Revised 12/30/2018

NORTH PACIFIC RIGHT WHALE (*Eubalaena japonica*): Eastern North Pacific Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

A review of all 20th-century sightings, catches, and strandings of North Pacific right whales was conducted by Brownell et al. (2001). Data from this review were subsequently combined with historical whaling records to map the known distribution of the species (Fig. 1; Clapham et al. 2004, Shelden et al. 2005). Although whaling records initially indicated that right whales ranged across the entire North Pacific Ocean north of 35°N and occasionally as far south as 20°N (Fig. 1; Scarff 1986, 1991), analysis shows a pronounced longitudinally bimodal distribution (Josephson et al. 2008a). Before right whales in the North Pacific were heavily exploited by commercial whalers, concentrations were found in the Gulf of Alaska, eastern Aleutian Islands, south-central Bering Sea, Sea of Okhotsk, and Sea of Japan (Braham and Rice 1984). An analysis conducted on the North Pacific right whale fishery by Josephson et al. (2008b) showed that within the course of a decade (1840s), right whale abundance was severely depleted, particularly in the eastern portion of their range. In a comprehensive review, Brownell et al. (2001) found only 82 published sightings of right whales in the entire eastern North Pacific from 1962 to 1999, with the majority of these occurring in the Bering Sea and adjacent areas of the Aleutian Islands; this surprising lack of sightings ultimately led to the discovery that right whales had been subject to large illegal catches (primarily from 1962 to 1968) by the former U.S.S.R. (Ivashchenko and Clapham 2012; Ivashchenko et al. 2013, 2017).

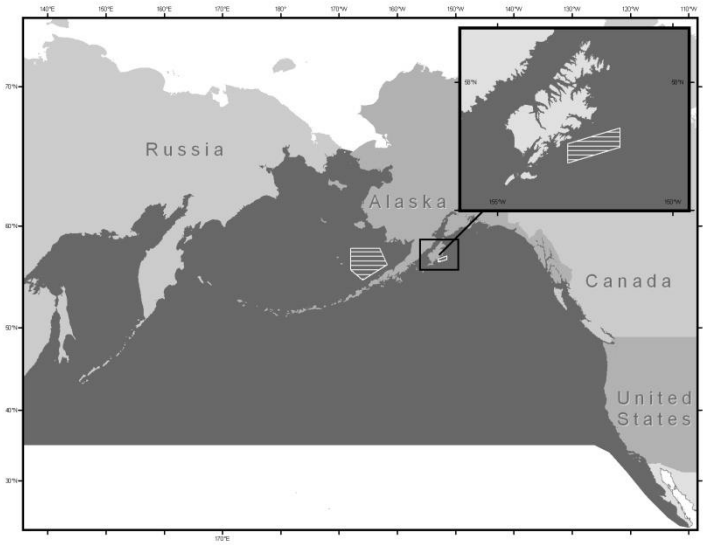

Figure 1. Approximate historical distribution of North Pacific right whales in the North Pacific (dark shaded area). Striped areas indicate North Pacific right whale critical habitat (73 FR 19000, 8 April 2008).

In lower latitude waters, North Pacific right whales have been reported as far south as central Baja California and Hawaii; in higher latitudes, they have been observed as far east as Yakutat Bay, Haida Gwaii, and Vancouver Island in the eastern North Pacific and as far north as the subarctic waters of the Bering Sea in the summer (Herman et al. 1980, Rowntree et al. 1980, Berzin and Doroshenko 1982, Salden and Mickelsen 1999, Brownell et al. 2001, Ford et al. 2016). However, most right whale sightings (and most survey effort) in the past 20 years, starting in 1996, have occurred in the southeastern Bering Sea, with a few records in the Gulf of Alaska near Kodiak Island, Alaska (Waite et al. 2003; Shelden et al. 2005; Wade et al. 2011a, 2011b).

North Atlantic (*E. glacialis*) and Southern Hemisphere (*E. australis*) right whales calve in coastal waters during the winter months. However, in the eastern North Pacific no such calving grounds have been identified (Scarff 1986). Migratory patterns of North Pacific right whales are unknown, although it is thought they migrate from high-latitude feeding grounds in summer to more temperate waters during the winter, possibly well offshore (Braham and Rice 1984, Scarff 1986, Clapham et al. 2004). A right whale sighted off Maui in April 1996 (Salden and Michelsen 1999) was identified 119 days later and 4,111 km north in the Bering Sea (Kennedy et al. 2011). While the photographic match confirms that Bering Sea animals occasionally travel south, there is currently no reason to believe that either Hawaii or tropical Mexico have ever been anything except extra-limital habitats for this species (Brownell et al. 2001).

Passive acoustic monitoring from 2008 to 2015 of the northern Bering Sea detected calls matching the North Pacific right whale up-call criterion in late fall through spring (Wright 2015, 2017), suggesting that North Pacific right whales occur in the northern Bering Sea during winter months; however, there remains a possibility that some winter calls were made by bowhead whales. An individual North Pacific right whale was visually identified north of St. Lawrence Island in November 2012 (G. Sheffield, University of Alaska Fairbanks, Nome,

AK), confirming their presence at higher latitudes late in the season. However, the winter upsweeps were observed during bowhead whale song and heavy ice conditions. As a result, these calls were termed "ambiguous winter up-calls" because the northern region winter up-calls of this subtype could not be definitively classified as either bowhead whale or North Pacific right whale calls (Wright 2015, 2017). However, the acoustic data suggest that North Pacific right whales could possibly occupy the northern Bering/southern Chukchi seas during the winter months.

Information on the summer and autumn distribution of right whales is available from dedicated vessel and aerial surveys, bottom-mounted acoustic recorders, and vessel surveys for fisheries ecology and management that have also included dedicated marine mammal observers. Aerial and vessel surveys for right whales have occurred in a portion of the southeastern Bering Sea (Fig. 1) where right whales have been observed most summers between 1996 and 2010 (Goddard and Rugh 1998, Rone et al. 2012). North Pacific right whales were observed consistently in this area, although it is clear from historical and Japanese sighting survey data that right whales often range outside this area and occur elsewhere in the Bering Sea (Moore et al. 2000, 2002; LeDuc et al. 2001; Clapham et al. 2004). Bottom-mounted acoustic recorders were deployed in the southeastern Bering Sea (2000-2017) and the northern Gulf of Alaska (1999-2001) to document the seasonal distribution of right whale calls (Mellinger et al. 2004). Analysis of the data from those recorders deployed between October 2000 and January 2006 indicates that right whales remain in the southeastern Bering Sea from May through December with peak call detection in September (Munger and Hildebrand 2004). Data from recorders deployed between May 2006 and April 2007 show the same trends (Stafford and Mellinger 2009, Stafford et al. 2010). Recorders have been deployed by the Alaska Fisheries Science Center's Marine Mammal Laboratory (MML) from 2007 through 2017 at various locations throughout the Bering Sea and Aleutian Passes.

Results from passive acoustic monitoring from the eastern Bering shelf (2011-2015) indicated that North Pacific right whales occurred in two passes of the eastern Aleutian Islands (Umnak and Unimak Pass) and that North Pacific right whale calling occurred at consistently high levels in the southeastern Bering shelf (SEBS) during ice-free months (Wright 2017). No North Pacific right whale calls were detected from January to April in the southeastern Bering Sea, which coincides with persistent winter detections in the waters of the eastern Aleutian Islands, supporting the theory that North Pacific right whales migrate out of the SEBS during winter months (Wright 2017).

The probability of acoustically detecting right whales in the Bering Sea has been found to be strongly influenced by the abundance of the copepod *Calanus marshallae* (Baumgartner et al. 2013), and those authors propose that *C. marshallae* is the primary prey for right whales on the Bering Sea shelf. The seasonal development of these copepods into later life-history stages that can be exploited by right whales closely matches the peak timing of right whale call detections (Munger et al. 2008, Baumgartner et al. 2013). Additionally, right whale "gunshot" call detections increased shortly after peaks in copepod biovolume (Stafford et al. 2010). Baumgartner et al. (2013) suggest that the availability of *C. marshallae* on the middle shelf of the southeastern Bering Sea is the reason right whales aggregate there annually. Satellite-telemetry data from four whales tagged in 2008 and 2009 provide further indication of this area's importance as foraging habitat for Eastern North Pacific right whales (Zerbini et al. 2015). Right whales were not observed outside the localized area in the southeastern Bering Sea during surveys conducted for fishery management purposes that covered a broader area of Bristol Bay and the Bering Sea (Moore et al. 2000, 2002; see Fig. 1 in the Northeast Pacific fin whale Stock Assessment Report for locations of tracklines for these surveys).

In the summer of 2017, the International Whaling Commission's (IWC) Pacific Ocean Whale and Ecosystem Research (POWER) survey used a combination of passive acoustic monitoring and visual sightings to find 17 right whales in the southeastern Bering Sea (IWC 2017). The majority of these sightings were in Bristol Bay east of the North Pacific right whale critical habitat, with others in the critical habitat. Through comparisons of photographs to those in the North Pacific Right Whale Photo-identification Catalogue (curated by MML), eight previously known individuals were identified, and another four were tentatively categorized as new animals (with the caveat that some whales in the existing catalogue are poorly photographed and therefore might represent duplicates).

There are fewer sightings of right whales in the Gulf of Alaska than in the Bering Sea (Brownell et al. 2001); although, until the summer of 2015, there was little survey effort in this region, notably in the offshore areas where right whales commonly occurred during whaling days (Ivashchenko and Clapham 2012). Waite et al. (2003) summarized sightings from the Platforms of Opportunity Program from 1959 to 1997. Additional lone animals were observed off Kodiak Island in the Barnabus Canyon area from NOAA surveys in August 2004, 2005, and 2006 (Wade et al. 2011b). A single right whale was reported in Pasagshak Bay, Kodiak, by a kayaker in May 2010, and one was sighted in December 2011 by humpback whale researchers in Uganik Bay, Kodiak (A. Kennedy, NMFS-

AFSC-MML, pers. comm., 7 October 2012). A single right whale was sighted south of the Alaska Peninsula (53.5°N, 156.5°W) during a seismic survey in July 2011 (Davis et al. 2011). On 17 July 2017, a tentatively new individual was observed and photographed by a sailboat charter at Kilokak Rocks (57 10.5°N, 156 18°W) in the Gulf of Alaska between Kodiak Island and the Alaska Peninsula (https://www.happywhale.com/browse?view=map&enc=20924, accessed December 2018). Acoustic monitoring from May 2000 to July 2001 at seven sites in the Gulf of Alaska detected right whale calls at only two sites: one off eastern Kodiak and the other in deep water south of the Alaska Peninsula (detection distance in 10s of kilometers) (Mellinger et al. 2004). More recently, right whale up and gunshot calls were detected in Unimak Pass in May-September and December-February on recorders deployed in 2009-2015 (Wright 2017). Similarly, gunshot calls were detected at Umnak Pass in July-September on a recorder deployed in 2009 (Wright 2015). Additionally, right whale up-calls were detected on a recorder deployed near Quinn Seamount in the Gulf of Alaska on a few days each in June, July, August, and September 2013 (Širović et al. 2015).

A dedicated vessel survey for right whales was conducted by NMFS in August 2015 aboard the NOAA ship *Reuben Lasker*; the cruise used visual and acoustic survey techniques and followed tracklines on the shelf and in deeper waters to the south and east of Kodiak (Rone et al. 2017). Right whales were acoustically detected twice on the shelf in the Barnabus Trough area, but none were visually observed.

Most of the illegal Soviet catches of right whales occurred in offshore areas, including a large area to the east and southeast of Kodiak Island (Doroshenko 2000, Ivashchenko and Clapham 2012); the Soviet catch distribution closely parallels that seen in plots of 19th-century American whaling catches by Townsend (1935). Whether this region remains an important habitat for this species is currently unknown. The sightings and acoustic detection of right whales in coastal waters east of Kodiak Island indicate at least occasional use of this area; however, the lack of visual detections of right whales during the *Reuben Lasker* cruise in August 2015 adds to the concern that the Gulf of Alaska population may be extremely small.

There have been two sightings of single right whales in the waters of British Columbia. The first was observed off Haida Gwaii on 9 June 2013 and the second, a large adult, was seen in the Strait of Juan de Fuca on 25 October 2013; this second animal had an apparently healed major wound across the rostrum, which may have been caused by a previous entanglement in fishing gear (Ford et al. 2016). Two right whale calls were detected on a bottom-mounted hydrophone off the Washington Coast on 29 June 2013 (Širović et al. 2015). No right whale calls were detected in previous years at this site.

There were two photographically documented but unpublished observations of right whales made by the public off California in 2017: one off La Jolla and another in the Channel Islands. The animals concerned appeared to be different individuals, although good photos of the La Jolla whale are unavailable. The Channel Islands whale was well photographed and represents a new individual to the North Pacific Right Whale Photo-identification Catalogue.

The following information was considered in classifying stock structure according to the Dizon et al. (1992) phylogeographic approach: 1) Distributional data: distinct geographic distribution; 2) Population response data: unknown; 3) Phenotypic data: unknown; and 4) Genotypic data: evidence for some isolation of populations. Based on this limited information, two stocks of North Pacific right whales are currently recognized: a Western North Pacific and an Eastern North Pacific stock (Rosenbaum et al. 2000, Brownell et al. 2001, LeDuc et al. 2012). The former is believed to feed primarily in the Sea of Okhotsk.

POPULATION SIZE

The U.S.S.R. illegally killed an estimated 771 right whales in the eastern and western North Pacific, with the majority (662) killed between 1962 and 1968 (Ivashchenko et al. 2017). These takes severely impacted the two populations concerned, notably in the east (Ivashchenko and Clapham 2012, Ivashchenko et al. 2013). Based on sighting data, Wada (1973) estimated a total population of 100-200 right whales in the North Pacific. Rice (1974) stated that only a few individuals remained in the Eastern North Pacific stock and that for all practical purposes the stock was extinct because no sightings of a mature female with a calf had been confirmed since 1900. However, confirmed sightings over the last 20 years, starting in 1996 (Goddard and Rugh 1998), have invalidated this view (Wade et al. 2006, Zerbini et al. 2015, Ford et al. 2016, IWC 2017). Brownell et al. (2001) suggested from a review of sighting records that the abundance of this species in the western North Pacific was likely in the "low hundreds," including the population in the Sea of Okhotsk.

Biopsy samples of right whales encountered in the southeastern Bering Sea were taken in 1997 and 1999. Genetic analyses identified three individuals in 1997 and four individuals in 1999; of the animals identified, one was identified in both years, resulting in a total genetic count of six individuals (LeDuc et al. 2001). Genetic analyses of samples from all six whales sampled in 1999 determined that the animals were male (LeDuc et al. 2001). Two right

whales were observed during a vessel-based survey in the central Bering Sea in July 1999 (Moore et al. 2000). Three biopsies were obtained by the IWC POWER cruise in the southeastern Bering Sea in the summer of 2017 (IWC 2017); one of these was from a previously unknown individual.

During the southeastern Bering Sea survey in 2002, there were seven sightings of right whales (LeDuc 2004). One of the sightings in 2002 included a right whale calf; this is the first confirmed sighting of a calf in decades (a possible calf or juvenile sighting was also reported in Goddard and Rugh 1998). This concentration also included two probable calves. In the southeastern Bering Sea during September 2004, multiple right whales were acoustically located and subsequently sighted by another survey vessel approaching the position of an individual located with a satellite tag (Wade et al. 2006). An analysis of photographs confirmed at least 17 individual whales (not including the tagged whales). Genetic analysis of biopsy samples identified 17 individuals: 10 males and 7 females. The discovery of seven females was significant, as only one female had been identified previously, and at least two calves were present.

The North Pacific Right Whale Photo-identification Catalogue currently contains a minimum of 25 individual whales from the eastern North Pacific. From 2008 to 2017, 25 right whales were photographically identified, some repeatedly (Clapham et al. 2013, Ford et al. 2016). Including individuals observed more than once, this comprises 8 animals photographed in 2008 (all in the Bering Sea), 7 in 2009 (Bering Sea), 3 in 2010 (1 in the Bering Sea, 2 off Kodiak), 2 in 2011 (Bering Sea), 1 in 2012 (Gulf of Alaska), 2 in 2013 (both off British Columbia), and 14 in 2017 (12 in the Bering Sea, 1 in Kodiak, 1 in the Channel Islands). These numbers include four individuals that were tracked with satellite-monitored radio tags in the Bering Sea in 2004, 2008, and 2009 (Zerbini et al. 2015).

Photographic (18 identified individuals) and genotype (21 identified individuals) data through 2008 were used to calculate the first mark-recapture estimates of abundance for right whales in the Bering Sea and Aleutian Islands, resulting in estimates of 31 (95% CL: 23-54; CV = 0.22) and 28 (95% CL: 24-42), respectively (Wade et al. 2011a). The abundance estimates are for the last year of each study, corresponding to 2008 for the photo-identification estimate and 2004 for the genetic identification estimates. Wade et al. (2011a) also estimate the population consists of 8 females (95% CL: 7-18) and 20 males (95% CL: 17-37). Wade et al. (2011a) summarized the photo-identification and genetic-identification catalogues as follows: twenty-one individuals were identified from genotyping from the Aleutian Islands and Bering Sea from 1997 to 2004, comprising 15 males and 6 females. In aggregate, there were eight photo matches of individual whales across years involving five individuals. Wade et al. (2006) reported 17 individuals (including 7 females) identified from genotyping in 2004; that number was revised to 16 individuals (including 6 females) because a typographical error was subsequently discovered that masked a duplicate sample. There were four biopsies taken in 2008 and 2009 of two males and two females; three of these animals had been sampled in previous years. These samples were not included in the Wade et al. (2011a) abundance estimate.

Another seven individuals were observed in the summer of 2009, and one individual was seen in the summer of 2010 (Clapham et al. 2013). Four individuals were seen in the summer of 2011 (Berchok et al. 2011, 2015). The two sightings of right whales (one in June and one in October) in British Columbia waters in 2013 (noted above) were the first sightings of this species in this region in decades (Ford et al. 2016). Comparisons with the North Pacific Right Whale Photo-identification Catalogue showed that neither individual observed in British Columbia had been previously photographed elsewhere. Whether these two sightings indicate that right whales are returning to these coastal waters where they were once hunted is unclear.

As noted above, 12 individuals were photographed by the IWC POWER cruise in the Bering Sea in the summer of 2017; four were likely new to the catalogue.

LeDuc et al. (2012) analyzed 49 biopsy samples from right whales identified as being from 24 individuals, of which, all but one were from the eastern North Pacific. The analysis revealed a male-biased sex ratio and a loss of genetic diversity that appeared to be midway between that observed for right whales in the North Atlantic and the Southern Hemisphere. The analysis also suggested a degree of separation between eastern and western populations, a male:female ratio of 2:1, and a low effective population size for the Eastern North Pacific stock, which LeDuc et al. (2012) considered to be at "extreme risk" of extirpation.

The sightings of right whales in Barnabus Trough occurred at locations with the highest density of zooplankton, as measured by active-acoustic backscatter. Fecal hormone metabolite analysis from one whale estimated levels consistent with an immature male, indicating either recent reproduction in the Gulf of Alaska or movements between the Bering Sea and Gulf of Alaska. Photo-identification (of two whales) and genotyping (of one whale) failed to reveal a match to Bering Sea right whales. No matches were made of the single right whale observed by the IWC cruise in August 2012.

The majority of recent detections of right whales in pelagic waters of the Gulf of Alaska came from passive acoustic recorders. These detections of calls are exceptionally rare (Mellinger et al. 2004, Širović et al. 2015). However, it is interesting to note the contrasting data from the southeastern Bering Sea, where similar instruments on the middle shelf (<100 m depth) detected right whale calls on more than 6 days per month in July-October (Munger et al. 2008), despite a population estimated to be only 31 whales (Wade et al. 2011a). The paucity of detections of right whales in pelagic waters of the Gulf of Alaska may still be partially due to a lack of survey and recording effort in those areas, but the lack of calls in passive-acoustic monitoring suggests that right whales are very rare in the pelagic areas monitored. More extensive coverage of shelf and nearshore waters of the Gulf of Alaska during previous ship and airplane surveys for cetaceans (summarized in Wade et al. 2011b) detected a single right whale near Kodiak Island (Waite et al. 2003), and there were two acoustic detections from the *Reuben Lasker* survey in August 2015 (Rone et al. 2017). Therefore, the Barnabus Trough/Albatross Bank area represents the only location in the Gulf of Alaska where right whales have been repeatedly detected in the last 4 decades, and those detections add only a minimum of two additional whales (from photo-identification in 2005 and 2006) to the total Eastern North Pacific population. However, with the exception of the August 2015 study off Kodiak Island, there has been virtually no survey coverage of the offshore waters in which right whales commonly occurred during historical and more recent (1960s) whaling periods (Townsend 1935, Ivashchenko and Clapham 2012).

Minimum Population Estimate

The minimum estimate of abundance (N_{MIN}) of Eastern North Pacific right whales is 26 whales based on the 20th percentile of the photo-identification estimate of 31 whales (CV = 0.226: Wade et al. 2011a). This estimate will be 10 years old in 2018 and the 2016 guidelines for preparing Stock Assessment Reports (NMFS 2016) recommend that N_{MIN} be considered unknown if the abundance estimate is more than 8 years old; however, given the extremely low abundance of this stock and the very low calf production, it seems unlikely that the current abundance is significantly different.

Current Population Trend

No estimate of trend in abundance is available for this stock.

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

Due to insufficient information, the default cetacean maximum theoretical net productivity rate (R_{MAX}) of 4% is used for this stock (Wade and Angliss 1997). However, given the small apparent size, male bias, and very low calf production in this population, this rate is likely to be unrealistically high.

POTENTIAL BIOLOGICAL REMOVAL

Potential biological removal (PBR) is defined as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$. The recovery factor ($F_R$) for this stock is 0.1, the recommended value for cetacean stocks which are listed as endangered (Wade and Angliss 1997). A reliable estimate of N_{MIN} for this stock is 26 whales based on the mark-recapture estimate of 31 whales (CV = 0.226: Wade et al. 2011a). The calculated PBR level for this stock is therefore 0.05 ($26 \times 0.02 \times 0.1$), which would be equivalent to one take every 20 years.

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Information for each human-caused mortality, serious injury, and non-serious injury reported for NMFS-managed Alaska marine mammals in 2012-2016 is listed, by marine mammal stock, in Helker et al. (in press); however, only the mortality and serious injury data are included in the Stock Assessment Reports. No human-caused mortality or serious injury of Eastern North Pacific right whales was reported in 2012-2016; although, given the remote nature of the known and likely habitats of North Pacific right whales, it is very unlikely that any mortality or serious injury in this population would be observed. Consequently, it is possible that the current absence of reported mortality or serious injury due to entanglement in fishing gear, ship strikes, or other anthropogenic causes (e.g., oil spills) is not a reflection of the true situation.

Fisheries Information

Information (including observer programs, observer coverage, and observed incidental takes of marine mammals) for federally-managed and state-managed U.S. commercial fisheries in Alaska waters is presented in Appendices 3-6 of the Alaska Stock Assessment Reports.

There are no historical reports of fisheries-caused mortality or serious injury of Eastern North Pacific right whales. However, given what we know about susceptibility of other large whales to fisheries-caused mortality and serious injury, we assume that the potential exists for North Pacific right whales. Mortality and serious injury of humpback whales and fin whales in trawl gear, gray whales in gillnet gear, and bowhead whales in pot gear (George et al. 2017) has been documented. While much of the trawl fleet has observer coverage, several gillnet fisheries and pot fisheries in the range of Eastern North Pacific right whales do not. Therefore, the potential for fisheries-caused mortality and serious injury may be greater than is reflected in existing observer data.

Right whales presumably from the Western North Pacific population have suffered fisheries-caused mortality or serious injury. Gillnets were implicated in the death of a right whale off the Kamchatka Peninsula (Russia) in October of 1989 (Kornev 1994). The Marine Mammal Commission reported that in February 2015, a young right whale was found entangled in aquaculture gear in South Korea; much of the gear was cut off, but the whale's fate is unknown. And in October 2016, an entangled right whale was reported to have died while being disentangled in Volcano Bay, Hokkaido, Japan. No other incidental takes of right whales are known to have occurred in the North Pacific, although two photographs from the North Pacific Right Whale Photo-identification Catalogue show potential fishing gear entanglement (A. Kennedy, NMFS-AFSC-MML, pers. comm., 21 September 2011; Ford et al. 2016). The right whale photographed on 25 October 2013 off British Columbia and northern Washington State, showed potential fishing gear entanglement (Ford et al. 2016). Given the very small estimate of abundance, any mortality or serious injury incidental to commercial fisheries would be considered significant. Entanglement in fishing gear, including lobster pot and sink gillnet gear, is a significant source of mortality and serious injury for North Atlantic right whales (Waring et al. 2014).

Although there are no records of mortality or serious injury of Eastern North Pacific right whales in any U.S. fishery, given the remote nature of the known and likely habitats of North Pacific right whales, it is very unlikely that any mortality or serious injury in this population would be observed. Consequently, it is possible that the current absence of reported entanglement-related mortality or serious injury in this stock is not a reflection of the true situation.

Alaska Native Subsistence/Harvest Information

Subsistence hunters in Alaska and Russia do not hunt animals from this stock.

Other Mortality

Ship strikes are considered the primary source of human-caused mortality and serious injury of right whales in the North Atlantic (Cole et al. 2005, Henry et al. 2012), and it is possible that right whales in the North Pacific are also vulnerable to this source of mortality. However, due to their rare occurrence and scattered distribution, it is impossible to assess the threat of ship strikes to the Eastern North Pacific stock of right whales. There is concern regarding the effects of increased shipping through Arctic waters and the Bering Sea with retreating sea ice, which may increase the potential risk to right whales from shipping.

Overall, given the remote nature of the known and likely habitats of North Pacific right whales, it is very unlikely that any mortality or serious injury in this population would be observed. Consequently, it is possible that the current absence of reported ship-strike-related or other anthropogenic mortality or serious injury in this stock is not a reflection of the true situation.

STATUS OF STOCK

The right whale is listed as endangered under the Endangered Species Act of 1973, and therefore designated as depleted under the Marine Mammal Protection Act. In 2008, NMFS relisted the North Pacific right whale as endangered as a separate species (*Eubalaena japonica*) from the North Atlantic species, *E. glacialis* (73 FR 12024, 06 March 2008). As a result, the stock is classified as a strategic stock. The abundance of this stock is considered to represent only a small fraction of its pre-commercial whaling abundance, i.e., the stock is well below its Optimum Sustainable Population (OSP). The total estimated annual level of human-caused mortality and serious injury is unknown for this stock. The reason(s) for the apparent lack of recovery for this stock is (are) unknown. Brownell et al. (2001) and Ivashchenko and Clapham (2012) noted the devastating impact of extensive illegal Soviet catches in the eastern North Pacific in the 1960s, and both suggested that the prognosis for right whales in this area was poor. Biologists working aboard the Soviet factory ships that killed right whales in the eastern North Pacific in the 1960s considered that the fleets had caught close to 100% of the animals they encountered (Ivashchenko and Clapham 2012); accordingly, it is quite possible that the Soviets wiped out the great majority of the animals in the population at that time. In its review of the status of right whales worldwide, the IWC expressed "considerable concern" over the status of this population (IWC 2001), which is currently the most endangered stock of large

whales in the world for which an abundance estimate is available. A genetic analysis of biopsy samples from North Pacific right whales found an apparent loss of genetic diversity, low frequencies of females and calves, extremely low effective population size, and possible isolation from conspecifics in the western Pacific indicating that right whales in the eastern North Pacific are in severe danger of immediate extirpation from the eastern North Pacific (LeDuc et al. 2012).

There are key uncertainties in the assessment of the Eastern North Pacific stock of North Pacific right whales. The abundance of this stock is critically low and migration patterns, calving grounds, and breeding grounds are not well known. There appear to be more males than females in the population and calf production is very low. PBR is designed to allow stocks to recover to, or remain above, the maximum net productivity level (MNPL) (Wade 1998). An underlying assumption in the application of the PBR equation is that marine mammal stocks exhibit certain dynamics. Specifically, it is assumed that a depleted stock will naturally grow toward OSP, and that some surplus growth could be removed while still allowing recovery. However, the Eastern North Pacific right whale population is far below historical levels and at a very small population size, and small populations can have different dynamics than larger populations from Allee effects and stochastic dynamics. Although there is currently no known direct human-caused mortality, given the small number of animals estimated to be in the population, any human-related mortality or serious injury from ship strikes or commercial fisheries is likely to have a serious population-level impact.

HABITAT CONCERNS

NMFS conducted an analysis of right whale distribution in historical times and in more recent years and stated that principal habitat requirements for right whales are dense concentrations of prey (Clapham et al. 2006) and, on this basis, proposed two areas of critical habitat: one in the southeastern Bering Sea and another south of Kodiak Island (70 FR 66332, 2 November 2005). In 2006, NMFS issued a final rule designating these two areas as northern right whale critical habitat, one in the Gulf of Alaska and one in the Bering Sea (71 FR 38277, 6 July 2006; Fig. 1). In 2008, NMFS redesignated the same two areas as Eastern North Pacific right whale critical habitat under the newly recognized species name, *E. japonica* (73 FR 19000, 8 April 2008; Fig. 1).

Potential threats to the habitat of this population derive primarily from commercial shipping and fishing vessel activity. There is considerable fishing activity within portions of the critical habitat of this species, increasing the risk of entanglement. However, photographs of right whales in the eastern North Pacific to date have shown little evidence of entanglement scars; the sole exception is the animal photographed in the Strait of Juan de Fuca in October 2013 (Ford et al. 2016). Unimak Pass is a choke-point for shipping traffic between North America and Asia, with shipping density and risk of an accidental spill highest in the summer (Renner and Kuletz 2015), a time when right whales are believed to be present. The high volume of large vessels transiting Unimak Pass (e.g., 1,961 making 4,615 transits in 2012: Nuka Research and Planning Group, LLC 2014a, 2014b), a subset of which continue north through the Bering Sea, increases both the risk of ship strikes and the risk of a large or very large oil spill in areas in which right whales may occur. The risk of accidents in Unimak Pass, specifically, is predicted to increase in the coming decades, and studies indicate that more accidents are likely to involve container vessels (Wolniakowski et al. 2011). Past offshore oil and gas leasing has occurred in the Gulf of Alaska and Bering Sea in the northern areas of known right whale habitat. The Bureau of Ocean Energy Management (BOEM) proposed an Outer Continental Shelf leasing plan for 2007-2012 that prioritized lease sales for the North Aleutian Basin in 2010 and 2012 (Aplin and Elliott 2007), but it was later withdrawn by Presidential Executive Order. Therefore, the North Aleutian Basin was not included in the 2017-2022 national lease schedule by BOEM, and there are no residual active leases from past sales. However, BOEM has announced plans to replace the 2017-2022 OCS plan (with a new 2019-2024 leasing plan) and to reconsider all current moratoria on offshore oil and gas exploration and extraction (82 FR 30886, 3 July 2017). It is noteworthy that two tagged right whales were observed to briefly visit the North Aleutian Basin area, one in 2004 and one in 2009 (Zerbini et al. 2015). The development of oil fields off Sakhalin Island in Russia is occurring within habitat of the western North Pacific population of right whales (NMFS 2006). However, no oil exploration or production is currently underway in offshore areas of the Bering Sea or Gulf of Alaska, and no lease sales are currently scheduled to occur in those areas. The possibility remains that there will be lease sales in these areas in the future, even though no discoveries have yet been announced and most leases have not contained commercially viable deposits (NMFS 2006). However, in Cook Inlet, lease sales are planned (the next federal sale under the existing 2017-2022 leasing plan will occur in 2021 and state sales currently occur annually) and exploration activity is occurring in both state and federal waters. BOEM (2016) conducted an oil spill model for lower Cook Inlet that suggested if a very large oil spill occurs in offshore waters it will impact right whale habitat around Kodiak Island and along the Alaska Peninsula. Although there is currently no oil and gas activity in the Alaska Chukchi Sea, oil exploration and production is ongoing in the Beaufort Sea, and this will likely include

an increased level of associated vessel traffic through the Bering Sea en route to and from the Arctic, which could increase risks to right whales from ship strikes.

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