

Observation of a Right Whale (*Eubalaena glacialis*) Birth in the Coastal Waters of the Southeast United States

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Abstract

The coastal waters of the southeast United States between Brunswick, Georgia, and Cape Canaveral, Florida, is the only known calving ground for the North Atlantic right whale (*Eubalaena glacialis*). On 1 January 2005, during the New England Aquarium research team's standard aerial survey, a single right whale was observed at the surface 17 nmi east of the northern tip of Talbot Island, Florida. While circling over the whale to obtain photographs for individual identification, observers noticed a red coloration visible in the water around the whale that looked like blood. The water around the whale's belly, side, and flukes was clearly red, but the color was dispersing quickly due to the thrashing behavior of the whale. After 3 min and 37 s of observation, a calf appeared to the side of the adult. The calf had no visible cyanid coverage on the head, body, or flukes. The flukes appeared to be slightly limp and curled under at both tips. The mother lifted the calf to the surface on her back. As the mother rose to the surface, the calf was draped limply over her body. The calf rolled off the mother's back into the water and began to swim next to the mother. The event described here is the first known observation of behaviors that have been interpreted as a birth of a right whale calf.

Key Words: Right whale, *Eubalaena glacialis*, birth, calf, cetacean, reproduction

Introduction

The observation of birth in wild populations of cetaceans is rare and had never been documented in the North Atlantic right whale (*Eubalaena glacialis*). A record of a birth event in this species is especially important because the North Atlantic right whale remains one of the most critically endangered whales in the world. The right whale population was depleted due to commercial exploitation by the middle of the 18th century, and by the early 20th century, this species was near

extinction (Reeves, 2001). Despite international protection since 1935 (Kraus et al., 2005), the right whale population in the western North Atlantic currently is less than 350 individuals (Kraus & Hatch, 2001). Since 1980, the population growth rate has declined (Fujiwara & Caswell, 2001), and high mortality rates are attributed to fishing gear entanglement and vessel collisions (Knowlton & Kraus, 2001).

An examination of historical whaling records in the 1980s by Reeves & Mitchell (1986) indicated that right whales were hunted off the coast of Georgia. Based on this information, an aerial survey was conducted in the southeast United States in 1984 during which time right whale mother/calf pairs were observed (Kraus et al., 1986b; Brown et al., 2007). Beginning in 1994, daily aerial surveys were flown December through March as part of the Early Warning System (EWS) to reduce the risk of ship strikes on right whales. In addition, the EWS surveys monitor right whale distribution and calf production (Knowlton et al., 1994; Knowlton & Kraus, 2001; Brown et al., 2007) in the coastal waters between Brunswick, Georgia, and Cape Canaveral, Florida.

Despite hundreds of hours of survey effort each calving season, an actual birthing has never been documented. Although female right whales are seen with their calves in the southeast U.S., little is known about the actual birthing event. Here we report on an observation of a birth of a North Atlantic right whale in the coastal waters of the southeast U.S.

Materials and Methods

Surveys were flown daily from 1 December 2004 through 31 March 2005. Transects were conducted in the area from the southern end of Cumberland Island, Georgia, approximately 12 km north of the St. Mary's River entrance, to Jacksonville, Florida, approximately 12 km south of the St. John's River entrance from the shoreline to 54.8 to 63.9 km offshore. Twelve east/west transects were flown perpendicular to the coast at 5.5-km intervals with

a western limit of 0.9 km off the shoreline. A total of 761 km of on-transect effort, 5 to 7 h depending on number of whale sightings, were flown during each completed survey.

Necessary conditions for all flights included a minimum ceiling of 305 m, visibility greater than 5.5 km, and winds less than 17 kts. Surveys were conducted in a twin engine Cessna 337 Skymaster at an altitude of 305 m and an average speed of 160 km/h.

The survey team consisted of a pilot in command (PIC), pilot second in command (SIC), and two observers positioned on each side of the aircraft in the rear seats. The observers scanned the water surface out to at least 3.7 km. To maintain standardized sighting effort, the PIC and SIC were instructed not to alert the observers to any sightings but were allowed to report a sighting after it had been passed by the aircraft if missed by the observers. The distance of each right whale sighting from the flight track was measured using GPS positions of the sighting and the transect line.

When sightings of right whales occurred, the aircraft left the transect line at a right angle to the sighting and flew directly over the whale(s) to obtain an exact GPS location of the whale(s). The aircraft then circled the whale(s), allowing observers to obtain photographs for individual identification of each whale sighted. High-resolution digital images were obtained at an altitude of 305 m using a digital Nikon D1X camera with a fixed Nikkor 400-mm lens. At the conclusion of photographic work on each sighting, the aircraft returned to the transect line at the point of departure.

Results

On 1 January 2005, a standard EWS aerial survey was conducted in light rain but otherwise acceptable sighting conditions: a Beaufort sea state of 2, visibility greater than 9 km, and cloud cover greater than 90%. However, high turbidity made subsurface sighting conditions extremely poor. At 1443 h, a lone adult right whale was observed 31 km east of the northern tip of Little Talbot Island, Florida. Following standard protocol for right whale surveys, the aircraft broke away from the survey transect and flew directly to the whale (30° 29.6' N, 081° 08.1' W). The water around the whale was red with the appearance of blood. The whale's behavior at the time was best described as "thrashing" on the surface. *Thrashing* is defined here as the rapid and repetitive flexion and extension of the peduncle and flukes under, at, and above the surface of the water while the whale was rolled onto one side. The white water generated by the whale's movements made assessment more difficult. The whale's thrashing behavior persisted

for over 3 min after the initial observation, but the whale remained in the same general location. At first it was thought that the whale was injured, yet there were no visible signs of a wound.

Digital photographs were obtained of the whale and surrounding water. Although the water along the whale's belly and flukes was clearly red, the discoloration dispersed quickly due to the whale's movements, reappearing after each surfacing (Figures 1 & 2). After 3 min and 37 s, the whale surfaced without thrashing, and a small calf was observed at her side. With the next surfacing, the calf was lifted and ended up draped limply across the mother's back (Figure 3). The light gray calf rolled off the mother and back into the water (Figure 4) and began to swim alongside. The calf's head was smooth, and there were no erupted callosities or cyamid coverage on the head, body, or flukes. The only visible fetal folds were on the calf's flukes, which were limp and curled under at both tips.

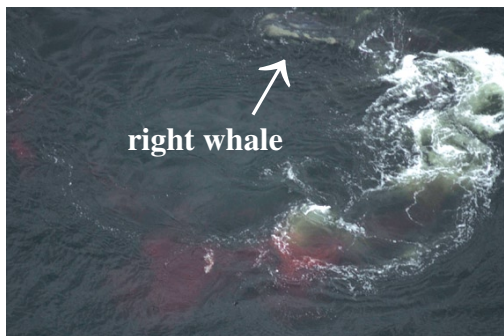


Figure 1. Blood was observed shortly after the survey team's arrival on site.



Figure 2. The right whale was documented thrashing at the surface; blood is apparent in the surrounding water.

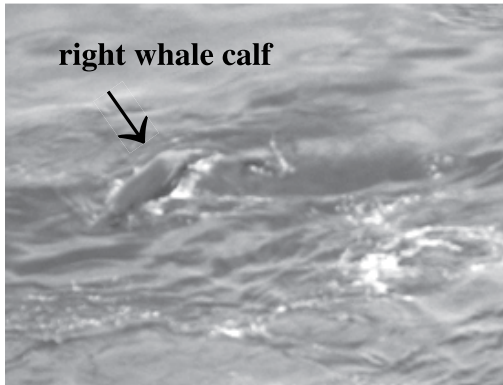


Figure 3. The right whale calf is draped limply across the mother's back.

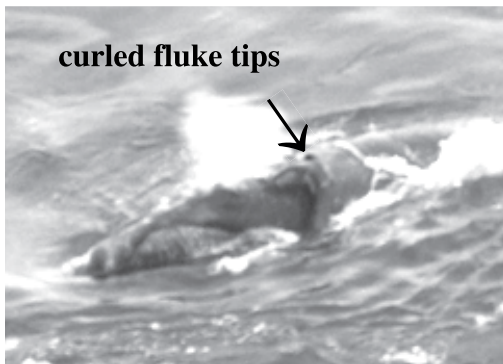


Figure 4. The right whale calf rolled off the mother and back into the water.

Discussion

Birthing events of cetaceans in the wild are uncommon but have been documented in both mysticetes and odontocetes. Common in these observations is the lifting, pushing, or nudging of the newborn calf near the surface of the water just after birth by the mother or other associated adults. This behavior has been described in a sperm whale (*Physeter catodon*) off Sri Lanka (Weilgart & Whitehead, 1986), beluga whale (*Delphinapterus leucas*) in the St. Lawrence estuary (Beland et al., 1990), resident killer whale (*Orcinus orca*) in British Columbia (Stacy & Baird, 1997), false killer whale (*Pseudorca crassidens*) off Morocco (Notarbartolo di Sciarra et al., 1997), and humpback whale (*Megaptera novaeangliae*) off Hawaii (Silvers et al., 1997). Also common in past observations is the physical appearance of the calf's flukes. Limp flukes have been described in the 1986 beluga whale observation (Beland et al., 1990). In addition, flukes curled at both tips have been described in the 1983 sperm whale

observation (Weilgart & Whitehead, 1986) and in the 1994 humpback whale observation (Silvers et al., 1997).

The adult whale observed was individually identified from the photographs obtained by using methods described by Kraus et al. (1986a) and Hamilton & Martin (1999) as right whale catalog #1632, a reproductively active female of unknown age.

Digital photographs from subsequent surveys documented the calf as having a small amount of orange cyamid coverage on the flukes 4 d after the birthing event and extensive cyamid coverage on the flukes and the lip ridges of the mouth 6 d after the event. Increasing cyamid coverage of a newborn right whale is typical (H. Pettis, pers. comm., October 2005). As a southern right whale (*Eubalaena australis*) calf grows, the patches of orange cyamids (*Cyamus erraticus*) disappear, and white cyamids (*Cyamus ovalis*) colonize the callosities (Rowntree, 1996). Additionally, the mother and her calf were sighted throughout the winter season and again in August 2005 on summer feeding and nursery grounds in the Bay of Fundy.

Observation lasted 20 min, but less than 4 min elapsed between the initial sighting of the lone adult and the appearance of the calf. When last seen during this event, the two whales were side by side, the calf within a half body length of the mother and both at the surface with frequent body contact and rolling. Several times the mother and calf surfaced with the calf positioned near the flukes of the mother, but there was no way to determine if the calf was actually suckling; observation of any subsurface behavior was hampered by poor water clarity. No confirmable afterbirth or placental material was visible from the aircraft, although photographs do show something that could represent a solid mass at the surface nearby. Although subsequent analysis of the photographs showed no evidence of the actual parturition event, the mother's behavior, the red discoloration in the water, and the calf's physical appearance led us to conclude that we had observed the birth of a right whale.

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Literature Cited

- Beland, P., Faucher, A., & Corbeil, P. (1990). Observations on the birth of a beluga whale (*Delphinapterus leucas*) in the St. Lawrence Estuary, Quebec, Canada. *Canadian Journal of Zoology*, 68, 1327-1329.
- Brown, M. W., Kraus, S. D., Slay, C. K., & Garrison, L. P. (2007). Surveying for discovery, science, and management. In S. D. Kraus & R. M. Rolland (Eds.), *The urban whale: North Atlantic right whales at the crossroads* (pp. 105-137). Cambridge, MA: Harvard University Press. 543 pp.
- Fujiwara, M., & Caswell, H. (2001). Demography of the endangered North Atlantic right whale. *Nature*, 414, 537-541.
- Hamilton, P. K., & Martin, S. M. (1999). *A catalog of identified right whales from the western North Atlantic: 1935-1997*. Boston: New England Aquarium.
- Knowlton, A. R., & Kraus, S. D. (2001). Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. In P. B. Best, J. L. Bannister, R. J. Brownell, Jr., & G. P. Donovan (Eds.), *Right whales: Worldwide status* (pp. 193-208). Cambridge, UK: International Whaling Commission. 309 pp.
- Knowlton, A. R., Kraus, S. D., & Kenney, R. D. (1994). Reproduction in North Atlantic right whales (*Eubalaena glacialis*). *Canadian Journal of Zoology*, 72, 1297-1305.
- Kraus, S. D., & Hatch, J. J. (2001). Mating strategies in the North Atlantic right whale (*Eubalaena glacialis*) [Special issue]. *Journal of Cetacean Research and Management*, 2, 237-244.
- Kraus, S. D., Prescott, J. H., Knowlton, A. R., & Stone, G. S. (1986b). Migration and calving of right whales (*Eubalaena glacialis*) in the western North Atlantic. In R. L. Brownell, Jr., P. B. Best, & J. H. Prescott (Eds.), *Right whales: Past and present status* (pp. 139-144). Cambridge, UK: International Whaling Commission. 289 pp.
- Kraus, S. D., Brown, M. W., Caswell, H., Clark, C. W., Fujiwara, M., Hamilton, P. K., et al. (2005). North Atlantic right whales in crisis. *Science*, 309, 561-562.
- Kraus, S. D., Moore, K. E., Price, C. E., Crone, M. J., Watkins, W. A., Winn, H. E., et al. (1986a). The use of photographs to identify individual North Atlantic right whales (*Eubalaena glacialis*). In R. L. Brownell, Jr., P. B. Best, & J. H. Prescott (Eds.), *Right whales: Past and present status* (pp. 145-151). Cambridge, UK: International Whaling Commission. 289 pp.
- Notarbartolo di Sciarra, G., Barbaccia, G., & Azzellino, A. (1997). Birth at sea of a false killer whale, *Pseudorca crassidens*. *Marine Mammal Science*, 13(3), 508-511.
- Reeves, R. R. (2001). Overview of catch history, historic abundance and distribution of right whales in the western North Atlantic and in Cintra Bay, West Africa [Special issue]. *Journal of Cetacean Research and Management*, 2, 231.
- Reeves, R. R., & Mitchell, E. D. (1986). American pelagic whaling for right whales in the North Atlantic. In R. L. Brownell, Jr., P. B. Best, & J. H. Prescott (Eds.), *Right whales: Past and present status* (pp. 221-254). Cambridge, UK: International Whaling Commission. 289 pp.
- Rowntree, V. J. (1996). Feeding, distribution, and reproductive behavior of cyamids (Crustacea: Amphipoda) living on humpback and right whales. *Canadian Journal of Zoology*, 74, 103-109.
- Silvers, L. E., Atkinson, S., Iwasa, M., Combelles, C., & Salden, D. R. (1997). A large placenta encountered in the Hawaiian winter grounds of the humpback whale, *Megaptera novaeangliae*. *Marine Mammal Science*, 13(4), 711-716.
- Stacy, P. J., & Baird, R. W. (1997). Birth of a "resident" killer whale off Victoria, British Columbia, Canada. *Marine Mammal Science*, 13(3), 504-508.
- Weilgart, L. S., & Whitehead, H. (1986). Observations of a sperm whale (*Physeter catodon*) birth. *Journal of Mammalogy*, 67(2), 399-401.