

Short Note

First Encounter of the North Pacific Right Whale (*Eubalaena japonica*) in the Waters of Chukotka

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In recent years, due to increasing sea temperatures and ice cover loss, some subarctic and temperate species are seen more often in Arctic waters, including some cetacean species (e.g., Higdon & Ferguson, 2009; Vikingsson et al., 2015; Moore, 2016). The North Pacific right whale (*Eubalaena japonica*) is listed as “Endangered” by the International Union for Conservation of Nature (IUCN); it is one of the most endangered whale species in the world that has failed to recover after intensive commercial whaling in the 19th and 20th centuries (Brownell et al., 2001).

Both historically and in recent times, the sightings of this species in the eastern North Pacific have been mostly concentrated between 40° and 60° N (Cooke & Clapham, 2018; Figure 1). In the western North Pacific, no encounters were registered north of Cape Navarin (62.27° N) according to 19th and 20th century whaling catch and sighting records summarized by Clapham et al. (2004); however, maps of takes by American whalers (Townsend, 1935) did show a few in June and July near Chukotka (approximately at 63 to 64° N). Tomilin (1962) mentioned that right

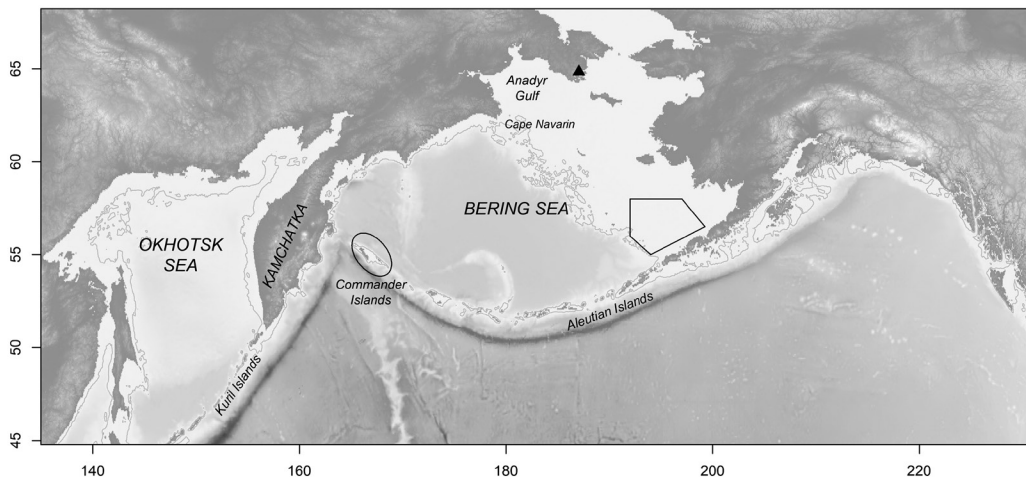


Figure 1. Map of the North Pacific. The triangle marks the location of the sighting described herein. The oval marks the area where the northernmost encounters in recent years of whales from the northwest Pacific right whale (*Eubalaena japonica*) subpopulation were registered. The pentagon marks the U.S.-designated Critical Habitat for right whales in the southeastern Bering Sea.

whales ranged north up to Anadyr Gulf, possibly based on the Townsend maps, but Sokolov (1963) reported that the species rarely occurred north of the Commander Islands. In recent years, encounters in the western North Pacific occurred in the Okhotsk Sea, off eastern Kamchatka, Kuril, and Commander Islands south to 57° N (Ovsyanikova et al., 2015).

In this note, we report an encounter with a North Pacific right whale in eastern Chukotka, far north of its typical range. The right whale was sighted for the first time 7 August 2018 in Penkigney Bay on the eastern coast of the Chukotka Peninsula (64.85° N, 172.96° W; Figure 1). The right whale was encountered from a small (4.5 m) inflatable boat during a daily research trip dedicated to the study of a local humpback whale (*Megaptera novaeangliae*) feeding aggregation. The trip was part of a cetacean research expedition conducted in August–September 2018 in southeastern Chukotka.

When encountered, the right whale was approached, and photographs were taken of flukes and both sides of the animal's head for individual photo-identification (Figure 2). These photographs were compared to a photo-identification catalogue of right whales previously encountered in Russian waters and to a photo-identification catalogue for the species maintained at the Marine Mammal Laboratory (National Oceanic and Atmospheric Administration [NOAA], Seattle, WA, USA). Callosity and scar patterns did not match any of the distinct individuals in these catalogues.

The right whale was subsequently resighted on 8, 12, and 16 August within 5 km of the original sighting location, still inside Penkigney Bay. We confirmed that it was the same individual using photo identification during each new encounter. Each day, the right whale's predominant behavior was inferred to be feeding at depth as it was observed raising flukes above the water and surfacing regularly without any particular direction of movement.

The animal was often found in close proximity to humpback whale groups, and once we observed the right whale surfacing within a humpback group at a distance of less than one body length away from two humpbacks. Associations of right whales with humpbacks have been described previously in the Gulf of Alaska and Hawaii (Herman et al., 1980; Wade et al., 2011).

In contrast to humpback whales, which catch their prey (large plankton or small fish) through taking a large amount of water into the enlarged oral cavity by fast lunges, right whales are skim feeders on plankton prey (mostly Calanidae, e.g., *Neocalanus cristatus* and *N. plumchrus*), which are collected while swimming through water (Werth et al., 2000). The coastal waters of Chukotka are rich in plankton species suitable as whale prey

(Volkov, 2012). Penkigney Bay and other bays of this region are the only fjords in the northern Bering Sea reaching depths of more than 100 m, while all adjacent areas in the northern Bering Sea and Bering Strait have only a shallow shelf with depths of about 40 to 50 m. These fjords support a local aggregation of humpback whales (our unpub. data). It is possible that right whales would also benefit from the plankton concentration in the fjords despite focusing on different species.

Historical whaling data from 19th-century whaling catches suggest that North Pacific right whales are divided into discrete western and eastern subpopulations (Brownell et al., 2001; Clapham et al., 2004; Shelden et al., 2005; Gregr, 2011). During summer, the northwest Pacific subpopulation was found mostly in the Sea of Okhotsk and off the coasts of Kamchatka, Kuril, and Commander Islands (Ovsyanikova et al., 2015). The northeast Pacific subpopulation was concentrated in summer in the Gulf of Alaska and in the southeastern Bering Sea. Both subpopulations are small and endangered, but the northeast subpopulation is considered smaller and is rated critically endangered—several tens of animals vs several hundred in the northwest Pacific subpopulation (Brownell et al., 2001; Wade et al., 2011; Cooke & Clapham, 2018). Therefore, the important question arises as to whether the right whale observed in Chukotka belongs to the northeast or northwest subpopulation. Penkigney Bay is situated about 900 km north from the closest locations of recent encounters in the eastern North Pacific, and about 1,500 km from those in the western North Pacific. If judging only from the distance, it appears more likely that the whale came from the northeast subpopulation that feeds in the southeastern Bering Sea. On the other hand, the northwest subpopulation is larger (Brownell et al., 2001), which contributes to the probability that the whale is part of the northwest Pacific subpopulation.

To resolve this question, we collected a slough skin sample of the right whale from the water surface and analyzed it in the Molecular Diagnostics Center of the A. N. Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences. The mtDNA tRNA-Pro gene (67 bp) and a fragment of the control region (542 bp) were sequenced using the primers described by LeDuc et al. (2002) (5'-taccaaatgatgaacacctag-3' and 5'-ctccctaagactcaaggaag-3'), a BigDye Terminator v.3.1 reagents kit, and a 3500 Genetic Analyzer. The sequence of the mtDNA control region of the sample matched haplotype 3 from LeDuc et al. (2012) (GenBank accession number JX441358). This haplotype has been observed only in the eastern North Pacific and did not occur in four samples from the western North Pacific analyzed to date (one sample in

LeDuc et al., 2012; three samples, our unpub. data). Therefore, it appears more likely that the right whale we observed in Chukotka belonged to the northeast Pacific subpopulation.

The sex of the whale—a male—was determined by the PCR-based method adopted for fluorescent labeled primers (Jayasankar et al., 2008). Wade et al. (2011) reported a significant sex bias among



Figure 2. Photographs of the left and right sides of the North Pacific right whale's head, showing its unique callosity pattern, and its tail flukes with characteristic tooth rake marks. (Photo credit: Olga V. Titova)

the whales identified in the northeast Pacific right whale subpopulation: among 21 genotyped individuals, 15 were males and only six were females.

Our sighting of this North Pacific right whale is the first confirmed recent sighting record of the species in the waters of Chukotka Peninsula and the northernmost sighting of the species recorded to date. Right whales have not been observed in the waters of Chukotka since the period of commercial whaling; and even then, no observations occurred north of Provideniya (Townsend, 1935; Clapham et al., 2004; Ovsyanikova et al., 2015). Most encounters of the northeast subpopulation have been located on the southeastern Bering Sea shelf, within an area south to 58° N, where North Pacific right whale Critical Habitat was designated by NOAA in 2008 (National Marine Fisheries Service [NMFS], 2008). The encounter reported herein is an important contribution to the knowledge about ranging patterns of this critically endangered subpopulation.

Despite being a single observation that could be caused by the abnormal travelling pattern of a particular animal, this extreme northward migration could be related to the recent rapid increase in annual temperatures that has been reported to drive northward range shifts in various subarctic and temperate marine species (e.g., phytoplankton: Neukermans et al., 2018; fish: Fosshiem et al., 2015; whales: Higdon & Ferguson, 2009). On the one hand, it may suggest that the northeast Pacific right whale subpopulation can benefit from the expansion of suitable foraging habitat to areas farther north due to warming. On the other hand, this process could result in ecological shifts in the ecosystem of the southeastern Bering Sea, which may lead to the designated NOAA Critical Habitat for the species requiring expansion to a much wider area. Climate-driven ecological variation promises to present challenges for the area-based conservation approach, and further research is essential for decision making leading to effective management to ensure successful conservation.

Acknowledgments

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