see also, e.g.*, Wright et al. 2018, at 88 ("Although there is limited evidence for [the threat of entanglement], the remote habitat makes detections of anthropogenic mortalities unlikely. Right whales in other parts of the world with high vessel activity are vulnerable to . . . entanglement.").

[190] Muto et al. 2020, at 251 (2019 Stock Assessment) (emphasis added).

[191] Albouy, C., Delattre, V., Donati, G., Frölicher, T. L., Albouy-Boyer, S., Rufino, M., . . . & Leprieur, F. (2020). Global vulnerability of marine mammals to global warming. *Scientific Reports*, *10*(1), 1–12.

[192] *Id.* at 7–8.

[193] *Id*. at 7–8.

[194] *Id*. at 9.

The northeast Pacific is experiencing more frequent and intense marine heat waves due to climate change, including from 2014 to 2016 and again in 2019. A recently published study investigated the resulting impacts on key copepod occurrence and abundance, finding "dramatic" biological effects "across trophic levels, with changes in plankton community composition and die-offs of fish, marine mammals, and seabirds."[195] Of major concern for North Pacific right whales is the reduction of a primary food source, *N. plumchrus*, with heat waves changing their phenology (timing of abundance) and reducing their abundance.[196] As researchers noted, "*N. plumchrus* are a vital source of nutrient dense biomass that cannot be supplemented by smaller warm water species, such as *C. pacificus* or *Oithona spp*."[197] There could be "dire consequences" as a result, particularly "for the economically and culturally important fish, marine mammals, and seabirds that rely on *N. plumchrus* as a food source," including North Pacific right whales.[198]

NMFS recently summarized these concerns:

> Climate change is considered one of the most significant threats facing [the North Pacific right whale's] northernmost habitat in the Pacific. North Pacific right whales feed on zooplankton, but sea ice coverage determines where and when zooplankton can be found. Warming ocean temperatures change sea ice coverage, impacting zooplankton distribution and availability. Impacts to prey could affect the foraging behavior and success of North Pacific right whales leading to nutritional stress and diminished reproduction.[199]

And while climate change decreases the whale's available prey base, there is evidence it also affects the whale's movements and energy demands: individuals "tagged in cold years (2008–2009) remained in the middle of the Bering Shelf, travelled more slowly and covered a smaller area than those tagged in the warm year (2004)."[200] "As homoeothermic (warm-blooded) animals, right whales expend additional energy for thermoregulation when temperatures are either too cold or too hot compared to some thermal optimum."[201]

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[195] Ashlock, L., García-Reyes, M., Gentemann, C., Batten, S., & Sydeman, W. (2021). Temperature and Patterns of Occurrence and Abundance of Key Copepod Taxa in the Northeast Pacific. *Frontiers in Marine Science*, 1271, at 2.

[196] Ashlock 2021, at 8.

[197] Ashlock 2021, at 8.

[198] Ashlock 2021, at 8.

[199] NMFS, Whales and Climate Change: Big Risks to the Ocean's Biggest Species (updated Feb. 15, 2022), https://www.fisheries.noaa.gov/national/climate/whales-and-climate-change-big-risks-oceans-biggest-species.

[200] van Weelden, C., Towers, J. R., & Bosker, T. (2021). Impacts of climate change on cetacean distribution, habitat and migration. *Climate Change Ecology*, 100009, at 4.

[201] NMFS, North Atlantic Right Whale (*Eubalaena glacialis*) – Source Document for the Critical Habitat Designation: Review of information pertaining to the definition of "critical habitat" (Dec. 2015), https://media.fisheries.noaa.gov/dam-migration/16narwchbiologicalsourcedocument122115-508.pdf, at 49.

Climate change is also increasing the threat of ship strikes by melting sea ice and opening passages to ships, causing an increase in traffic through Unimak Pass:

> Unfortunately, interactions of NPRWs and anthropogenic sources will likely increase with impending climate change. Climate models conservatively predict major changes to ice extent throughout the Chukchi and Bering seas by 2050 (Stroeve et al. 2007, Wang et al. 2012). Trans-Arctic ship traffic is anticipated to increase due to an ice-free Northwest Passage and Northern Sea Route, increasing the likelihood of NPRW collision with ships in Unimak Pass and the SEBS. Unimak Pass is also increasingly used by ships taking a Great Circle route through the Bering Sea from North America and Asia (Nuka Research and Planning Group 2014, 2016). As stated previously, 60% of the deep draft vessels involved in international trade that transited Unimak Pass in 2012 were cargo vessels, followed by 24% container vessels (Nuka Research and Planning Group 2014). It is therefore imperative that management strategies be implemented for NPRWs, especially in high vessel traffic areas such as Unimak Pass, to provide the population a chance to recover.[202]

Climate change is a major threat to the habitat of North Pacific right whales, and greater habitat protections are important for enhancing the resilience of the ecosystem to these changes.

D. Anthropogenic Noise

Baleen whales are highly sensitive to anthropogenic noise, which disrupts their communication, navigational ability, and social patterns.[203] Vessel traffic is a major concern in particular because it produces low-frequency noise that overlaps with the acoustic signals that baleen whales use.[204] Impacts can include hearing damage or impairment; changes in social patterns and primary biological functions like mating and courtship; displacement from key feeding or other habitat areas, and increased vulnerability to ship strikes and other hazards due to sensitization.[205] Anthropogenic noise is also known to cause physiological responses and chronic stress among right whales, which "can lead to detrimental effects on health and reproduction."[206]

"Acoustic communication may be vital for the success of small marine mammal populations,"[207] and research shows this may be particularly true for North Pacific right whales,

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[202] Wright et al. 2018, at 88.

[203] NMFS 2013, at I-12 to I-18 (Recovery Plan); Wright et al. 2018, at 89 ("Elevated noise levels from anthropogenic noise impact the behavior, physiology, and area over which marine mammals, including right whales, can communicate.").

[204] Rolland, R. M., Parks, S. E., Hunt, K. E., Castellote, M., Corkeron, P. J., Nowacek, D. P., . . . & Kraus, S. D. (2012). Evidence that ship noise increases stress in right whales. Proceedings of the Royal Society B: *Biological Sciences*, *279*(1737), 2363–2368, at 2363.

[205] NMFS 2013, at I-12 to I-13 (Recovery Plan).

[206] Rolland et al. 2012, at 2365–2367.

[207] Wright et al. 2018, at 89.

which not only produce single "gunshot" calls to communicate, but also put these calls into rhythmic, consistent, and recognizable tunes to comprise songs. And while the role of these songs is not yet fully understood, scientists believe they may play a part in courtship activities, reproduction, and social ordering—meaning anthropogenic noises could alter and disrupt fundamental life functions of a species that is dangerously close to extinction.[208]

Noise is a major concern in the proposed designation areas due to the high volume of shipping traffic, particularly in Unimak Pass where "[p]ervasive vessel noise . . . highlights near constant potential for interaction with anthropogenic disturbance. *Consistently higher vessel noise during Dec−Feb suggests that this species is most vulnerable during the assumed migratory period*."[209] However, studies show these risks exist "both during and outside of the assumed migratory period,"[210] with the highest risks likely occurring during the summer and winter months.[211]

Indeed, given the extremely high noise levels in Unimak Pass, researchers believe some calls were likely masked from detection and they underreported the presence of right whales:

> The probable reason that there were detections despite the noisy conditions is that the passage is narrow (~16 km), forcing NPRW to be close to our recorder location when transiting through this area. On the other hand, this narrow passage increases the chances that the vessels are passing close to the whales, which may influence calling behavior. Right whales do respond behaviorally to vessel noise; congeneric right whales upcall louder but less often at a higher frequency in high noise conditions in an attempt to compensate for higher background noise. Consequently, NRPW may be producing loud upcalls in order to be heard by conspecifics in this noisy environment. . . . *The detection of [North Pacific right whales] at Unimak Pass remains a major concern given the pervasive vessel noise in this area*.[212]

Designating the essential migratory and feeding areas as proposed would give NMFS and other agencies additional, needed tools to address noise impacts within these important habitats. For example, if designated, all projects with a federal nexus affecting these areas—such as military activities and seismic surveys for the oil and gas industry—would invoke NMFS's authority under section 7 to prevent or alleviate noise-related impacts. Any direct, indirect, or cumulative adverse effects on the whale's ability to communicate in these vital habitats could have major consequences given the precarious status of the population, making such management considerations and protections urgently necessary.

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[208] Crance et al. 2019, at 3476; Darling, J. D., Jones, M. E., & Nicklin, C. P. (2006). Humpback whale songs: Do they organize males during the breeding season?. *Behaviour*, 1051–1101.

[209] Wright et al. 2018, at 77 (abstract) (emphasis added).

[210] Wright et al. 2018, at 77 (abstract).

[211] Muto et al. 2021 (2020 Stock Assessment); Wright et al. 2018, at 88.

[212] Wright et al. 2018, at 87, 88.

E. Oil and Gas Spills

Threats of oil or gas spills are also high in the proposed, revised designation given the rough ocean conditions and dense shipping traffic, which includes oil tankers, container ships, and other deep-water vessels carrying large amounts of fuel. The "risk of an accidental spill [is] highest in the summer, a time when right whales are believed to be present."[213] "Most accidents were predicted to take place in Unimak Pass, Akutan Pass, and the approach to Dutch Harbor. For this reason, these areas were also the most likely to experience a spill. Overall, both bunker and cargo spills were predicted to increase slightly in the future, largely due to the increasing transit of container ships."[214]

Marine mammals suffer a host of known harms from oil spill incidents. Routes of exposure include inhalation, aspiration, ingestion (either directly or of contaminated prey), and dermal contact/adsorption.[215]

Inhalation constitutes a primary source of cetacean oil exposure. Inhalation of toxic hydrocarbons can cause respiratory irritation, inflammation, emphysema, and pneumonia.[216] Oil also can damage lung tissues directly.[217] Because cetaceans breathe at the air/water interface, and because they experience deep lung air exchange (80–90% lung volume) with each breath, they experience a high magnitude and duration of exposure to toxic oil droplets, volatile organic

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[213] Muto et al. 2021, at 259 (2020 Stock Assessment) (citing Renner, M., & Kuletz, K. J. (2015). A spatial–seasonal analysis of the oiling risk from shipping traffic to seabirds in the Aleutian Archipelago. *Marine Pollution Bulletin*, *101*(1), 127–136; Wright et al. 2018).

[214] Wolniakowski, K.U., Wright, J., Folley, G., Franklin, M.R. (2011). Aleutian Islands Risk Assessment Project – Phase A Summary Report, at 19; *see also* Muto et al. 2020, at 252 (2019 Stock Assessment) ("The high volume of large vessels transiting Unimak Pass (e.g., 1,961 making 4,615 transits in 2012: Nuka Research and Planning Group, LLC 2014a, 2014b), a subset of which continue north through the Bering Sea, increases both the risk of ship strikes and the risk of a large or very large oil spill in areas in which right whales may occur. The risk of accidents in Unimak Pass, specifically, is predicted to increase in the coming decades, and studies indicate that more accidents are likely to involve container vessels (Wolniakowski et al. 2011)").

[215] Some animals affected by the *Deepwater Horizon* oil spill presented with oil adhered to their bodies, contradicting previous speculation that such adherence would not occur. Schwacke, L. H., Smith, C. R., Townsend, F. I., Wells, R. S., Hart, L. B., Balmer, B. C., . . . & Rowles, T. K. (2014). Health of common bottlenose dolphins (Tursiops truncatus) in Barataria Bay, Louisiana, following the Deepwater Horizon oil spill. *Environmental Science & Technology*, *48*(1), 93–103; Aichinger Dias, L., Litz, J., Garrison, L., Martinez, A., Barry, K., & Speakman, T. (2017). Exposure of cetaceans to petroleum products following the Deepwater Horizon oil spill in the Gulf of Mexico. *Endangered Species Research*, *33*, 119–125; NOAA, NOAA's Oil Spill Response – Effects of Oil on Marine Mammals and Sea Turtles (May 12, 2010); Van Dolah, F. M., Neely, M. G., McGeorge, L. E., Balmer, B. C., Ylitalo, G. M., Zolman, E. S., . . . & Schwacke, L. H. (2015). Seasonal variation in the skin transcriptome of common bottlenose dolphins (Tursiops truncatus) from the northern Gulf of Mexico. *PLoS One*, *10*(6), e0130934; Takeshita, R., Sullivan, L., Smith, C., Collier, T., Hall, A., Brosnan, T., . . . & Schwacke, L. (2017). The Deepwater Horizon oil spill marine mammal injury assessment. *Endangered Species Research*, *33*, 95–106.

[216] Geraci, J. R., & Aubin, D. J. S. (Eds.). (1988). *Synthesis of effects of oil on marine mammals*. Department of the Interior, Minerals Management Service, Atlantic OCS Region; NOAA 2010.

[217] Geraci & Aubin 1988.

compounds, and aerosolized oil compounds, including PAHs.[218] Dispersants increase the escape rate and reduce droplet size, enhancing exposure.[219] Cetaceans also lack turbinates that filter air en route to the lungs, and toxicant adsorption is facilitated by a rich lung blood supply that takes the contaminants directly to the heart and rest of the body prior to detoxification in the liver.[220]

Inhalation of additional harmful compounds can occur when surface oil is burned as part of clean-up efforts.[221] Even years after exposure to toxic fumes released during oil spills, cetaceans can suffer mortality.[222] If absorbed into the lungs and bloodstream, toxic hydrocarbons can accumulate in tissues like the brain and liver. Exposure can cause neurological disorders and organ damage; anemia and immune suppression; and reproductive failure or death.[223]

In addition to inhaling oil compounds, cetaceans may be exposed through aspiration or ingestion. Aspiration can occur if cetaceans incidentally draw contaminated seawater into their lungs or they ingest oil and, succumbing to nausea, aspirate contaminated vomit.[224] Aspiration can cause physical injury, including severe inflammatory response and lung disease (pneumonia, fibrosis, abscesses, infection, and pulmonary dysfunction).[225] Ingestion of oil can occur incidentally through feeding behaviors or through intake of contaminated prey.[226] Finally, oil and related toxicants can be adsorbed through dermal contact, especially through sensitive areas like the eyes, mouth, and blowhole, as well as abrasions or other lesions.[227]

Cetaceans also are exposed to spilled oil through ingestion, either directly or from contaminated prey. Baleen whales that filter-feed at the surface are vulnerable to coating and fouling their baleen plates with oil, thereby decreasing their ability to eat.[228] Cetaceans may ingest oil- and toxicant-contaminated zooplankton and other prey, leading to gastrointestinal inflammation, ulcers, bleeding, diarrhea, and maldigestion.[229]

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[218] Venn-Watson, S., Colegrove, K. M., Litz, J., Kinsel, M., Terio, K., Saliki, J., . . . & Rowles, T. (2015). Adrenal gland and lung lesions in Gulf of Mexico common bottlenose dolphins (Tursiops truncatus) found dead following the Deepwater Horizon oil spill. *PLoS One*, *10*(5), e0126538; Takeshita et al. 2017.

[219] Takeshita et al. 2017.

[220] *Id.*

[221] Frasier, K. E. (2020). Evaluating impacts of deep oil spills on oceanic marine mammals. In *Scenarios and Responses to Future Deep Oil Spills* (pp. 419–441). Springer, Cham.

[222] Venn-Watson et al. 2015.

[223] Geraci & St. Aubin 1988; NOAA 2010.

[224] Venn-Watson et al. 2015; Takeshita et al. 2017.

[225] Takeshita et al. 2017.

[226] *Id.*

[227] *Id.*

[228] Geraci & St. Aubin 1988; NOAA 2010.

[229] Etnoyer, P. J., Wickes, L. N., Silva, M., Dubick, J. D., Balthis, L., Salgado, E., & MacDonald, I. R. (2016). Decline in condition of gorgonian octocorals on mesophotic reefs in the northern Gulf of Mexico: before and after the Deepwater Horizon oil spill. *Coral Reefs*, *35*(1), 77–90; Geraci & St. Aubin 1988; NOAA 2010.

In terms of contaminant risk, PAHs constitute a key oil spill-related threat to marine mammals, with compounds being found in tissues of marine mammals that include sperm whales (*Physeter macrocephalus*), fin whales (*Balaenoptera physalus*), and striped dolphins (*Stenella coeruleoalba*).[230] Documented effects of PAHs on marine mammals include carcinogenesis, dermal irritation, conjunctivitis, thermoregulatory effects, hepatic and hypothalamic lesions, hepatic necrosis, and reduced survival of young.[231] PAHs also have shown strong cytotoxic effects on marine mammal testis and likely contribute to adrenal gland lesions.[232]

Heavy metal exposure also poses a threat to marine wildlife in the wake of an oil spill.[233] Oil from the *Deepwater Horizon* blowout contained measurable amounts of aluminum, chromium, cobalt, copper, iron, lead, magnesium, nickel, vanadium, and zinc.[234] Nickel and chromium damage DNA and cause cancer in animals and humans, and researchers found high levels of both these metals in skin samples taken after the *Deepwater Horizon* spill from northern Gulf of Mexico sperm whales and Bryde's whales.[235] This has potentially grave health implications, as metal concentrations in skin typically are lower than in vital organs including the liver, lungs, brain, and reproductive organs.[236] Geospatial analysis showed that whales with higher concentrations of nickel and chromium in their skin were sampled in areas more heavily contaminated with *Deepwater Horizon* oil.[237] In addition to being exposed dermally, it is likely that cetaceans were exposed to heavy metals through inhalation, especially during burning operations.[238]

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[230] Vos, J. G., Bossart, G. D., Fournier, M., O'Shea, T. J. Volume 3 –Toxicology of Marine Mammals, In *New Perspectives: Toxicology and the Environment*, at 116, Table 6.6; Holsbeek, L., Joiris, C. R., Debacker, V., Ali, I. B., Roose, P., Nellissen, J. P., . . . & Bossicart, M. (1999). Heavy metals, organochlorines and polycyclic aromatic hydrocarbons in sperm whales stranded in the southern North Sea during the 1994/1995 winter. *Marine Pollution Bulletin*, *38*(4), 304–313, at 308, Marsili, L., Caruso, A., Fossi, M. C., Zanardelli, M., Politi, E., & Focardi, S. (2001). Polycyclic aromatic hydrocarbons (PAHs) in subcutaneous biopsies of Mediterranean cetaceans. *Chemosphere*, *44*(2), 147–154, at 149.

[231] Reynolds, J. & Wetzel, D, Polycyclic aromatic hydrocarbon (PAH) contamination in Cook Inlet belugas, Mote Marine Laboratory, Sarasota, FL (undated).

[232] Collier, T. K., Anulacion, B. F., Arkoosh, M. R., Dietrich, J. P., Incardona, J. P., Johnson, L. L., . . . & Myers, M. S. (2013). Effects on fish of polycyclic aromatic hydrocarbons (PAHs) and naphthenic acid exposures. In *Fish Physiology* (Vol. 33, pp. 195–255). Academic Press; Venn-Watson et al. 2015.

[233] Wise Jr, J. P., Wise, J. T., Wise, C. F., Wise, S. S., Gianios Jr, C., Xie, H., . . . & Wise Sr, J. P. (2018). A three year study of metal levels in skin biopsies of whales in the Gulf of Mexico after the Deepwater Horizon oil crisis. *Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology*, *205*, 15–25.

[234] Wise Jr, J. P., Wise, J. T., Wise, C. F., Wise, S. S., Gianios Jr, C., Xie, H., . . . & Wise Sr, J. P. (2014). Concentrations of the genotoxic metals, chromium and nickel, in whales, tar balls, oil slicks, and released oil from the gulf of Mexico in the immediate aftermath of the deepwater horizon oil crisis: is genotoxic metal exposure part of the deepwater horizon legacy? *Environmental Science & Technology*, *48*(5), 2997–3006.

[235] *Id.*

[236] Wise, Jr. et al. 2018.

[237] Wise, Jr. et al. 2014.

[238] *Id.*

Metals bioaccumulate in animal tissues and can remobilize during periods of physiological stress, so exposure to and effects from these metals will likely persist for years.[239] Indeed, long-term impacts from oil spills have been observed for other species. Long-term studies of killer whales impacted by the *Exxon Valdez* spill indicate that oil spills can have long-term, population-level effects on marine mammals. A resident killer whale pod that suffered a 33% loss in the year following the *Exxon Valdez* spill had not recovered to pre-spill numbers 16 years after the spill, while a transient pod that experienced a 41% loss, including reproductive-age females, has continued to decline toward extinction since the spill.[240]

F. Loss of Genetic Diversity

There is strong evidence that commercial whaling caused a severe demographic bottleneck in North Pacific right whales, leading to problems from inbreeding, a reduction in opportunities to breed and interact, and a loss of genetic diversity that continue to have major consequences today. Genetic analysis supports the belief that eastern and western populations do not interbreed, and unfortunately, also confirms the eastern population is "in severe danger of immediate extirpation."[241] The study examined biopsy samples from 23 right whales in the eastern North Pacific, estimating the number of reproducing animals is just 11.6 individuals, which is "alarmingly low."[242] "[I]t has been suggested that if the number of reproductive animals is fewer than 50, the potential for impacts associated with inbreeding depression increases substantially."[243] Additionally, the male-to-female ratio was estimated at two to one,[244] which is problematic because an overabundance of males relative to females results in less offspring production with consequences for population growth and viability.[245] Results from a multi-year survey effort "suggest this ratio may be (even) more skewed toward males than previously thought," with "[a]nalyses of six biopsy samples collected result[ing] in five males and one female."[246]

LeDuc concluded North Pacific right whales have lost genetic diversity, and though it does not yet seem as severe as in the North Atlantic, there is cause for significant concern:

> [I]t is noteworthy that of the 5 haplotypes in *E. glacialis*, one has not been recorded in females, whereas 2 of the 6 haplotypes of the eastern population of *E. japonica* were only

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[239] *Id.*

[240] Matkin, C. O., Saulitis, E. L., Ellis, G. M., Olesiuk, P., & Rice, S. D. (2008). Ongoing population-level impacts on killer whales Orcinus orca following the 'Exxon Valdez'oil spill in Prince William Sound, Alaska. *Marine Ecology Progress Series*, *356*, 269–281.

[241] LeDuc et al. 2012, at 167.

[242] LeDuc et al. 2012, at 167.

[243] 71 Fed. Reg. at 77,699.

[244] LeDuc et al. 2012, at 165.

[245] Grayson, K. L., Mitchell, N. J., Monks, J. M., Keall, S. N., Wilson, J. N., & Nelson, N. J. (2014). Sex ratio bias and extinction risk in an isolated population of tuatara (Sphenodon punctatus). *PLoS One*,*9*(4), e94214, at 1.

[246] Matsuoka et al. 2021, at 9.

recorded in males. *The potential for further loss of haplotypic diversity is very real.* Waldick et al. (2002) suggested that low variability may be characteristic of *E. glacialis* and not completely attributable to population decline. However, if low population levels have led to a loss of diversity in *E. glacialis*, the extent of the loss may be a function in part of the longer duration of their population bottleneck in comparison to *E. japonica*. The greatest decline in the numbers of *E. glacialis* took place prior to 1750, and the population has remained at low numbers since then, whereas the exploitation of *E. japonica* has been more recent, occurring mainly in the mid-19th century and then again in the 1960s by illegal pelagic Soviet whaling. Although *E. japonica* has retained more genetic diversity than *E. glacialis*, the very low population estimate for the eastern population reported by Wade et al. (2011a) indicates that *further loss of diversity is a very real concern, especially in light of the fact that some of the rare haplotypes could soon disappear from the population.*

The loss of genetic diversity makes North Pacific right whales vulnerable to a stochastic event and possible extinction, and affording them greater protections is necessary to promote their conservation and recovery.

VI. Conclusion

The right whale faces imminent extinction in the eastern North Pacific, with numbers so few that the loss of a single individual from a ship strike, an entanglement, vessel noise, climate change, or other threat could be the ultimate death knell on the entire population. New research from NMFS and others provides valuable, much-needed information to protect its essential habitats—confirming a key travel corridor and identifying main foraging grounds that extend beyond that previously documented. These habitats are critical to the survival and recovery of the world's most endangered whale, and special management considerations are urgently necessary to protect these areas given the high magnitude of threats confronting them and the precarious status of the species.

We applaud NMFS for conducting this research and documenting these new discoveries, which conclusively identify habitat containing water characteristics; geologic qualities; areas with dynamic conditions, prey abundance, foraging grounds; and connectivity between habitats that are essential for the right whale's life-history needs—areas that clearly meet the definition of "critical habitat."[247] Now that this information has been gathered and analyzed, it is time to put it into use by revising the critical habitat designation as proposed.

The best available science demonstrates that Unimak Pass, Albatross Bank, and Barnabas Trough are essential to the survival and recovery of North Pacific right whales. NMFS should propose an expanded critical habitat designation to include these vital areas, connecting the two existing critical habitat units into an expanded, single unit as proposed.[248] Expanded critical

[247] 50 C.F.R. § 424.02.

[248] *See* 50 C.F.R. § 424.12(d) ("When several habitats, each satisfying the requirements for designation as critical habitat, are located in proximity to one another, the Secretary may designate an inclusive area as critical habitat.").

habitat will provide NMFS and others additional authority to implement special management considerations and protections—which could be the determining factor in the fate of the species. We urge NMFS to promptly respond to this petition by issuing a positive 90-day finding to include the additional habitat areas as proposed, followed by a final rule to protect this expanded area within 12 months of receiving our petition, as the ESA requires.