

North Atlantic Right Whale

Eubalaena glacialis

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DESCRIPTION

Taxonomy and Basic Description

The North Atlantic right whale was first described by Müller (1776). Not built for speed, the northern right whale has a rotund body with a large head (one-third of its total body length) and a narrow, arching rostrum. Its baleen can reach up to 3 m (8 ft.) with the fringe along the inside edge fine enough to allow right whales to filter very small food items from the water. Right whales have a broad, smooth back absent a dorsal fin. Callus-like patches of skin are found on the rostrum, lower lip, and around the eyes. These patches are called callosities and offer a secure holding place for cyamids, (whale lice) which give the callosities an orange or whitish-yellow color. Right whales also have broad, paddle-like flippers and large flukes with smooth concave margins. These whales are predominately black in color, are often mottled, and have a variable amount of white on the belly. Their spout is V-shaped. Adults reach 13 to 18 m (43 to 59 ft.) in length and a weight of 55 metric tons (60 tons) (Wynne & Schwartz 1999).

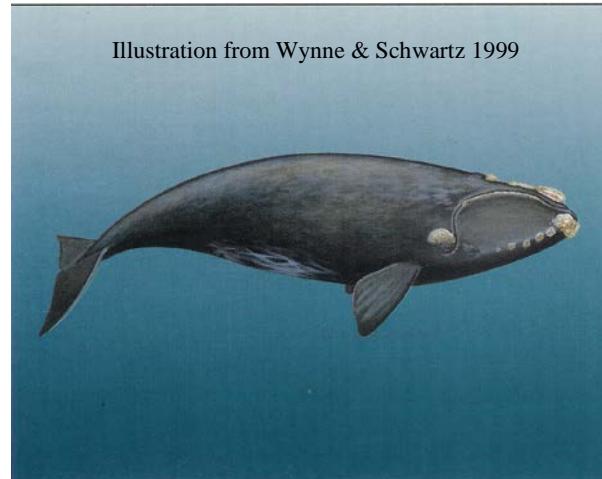


Illustration from Wynne & Schwartz 1999

Status

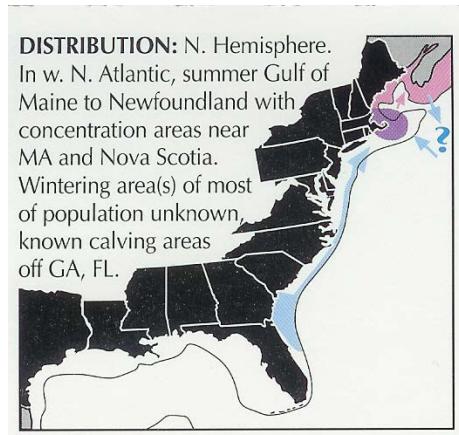
The North Atlantic right whale is federally listed as an endangered species. It is among the rarest of all large whale species and, indeed, of all marine mammal species. Population size is at a critical level with an estimated 361 animals remaining in western North Atlantic waters (Waring et al. 2010). The northern right whale is defined as “strategic” under the Marine Mammal Protection Act (MMPA) due to its endangered status and because the average annual fishery-related mortality and serious injury exceeds its Potential Biological Removal (PBR) level, which is 0.7 individuals (Waring et al. 2010).

POPULATION SIZE AND DISTRIBUTION

The seasonal movements of the North Atlantic right whale are still poorly understood. Individuals in the western North Atlantic population range from winter calving and nursery areas off the southeastern United States to summer feeding grounds off New England and north to the Bay of Fundy and Scotian Shelf. These northern waters are also important mating and nursery habitats. Analyses based on both genetics and sighting histories of photographically identified individuals suggest that not all reproductively active females return to calving and nursery

grounds each year (Waring et al. 2004). In addition, other than calving females and a few juveniles that winter off the coasts of Georgia and Florida, the wintering location of the remaining individuals in the population is unknown. Therefore, it appears that one or more additional wintering and summering grounds may exist in unsurveyed locations. However, it is possible that the “missing” animals simply disperse over a wide area at these times (Waring et al. 2004). Map from Wynne & Schwartz, 1999

The right whale was routinely harvested in U.S. waters from 1650 through 1924, with a peak in the early 1700s (Wynne & Schwartz 1999). An estimate of pre-exploitation population size is not available. Population trajectories, based on historical data and estimated present population size, indicate that there may have been 1,000 right whales in the population during the mid 1600s (Waring et al. 2004). During this time period, the population size has been greatly reduced to the point where today there are an estimated 361 animals remaining. It is currently unclear whether the population is stationary, undergoing modest growth, or in decline. Recent examination of the minimum number alive population index suggests a small positive trend in population size with a mean growth rate of 2.1% estimated from 1990-2005 (Waring et al. 2010). The size of this stock is considered to be extremely low relative to its Optimum Sustainable Population (OSP) level in the U.S. Atlantic Exclusive Economic Zone (EEZ).



HABITAT AND NATURAL COMMUNITY REQUIREMENTS

There are five well-known habitats used annually by western North Atlantic right whales: 1) coastal Florida and Georgia, 2) Great South Channel east of Cape Cod, 3) Cape Cod and Massachusetts Bays, 4) the Bay of Fundy, and 5) Browns and Baccaro Banks south of Nova Scotia (NMFS 2005). Movements within and between these habitats are believed to be more extensive than originally considered (Waring et al. 2004).

Important feeding areas occur in the Bay of Fundy, Cape Cod Bay, Great South Channel and the Scotian Shelf. Right whales are frequently found in coastal and shelf waters and, for much of the year, their distribution is strongly correlated to the distribution of their prey, calanoid copepods (NMFS 2005). Individuals are generally found in Cape Cod Bay and adjacent waters from January through early May. In late spring, mothers with their newborn calves appear. In summer, right whales make their way northward to feeding grounds off Maine, New Brunswick, and Nova Scotia. As mentioned earlier, these northern waters are also important mating and nursery habitats. In October, a portion of the population—mostly pregnant females—migrates southward to waters off southern Georgia and northern Florida to calve. At present, the southeastern United States is the only known calving ground for the western North Atlantic right whale.

Depending on the time of the year, right whales will spend much of their time near bays and peninsulas and in shallow, coastal waters. These areas provide shelter, food abundance, and security for females rearing young or avoiding the mating efforts of males. Four important habitat areas, used as both feeding and nursery grounds for northern right whales, are the

Browns-Baccaro Bank, Bay of Fundy, Great South Channel and the Cape Cod Bay. Each of these areas is distinguished by high densities of copepod populations. The first three have deep basins (150 m) flanked by relatively shallow water. Copepods are concentrated here because of convergences and upwellings driven by tidal currents. This also occurs in the Cape Cod Bay even though a deep basin isn't present (Cummings 1985; Katona 1999). A fifth important habitat area is found off southern Georgia and northern Florida in nearshore waters; this area serves as a nursery ground and is characterized by large shallow embayments that provide safe areas for females to calve in the winter.

Right whales are known to occur in waters off South Carolina during the winter but the duration of their residency and the extent to which they utilize this area of habitat is currently unknown. There have been three strandings reported: one off Murrels Inlet in 2001, one off Charleston in 2011, and one on Cape Island in March of 2011; the latter two died (Wayne McFee, NOAA, pers. comm.).

Three areas have been designated under the Endangered Species Act as critical habitat for this species (59 FR 28793, June 3, 1994). Two include feeding and nursery areas off the northeastern United States in Cape Cod/Massachusetts Bay and the Great South Channel; the third is the winter calving and nursery area in waters off the southeastern United States. NMFS is currently engaged in evaluating the need for revising the critical habitat designation for the North Atlantic right whale (75 FR 61690, October 6, 2010).

CHALLENGES

The two most common anthropogenic causes of right whale mortalities in the western North Atlantic are ship strikes and entanglement in fishing gear. The greatest known cause of mortality is ship strikes, which accounted for approximately 35% of documented mortalities between 1970 and 1999 (NMFS 2005). The relatively low incidence of photographically identified whales showing scars/wounds attributed to ship propellers when compared to the high rate of such wounds on stranded carcasses indicates that a high proportion of ship/whale interactions are fatal to the whale (Kraus 1990). With improved reporting and more thorough necropsies performed in recent years, the rate of detection and confirmation of ship strike related deaths has most likely increased which may confound efforts to determine trends in the frequency of collisions. Ship speed has been argued as an important factor regarding the frequency of ship strike occurrence in large whale species including the right whale (Laist et al. 2001).

Gear entanglement was estimated to account for 7% of the known mortality of North Atlantic right whales from 1970 to early 1993 (Kenney and Kraus 1993). At least two additional entanglement deaths occurred between late 1993 and 1999 (Knowlton and Kraus 2001). In the instances where mortality does not initially occur, such events probably weaken the entangled individuals making them more susceptible to other direct causes of mortality (Kenney and Kraus 1993). Entanglement-related stress may also decrease reproductive success or reduce the life span of an individual and may adversely affect the growth of the population. Fishing gear commonly implicated in right whale entanglements are gillnets, lobster pots, seine nets and fish weirs (NMFS 1991). Based on scarification, Hamilton et al. (1998) reported that 61.6% of the western North Atlantic population has been entangled in fishing gear. A subsequent study by

Knowlton et al. (2001) estimated that between 10% and 28% of the population interacts with fishing gear every year.

Other potential challenges include habitat degradation, noise, contaminants and climate and ecosystem change (NMFS 2005). A continued impact to the coastal habitat of the right whale in the North Atlantic is the undersea exploration and extraction of mineral deposits, as well as dredging of major shipping channels. Offshore oil and gas drilling activities have been proposed off the coast of the mid- and south-Atlantic U.S. (NMFS 1991). Right whales also frequent coastal waters where dredging and its associated disposal operations occur on a regular basis, such as along the southeastern U.S. It is unknown to what extent mineral extraction and dredging activities may impact right whales.

CONSERVATION ACCOMPLISHMENTS

SCDNR and South Atlantic Fishery Management Council (SAFMC) personnel serve as members of the Atlantic Large Whale Take Reduction Team (ALWTRT). National Oceanic and Atmospheric Administration (NOAA) Fisheries established the ALWTRT, comprised of stakeholder groups, to determine ways to reduce serious injury and mortality of northern right, fin and humpback stocks that interact with Category I or II fisheries. Category I Fisheries are those that have a serious injury/mortality rate of 50 percent or more of a marine mammal stock's PBR. Category II Fisheries are those that are expected to have a serious injury/mortality rate of more than 1 percent but less than 50 percent of a marine mammal stock's PBR. The final plan was implemented in 1999; however, despite the measures put forth in the plan, annual mortalities and serious injury are still exceeding PBR for right whales (0.7 whales). Consequently, the ALWTRT is currently working with NOAA Fisheries to amend the Atlantic Large Whale Take Reduction Plan in order to meet the goals of the MMPA which mandate reducing incidental mortality or serious injury to below each stock's PBR level within six months of the plan's implementation. The long-term goal is to reduce serious injuries and mortality to an insignificant level approaching a Zero Mortality Rate Goal (ZMRG) in order that they can reach or maintain their optimum sustainable population size. To date, despite efforts of the plan to reduce large whale entanglements and other activities to reduce ship strikes, annual mortalities attributed to fishery interactions and ship strikes are still exceeding PBR for right whales (PBR = 0.7 whales, from 2004 – 2008 the minimum rate of annual human-caused mortality and serious injury averaged 2.8 per year). In 2011, the PBR value was changed to 0.8. SCDNR personnel will continue to serve on the ALWTRT in order to help develop and implement programs and activities designed to reduce North Atlantic right whale non-natural mortalities to insignificant levels approaching the ZMRG, which is 0.07 right whales.

South Carolina also has representatives on the Southeastern Right Whale Recovery Plan Implementation Team (SEIT). Since its inception in August 1993, the SEIT has met regularly and has been active in a number of areas. Among other things, the SEIT has coordinated a number of efforts to educate mariners about the threat of ship strikes in right whale habitat. Particularly, the SEIT has been instrumental in developing a system of aircraft surveys and communication systems that alert mariners to the presence of right whales in the southeastern US on a real time basis. In addition, the team has addressed and/or provided recommendations to NOAA Fisheries regarding right whale research in the southeastern US, additional measures to

reduce the possibility of ship strikes, development of safe operating procedures for large vessels transiting right whale habitat, minimum vessel approach distances, and restrictions on hazardous fishing gear in right whale calving areas (NMFS 2005).

SCDNR conducted a marine mammals stranding program from 1991 to 2005 to obtain data on marine mammals that strand along the South Carolina coast. NOAA National Ocean Service in Charleston managed the stranding network from 2006-2007. Since 2008 Coastal Carolina University has managed the volunteer SC marine mammal stranding network in collaboration with NOAA National Ocean Service in Charleston, SC. SCDNR continues to provide logistical and veterinary support to the stranding program. Sea to Shore Alliance currently conducts aerial surveys during the winter to monitor the occurrence of right whales off of the southeastern US.

CONSERVATION RECOMMENDATIONS

- Analyze available data and collect additional whale sighting data to assess expanding or modifying the critical habitat boundaries.
- Assess the utility and feasibility of voluntary and mandatory ship routing measures and vessel speed restrictions in right whale habitat.
- Develop and implement programs and regulations to incorporate gear modifications and fishing practices that reduce entanglements of right whales in South Carolina waters.
- Conduct studies of gear modifications that result in reduced right whale entanglements.
- Assess right whale population size, survival rate, and trends on a regular basis.
Determine right whale foraging ecology.
- Continue and expand annual winter surveys for right whales off the southeastern US coast.
- Compile or collect relevant physical, chemical, biological, oceanographic, fishery, and other data to characterize features of important right whale habitats and potential sources of anthropogenic destruction and degradation of critical right whale habitats.
- Use acoustic detection technology to monitor right whale occurrence and distribution.
- Continue to maintain a database of right whale sightings and photo-identifications.
- Conduct studies to determine the direct and indirect effects of coastal development, mineral extraction, and dredging activities on the distribution, behavior, and productivity of right whales.
- Continue and improve seasonal aircraft surveillance of right whale habitats and other elements of the “Sighting Advisory System.”
- Continue and improve the mandatory ship reporting system for right-whale sightings.
- Continue and improve the stranding network for right whales.
- Continue and expand efforts to educate mariners and the shipping industry, and fishermen and the fishing industry, about right whale vulnerability to ship strikes and fishing gear entanglements.
- Provide right whale sighting locations to mariners through broadcasts and other appropriate media.
- Encourage reports of right whale entanglements to the disentanglement network.

MEASURES OF SUCCESS

SCDNR personnel will continue to serve on the ALWTRT and the SEIT in order to help develop and implement programs and activities designed to reduce North Atlantic right whale non-natural mortalities to insignificant levels approaching the ZMRG.

LITERATURE CITED

- Cummings, W. 1985. Right Whales. Academic Press. New York, New York.
- Hamilton, P.K., M.K. Marx and S.D. Kraus. 1998. Scarification analysis of North Atlantic right whales (*Eubalaena glacialis*) as a method of assessing human impacts. Final report to NMFS Northeast Fisheries Science Center, contract No. 4EANF-6-0004.
- Katona, S. and S. Kraus. 1999. Efforts to Conserve the North Atlantic Right Whale. Smithsonian Institution Press. Washington, D.C.
- Kenney, R. and S. Kraus. 1993. Right Whale Mortality – a Correction and an Update. Mar. Mamm. Sci. 9:445-446.
- Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. Jour. Cetacean Res. and Manag. 2:193-208.
- Knowlton, A.R., M.K. Marx, H.M. Pettis, P.K. Hamilton and S.D. Kraus. 2001. Scarification analysis of North Atlantic right whales (*Eubalaena glacialis*): monitoring rates of entanglement interaction. Report to the National Marine Fisheries Service. Available from: New England Aquarium, Central Wharf, Boston, Massachusetts.
- Kraus, S.D. 1990. Rates and potential causes of mortality in North Atlantic right whales (*Eubalaena glacialis*). Mar. Mamal Sci. 6(4):278-291.
- Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet and M. Podesta. 2001. Collisions between ships and whales. Marine Mammal Science. 17(1):35-75.
- Muller. 1776. *Balaena glacialis*. Zool. Danicae prodr. 7 pp.
- National Marine Fisheries Service. 1991. Final Recovery Plan for the Northern Right Whale (*Eubalaena glacialis*). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Office of Protected Resources. 86 pp.
- National Marine Fisheries Service. 2005. Recovery Plan for the North Atlantic Right Whale (*Eubalaena glacialis*). National Marine Fisheries Service, Silver Spring, Maryland.

Waring, G., R. Pace, J. Quintal, C. Fairfield and K. Maze-Foley. 2004. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2003. NOAA Tech. Mem. NMFS-NE-182. 260 pp.

Waring, G., E. Josephson, K. Maze-Foley, and P. Rosel. 2010. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2010. NOAA Tech. Mem. NMFS-NE-219. 606 pp.

Wynne, K. and M. Schwartz. 1999. Marine Mammals and Turtles of the U. S. Atlantic and Gulf of Mexico. Rhode Island Sea Grant. Narragansett, Rhode Island. 114 pp.