MARINE MAMMAL COMMISSION

10 November 2020

LCDR Michael Newell
17th Coast Guard District
U.S. Coast Guard
709 West 9th Street
Juneau, Alaska 99802

Docket Number USCG-2018-1058

Dear LCDR Newell:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the U.S. Coast Guard's (USCG) *Federal Register* notice (83 Fed. Reg. 65701) and subsequent notices[1] requesting comments on its Alaskan Arctic Coast Port Access Route Study (AACPARS). The Commission has also reviewed the USCG's conceptual route for the Arctic[2]. The objective of the AACPARS is to evaluate the need for establishing vessel routing measures in the U.S. Exclusive Economic Zone (EEZ) of the Arctic coast from the border between the United States and Canada to Cape Prince of Wales on Alaska's Seward Peninsula at the eastern boundary of the Bering Strait. The USCG has already established routing measures for the Alaska region from Unimak Pass through the Bering Strait. The current measures would begin at the northern end of the established Bering Strait route.

Under the current warming conditions, both the geographic extent of open water and the length of the ice-free season are increasing in the Arctic Ocean. This has contributed to an increase of 128 percent in vessel traffic in U.S. waters north of the Bering Strait between 2008 and 2018, with vessel traffic expected to continue to rise at an average annual rate of 2.6 percent through 2030[3] (U.S. Committee on the Maritime Transportation System; CMTS 2019). Activities related to natural resource exploration and extraction (e.g., liquefied natural gas transport and mining), commercial shipping, military operations and strategic monitoring, oceanographic research, tourism-related traffic and infrastructure development are expected to continue to contribute to much of that growth (CMTS 2019; Department of Defense 2019).

The Commission commends the USCG for recognizing and taking steps to develop routing measures in Alaska, and most recently in the Arctic, to enhance navigational safety in response to increasing vessel traffic. Routing measures would help mitigate the growing risks of vessel accidents and oil spills to the marine environment that are associated with increasing vessel traffic in the Arctic. Routing measures would also help mitigate direct and indirect impacts to marine mammals and ensure access to marine mammals by Alaska Natives. Marine mammals have long been an important part of Alaska Native subsistence and culture, as recognized by the exemption provided

[1] 84 Fed. Reg. 46501; 85 Fed. Reg. 1793; and 85 Fed. Reg. 40155
[2] https://www.arcticpars.org/s/AACPARS-Flyer.pdf
[3] Based on the "most plausible scenario" projection of vessel activity.

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to Alaska Natives to the taking prohibitions of the Marine Mammal Protection Act (MMPA) when the Act was established in 1972.

Oil spills and discharges of other hazardous substances: risks, prevention, and response

Increased presence of vessels in the Arctic increases the risk of oil spills and discharges of other harmful substances due to vessel collisions, onboard accidents, entrapment of vessels in ice, and groundings[4]. Direct exposure of marine mammals to oil and other hydrocarbons from an oil spill can cause acute injury or mortality, as evidenced by the significant loss of marine mammals resulting from the Exxon Valdez and Deepwater Horizon (DWH) oil spills (Loughlin 1994; Helm et al. 2015; Wallace et al. 2017). Indirect or chronic exposure to oil can have long-term effects on marine mammal reproduction and survival (Ballachey et al. 2007; Kellar et al. 2017; Smith et al. 2017). The threat of oil spills and the resulting mortality or contamination of marine mammals is a significant concern for Alaska Native communities that depend on marine mammals to meet cultural and nutritional needs, including as a primary food source[5].

The ability of industry or government agencies to respond to oil spills in the far north and in icy conditions is minimal at best. The remoteness and harsh conditions of Arctic waters make incident response challenging, because of "extreme weather and environmental conditions, lack of communications, logistical and information infrastructure, significant geographical distances and vulnerability of Arctic species, ecosystems and cultures" (National Academy of Sciences, Engineering, and Medicine; NASEM 2014). This situation elevates concern for human safety and environmental impacts, including impacts on marine mammals. Although oil spill response capabilities in the Arctic have improved as a result of collaborative research, planning, and preparation[6], significant challenges remain, with no assurance that current response capabilities in the Arctic would be sufficient in the event of a major spill in marine waters (Wilkinson et al. 2017).

Routing vessels away from biologically sensitive areas for marine mammals[7] has the potential to decrease vessel collisions and potential for oil spills and other harmful discharges in the icy conditions commonly encountered in Arctic waters. Established routing would make vessel movements more predictable, thereby reducing risks associated with navigating Arctic waterways. It could also reduce the risk of spills impacting nearshore habitats and coastal communities by routing vessels away from shore. Neither the USCG nor local communities in the AACPARS area have sufficient equipment or capabilities to respond quickly and effectively to a major vessel-related oil spill event (NASEM 2014). As a result, as noted in the Commission's comments on the Bering Strait PARS (letters dated 6 May 2011, 3 June 2015, and 10 May 2017), prevention of at-sea accidents in

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[4] Although not the focus of this discussion, it should be noted that accidental discharges of transported products can also be harmful to Arctic ecosystems. For example, in 2004, the *M/V Selendang Ayu* grounded in rough seas off Unalaska Island, resulting in the release of about 350,000 gallons of oil and diesel as well as 132 million pounds of soybeans. The damage assessment documented impacts to marine resources from exposure to oil (NOAA et al. 2016), but the grounding also resulted in low oxygen levels and impacts to marine invertebrates from the decomposition of soy beans left to rot in coastal waters (https://response.restoration.noaa.gov/about/media/recipes-disaster-cleaning-after-food-spills.html).

[5] https://www.mmc.gov/priority-topics/arctic/arctic-oil-and-gas-development-and-marine-mammals/

[6] https://www.dco.uscg.mil/ICCOPR/; https://www.bsee.gov/site-page/arctic-oil-spill-response-research; http://dec.alaska.gov/spar.aspx; http://www.arcticresponsetechnology.org/

[7] For the purposes of this letter, such areas refer to marine mammal calving, resting, migrating, and feeding areas, as identified herein.

Arctic waters is critical. As part of the AACPARS, the Commission recommends that the USCG conduct an updated assessment of oil spill prevention and response capabilities needed to minimize the risks associated with spills of fuel oil or other hazardous materials in each of the northwest Alaska and North Slope communities. The assessment should include recommendations concerning (1) training, equipment, and logistical support needed to minimize the risk of vessel collisions, (2) emergency response to aid vessels that are disabled or run aground, and (3) containment and cleanup of any hazardous materials that are spilled, regardless of location, season, weather, or ice conditions. Similarly, the Commission recommends that the USCG collaborate with the National Oceanic and Atmospheric Administration (NOAA), the U.S. Fish and Wildlife Service (FWS), and the Alaska Department of Fish and Game (ADFG) on environmental studies to better document marine biological resources in the Arctic that would be the focus of a National Resource Damage Assessment in the event of major marine oil spill.

Background information on marine mammals

In addition to increasing the potential for oil spills, increased vessel traffic in the Arctic has the potential to increase the risk of vessel strikes of marine mammals (especially large whales); increase disturbance of marine mammals by engine and other vessel sounds, ice-breaking activities, or the physical presence of vessels; and disrupt the subsistence hunting activities of Alaska Native communities caused by the presence of vessels and their bow waves or wakes. To assist the USCG in its development of vessel routing measures, the Commission is providing information herein that pertains to the following specific areas of interest identified by the USCG (83 Fed. Reg. 65702):

- times and locations where vessel operations could have significant consequences for species of concern, subsistence activities, and marine mammal migration routes;
- areas of known biological importance, and whether they are of importance year-round or only during specific times;
- specific times and locations of current and expected future subsistence activity; and
- information on specific habitat characteristics that tend to attract higher concentrations of marine mammals.

Significant research investments have been made in recent decades[8] to gather data on large-scale physical and biological processes in the Beaufort and Chukchi Seas, the distribution and movements of marine mammals in the Arctic, and how changes in climate and increasing human activity are affecting these animals and Alaska Native communities. Although many uncertainties remain, research shows that some marine mammals are experiencing changes in abundance, distribution, and habitat use associated with changing weather and oceanographic patterns throughout these waters (Kovacs et al. 2011; Moore et al. 2014; Huntington et al. 2016). The following sections summarize the distribution, movements, behavior, and habitat characteristics of marine mammals most likely to be directly impacted by increased vessel traffic in the U.S. Arctic. These include species identified by Hauser et al. (2018a) as being especially vulnerable to vessel traffic (bowhead and beluga whales and Pacific walruses), as well as other cetaceans that the Commission believes are vulnerable due to their regular occurrence in the U.S. Arctic (gray whales)

[8] By NOAA, FWS, Bureau of Ocean Energy Management (BOEM), U.S. Geological Survey (USGS), ADFG, North Slope Borough (NSB), Northwest Arctic Borough (NWAB), Arctic Research Commission, North Pacific Research Board, regional organizations, oil and gas industry, Alaska Native tribal villages, and others.

or increasing seasonal presence north of the Bering Strait (humpback, fin, minke, and killer whales, and harbor porpoises). It should be noted, however, that increased vessel traffic, and particularly oil spills, have the potential to affect all marine mammals in the region, including other marine mammal species not discussed here, such as bearded, ringed, spotted, and ribbon seals and polar bears.

Marine mammal distribution maps, data sources, and caveats. The Commission drew from several sources in its analyses, including marine mammal density, sightings, and distribution maps from the following sources, which are provided as Appendices:

- Appendix 1: Maps showing densities and sightings data from the Aerial Surveys of Arctic Marine Mammals (ASAMM) project[9]. The densities were derived from ASAMM surveys conducted from 2000-2016 and were adapted from Schick et al. (2017). The individual sightings were from ASAMM surveys conducted in 2018 and 2019 and were adapted from Clarke et al. 2019, 2020. Figure 1 indicates the ASAMM study area, which partially overlaps the AACPARS area. The remaining maps (Figures 2-22) show density and sightings data for bowhead, beluga, and gray whales, walruses, and other baleen whales in the Chukchi and Beaufort Seas, aggregated for the months of July to October for all years and also broken out by month. Geospatial data files were provided courtesy of the Duke University Marine Laboratory, Beaufort, North Carolina, and NOAA's National Marine Fisheries Service, Marine Mammal Laboratory, Seattle, Washington[10]. The maps represent visual detections only; they do not include locations of marine mammals outside the ASAMM study area or those from acoustic detections, nor do they provide detailed depictions of species' habitat use and movements as provided by telemetry studies (e.g. Citta et al. 2018) or traditional knowledge.
- Appendix 2: Maps showing 'Biologically Important Areas' for bowhead, gray, and beluga whales (Figures 1-3), developed by NOAA as part of its Cetacean and Sound Mapping program[11].
- Appendix 3: Maps showing baleen whale sightings in the Chukchi Sea from 2009-2019, north of the Bering Strait, reported by marine mammal observers on Pacific Arctic research cruises and submitted to the multi-national Distributed Biological Observatory (DBO)[12]. The maps were generated by K. Stafford (University of Washington) from unpublished data available on the National Science Foundation's Arctic Data Center website[13].

Bowhead whales. The bowhead is the only baleen whale to spend its entire life cycle in the U.S. Arctic[14]. The overall distribution and seasonal movements of the Bering-Chukchi-Beaufort (BCB) stock[15] are fairly well documented (see, for example, Braham 1984; Fraker and Bockstoce 1984; Moore and Reeves 1993; Quakenbush et al. 2010). In general, BCB bowhead whales overwinter in the Bering Sea and migrate into the Chukchi and Beaufort Seas in the spring. The majority of whales follow the western Alaska coast, reaching Point Barrow by late spring. They then travel east and spend the summer and early fall feeding in the Beaufort Sea. In the late summer and fall, the whales travel west through the Beaufort Sea off the northern coast of Alaska past Point Barrow and across

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9 https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/aerial-surveys-arctic-marine-mammals
10 See References for a list of other geospatial data files used in the Commission's analyses.
11 https://cetsound.noaa.gov/important
12 https://dbo.cbl.umces.edu/; see also Moore and Grebmeier 2018.
13 https://arcticdata.io/
14 The U.S. Arctic as defined in the Arctic Research and Policy Act of 1984 (15 U.S.C. § 4111).
15 Sometimes referred to as the Western Arctic stock of bowhead whales.

the Chukchi Sea, many of them reaching the Chukotka coast of Russia before returning to the Bering Sea for the winter.

Although bowhead whale movement patterns are fairly predictable, there is inter-annual variation in the timing and routes of those movements, particularly in recent years as sea ice cover in the Arctic has decreased and become more variable (see Appendix 1, Figure 1 - 5). The inter-annual variability of seasonal movements, as well as the timing and location of biologically important activities, such as feeding, have been revealed by studies involving tagging and telemetry (Mate et al. 2000; Quakenbush et al. 2010; Citta et al. 2012, 2015, 2018, 2021), aerial surveys (Moore 1992, 2000; Moore and Clarke 1992; Moore and DeMaster 1998; Moore et al. 2000; Clarke et al. 2011a,b,c,d, 2012, 2013a, 2014, 2015, 2017a,b, 2018, 2019, 2020; Mocklin et al. 2012; Shelden et al. 2017), acoustic monitoring (Moore et al. 2010; Hannay et al. 2013), stomach content analyses (Lowry et al. 2004), seasonal sea ice cover and ocean conditions (Moore and Laidre 2006; Ahjian et al. 2010), and traditional knowledge (Huntington and Quakenbush 2009; Braund & Associates 2010; Quakenbush and Huntington 2010; Ashjian et al. 2010; Huntington 2013).

The primary drivers of movements north of the Bering Strait are ice cover, water depth, and prey availability (Moore and DeMaster 1998; Moore 2000), although anthropogenic sounds and smell may also be influential to movements and behavior (Blackwell and Thode 2021; Huntington et al. 2021). Studies of movement patterns indicate that most whales leave the Bering Sea and migrate north in April, before the Bering Sea is ice-free (Citta et al. 2012, 2021). In the Chukchi Sea, their migratory path northward is not well known but traditional knowledge indicates that whales travel fairly close to shore (Quakenbush and Huntington 2010), with movements along polynyas and the edges of the ice zone (Moore and Laidre 2006). Telemetry studies have shown that most of the migration through the Chukchi Sea occurs within 50 km of the coast (Citta et al. 2021). Whales historically were first observed in Wainwright in late April, but they have been observed to arrive earlier in recent years, as early as late March, and they finish passing through by early June, although there are occasional sightings and acoustic detections as late as July (Quakenbush and Huntington 2010; Hannay et al. 2013). Whales are found closer to shore, near the shorefast ice edge, when winds are from the east-northeast, and farther from shore when west winds cause the leads to close (Quakenbush and Huntington 2010).

Whales typically occur off Point Barrow between April and June, although some have been detected as early as March (Moore et al. 2010; Hannay et al. 2013). They do not appear to linger as they turn eastward, although some feeding occurs off Point Barrow during the spring migration (Lowry et al 2004; Mocklin et al. 2012). Most whales are found between 80 and 250 km from shore in continental slope waters across the Beaufort Sea as they migrate west toward Canada (Citta et al. 2021). Feeding occurs throughout the summer in Amundsen Gulf, Canada (Fraker and Bockstoce 1980; Moore et al. 2000, Citta et al. 2021)[16]. Feeding areas are largely influenced by oceanographic features that concentrate zooplankton prey species (primarily calanoid copepods and euphausiids; Lowry et al. 2004), such as fronts or upwelling areas (Citta et al. 2015). Some whales may remain or return to feed in the central and western Beaufort Sea throughout the summer (Moore 1992; Lowry

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[16] Incidental sightings from 1975-1991, prior to regular aerial surveys, indicate that some bowheads appeared to feed in the summer further west, in the northeastern Chukchi Sea (Braham et al. 1984, Moore 1992). Shore-based counts of bowhead whales migrating near Chukotka confirmed that a small percentage of the population feeds in Russian waters in the summer (Melnikov and Zeh 2007).

et al. 2004). Whales migrate westward in the late summer and fall and are typically found in shelf waters of the central Beaufort Sea along the 20-m isobath, outside the barrier islands (Moore et al. 2000; Mate et al. 2000; Shelden et al. 2017); deeper water transits westward across the Beaufort Sea have also been documented (Mate et al. 2000, Clarke et al. 2020). Whales continue to feed as they travel west past Kaktovik and Cross Island (Lowry et al. 2004). Large feeding aggregations are routinely found in the fall (September and October) off Point Barrow, where upwelling pushes zooplankton onto the shelf northeast of the point and they are retained by wind and currents, creating a 'krill trap' (Ashjian et al. 2010; Okkonen et al. 2011; Mocklin et al. 2012; Citta et al. 2015, 2018). Feeding aggregations off Point Barrow are known to occur based on traditional knowledge (Ashjian et al. 2010), acoustic monitoring (Hannay et al. 2013) and aerial surveys (e.g., Clarke et al. 2019, 2020). Once sea ice starts to form off Point Barrow, typically in November, most whales have traveled west into the northern Chukchi Sea and toward the Chukotka coast, where they generally follow waters between 71° and 74° N latitude (Quakenbush et al. 2010, Hannay et al. 2013), characterized by temperatures less than 0° C and salinities between 31.5 and 34.25 PSUs (practical salinity units; Citta et al. 2018). One whale tagged off Utqiaġvik (formerly known as Barrow) in September returned to the Bering Sea via the Alaska coast (Quakenbush et al. 2010). Acoustic monitoring has also detected whales traveling southward along the Alaska coast in the fall (Hannay et al. 2013), although traditional knowledge suggests this is rare (Quakenbush and Huntington 2010). Novel sounds in the environment, such as those from vessel traffic and oil and gas exploration and development (e.g., seismic surveys), can cause bowheads and other baleen whales to move away from vessels, vary their seasonal movements, and increase call rates (Quakenbush et al. 2010; Blackwell et al. 2015; Erbe et al. 2019; Thode et al. 2020).

During ASAMM surveys in September and October 2019, bowhead sightings occurred significantly farther from shore (median distance 46.2 km) and in deeper water (median depth 46 m) in the Alaskan Beaufort Sea as compared to previous years (Clarke et al. 2020). The offshore distribution in 2019 may have been associated with a mismatch in prey availability and whale migration timing (S.E. Moore, pers. comm.) and/or the presence of killer whales, warm water, or anthropogenic sounds (R.S. Suydam, pers. comm.). Only 11 percent of whales were observed feeding off Point Barrow in 2019, which was lower than in most previous years (Clarke et al. 2020).

Satellite sensor data suggest that decreasing seasonal sea ice cover throughout the Arctic Ocean is increasing primary productivity (Arrigo and van Dijken 2015; Frey et al. 2019). The increase in phytoplankton suggests that current conditions in the Arctic are beneficial for bowheads and other baleen whales (Moore 2016; Moore et al. 2019). This possibility is supported by a trend of improved body condition of bowhead whales, especially of juvenile whales (George et al. 2015) and by increases in sightings of bowhead calves (Clarke et al. 2017). The seasonal duration of bowhead whale occurrence in the western Beaufort Sea has increased in recent years, coincident with the loss of sea ice, with whales spending more time feeding close to shore and around Point Barrow (Drunkenmiller et al. 2012), but may also be related to the increase in the size of the bowhead population (Givens et al. 2016). The increased presence of whales in the Alaskan Beaufort Sea during ice-free periods, when an increasing number of vessels are taking advantage of open-water routes across the Arctic, is likely to increase disturbance of feeding whales and also increase the risk of whales being struck by vessels.

Beluga whales. Beluga whales generally are distributed along the shelf edge and in deeper waters of the Beaufort Sea, including Barrow Canyon (see Appendix 1, Figures 6 - 10). Beluga whales occur in lower numbers in coastal and offshore waters of the Chukchi Sea and in coastal waters of the Beaufort Sea. Aerial surveys and acoustic monitoring indicate the fairly consistent presence of beluga whales in the Chukchi and Beaufort Seas throughout the summer and fall (Clarke et al. 2011a,b,c,d, 2012, 2013a, 2014, 2015, 2017a,b, 2018, 2019, 2020; Hannay 2013). Acoustic monitoring from several stations in the Chukchi Sea has detected beluga whale vocalizations from Cape Lisburne to Point Barrow from April to June, with acoustic detections primarily off Utqiaġvik by July (Hannay et al. 2013; see also Appendix 1, Figure 7). Aerial surveys indicate a shift in densities eastward to the Canadian Beaufort Sea in the summer, with whales returning to the U.S. Beaufort Sea and Barrow Canyon in the fall (Hannay et al. 2013; see also Appendix 1, Figure 10).

Belugas in the Arctic are comprised of two genetically differentiated stocks—the Beaufort Sea stock and the Eastern Chukchi Sea stock (O'Corry-Crowe et al. 1997; Muto et al. 2019). Both have distinct distribution and movement patterns and home ranges (Hauser et al. 2014). The Eastern Chukchi Sea stock travels north from the eastern Chukchi Sea to Utqiaġvik starting in May (Clarke et al. 1993; Moore et al. 1993; Suydam et al. 2005). Barrow Canyon is considered core habitat for this stock during the early summer (Hauser et al. 2014), with belugas also seen regularly along the Chukchi Sea coast throughout the summer, particularly near the Kasegaluk Lagoon, just south of Icy Cape (Frost et al. 1993; Huntington et al. 1999; Lowry et al. 2017). Animals from this stock then travel north and east into continental slope and basin waters of the Beaufort Sea in the fall, to as far north as 80° N latitude in moderate to heavy ice conditions (Moore et al. 2000; Suydam et al. 2005; Asselin et al. 2011). The Beaufort Sea stock of beluga whales also winters in the Bering Sea and travels north in the spring through the Chukchi Sea, but travels further east across the Beaufort Sea to the relatively shallow (<80 m), immensely productive waters of the Mackenzie River delta and to western Amundsen Gulf in the Canadian Beaufort Sea (Harwood et al. 1996; Harwood et al. 2014; Hauser et al. 2014; Postma et al. 2017). In the late summer and fall, the two beluga whale stocks in the Beaufort Sea appear to switch positions longitudinally, with the Eastern Chukchi Sea stock remaining in the central Beaufort Sea and the Beaufort Sea stock traveling west toward and past Utqiaġvik (Hauser et al. 2014). Both stocks are generally located along the outer edge of the continental shelf and in slope waters during this time (Moore et al. 2000; Clarke et al. 2011a,c,d, 2012, 2013a, 2014, 2015, 2017a,b, 2018, 2019, 2020; Hauser et al. 2014, 2018b). Such migratory 'switching' results in considerable geographical overlap of the two stocks starting in September and extending through November as they both leave the Beaufort Sea and head west through the Chukchi Sea and south to the Bering Sea for the winter (Suydam et al. 2005; Hauser et al. 2014). Changes in seasonal sea-ice conditions in more recent years has not significantly changed the beluga's preference for deeper slope waters; however, there appears to be a trend toward more prolonged and deeper diving (Hauser et al. 2018b).

Beluga whales from an unknown stock once occurred regularly in Kotzebue Sound, arriving in mid- to late-June following break-up; however, their numbers declined dramatically after 1983 and have yet to recover (Lowry et al. 2017).

Feeding by beluga whales in the Beaufort Sea has not been well documented but they are thought to feed on Arctic cod while in shallow waters of the eastern Beaufort (Welch et al. 1993) and on benthic species in deeper slope and basin waters (Loseto et al. 2008). Foraging success in the deeper waters of Barrow Canyon appears to be enhanced when the Alaska Coastal Current is well-developed and flowing east-northeastward (Stafford et al. 2013). Alaska Native hunters also have identified Camden Bay as a feeding area for belugas in the Beaufort Sea (Huntington 2013).

Gray whales. The Eastern North Pacific stock of gray whales migrates annually along the comparatively shallow continental shelf of the west coast of North America. Most of the stock migrates from wintering grounds in Baja California, Mexico, to the northern Bering Sea and the Chukchi Sea in the summer to feed. Gray whales feed primarily on amphipods and mysiids by suction feeding along the sea floor, creating large excavations that alter the structure of benthic communities (Oliver and Slattery 1985; Brower et al. 2017).

Most of the gray whale population remains in the Bering Sea in both U.S. and Russian waters throughout the summer. Those entering the Chukchi Sea have been observed feeding in the southeastern Chukchi Sea, southwest of Point Hope, primarily in July but also in other months (Clarke et al. 2020; see Appendix 3, Figure 1). This area has been identified as a biological 'hotspot' for both benthic and pelagic prey species (Grebmeier et al. 2015; Nishino et al. 2016). Sightings north of Point Hope are clustered along the Alaskan coast in waters less than 50 m deep and within 70 km from shore, mostly between Cape Lisburne and Point Barrow (Moore et al. 2000; Clarke et al. 2012, 2013a,b, 2014, 2015, 2017a,b, 2018, 2019, 2020; Hannay et al. 2013; see Appendix 1, Figures 11‑15). Observations in this area are coincident with high concentrations of benthic amphipods (Schonberg et al. 2014; Brower et al. 2017).

During the summer and early autumn, gray whales have only occasionally been seen associated with ice, preferring instead open water or light-ice habitat (0-20 percent ice cover; Moore et al. 2000), including waters off Point Hope and Wainwright (Appendix 1, Figures 12 and 13). In September and October, gray whales have been observed clustered (1) near shore at Point Hope, (2) between Icy Cape and Point Barrow, and (3) in offshore waters near Hanna Shoal (Appendix 1, Figure 14 and 15). Gray whales show a preference for 'trough' habitat[17] in years when water inflow through the Bering Strait is moderate or low (Moore et al. 2000). In 2019, gray whales (including one calf) were sighted further east than usual, in the eastern Beaufort Sea (Clarke et al. 2020).

As with bowhead whales, increasing primary productivity appears to be beneficial for gray whales (Moore 2016; Moore et al. 2019), but increased vessel traffic and other human activities in the Alaskan Arctic and changes in other environmental conditions could moderate those favorable circumstances. Continued monitoring of gray whale prey species (both pelagic and benthic) and gray whale distribution in the Chukchi Sea will provide additional insights into how loss of seasonal sea ice, increasing ocean temperatures, and other changing environmental conditions affect marine mammal occurrence and movements (Brower et al. 2017), and the potential for disturbance from vessels and other activities.

Other cetaceans. Seasonal reduction and loss of sea ice, increasing ocean temperatures, and transport of Pacific water through Bering Strait may also be important factors in the increasingly common sightings of 'sub-Arctic' cetaceans (humpback, fin, minke, and killer whales and harbor porpoises) in the southcentral and northeastern Chukchi Sea since 2008 (Haley et al. 2010; Aerts et al. 2013; Brower et al. 2018; Clarke et al. 2020), and in recent acoustic detections of species typically limited to temperate waters (including Risso's dolphins, Pacific white-sided dolphins, and northern right whale dolphins; Seger et al. 2019). Sightings of sub-Arctic cetaceans have been clustered in the central channel just north of Bering Strait to Point Hope, extending from shore to the western

[17] Troughs are characterized as elongated depressions in the seafloor.

border of the U.S. EEZ (Clarke et al. 2014, 2015, 2016, 2017, 2018, 2019, 2020; Brower et al. 2018; Moore et al. 2019; Appendix 1, Figure 21, and Appendix 3, Figures 2-4). As mentioned previously, this area is a biological 'hot-spot' for benthic and pelagic prey of baleen whales (Grebmeier et al. 2015; Nishino et al. 2016). Fewer, scattered sightings of sub-Arctic baleen whales have been increasingly reported in waters north of this area throughout the summer and fall as far north as Hanna Shoal and as far east as Point Barrow (Clarke et al. 2014, 2015, 2016, 2017, 2018, 2019, 2020; Appendix 1, Figure 21).

Walruses. The Pacific walrus population ranges throughout continental shelf waters of the Bering and Chukchi Seas, with occasional occurrence in the Beaufort and East Siberian Seas (FWS 2014). A significant portion of the walrus population, particularly females and calves, migrates into the Chukchi Sea during the summer months and hauls out on sea ice to calve, nurse, molt, rest, and to gain access to feeding areas. Preferred haulout sites are in shallow-water areas – typically less than 80 m in depth – where sea ice is present (Fay and Burns 1988). Because of this dependence on seasonal sea ice for access to feeding areas and other purposes, walrus distribution within the eastern Chukchi Sea in any given year is highly dependent on the location and presence of sea ice and its persistence over shallow feeding areas such as Hanna Shoal (Garlich-Miller et al. 2011). Historically, large numbers of walruses hauled out on ice near or over Hanna Shoal from July through October (Fay et al. 1984). More recent studies of tagged walruses showed them to migrate north into the Chukchi Sea in May, arriving at Hanna Shoal in June, and remaining through August or September, depending on ice conditions (Jay et al. 2012).

Prior to 2007, walrus haulouts on the eastern coast of the Chukchi Sea were intermittent and short in duration, with the most consistently used site at Cape Lisburne in late September and October (Garlich-Miller 2013). This is because benthic productivity and biomass in nearshore waters of the Alaska northwest coast is generally more variable and suboptimal for feeding compared to offshore areas on or near Hanna Shoal (Schonberg et al. 2014). However, starting in 2007, declines in sea ice over Hanna Shoal during August and September have been associated with the establishment of large walrus haul-outs on barrier islands near Point Lay, with smaller, less regular haulouts occurring near Peard Bay, Wainwright, Icy Cape, and Cape Lisburne (Huntington et al. 2012; Jay et al. 2012; Goertz et al. 2017; MacCracken et al. 2017). From 2008 to 2011, tagged walruses traveled back and forth between coastal haul-outs and the Hanna Shoal area in August (Jay et al. 2012), presumably to exploit the denser concentrations of preferred benthic prey associated with the shoal. Movement back and forth between coastal haul-outs and offshore feeding areas increases the energy costs associated with feeding and also exposes walruses to vessel traffic and other human activities. Disturbances at coastal haulouts can cause walruses to stampede, crushing calves and yearlings (Fishbach et al. 2009; Garlich-Miller et al. 2012; Goertz et al. 2017), potentially with population-level consequences (Udevitz et al. 2013, 2017).

As seasonal sea ice continues to decline in the Chukchi Sea, large numbers of walruses continue to use the coastal haulout sites near Point Lay and Cape Lisburne as early as late July[18] and as late as October[19] (Garlich-Miller 2013; Fishbach et al. 2016; see also Appendix 1, Figures 16-20),

[18] https://www.adn.com/alaska-news/wildlife/2020/08/10/pacific-walrus-haulout-near-point-lay-in-northwest-alaska-is-earliest-on-record/
[19] https://www.fws.gov/alaska/sites/default/files/2020-08/Walrus%20Haulout%20 08/Walrus%20Haulout%20Advisory%20for%20Mariners%20Chukchi%20Sea%20Coast.pdf

and are thereby exposed to the associated risks. Continued sea-ice declines could also cause a long-term shift of the population to other sea-ice associated feeding areas to the northeast, in the Canadian Arctic, or to the northwest, in the East Siberian and Laptev Seas (MacCracken 2012). How walruses will respond to continued declines in seasonal sea ice in the Chukchi Sea over the long-term, and resulting effects on the population, are difficult to predict. However, for the short-term, it will be critical to establish vessel traffic restrictions, vessel speed restrictions, and/or vessel routing measures in the Chukchi Sea on and around Hanna Shoal and Point Lay and between the coast and the offshore walrus feeding grounds. Those measures should be in place throughout the summer and fall. Nearshore protective measures around Point Lay are especially important starting in mid-July when walruses are expected to use coastal haulout sites, and any disturbance leading to a stampede could be catastrophic (MacCracken 2012).

Impacts of increased vessel traffic on marine mammals

Mortality resulting from collisions between whales and vessels continues to be one of the top threats to whale populations worldwide (Clapham et al. 1999, Thomas et al. 2015). As such, the Commission is particularly concerned about the risk of vessels strikes to bowheads and other large whales. Because of their movements and distribution, baleen whales are the marine mammals most susceptible to being struck by vessels in Alaska's Arctic waters. Vessel strikes are a major cause of mortality and serious injury of another closely related baleen whale, the North Atlantic right whale (Hayes et al. 2019). Factors that contribute to the vulnerability of right whales to vessel strikes include their large body size, slow swim speed, buoyant body, use of coastal habitats, and tendency to feed and rest at the surface (Wiley et al. 2016). Although their habits differ, many of those characteristics are shared by bowhead whales, as well as gray and other baleen whales.

A recent assessment found that less than two percent of harvested BCB bowhead whales bore signs of vessel strikes (George et al. 2017). However, because of similarities between right and bowhead whales with respect to morphology, behavior, feeding, reproduction, and migration strategies, it is reasonable to conclude that bowhead whales will prove to be similarly vulnerable to ship strikes as vessel traffic continues to increase (Reeves et al. 2012). The area and time of greatest risk would likely be in the Beaufort Sea and near Point Barrow during the summer and fall. At those times, whales are feeding close to shore in relatively ice-free areas that could be transited by vessels. Vulnerability in the Chukchi Sea may also be of concern if changing ice conditions result in increased traffic earlier or later in the year.

Gray whales and other baleen whales are also at risk of vessel strikes, especially in waters just north of Bering Strait. NOAA scientists estimated that, between 2012 and 2016, ship strikes accounted for the serious injury or mortality of four gray whales from the Eastern North Pacific stock, or 0.8 whales annually (Carretta et al. 2019). Additional mortality from ship strikes probably goes unreported because the whales do not strand, are undetected, or lack obvious signs of trauma. Areas and times of greatest vulnerability to vessel strikes of gray whales and other baleen whales in the Alaskan Arctic would be the south-central Chukchi Sea and waters off Point Hope in the summer and between Icy Cape and Point Barrow in the fall.

Although not necessarily a vessel strike risk, expanded vessel traffic and associated vessel sound can cause disturbance to beluga whales, particularly in the Beaufort Sea in the summer and fall when exposure to traffic would be greatest (Hauser et al. 2018). If vessels were permitted to travel through Barrow Canyon, it would increase disturbance of beluga whales that use the canyon for feeding throughout the summer and fall.

Vessel traffic through important walrus feeding and sea-ice haulout areas has significant potential to disturb female walruses and their calves. Vessel traffic close to Hanna Shoal can separate females from their calves, and any human activity at the land-based haulout sites near Cape Lisburne and Point Lay can cause massive stampedes, resulting in significant mortality, particularly of calves and yearlings (Fishbach et al. 2009; Garlich-Miller et al. 2012; Goertz et al. 2017). As noted herein, FWS and nearby communities have implemented voluntary measures to prevent land, sea, or aerial activities from disturbing hauled-out walruses (Huntington et al. 2012).

As vessel traffic increases in the Chukchi and Beaufort Seas, the identification of biologically sensitive areas for marine mammals and the adoption of routing and other measures to govern vessel traffic would reduce the potential for vessel strikes and disturbance of bowhead, gray, and other baleen whales, and disturbance of belugas and walruses. The adoption of routing measures in the Bay of Fundy and on the Scotian Shelf in eastern Canada has significantly reduced the potential for vessel strikes of right whales (Vanderlaan et al. 2008), as has the designation of Areas to be Avoided in the Great South Channel (off Cape Cod, Massachusetts) and Roseway Basin (south of Nova Scotia, Canada; Vanderlaan and Taggart 2009). Similar measures have been adopted in California to reduce the risk of large strikes of humpback, blue, gray, and fin whales[20] (Schoeman et al. 2020).

Impacts of increased vessel traffic on Alaska Native subsistence hunting

Access to marine mammals is critical to ensuring food security for Alaska Native residents living in northwest Alaska and North Slope coastal communities. Hunting areas vary by species, season, and ocean and ice conditions. The effects of a changing climate have made some marine mammals less available to Alaska Native communities and also have increased concerns for the safety of hunters due to the unpredictability of weather and ice conditions. For instance, the inability of Alaska Native hunters on St. Lawrence Island to gain access to walruses in 2013 because of extreme ice and wind conditions caused a food shortage that prompted the governor to declare an economic disaster[21]. Food security remains a primary concern for many indigenous communities throughout the Arctic, whose culture, values, and identity are firmly rooted in their relationship with the environment and the hunting, gathering, and preparing of traditional foods (Inuit Circumpolar Council-Alaska 2020). Increased vessel traffic poses potentially adverse effects on marine mammal availability and hunting success and could further exacerbate food security concerns.

Engine sound, vessel movements, and other factors associated with shipping may alter the movement, habitat-use patterns, and behavior of marine mammals. The presence of vessels in subsistence areas can also disrupt hunting activities and create a safety hazard for small vessels (Huntington et al. 2015). It therefore is important for the USCG to take steps to ensure that any increase in vessel traffic does not disrupt hunting, alter marine mammal behavior, or cause them to abandon traditional hunting areas, thereby making them less available or even unavailable to hunters. Traditional knowledge has identified 'hot spots' of activity that should be factored into the

[20] https://www.fisheries.noaa.gov/west-coast/marine-mammals-west-coast-ship-strikes
[21] https://alaska-native-news.com/saint-lawrence-island-receives-economic-disaster-declaration-8671

development of vessel routing and other measures to mitigate impacts on hunting activities (Huntington and Quakenbush 2009; Braund and Associates 2010; Huntington et al. 2012; Huntington 2013; Galginaitis 2013, 2014). Those studies have documented how patterns are changing in response to sea-ice loss and other changes in climate and ocean conditions. Disruptions to bowhead hunting could have serious impacts on the nutrition and culture of Alaska Native communities across the Arctic—communities that rely heavily on the sharing of food derived from harvested marine mammals (Fall and Kostick 2018). Recent observations of bowheads occurring significantly farther offshore than they 'normally' do illustrate how hunters may come into contact with shipping if those designing vessel routing measures are not sufficiently mindful of both 'normal' and real-time whale distribution and the timing and location of subsistence activities. For example, as discussed herein, bowheads occurred significantly further offshore than usual during fall 2019 (Clarke et al. 2020). As a result, the whaling season in Utqiaġvik that year involved extensive searching by hunters up to 50 miles from shore, at substantial risk to the crews that normally do not go more than 15 miles from shore (H. Brower, pers. comm.), and only one whale being landed when more typically 10 to 15 whales are landed during the fall (Suydam et al. 2018, 2019).

To assess the risks posed by vessel traffic to Alaska Native subsistence, the Commission recommends that the USCG continue its efforts to consult with each of the Alaska Native communities bordering the Chukchi and Beaufort Seas, as well as with the relevant Alaska Native organizations (ANOs) (e.g., the Alaska Eskimo Whaling Commission, Arctic Marine Mammal Coalition, Alaska Beluga Whale Committee, Ice Seal Committee, and Eskimo Walrus Commission), the Alaska Waterway Safety Committee, NSB, NWAB, NOAA, FWS, ADFG, and others, as appropriate, to identify and characterize the seasons and areas in which traditional marine mammal subsistence hunting occurs, recognizing that such information will need to be updated as sea-ice conditions change and subsistence hunters adapt to the changes. The Commission also recommends that the USCG include Alaska Native communities in decision-making processes regarding vessel routing and infrastructure development in support of increased vessel traffic to the greatest extent possible.

Recommended biologically sensitive areas to avoid for marine mammals

Based on the information presented herein, and recognizing that shipping routes are constrained by the extent of seasonal sea ice in any given year, as is the presence of most marine mammals, the Commission recommends that the following biologically sensitive areas for marine mammals be avoided when routing long-distance vessels[22] through U.S. Arctic waters (see Figure 1):

- In the Chukchi Sea, an area that includes waters from Wales to Point Hope, including the entirety of Kotzebue Sound, and all coastal waters from Point Hope to Point Barrow out to 80 km (50 miles) from shore, from Point Hope to Utqiaġvik, inclusive of Barrow Canyon. Off Point Hope, the buffer zone would extend to within 14.5 km (7.8 nautical miles, nm) from the western edge of the U.S. EEZ and 81.5 km (44 nm) from Point Hope. The boundaries of this area are indicated by the pink-shaded area in Figure 1. Routing vessels around the shaded area would avoid the migratory path of bowhead whales in the spring, high-density areas occupied throughout the summer by gray whales between Icy Cape and

[22] Defined for the purpose of this letter as vessels traveling between the Bering Strait and the Canadian Arctic, with no planned stops in coastal Alaska communities.

Utqiaġvik and by beluga whales between Icy Cape and Point Lay, offshore feeding and land-based haulout sites used by walruses near Point Lay in the late summer, and feeding and aggregation areas for sub-Arctic cetaceans between Wales and Point Hope throughout the summer and fall. This route also would avoid all coastal areas used for subsistence hunting by Alaska Natives from Wales to Utqiaġvik.

- The Hanna Shoal core area, indicated by the dark teal-shaded area in Figure 1[23], which is used by walruses for calving, feeding, and resting, and by gray whales for feeding. Additionally, this area includes a buffer zone extending 25 km around the western and northwestern boundary of the shoal, indicated by the lighter teal-shaded area in Figure 1. Routing vessels around Hanna Shoal and the adjacent buffer zone would minimize vessel interactions with whales migrating through and feeding in Barrow Canyon.
- In the Beaufort Sea, an area encompassing the entirety of the U.S. Beaufort Sea from shore northward to the 2,000-m isobath, including Barrow Canyon, as indicated by the green-shaded area in Figure 1. Routing vessels around the shaded area would avoid the majority of migrating and feeding bowhead whales throughout the summer and fall and would minimize disturbance of beluga whales feeding in Barrow Canyon and along the shelf edge. This route also would avoid all subsistence hunting areas used by Alaska Natives in the Beaufort Sea.

Marine mammal distributions may shift in future years with changing seasonal sea ice conditions and with changes in the distribution of prey (and predator) species. To that end, the Commission recommends that the USCG continue to work with state and federal agencies, marine mammal scientists, oceanographers, Alaska Native communities, the Canadian Coast Guard, and Fisheries and Oceans Canada to conduct periodic analyses of (1) the occurrence, movements, seasonality, and habitat characteristics of all Arctic marine mammals, (2) how those factors may be changing in response to climate conditions, and (3) the animals' vulnerability to impacts associated with projected future vessel activity.

Recommended modifications to the USCG's conceptual route

The USCG has developed conceptual vessel routing measures for the Arctic, based on comments received during and after the Bering Strait PARS in 2015[24]. The routing measures consist of a series of four nautical mile-wide, two-way Traffic Separation Scheme (TSS) routes (as shown by the gray-shaded line in Figure 1). The USCG's conceptual TSS route would have vessels travel further offshore than current traffic patterns for the Alaskan Arctic Coast (CMTS 2019). The Commission agrees with the routing of vessels as far offshore of the Alaskan coast as possible. That approach would ensure that vessels avoid biologically sensitive areas for marine mammals, as discussed herein and depicted as the Commissions 'recommended areas to avoid' in Figure 1. An offshore route also would minimize disturbance of Alaska Native subsistence activities, decrease the risk of accidental oil spills or discharges from vessels reaching sensitive coastal areas and inadvertent groundings, which could also result in harmful oil spills and discharges from vessels.

To avoid biologically sensitive areas for marine mammals and also Alaska Native subsistence activities, the Commission recommends that the USCG modify its conceptual TSS route, as follows:

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[23] As defined by the Bureau of Ocean Energy Management, Hanna Shoal Presidential Withdrawal Area (2015).
[24] https://www.arcticpars.org/s/AACPARS-Flyer.pdf

- Add an additional waypoint further to the west off Point Hope, thereby increasing the distance from the TSS route to Point Hope from 63 km (34 nm) to 81.5 km (44 nm). The additional waypoint is identified as waypoint 2, in black, in Figure 1.
- Replace the USCG's waypoints 3-7 with a waypoint further to the west of the Hanna Shoal core area (outside the 25-km buffer area discussed herein), thereby avoiding Hanna Shoal and the area between Hanna Shoal and Barrow Canyon. The new waypoint is identified as waypoint 4, in black, in Figure 1.
- Replace the USCG's waypoints 8-10 with a waypoint further to the north off Point Barrow, at the 2000-m isobath. The new waypoint is identified as waypoint 5, in black, in Figure 1. The route between new waypoints 6 and 7, in black, would follow the USCG's conceptual route between waypoints 11-14, in gray. The easternmost waypoint at the U.S./Canadian border is the same for both the Commission's recommended route (waypoint 7, in black), and the USCG's conceptual route (waypoint 14, in gray).[25]

The approximate latitude and longitude of the waypoints associated with the Commission's recommended route are shown in the table insert in Figure 1, indicating also where those waypoints correspond with the USCG's conceptual route. The table in Figure 1 also indicates the approximate distance to shore for each waypoint. While the Commission's recommended route represents a slight increase in the overall distance from Wales to the Canadian border from 1525 km to 1629 km (an increase of 104 km), it would reduce the risk of interaction with marine mammals and subsistence activities by avoiding biologically sensitive areas for marine mammals in and around Hanna Shoal, Barrow Canyon, and along the shelf break in the Beaufort Sea.

The Commission's recommended route includes designation of a 10-knot speed restriction for the area between the northern terminus of the Bering Strait PARS route (waypoint 1 in Figure 1) and the waypoint west of Point Lay (waypoint 3). This has been a consistently high-use feeding area throughout the summer and fall for gray, minke, fin, and humpback whales, as shown in Appendix 3, Figures 1-4, and discussed herein. Based on experience with right whales and other large whales, limiting vessel speeds to 10 knots at times and in areas with the greatest potential for overlap between ships and whales appears to be effective at reducing vessel-strike mortality and serious injury (Conn and Silber 2013; Laist et al. 2014; Silber et al. 2014; Crum et al. 2019). Vessel speed restrictions have the added benefit of reducing greenhouse gas emissions and underwater sound levels in the Arctic (Leaper 2019; MacGillivray et al. 2019[26]), the latter also expected to be an increasing source of disturbance to marine mammals and subsistence hunting. <u>The Commission therefore recommends</u> that the USCG work with NOAA and the International Maritime Organization (IMO) to implement a 10-knot speed restriction in waters between the northern terminus of the Bering Strait PARS route (waypoint 1 in Figure 1) and the waypoint west of Point Lay (waypoint 3, in black).

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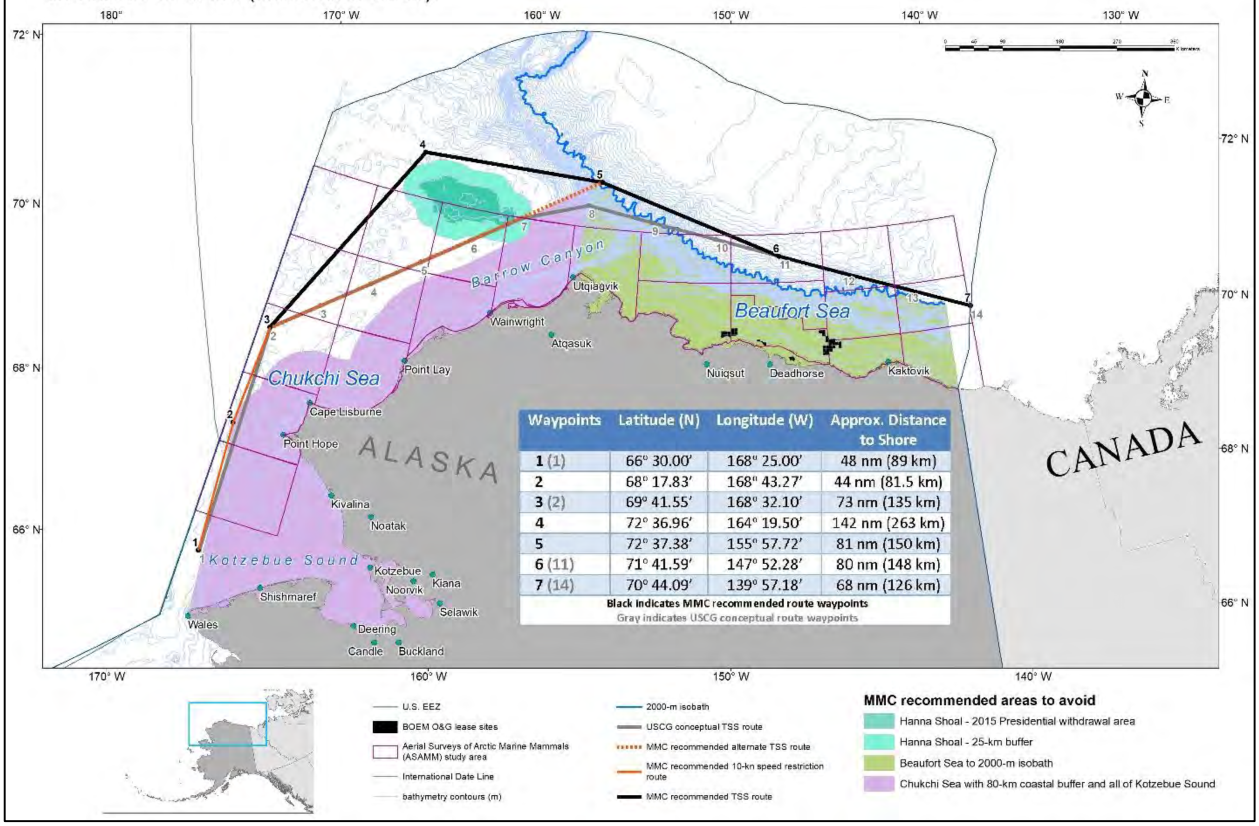
[25] This waypoint would abut the route most commonly travelled by large vessels as they pass through the westernmost edge of the Canadian Arctic, south of Banks Island (Dawson et al. 2018), a route which has been identified as the Canadian Coast Guard's primary northern marine transportation corridor through the western portion of the Northwest Passage (Chénier et al. 2016).

[26] Although slower speeds reduce broadband source levels, it may alter the spectral characteristics of certain types of propellers and could add other sources of sound through, for example, vibration (Halliday et al. 2019, pers. comm.). Additional studies are needed to understand how slower vessel speeds in a variety of vessels may affect Arctic marine mammals.

Figure 1. Marine Mammal Commission (MMC) recommended vessel routing through Alaskan Arctic Waters and areas to avoid (November 2020).



Waypoints	Latitude (N)	Longitude (W)	Approx. Distance to Shore
1 (1)	66° 30.00′	168° 25.00′	48 nm (89 km)
2	68° 17.83′	168° 43.27′	44 nm (81.5 km)
3 (2)	69° 41.55′	168° 32.10′	73 nm (135 km)
4	72° 36.96′	164° 19.50′	142 nm (263 km)
5	72° 37.38′	155° 57.72′	81 nm (150 km)
6 (11)	71° 41.59′	147° 52.28′	80 nm (148 km)
7 (14)	70° 44.09′	139° 57.18′	68 nm (126 km)

Black indicates MMC recommended route waypoints
Gray indicates USCG conceptual route waypoints

The Commission recognizes that deviations from the recommended route may be necessary in certain circumstances to ensure safe navigation. However, vessel traffic routed through biologically sensitive areas for marine mammals should be required or encouraged to take extra precautions to mitigate potential harm to marine mammals resting or feeding in this area. The Commission accepts that the USCG's route east of Hanna Shoal could be used as an alternate route through the northern Chukchi Sea in certain circumstances to ensure safe navigation, with two additional provisions: (1) replacing the USCG's waypoints 8-10 (in gray, in Figure 1) with the Commission's recommended waypoint 5 (in black, in Figure 1) to route vessels further north off Point Barrow; and (2) implementing a 10-knot speed restriction for the entire length of the alternate route through the Chukchi Sea.

The Commission's recommended TSS route does not address vessels servicing coastal communities or the mines or oilfields in northern Alaska via inshore traffic zones[27]. An analysis of vessel traffic in the U.S. Arctic region indicated heavy use of coastal waters by a range of vessels (Figures 6-13 in CMTS 2019), with some number of vessels making stops in or near coastal communities. In these situations, additional mitigation measures may be necessary to minimize interactions with marine mammals and subsistence activities, such as time- and area-specific vessel speed restrictions; passive acoustic monitoring to alert ships to the presence of whales; deployment

[27] Defined by the USCG as the area between the landward boundary of a traffic separation scheme and the adjacent coast (83 Fed. Reg. 65701).

of trained observers and thermal imaging technology to detect whales; and mariner outreach and education programs (Silber et al. 2009; Sèbe et al. 2019). Based on experience with right whales and other large whales, limiting vessel speeds to 10 knots at times and in areas with the greatest potential for overlap between ships and whales appears to be effective at reducing vessel-strike mortality and serious injury (Conn and Silber 2013; Laist et al. 2014; Silber et al. 2014; Crum et al. 2019). Similar measures should be considered to prevent disturbance of walruses where they aggregate in large numbers to feed and rest, such as on and around Hanna Shoal and in coastal waters near Point Lay. The Commission recommends that the USCG continue to work closely with federal and state resource agencies, Alaska Native communities, and mineral extraction industries (i.e., mining and oil and gas) to develop routing measures for inshore traffic zones to avoid biologically sensitive areas and times for marine mammals and subsistence activities to the greatest extent possible. The Commission further recommends that the USCG consider implementing other protective measures in biologically sensitive areas to minimize marine mammal-vessel encounters, including vessel speed restrictions; deployment of passive acoustic monitoring, trained observers, and thermal imaging technology to detect whales; and mariner outreach and education programs.

Measures that should be considered to enhance outreach to mariners, ensure compliance with routing measures, and assist vessels in avoiding biologically sensitive areas for marine mammals include vessel tracking (e.g., automatic identification systems, or AIS), geo-fencing[28], and real-time communications between vessel operators and shore-based vessel tracking systems. The Marine Exchange of Alaska has made considerable strides in enhancing remote vessel tracking systems, expanding geo-fencing capabilities, and establishing robust real-time communications systems with vessels transiting Alaska waters. The Commission recommends that the USCG continue to work with the Marine Exchange of Alaska and Alaska coastal communities to identify resources needed to support mariner outreach efforts, effective and reliable tracking of vessels, and communications systems to ensure compliance with routing measures and avoidance of biologically sensitive areas for marine mammals.

Additional considerations

In addition to consideration of the sensitive areas noted herein, the evaluation of routing measures could take into account vessel and ocean characteristics that pose different risks to safe navigation, including the types of vessels (e.g., barges, tankers, tugs, cruise ships); their purpose (i.e., servicing of coastal communities vs. longer distance through-transits); vessel speed; seasonal oceanic, weather, and ice conditions; bathymetry; navigational hazards; and sensitive marine areas for other species (Pastusiak 2016; Stevenson et al. 2019).

Of immediate concern is accurate mapping and charting of the Chukchi and Beaufort Seas to assess routing alternatives and ensure safe navigation in this still largely frontier area. In November 2019, the White House issued a Presidential Memorandum on Ocean Mapping[29] to enhance data collection to improve mapping and charting of the U.S. Exclusive Economic Zone, particularly coastal waters of the Alaskan Arctic. The Ocean Policy Committee has since issued the

[28] The use of AIS or global positioning system (GPS) data to determine when a vessel has entered or is approaching a geographically-defined area.
[29] https://www.whitehouse.gov/presidential-actions/memorandum-ocean-mapping-united-states-exclusive-economic-zone-shoreline-nearshore-alaska/

"National Strategy for Mapping, Exploring, and Characterizing the United States Exclusive Economic Zone"[30] to achieve the goals of the Presidential Memorandum. To address the challenges in Alaska more specifically, NOAA, the state of Alaska, and the Alaska Mapping Executive Committee have issued the "Alaska Coastal Mapping Strategy"[31], which outlines goals and priorities for mapping Alaska coastal waters. Priorities include building on existing partnerships, expanding coastal data collection, leveraging innovation in mapping technology development, and conducting strategic communications to promote stakeholder engagement, particularly engagement and communications with Alaska Native Organizations[32] and Alaska Native communities. The Commission encourages the USCG to continue to work with NOAA and the Alaska Mapping Executive Committee to identify and address critical gaps in available data to enhance mapping and charting of the Arctic and promote stakeholder engagement.

Continued changes in the distribution and movement patterns of marine mammals, and possible changes in their population status, will make it challenging to predict areas that will be most impacted by increased vessel traffic and to design routing systems that minimize impacts on the various species and on the Alaska Natives who depend on them for subsistence. This will be particularly difficult without a continuous, broad-scale visual and acoustic monitoring program. Information on the distribution and summer-fall movements of large whales, belugas, and walruses in the Arctic had been provided by aerial surveys conducted annually[33] since 1979, through an inter-agency agreement established between BOEM's Alaska Region and NOAA's Marine Mammal Laboratory in Seattle, Washington. Funding for that program was discontinued as of 2020, although the North Slope Borough provided funding for an abbreviated fall survey in 2020. It is unclear whether surveys will be funded in 2021. Passive acoustic monitoring has also been used to track marine mammal presence and movements and can provide safe and cost-effective year-round monitoring, although not in real-time. However, funding for acoustic monitoring has been inconsistent. It is unclear at this time what type of program will be established or which agency (or agencies) will provide necessary funding to ensure continued monitoring of Arctic marine mammals and potential shifts in their distribution due to the direct and indirect effects of continued sea-ice loss. <u>The Commission recommends</u> that the USCG work with NOAA, BOEM, local, state and other federal agencies, and private institutions to gain support for a coordinated, broad-scale, long-term marine mammal surveillance program in the Arctic that includes both aerial and/or vessel surveys and a year-round passive acoustic monitoring program.

The Commission also encourages the USCG to continue its participation and support of the Artic Council, specifically the Protection of the Arctic Marine Environment (PAME) working group's Arctic Marine Shipping Assessment (AMSA). The 2009 AMSA report[34] included recommendations related to, among other things: (1) coordination with IMO on shipping measures in the Arctic, (2) marine use by and engagement with indigenous communities, (3) addressing impacts on marine mammals, (4) oil spill prevention, (5) development of a comprehensive Arctic marine traffic awareness system, and (5) investing in hydrographic, meteorological, and oceanographic data. Continued efforts to implement the AMSA recommendations, with support

[30] https://www.whitehouse.gov/wp-content/uploads/2020/01/20200611-FINAL-STRATEGY-NOMEC-Sec.-2.pdf
[31] http://agc.dnr.alaska.gov/coastal.html
[32] Defined in the strategy as Alaska Tribes, Alaska Native corporations, Alaska Native consortia, and Alaska Native co-management organizations.
[33] With some exceptions.
[34] https://www.pame.is/projects/arctic-marine-shipping/amsa

from the USCG and other U.S. federal agencies, will result in science-based, internationally-supported routing measures that minimize impacts on marine mammals and indigenous communities.

Enhancing the consultation process with Alaska Native Tribal Governments

Executive Order 13175 "Consultation and Coordination with Indian Tribal Governments" requires that federal agencies conduct meaningful and timely consultation with Alaska Native tribes regarding actions with the potential to affect tribal trust resources. Such consultation ensures that appropriate consideration is given to the views and perspectives of Alaska Native tribes regarding federal agency decisions that affect the resources and interests of those tribes, including decisions that affect marine mammal resources. Effective consultation is facilitated by building and maintaining trust relationships between federal agency and tribal council leadership.

In December 2012, the Commission, in collaboration with the Indigenous Peoples Council for Marine Mammals (IPCoMM) and the Environmental Law Institute (ELI), convened a meeting to review and seek ways to improve the tribal consultation process (ELI 2013; ELI 2015). Following that review, the Commission contracted with ELI to work with IPCoMM, ANOs, and others to develop model procedures for government-to-government consultations with Alaska Native tribes under Executive Order 13175 and related directives designed to assist Alaska Native communities engage in meaningful consultations regarding policies, regulations, legislation, or other federal actions that have tribal implications. The result was a handbook meant to provide Alaska Native communities with guidance on how they can design their own policies and procedures for government-to-government consultation with federal agencies (ELI 2016).

The Commission commends the USCG for its hiring of a District 17 Tribal Liaison Specialist to coordinate resource management and partnership programs with Alaska Native groups, Native American communities, and tribal governments[35]. The Commission encourages the Tribal Liaison Specialist to expand the USCG's consultation process by engaging with each tribal village located within the area covered by the AACPARS, drawing on the best practices outlined in the ELI documents referenced above (ELI 2013, 2015, 2016), as well as ocean planning and policy guidance documents developed for vessel routing in the Bering Sea (Huntington et al. 2015; Raymond-Yakoubian and Daniel 2018). The Commission also commends the USCG for working with the Alaska Eskimo Whaling Commission, which has tribal authority, and the North Slope Borough to engage collaboratively with Alaska Native communities to seek input about the AACPARS. Meaningful engagement and consultation with Alaska Native tribes and communities will not only ensure the USCG's compliance with E.O. 13175, but it will also help to develop a long-term trust relationship with affected communities.

It is important to recognize that tribal capacity for consulting with the numerous federal agencies conducting or planning activities in the Arctic is limited. That capacity will be stretched even further as the USCG continues to consider measures to address increasing vessel traffic in the Arctic. The USCG was instrumental in supporting the organization of the Arctic Waterway Safety Committee to coordinate and provide input from various ANOs and tribal villages regarding vessel routing and impacts on Alaska Native communities. However, it is the Commission's understanding

[35] https://www.linkedin.com/jobs/view/tribal-liaison-specialist-gs-0301-12-13-at-u-s-coast-guard-1298954640

that the Arctic Waterway Safety Committee is no longer able to meet regularly due to a lack of funding. The Commission recommends that the USCG work with other federal agencies conducting or planning activities in the Arctic to build tribal capacity to engage in government-to-government consultation on federal actions that affect tribal resources and interests. One example of a federally-sponsored tribal capacity-building program that could be supplemented by the USCG is the Environmental Protection Agency's Indian Environmental General Assistance Program (GAP)[36]. The GAP provides funding to tribes and intertribal consortia to build capacity to administer environmental regulatory programs and to develop multimedia programs to address environmental issues.

We hope these comments and recommendations are helpful. Please contact me if you have any questions.

Sincerely,

Peter O Thomas

Peter O. Thomas, Ph.D.
Executive Director

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Appendix 1

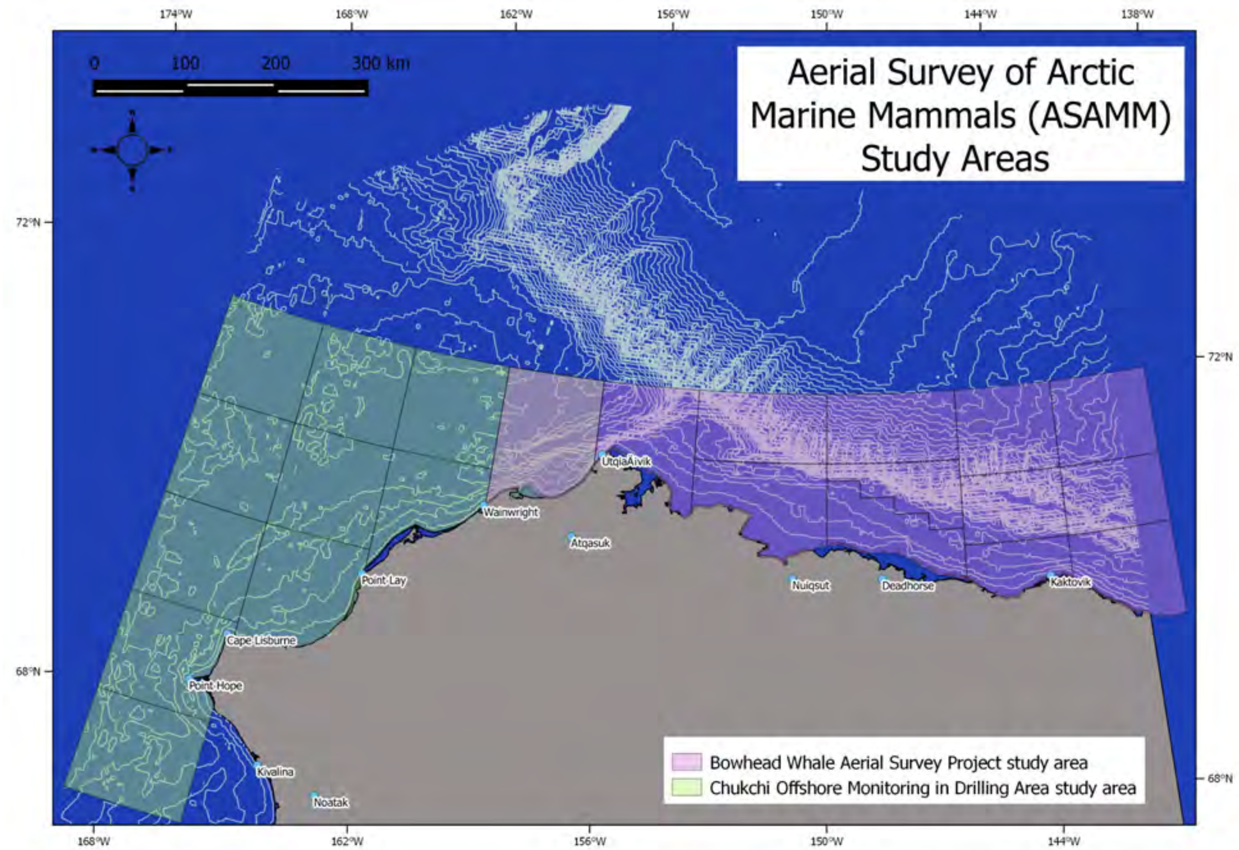


Figure 1. Survey blocks flown during Aerial Surveys of Arctic Marine Mammals (ASAMM) from 2000-2016. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

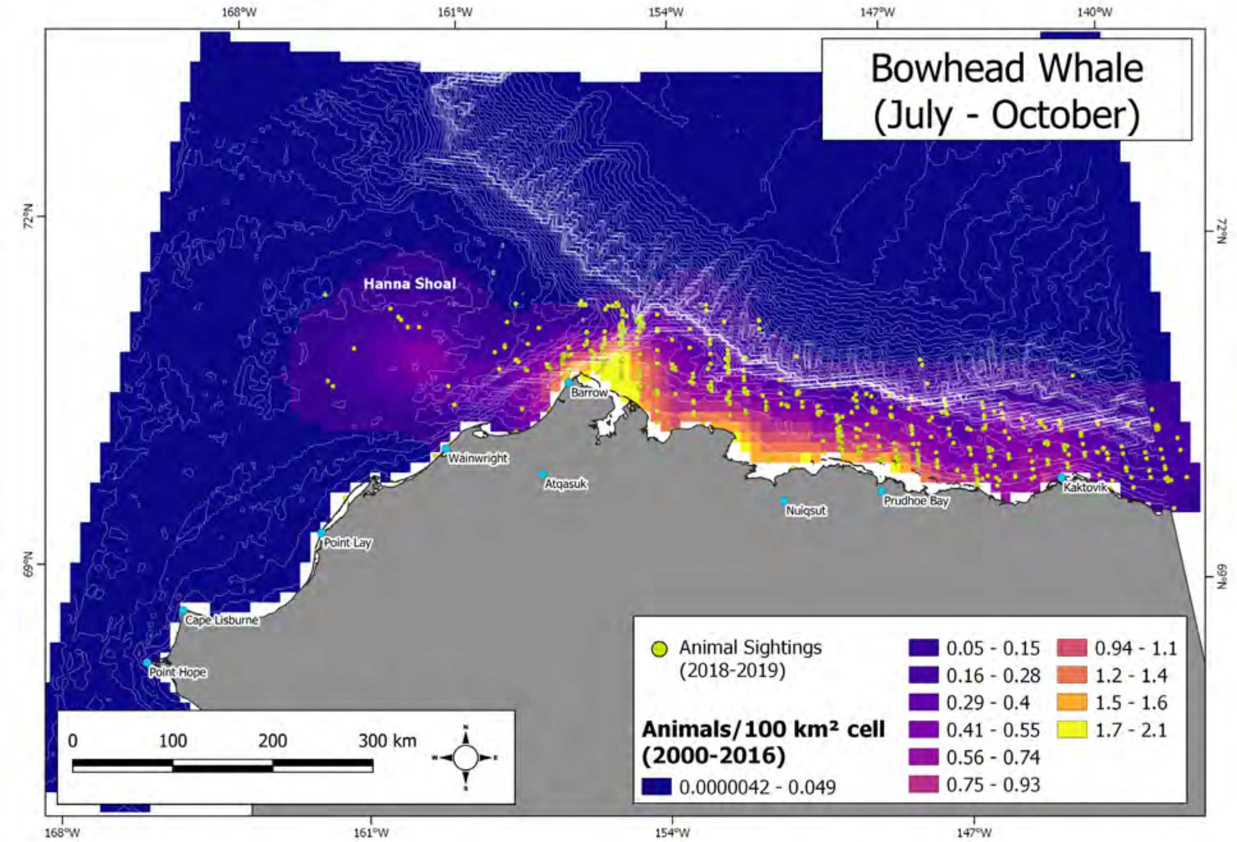


Figure 2. Predicted density of bowhead whales from July to October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 for July to October are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

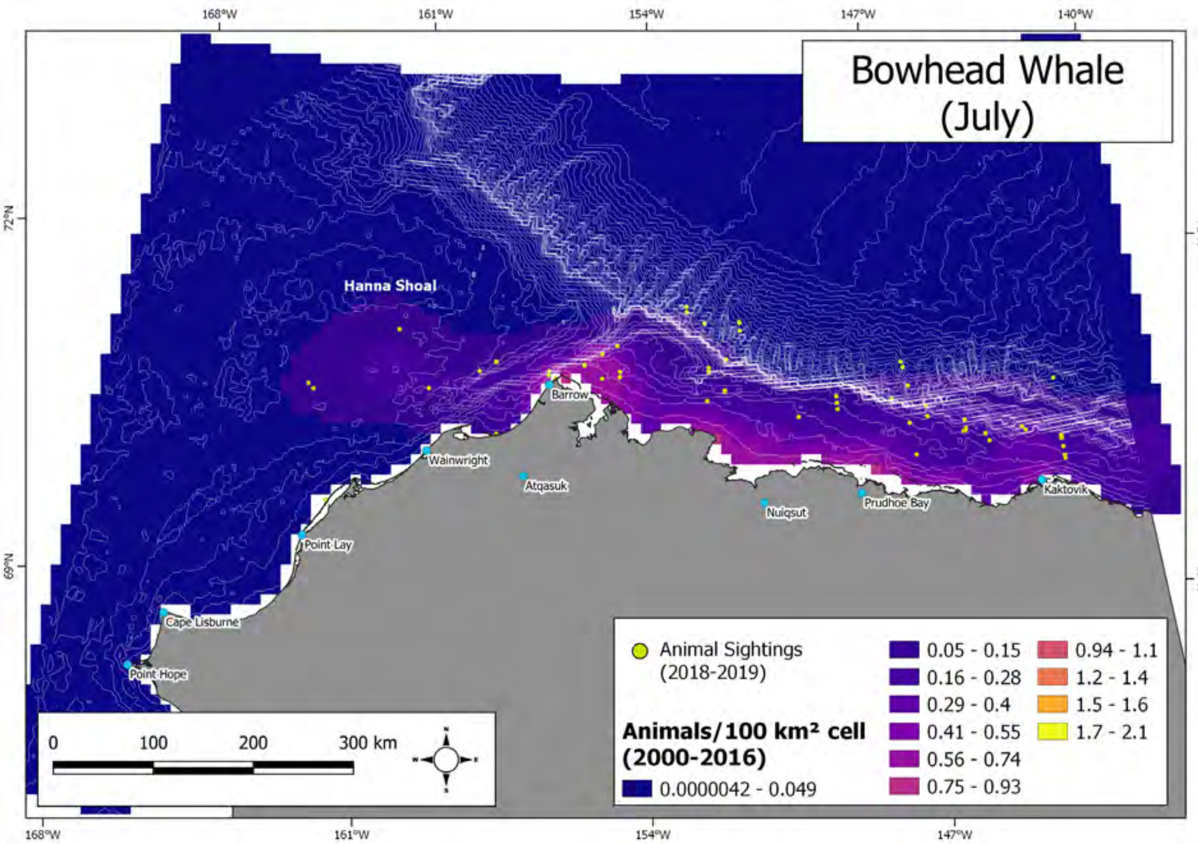


Figure 3. Predicted density of bowhead whales in July (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in July are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

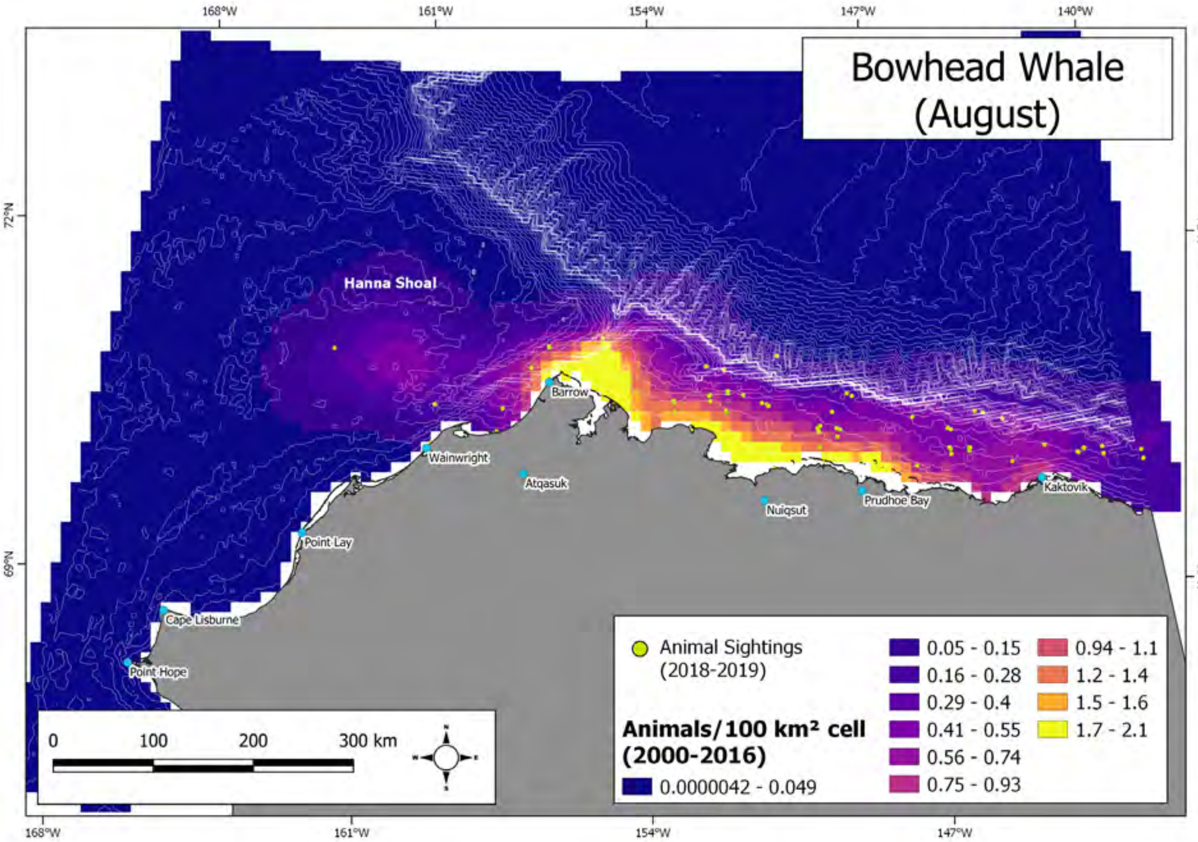


Figure 4. Predicted density of bowhead whales in August (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in August are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

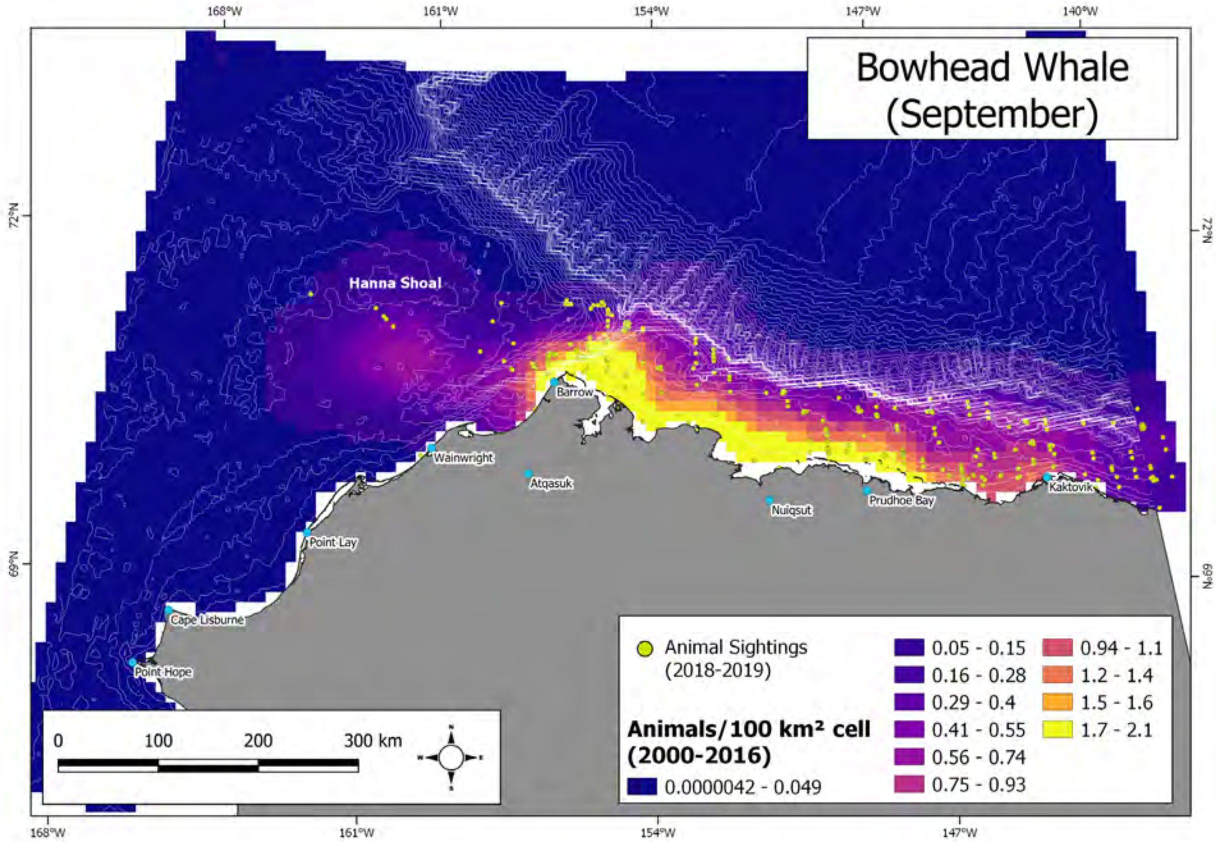


Figure 5. Predicted density of bowhead whales in September (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in September are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

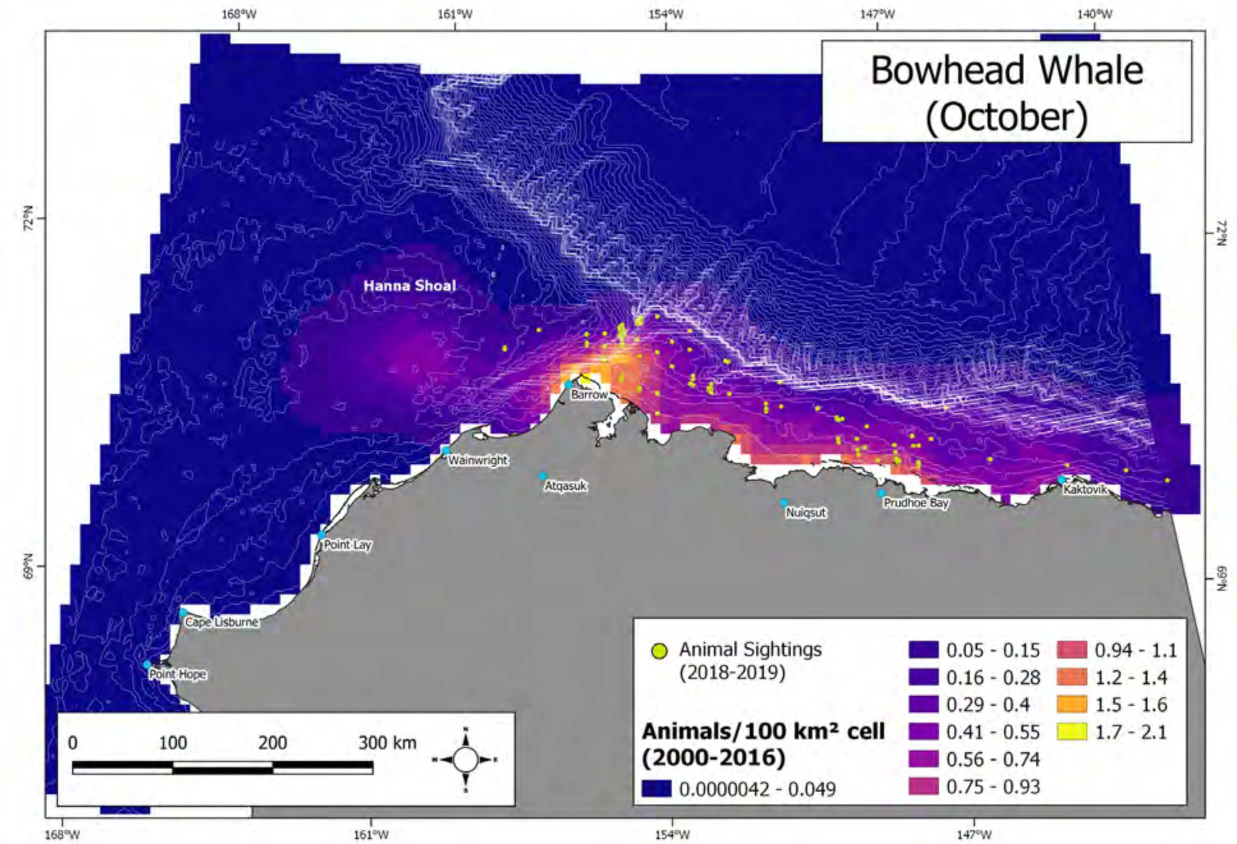


Figure 6. Predicted density of bowhead whales in October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in October are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

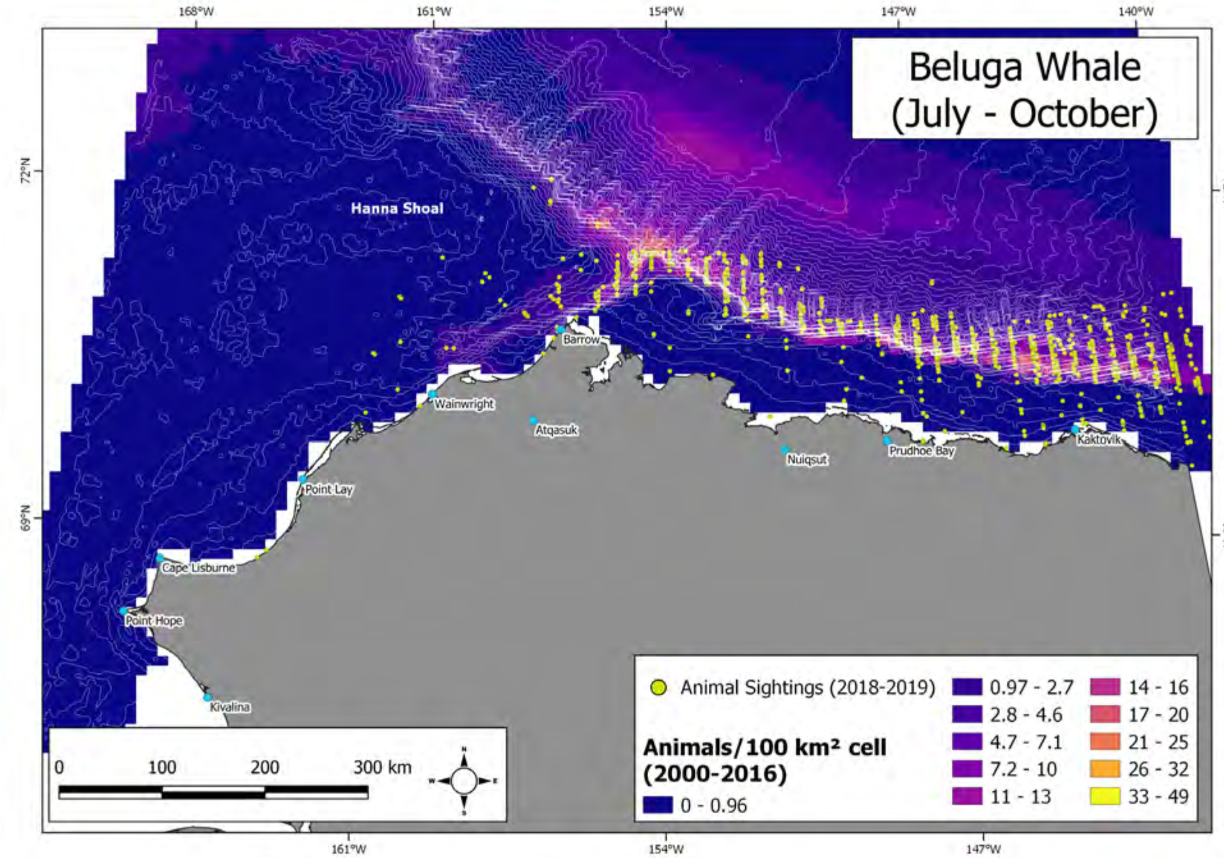


Figure 7. Predicted density of beluga whales from July to October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 for July to October are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

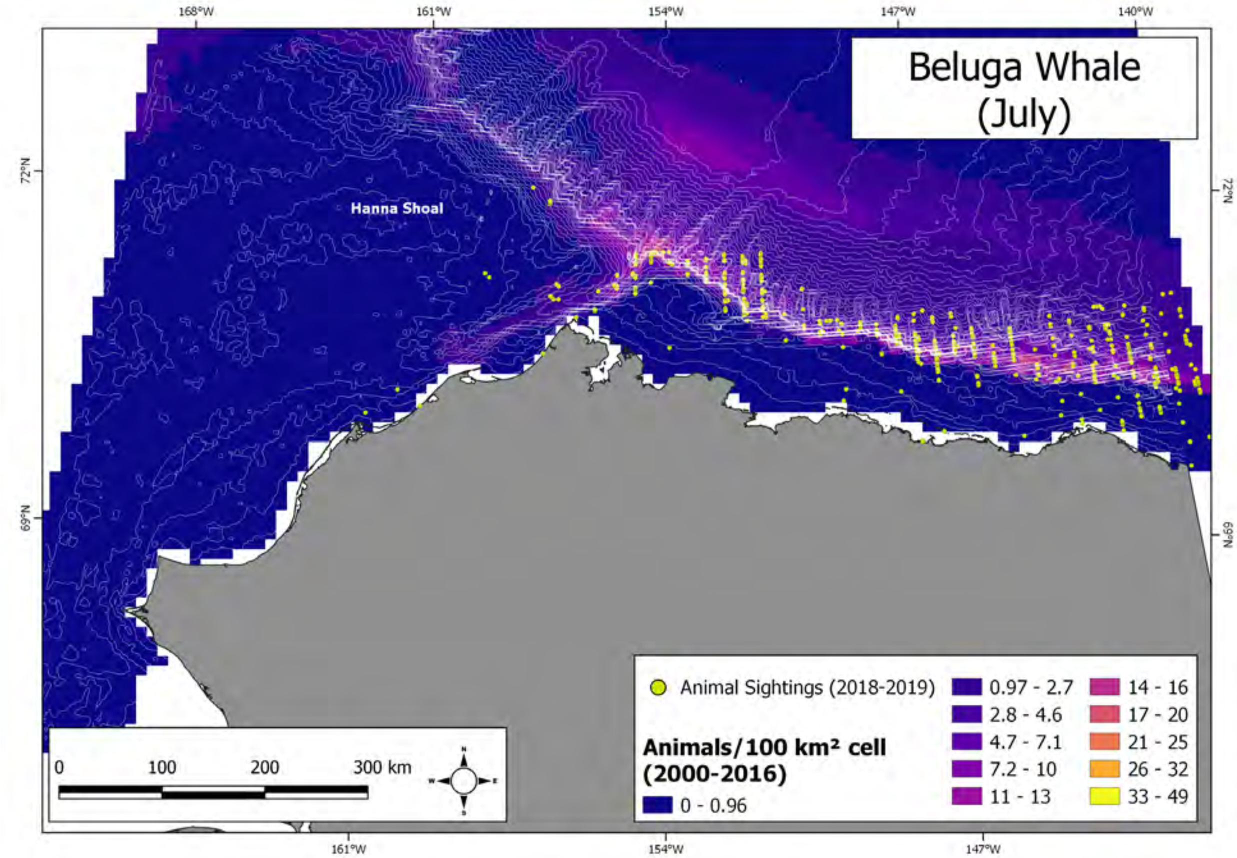


Figure 8. Predicted density of beluga whales in July (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in July are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

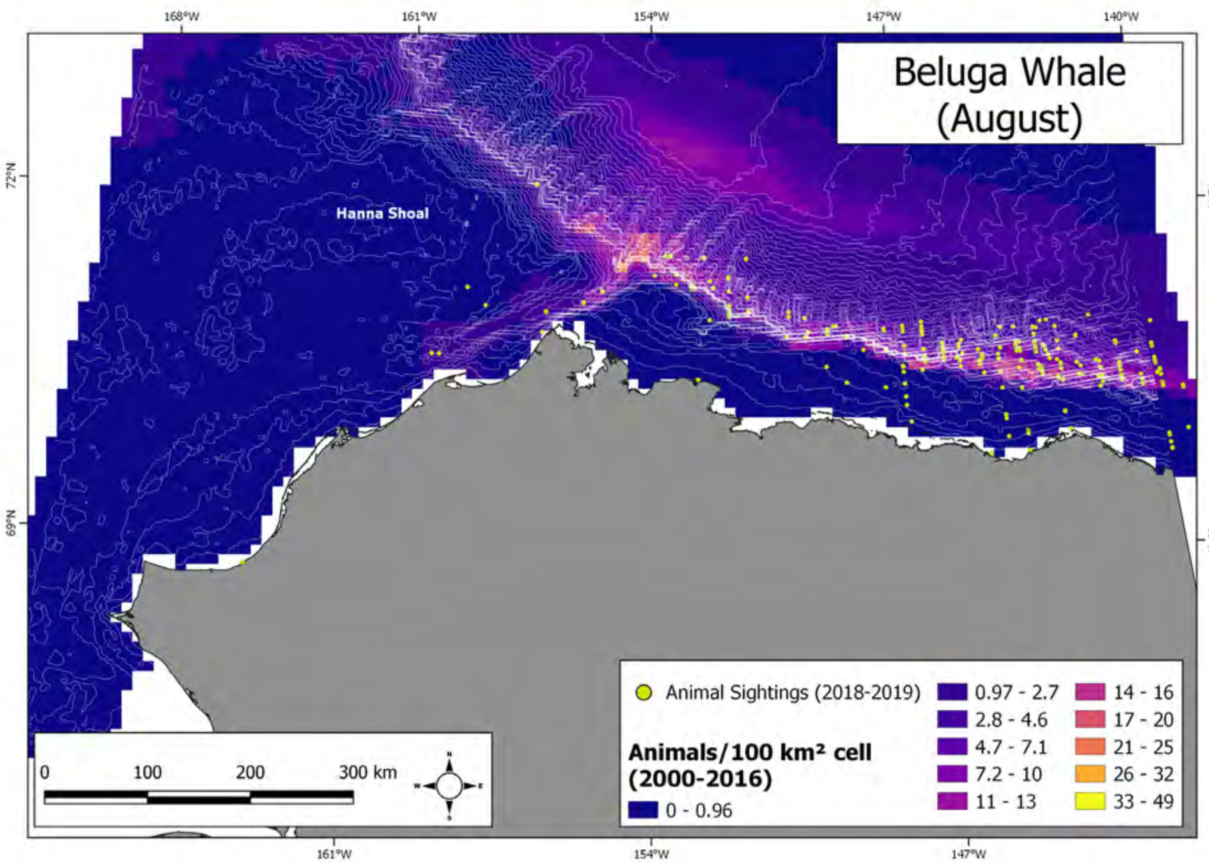


Figure 9. Predicted density of beluga whales in August (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in August are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

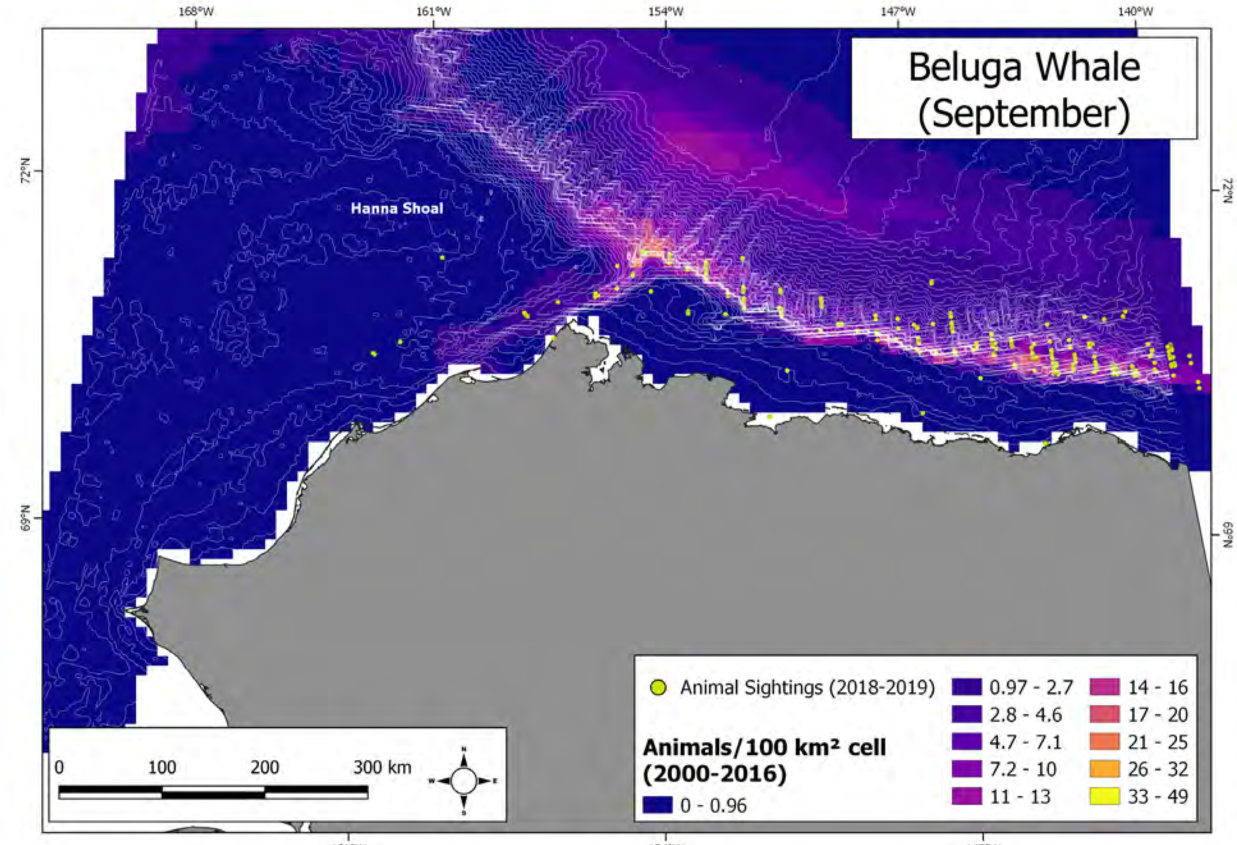


Figure 10. Predicted density of beluga whales in September (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in September are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

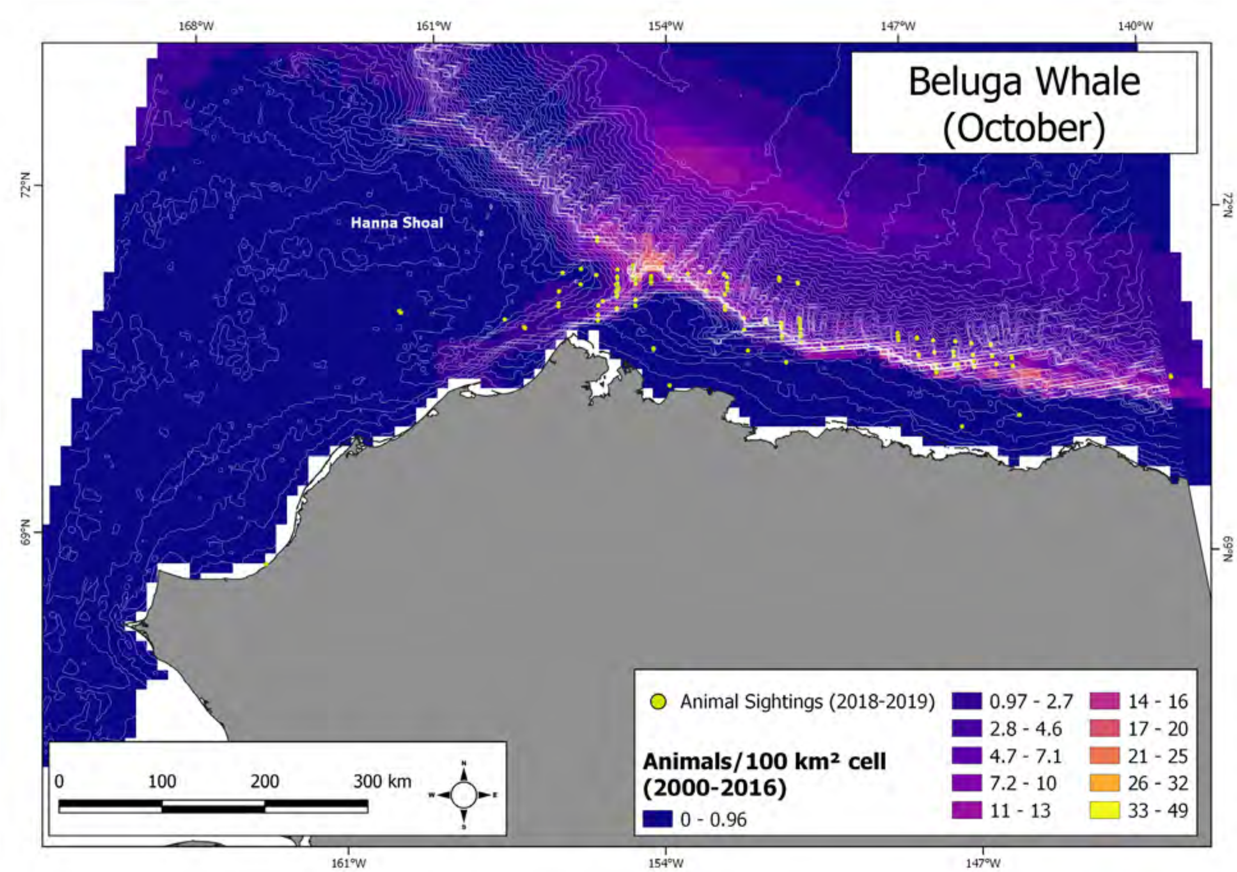


Figure 11. Predicted density of beluga whales in October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in October are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

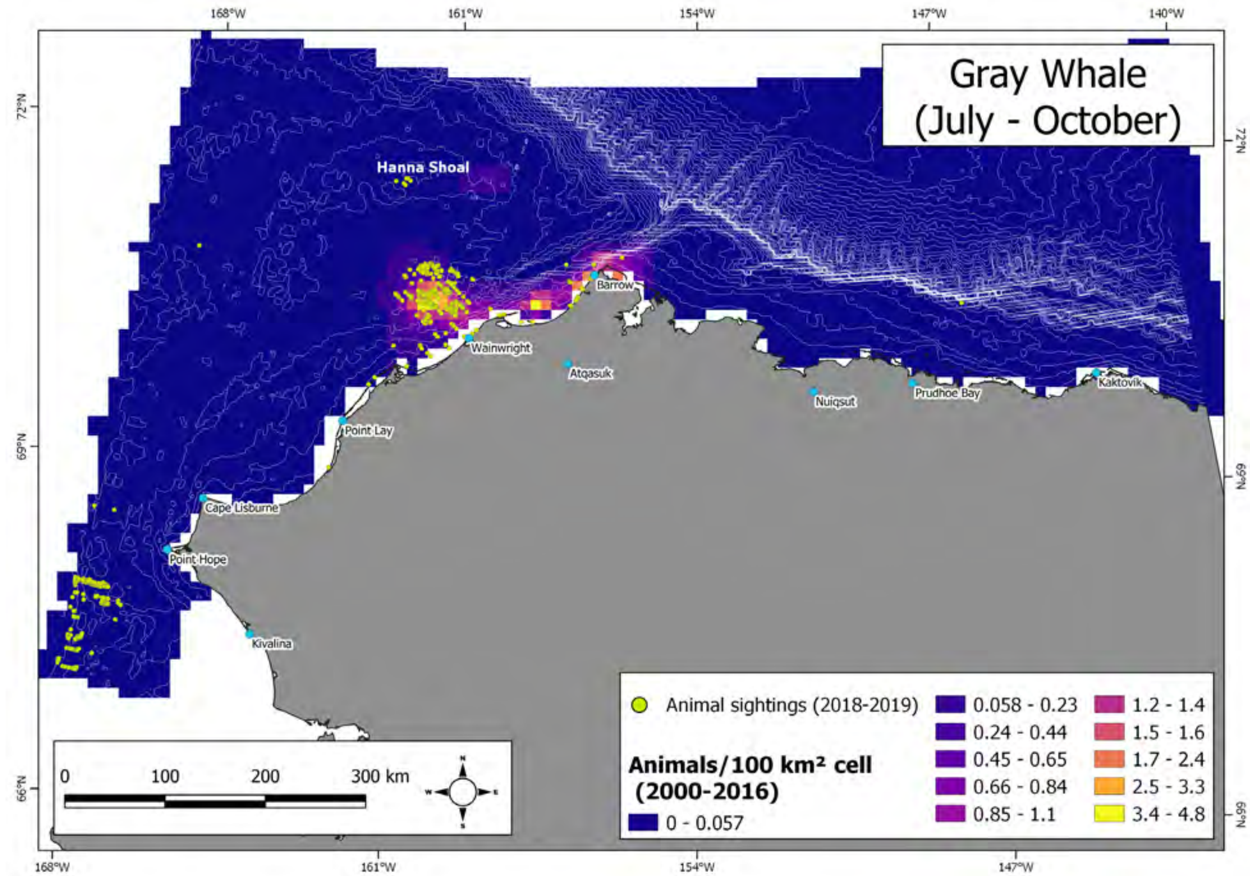


Figure 12. Predicted density of gray whales from July to October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 for July to October are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

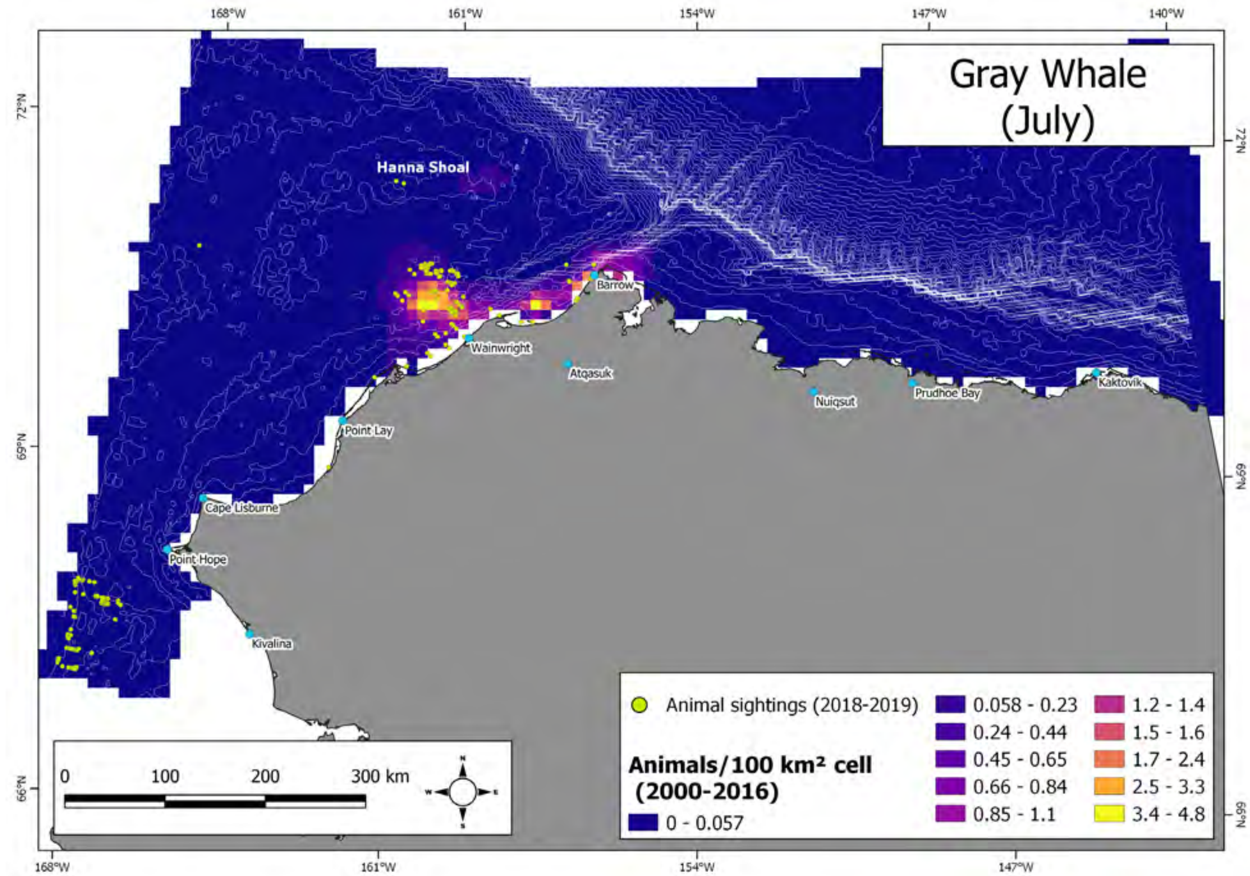


Figure 13. Predicted density of gray whales in July (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in July are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement No. M17PG00031 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

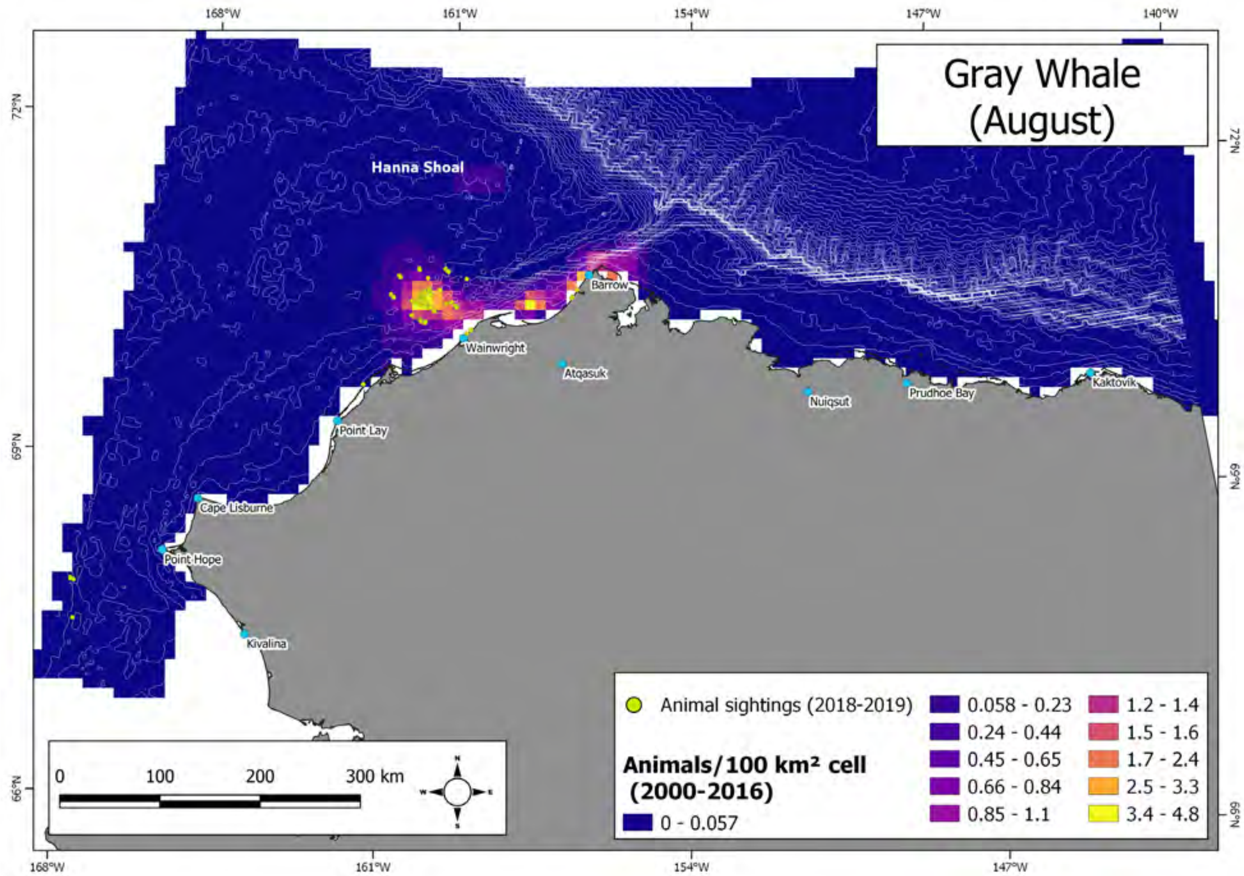


Figure 14. Predicted density of gray whales in August (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in August are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

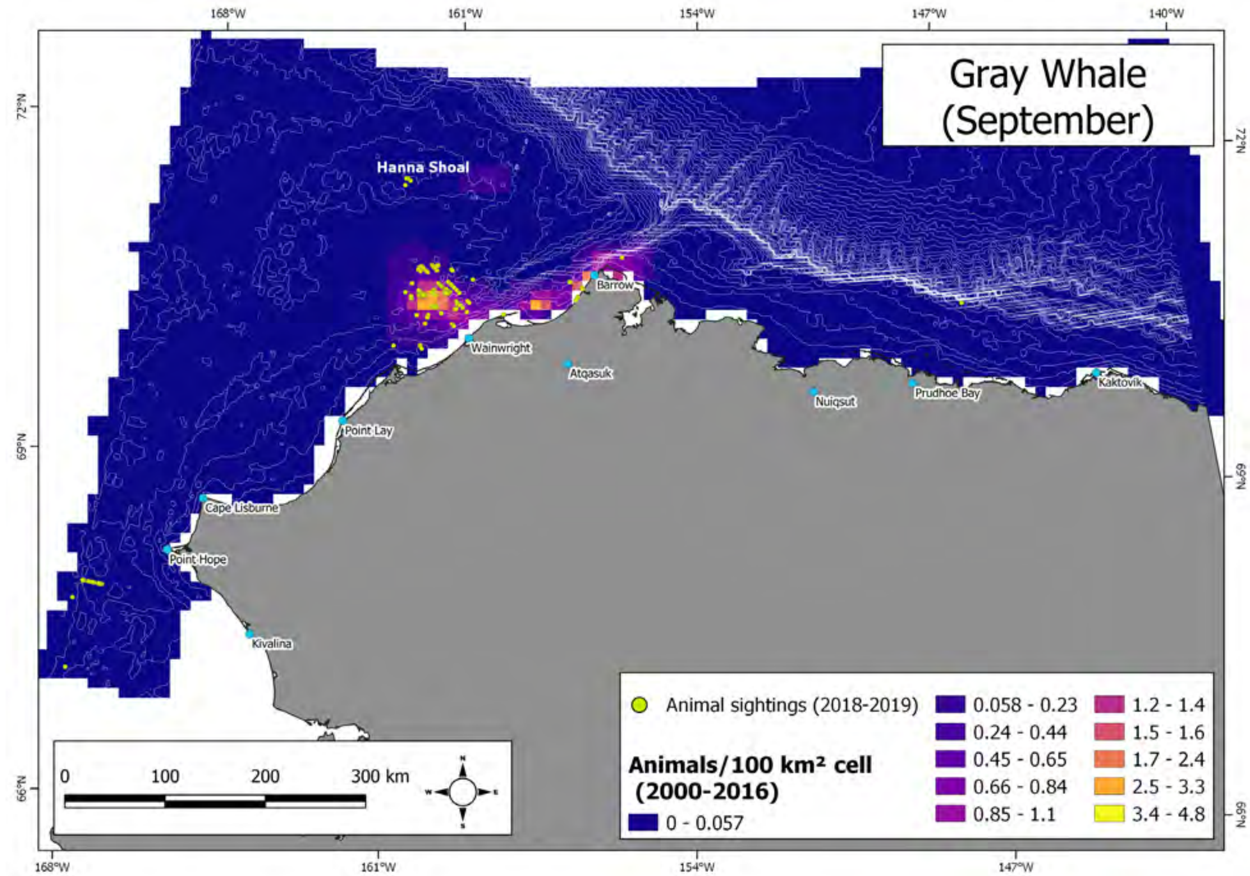


Figure 15. Predicted density of gray whales in September (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in September are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

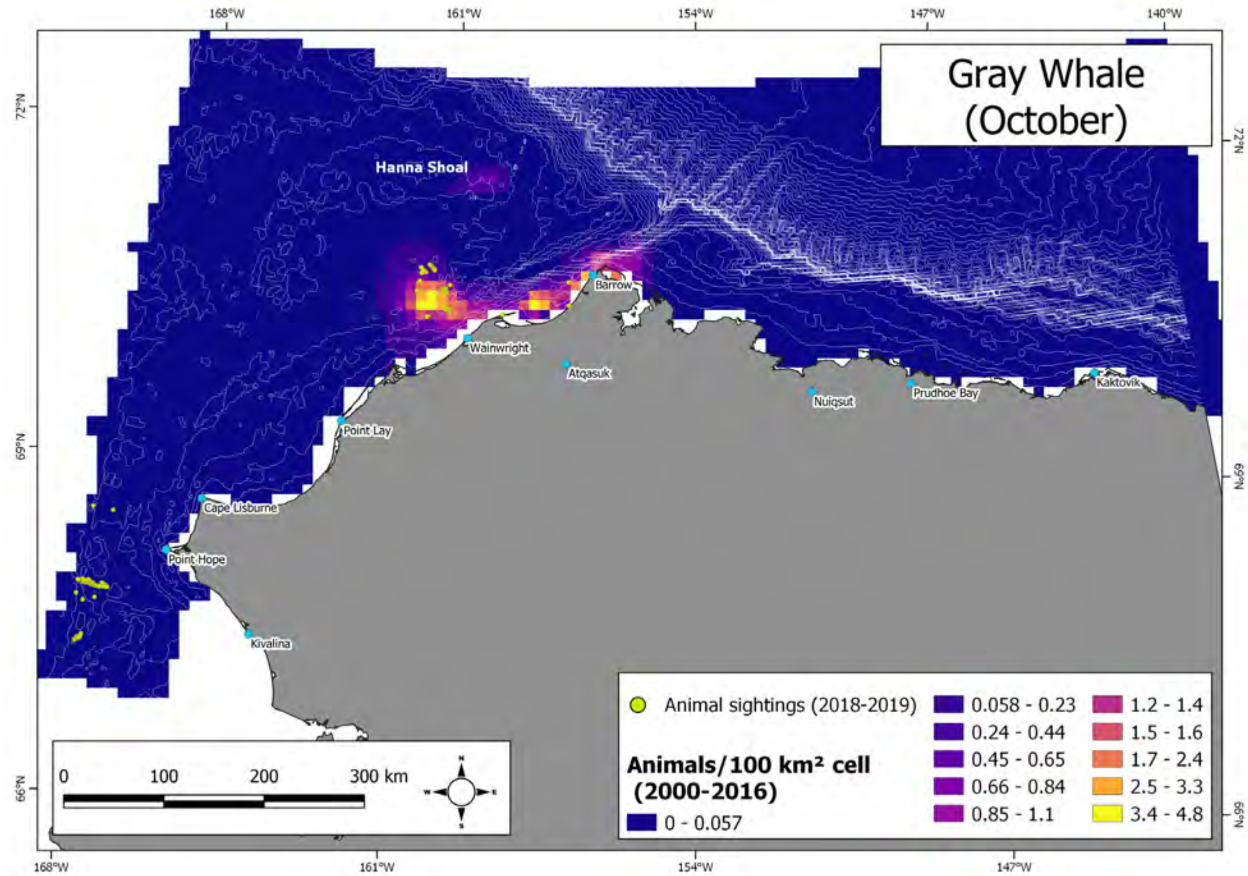


Figure 16. Predicted density of gray whales in October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in October are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

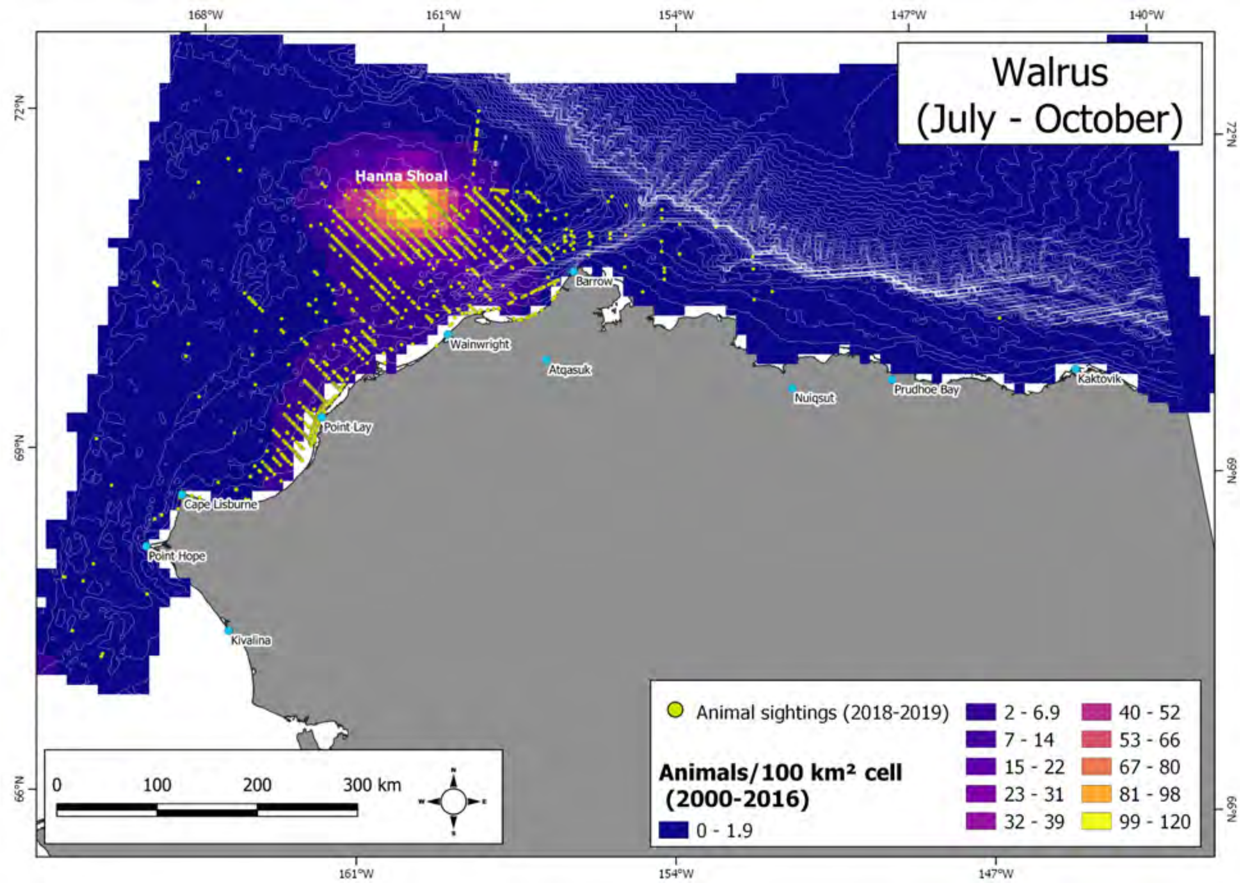


Figure 17. Predicted density of walrus from July to October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 for July to October are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

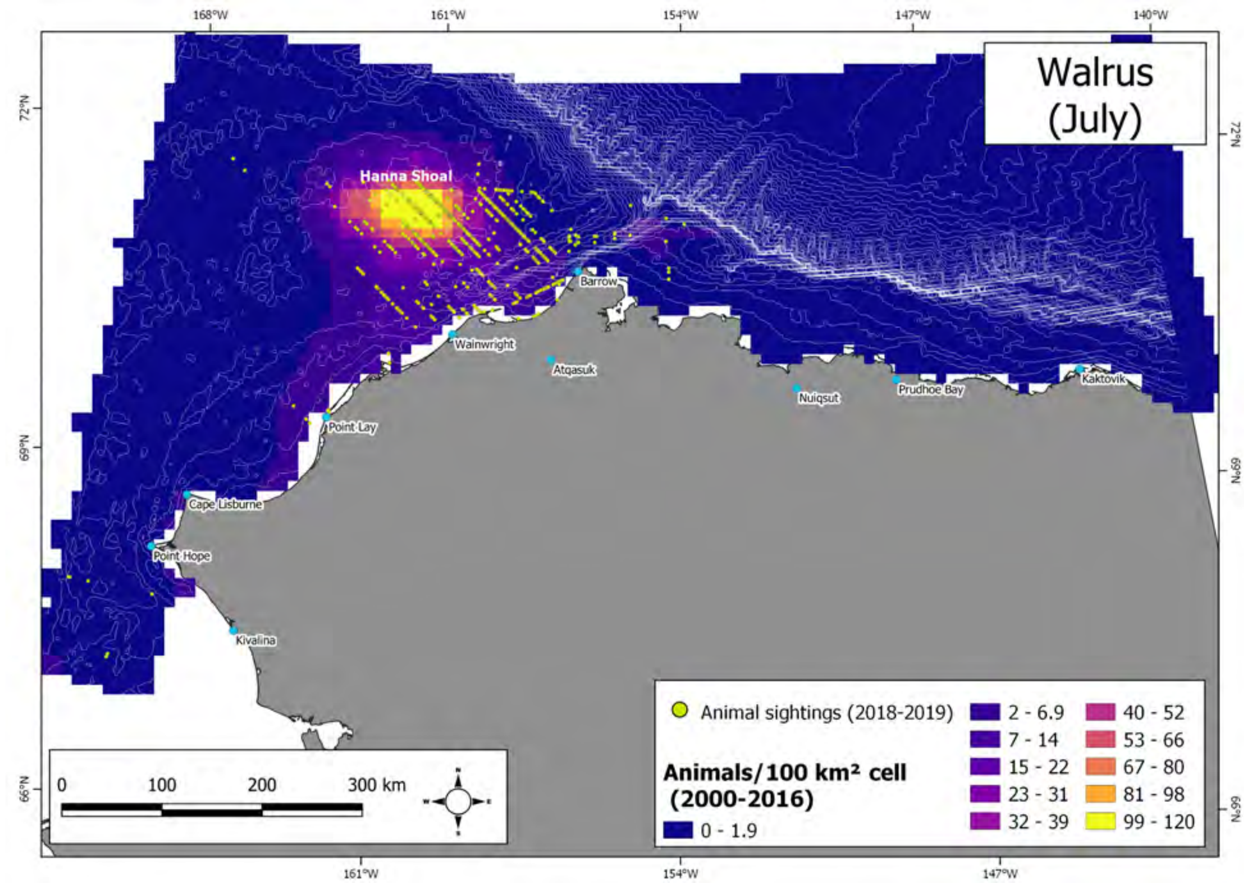


Figure 18. Predicted density of walrus in July (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in July are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

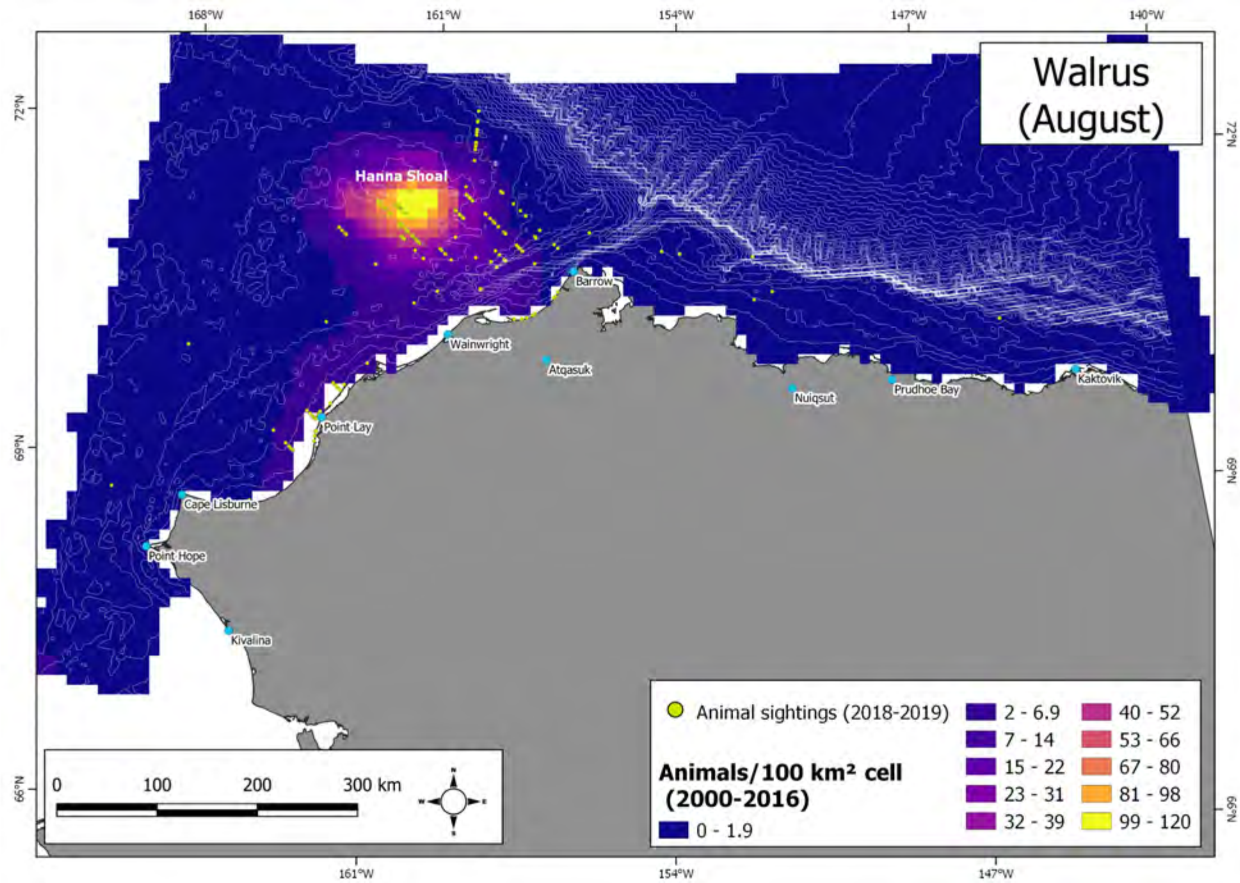


Figure 19. Predicted density of walrus in August (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in August are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

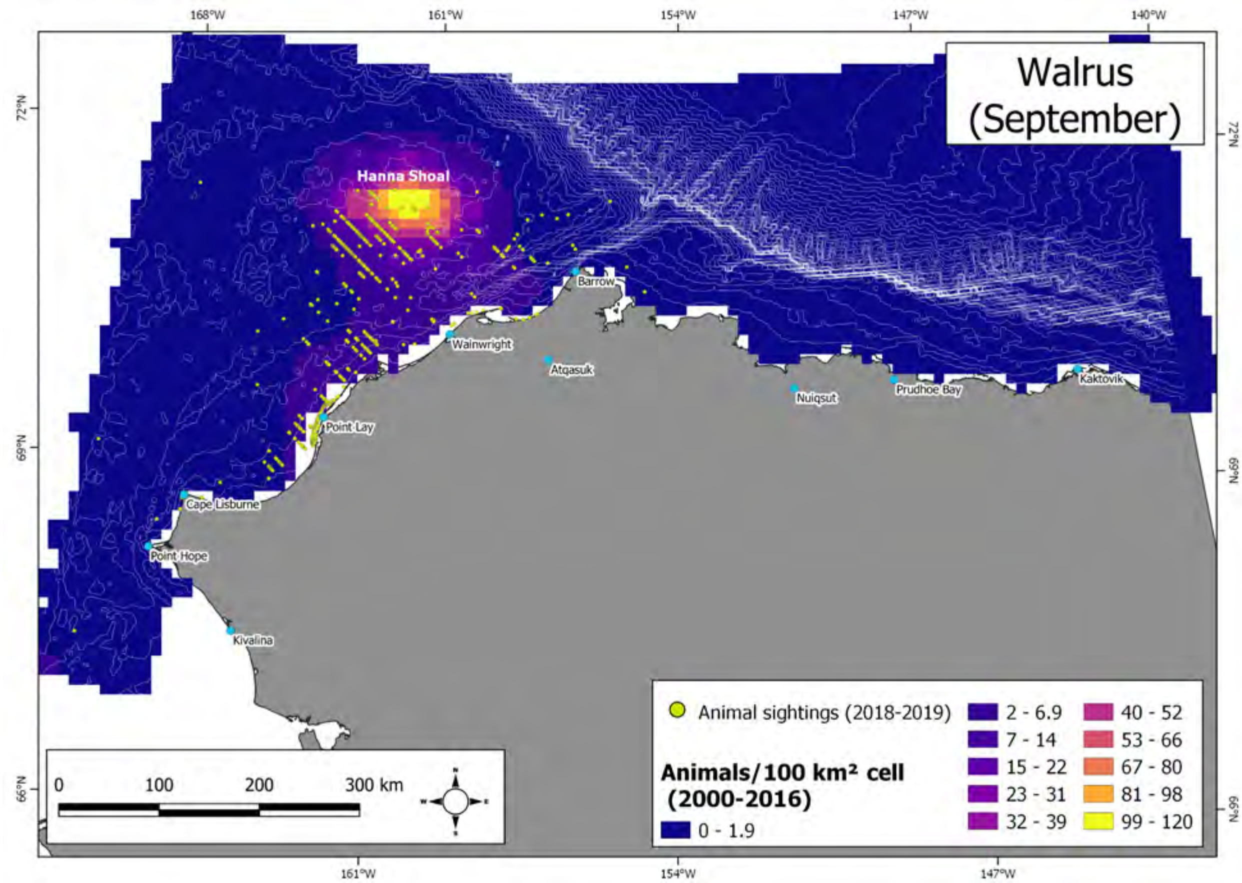


Figure 20. Predicted density of walrus in September (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in September are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

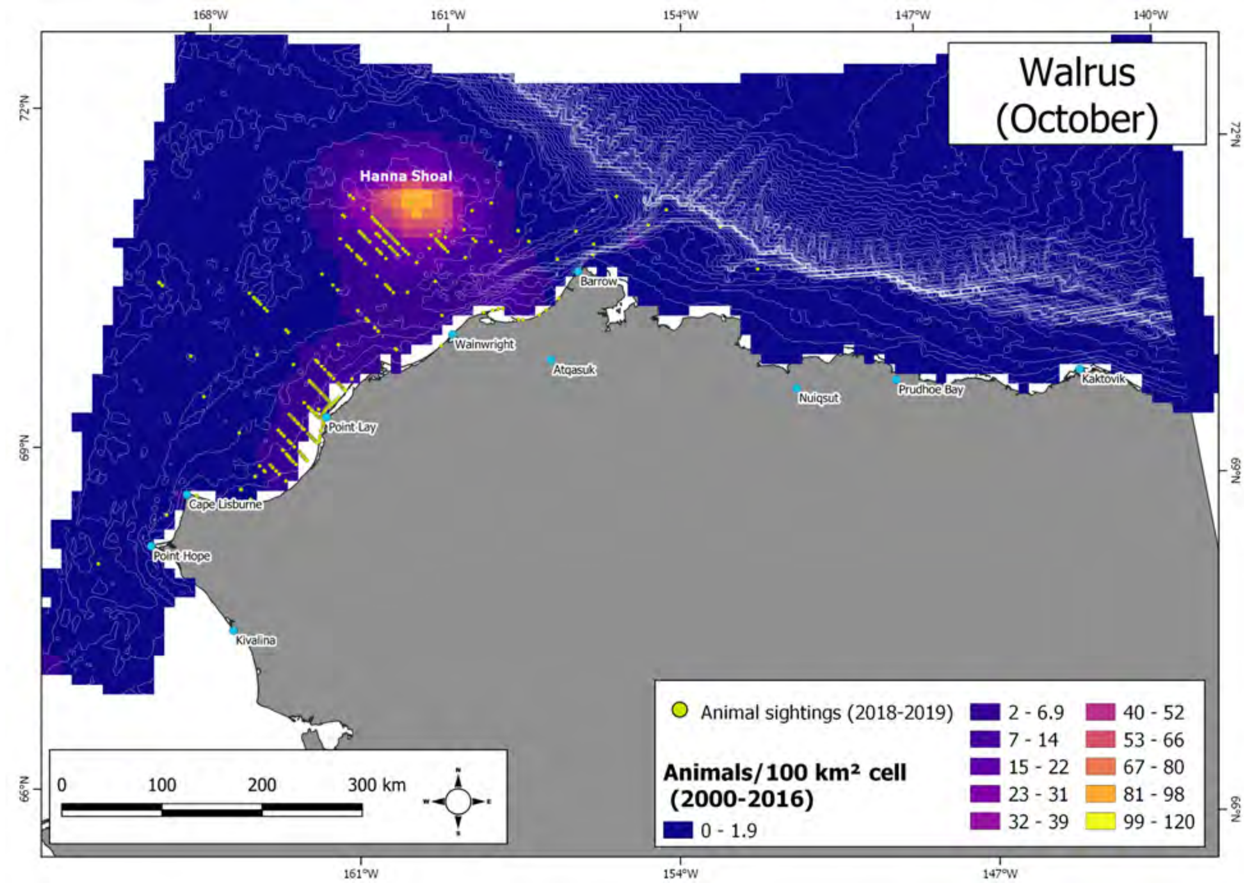


Figure 21. Predicted density of walrus in September (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 in September are also displayed. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

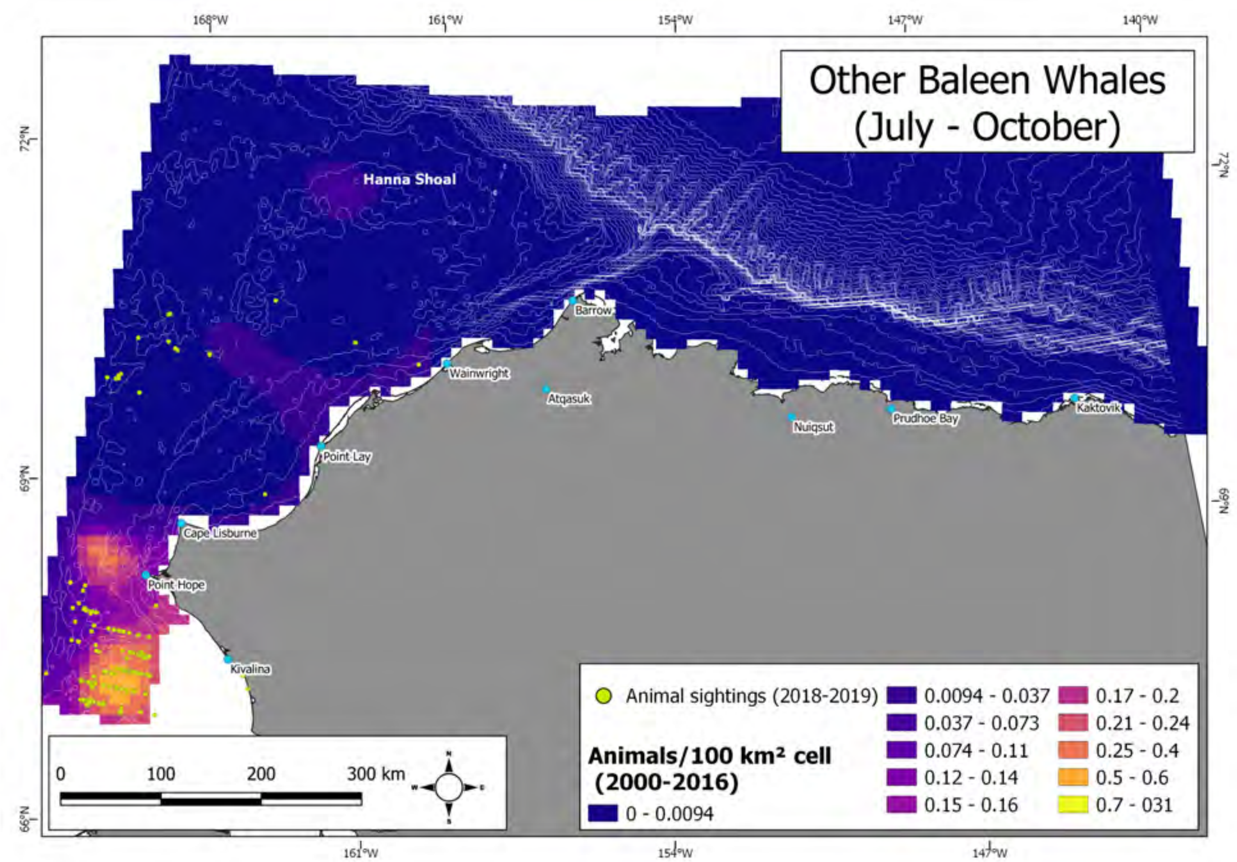


Figure 22. Predicted density of other baleen whale species from July to October (Schick et al. 2017) based on Aerial Surveys of Arctic Marine Mammals (ASAMM) sightings from 2000-2016. ASAMM sightings from 2018-2019 for July to October are also displayed. Species include humpback, minke, and fin whales. Funding for ASAMM was provided by the US Department of the Interior (USDOI), BOEM, Environmental Studies Program, Washington, D.C., through Interagency Agreement Nos. M17PG00031, M16PG00013, M11PG00033, M08PG20023, and M07RG13260 with the Alaska Fisheries Science Center (AFSC), NOAA. Bathymetry contours are shown in 100 m intervals.

Appendix 2

Biologically Important Areas for bowhead (Figure 1), gray (Figure 2), and beluga whales (Figure 3) in the Arctic, as identified by NOAA as part of its Cetacean and Sound Mapping program (https://cetsound.noaa.gov/important).

Figure 1. Biologically Important Areas for bowhead whales.

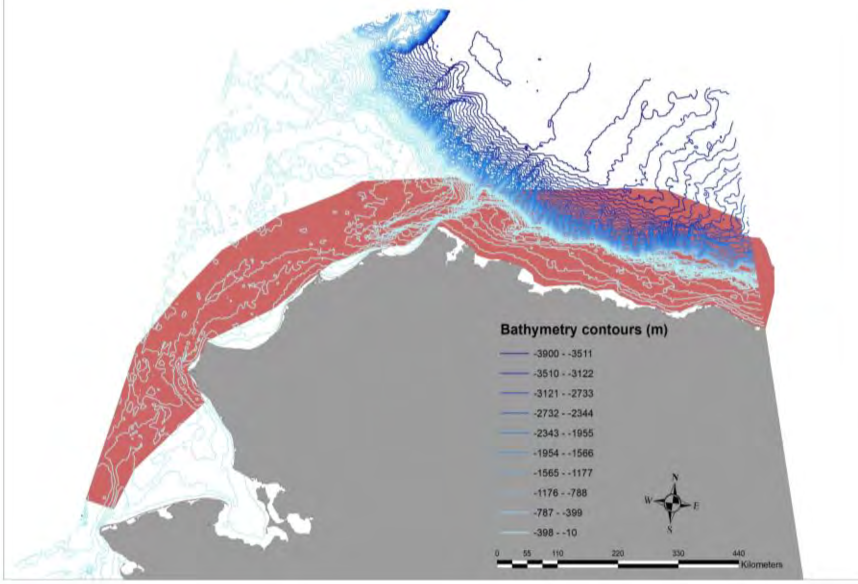


Figure 2: Biologically Important Areas for gray whales.

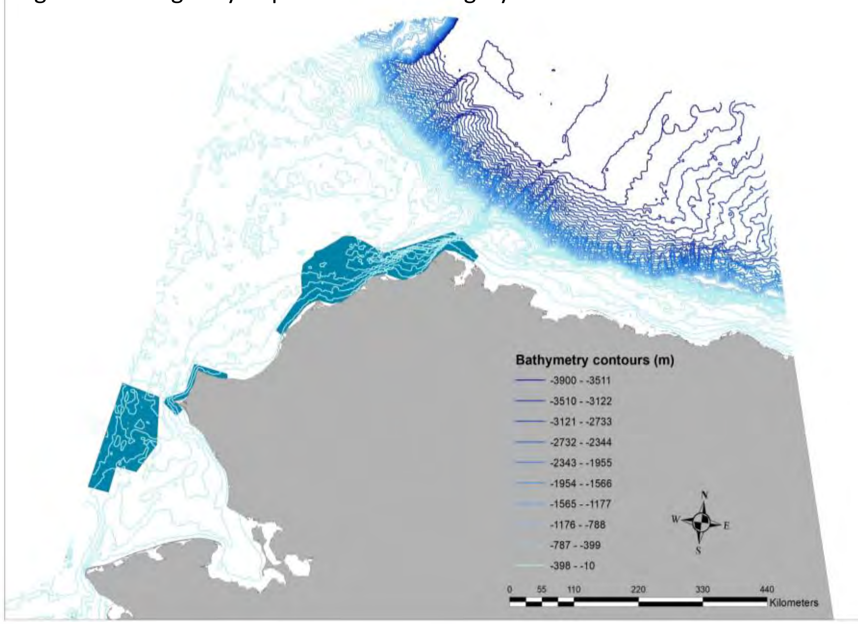
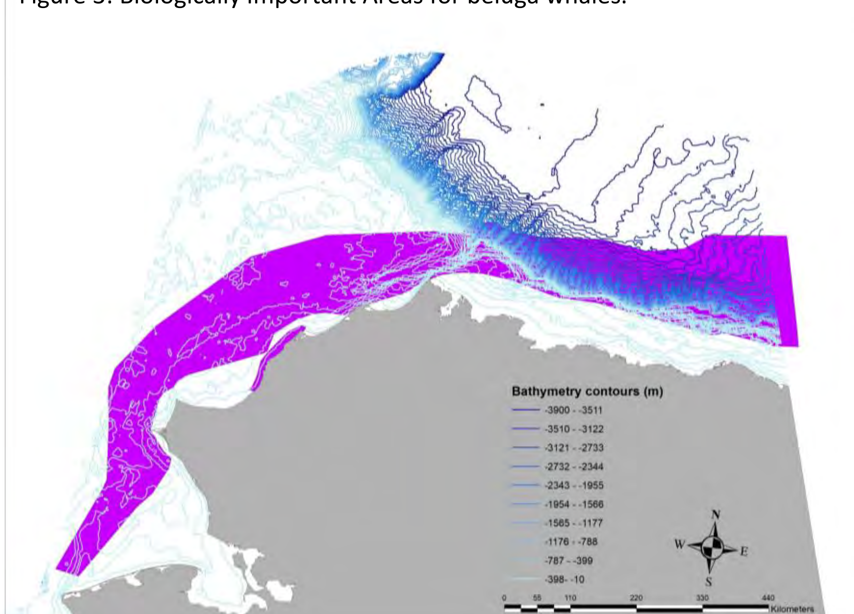


Figure 3: Biologically Important Areas for beluga whales.



Appendix 3

Maps of subarctic cetaceans seen by Marine Mammal Observers on Pacific Arctic cruises (2009-2019) and submitted to the Distributed Biological Observatory (https://dbo.cbl.umces.edu/; see also Moore and Grebmeier 2018).

The maps were generated by K. Stafford (University of Washington) from unpublished data available on the National Science Foundation's Arctic Data Center website (https://arcticdata.io/).

Bubble size is relative number of animals seen per sighting.

The legend is as follows:

2009 – Gray
2010 – Pink
2011 – Purple
2012 - Dark Green
2013 – Blue
2014 – Orange
2015 – White
2016 - Lime Green
2017 – Red
2018 - Yellow
2019 - Black

Figure 1. Gray Whales

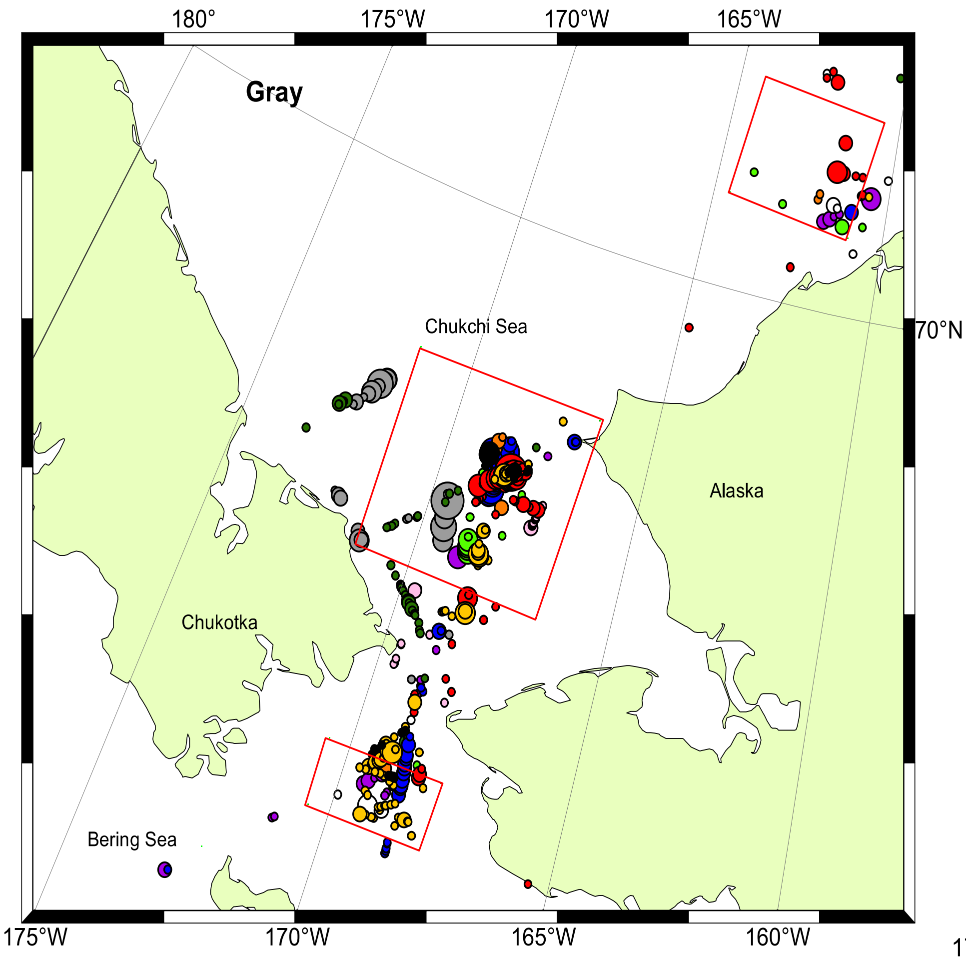


Figure 2. Minke Whales

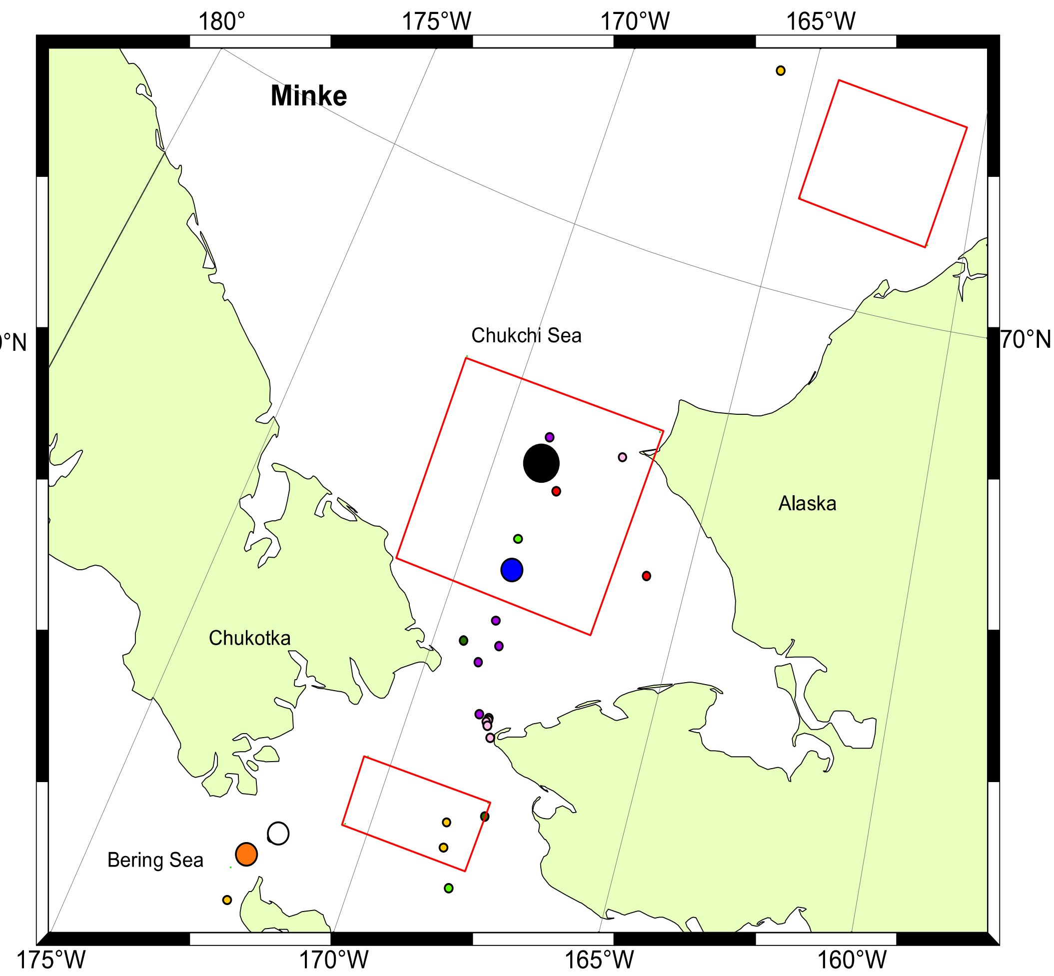


Figure 3. Fin Whales

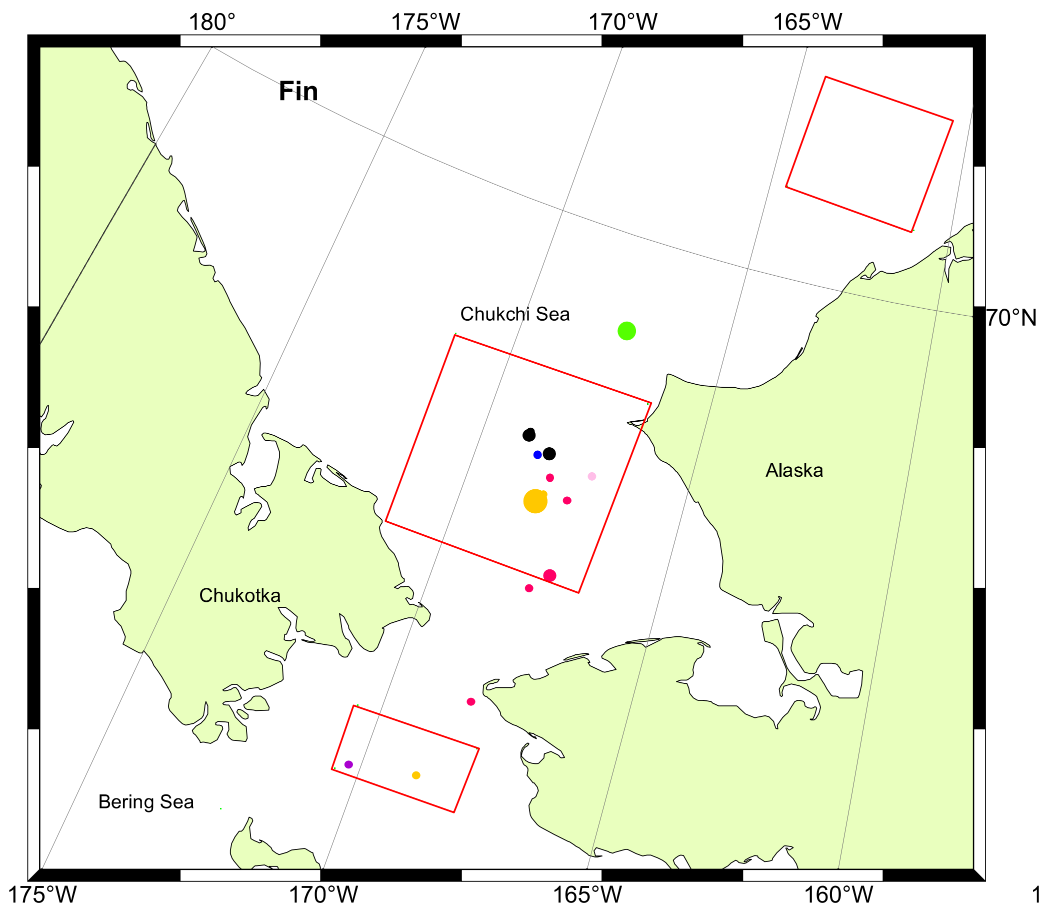


Figure 4. Humpback Whales