New England Aquarium

Protecting the blue planet

Right Whale

RESEARCH NEWS

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In this newsletter all photographs of right whales in U.S. waters were taken under NMFS/NOAA permit under the authority of the Marine Mammal Protection Act and the U.S. Endangered Species Act.

Right Whale Research News is produced and published by the New England Aquarium. We welcome your comments and suggestions!

Read more about a particular aspect of our project at www.neaq.org.

Photo: Y. Guilbault/NEAq

Right Whales and 9/11

Marilyn Marx

Aquarium senior scientist Dr. Roz Rolland and her colleagues have just published their findings from a unique and serendipitous study from the days following the terrorist attacks on September 11, 2001, when nearly all ship and air traffic throughout North America had come to a halt. It shows a link between underwater noise and stress in right whales.

In the summer of 2001, Dr. Susan Parks of Penn State University was recording right whale vocalizations to study their social behavior. At the same time Dr. Rolland was conducting a research project readers of *RWRN* may be familiar with: the collection of right whale fecal samples for studies of their reproduction and health (See *The Scoop on Poop* in *RWRN Nov. 2005*). The fecal samples contain hormones that are good indicators of stress levels and there were several samples from days just before and after 9/11. When Dr. Rolland heard that Dr. Parks had underwater sound recordings for two days before and after 9/11, they decided to compare their findings. Analysis of the post-9/11 acoustic recordings showed a significant decrease in the low-frequency underwater noise in the Bay, as well as a drop in the intensity of the noise, due to the dramatic decrease in ship traffic. The reduced noise coincided with decreased stress hormone levels in the fecal samples collected after 9/11. Dr. Rolland compared the stress hormone data from the 2001 season to the following four years and only those samples collected in the quiet days after 9/11 had lower stress levels. In a nutshell, right whales are living in a noisy, urban environment that appears to be resulting in chronically higher stress levels, which may, in turn, be having an impact on right whale health and reproduction.

The paper, "Evidence that ship noise increases stress in right whales," was published in February in the British journal *Proceedings of the Royal Society B*.

Phoenix with her month-old calf resting near her fluke, off Georgia in February 2012. Photo: Sea to Shore Alliance, NOAA permit #15488

Sponsored Whale Update

Marianna Hagbloom

The Right Whale Research Team would like to extend our thanks to all who sponsor a right whale! Your contributions help to support our research. In this issue, we have updates on four of our whales:

Piper (Catalog #2320) was sighted in Jordan Basin by the Aquarium team on December 13, 2011 (see *Mating Ground Update*). She was swimming alone, but since she is a reproductive female and this area is a potential right whale mating ground, we might be seeing her with a calf next year! **Piper** was also sighted on March 20, 2012, by the Provincetown Center for Coastal Studies (PCCS), swimming alone just north of Cape Cod.

Phoenix (Catalog #1705) was seen many times in the southeast beginning with a sighting by Florida Fish and Wildlife Conservation Commission (FWC) on December 29, 2011. She was in the area for a good reason: to give birth to her fourth calf! The Sea to Shore Alliance aerial survey team was the first to document **Phoenix** with her newborn calf off the Georgia coast on January 17, 2012. She and her calf were sighted several more times on the calving ground by those survey teams as well as the Georgia Department of Natural Resources and the Syracuse University /Northeast Fisheries Science Center team.

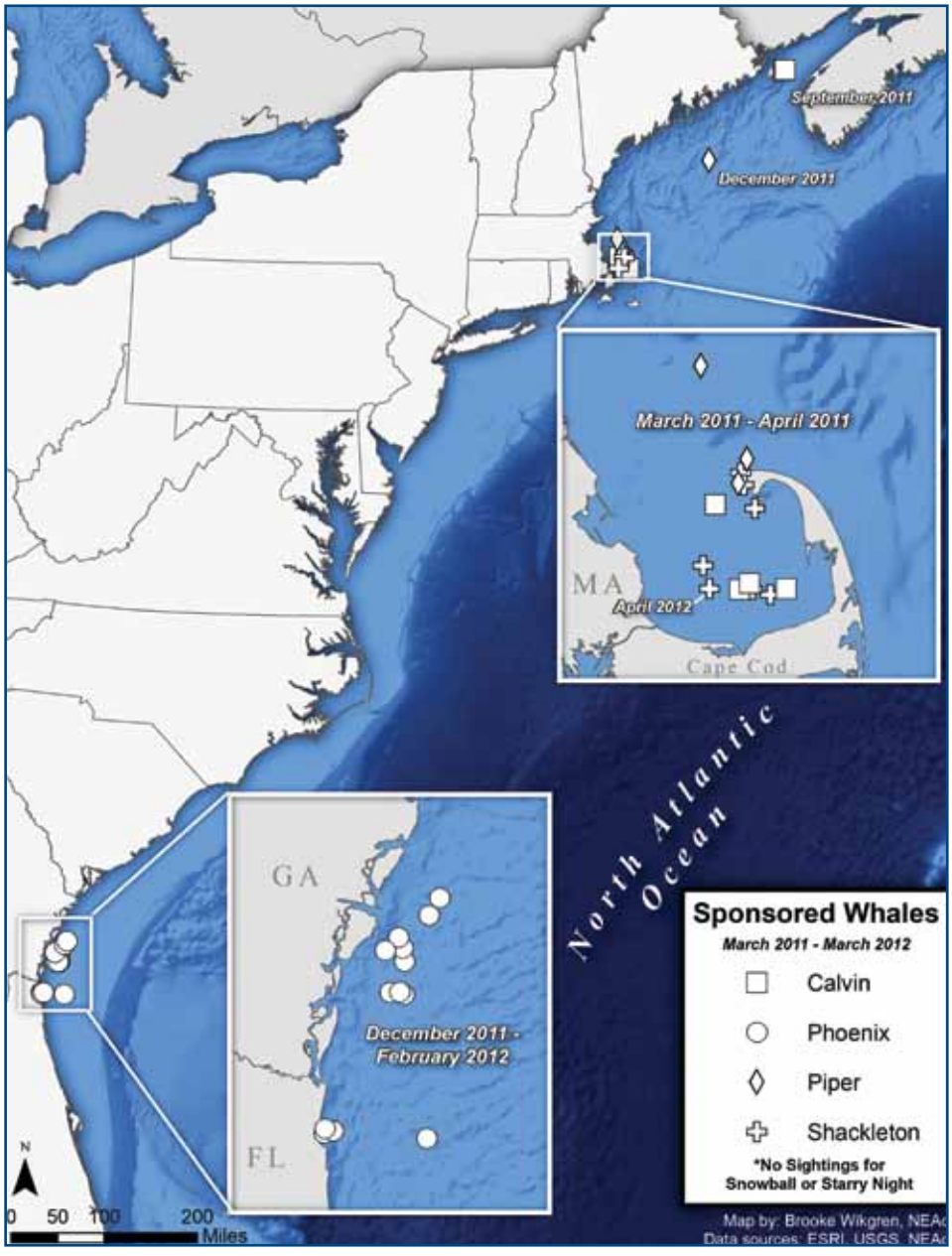
Calvin (Catalog #2223) was the focal female in a Surface Active Group with six other right whales in the waters off southern New England in March. She then made her way to the Stellwagen Bank National Marine Sanctuary, where she was seen by PCCS this April.

Shackleton (Catalog #2440) was sighted by PCCS on April 13, 2012, skim feeding alone in Cape Cod Bay. He was also recently confirmed in a Cape Cod Bay sighting from last April in which he was skim feeding with another right whale.

Unfortunately, we currently don't have updates for **Snowball (Catalog #1131)** or

Starry Night (Catalog #1028), but because we are continually analyzing photographs there may be a sighting or two that we haven't come across yet. Stay tuned for the next update, when we will have returned from our Bay of Fundy field season with (fingers crossed!) sightings for all the sponsored whales!

Piper raises her distinctively scarred fluke as she dives in December 2011.
Photo: Moira Brown/NEAq



Sponsored whale sightings March 2011 through April 2012. The 2012 sightings of **Calvin** are not shown.

Entanglement Study

Amy Knowlton

We know right whales frequently get entangled in fishing gear (82.9 percent of the population bears entanglement scars), but the annual percentage of animals observed with rope on the body has increased significantly over time, suggesting that it is becoming more difficult for the whales to free themselves completely from fishing gear. We wanted to examine whether the breaking strength of the ropes themselves could be the reason for this increase. We collaborated with the Provincetown Center for Coastal Studies in a review of the breaking strength and diameter of rope removed from entangled North Atlantic right whales and compared that information with the age of the whale from which the gear was taken and also the severity of any wounds inflicted by that gear. The study found that right whales get entangled in a wide range of diameter and breaking strength ropes and that many of these entanglements can lead to slow decline and death.

However, the most interesting finding was that age was a very

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First entangled as a 1-year-old, **Kingfisher (Catalog #3346)** remains entangled eight years later. Fishing rope is wrapped around his right flipper and a large open wound is visible. Chronic flipper entanglements have proven to be fatal for numerous right whales.
Photo: Tim Cole/NEFSC, NOAA permit #775-1875

Entanglement Study

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important factor in the ropes found on right whales. The data showed that adults were only found entangled in ropes with higher breaking strengths, but calves to 2-year-olds were only found in ropes with lower breaking strength ropes. These data suggest that adults are able to escape easily from ropes with lower breaking strengths, thus eluding complex entanglements, but they find it much more difficult-to break free from the stronger ropes. But younger animals are less able to break free from ropes with lower breaking strengths and are caught in complex entanglements. This suggests that if a young animal gets entangled in a rope with a higher breaking strength it may be unable to break free or even surface, resulting in its death. These findings have important implications for efforts aimed at reducing right whale fatalities from entanglements.

Catalog #3911, a two year old female, bearing a complex entanglement, with fishing gear through her mouth and tightly bound around her flippers. Despite extensive disentanglement efforts, she did not survive. Photo: FWC, NOAA Permit #594-1759

An Unusual Season on the Calving Ground

Philip Hamilton

After she lost her calf this year, **Half Note (Catalog #1301)** (top) was seen off Amelia Island, Fla., with an old friend, **Catalog #1158**. Although long-term associations are very rare in right whales, this pair had been seen together for several months at a time in past years. Photo: FWC, NOAA Permit #15488

Each year, some right whales migrate south to the coastal waters of the southeastern U.S. Some go there to calve, but over the last few years, there have been increasing numbers of juvenile and adult male whales as well. The New England Aquarium is contracted by the National Marine Fisheries Service to provide near real-time right whale identification support for the many teams surveying right whales in this region. In recent years, matching has been a challenging job, with over 200 whales seen in some years. But this year was much quieter in the southeast. We have confirmed just six mother/calf pairs and 61 other right whales. The right whale population has shown remarkable fluctuations in calving over the 32 years we have been monitoring them, with a high of 39 calves seen in 2009 and a low of just one calf seen in 2000. We hope that the 2012 results will be just a one-year dip in calving rather than the start of a sustained period of reduced reproduction. Another unusual aspect this year was that no whales new to the calving ground were discovered after February 1. (Typically a few new mother/calf pairs, and some other whales, arrive in the area during February and March.)

Sadly, one of the six known mothers has already lost her calf. This whale, known as **Half Note** (**Catalog #1301**), gave birth to her fifth calf this last December, but the calf had died by January 24th. When last seen, the calf looked quite thin, suggesting that something was hindering its ability to nurse. This mom has had a history of reproductive trouble; she has lost two calves on the calving ground in previous years. The cause of this reproductive distress is unknown.

Interestingly, after she lost her calf this year, **Half Note** started associating with an old friend: **Catalog #1158**, an adult female with a sparse reproductive history. This pair was seen together for eight months in 1997-1998 and for seven months in 2000-2001. In both cases, they were first seen together off the southeastern U.S. in years when **Half Note** could have given birth (but this was never witnessed) and they then migrated north to the feeding grounds off of Massachusetts. Such long-term associations are very rare in right whales (other than mothers with their calves for 12 to 18 months) and make us wonder more about what role relationships play in the right whale community. Will these two be seen together off of Massachusetts this spring? Will any more calves be discovered on the feeding grounds? We will report back in our fall newsletter.

Predators Target Young and Injured Right Whales

Jessica Taylor

The curved impression on her right side is evidence that Sharkbait survived a shark attack. She was one lucky calf! Photo: Zach Swaim/GDNR,NOAA permit #655-1652

Entanglements and collisions with vessels are the major causes of mortality in right whales, but what about the whales that are affected by these pressures and survive? What about newborn whales that aren't as strong as fully grown adults? These individuals are weak and more vulnerable to other threats than healthy members of the population. And in a just-published paper in the journal *Marine Mammal Science*—"Shark Predation on North Atlantic Right Whales (*Eubalaena glacialis*) in the Southeastern United States Calving Ground", Taylor et al. (2012)—we present evidence from the calving grounds that these weak animals are targets of shark predation.

In the paper we describe four cases of pre-mortem predation by sharks on right whales: three resulting in death and one live calf bearing bite marks on his right flank. During necropsies of the three dead whales it was important to distinguish predation (attacking a live whale) from scavenging (eating a whale carcass) because it is known that sharks will opportunistically scavenge whale carcasses to supplement their diet. But it was determined that the whales were alive at time of attack.

Two of the four cases of shark predation occurred in 2009, the year that produced the highest number of calves on record since studies began in 1980. Could it be that more calving events in that year attracted attention from predators? There have been two witnessed birthing events from aerial teams in the southeast (See *Observations of a Right Whale Birth* in *RWRN, May 2008* and *Naval Training Range…* in *RWRN, May 2010*) and they both documented large volumes of blood during parturition. All three calves that were victims of predation were estimated to be less than 15 days old at time of attack, with one possibly younger than 5 days. This whale is now 3 years old and recently received the not-so-heroic name **Sharkbait (Catalog# 3945)** but he certainly started off life courageously.

Two of the fatal cases also involved entanglements: One was a 2-year-old sighted severely entangled a month prior to death, and the other was a calf documented with net entanglement wounds, as well as shark bites on her peduncle. For a species where nearly 83 percent are affected by unique entanglements, could this encourage predators to take advantage of easy prey, where the relative energy expenditure to attack is less?

The vulnerability of newborn and injured whales, together with overlapping migration routes of right whales and white sharks, appears to have presented an opportunity for active predation.

The vulnerability of newborn and injured whales, together with overlapping migration routes of right whales and white sharks, appears to have presented an opportunity for active predation. Although shark predation may not pose a threat to healthy juveniles and adults, with high calving events in certain years, and more whales showing signs of severe entanglement injuries, it may be contributing to mortality—yet another example of the complexity of pressures acting on this fragile population.

A white shark scavenges on the belly-up carcass of a right whale (Catalog #2143) in January 2005. Photo: Jessica Taylor/NEAq, NOAA permit #655-1652-01.

Mating Ground Update

Philip Hamilton

As some of our faithful readers will remember, in November 2010 we made our first shipboard survey out to the suspected right whale mating ground near Jordan Basin in the central Gulf of Maine. The winter is a challenging time to do vessel-based research in the northeast, with cold temperatures and weather fronts that line up and quickly push through like eager Christmas shoppers at the checkout line. Even with these challenges, we were able to do three of our four planned trips to the area (see *Quest for the Right Whale…* in *RWRN May 2011)*.The fourth trip was put on hold until the following year, and on December 13, 2011, we finally got the weather window we needed to head offshore. We departed from Southwest Harbor, Maine, at 4:30 a.m. The seas were a bit lumpy as we headed out in the dark aboard the *M/V Friendship V*, but thankfully calmed down for the middle part of the day. We were fortunate to have a host of volunteers onboard to help with the spotting. They included fellow researchers, college students, colleagues from local agencies and two Maine lobstermen who had never before seen a right whale.

Now the really exciting news: Almost all the whales we saw that day were reproductive adults! All seven females had given birth before and were capable of getting pregnant in December (they had rested at least a year since they weaned their last calf), and most of the males had long sighting histories (some dating back to the early 1980s or before) and had sired calves previously (based on DNA paternity studies by geneticists at Trent and Saint Mary's universities in Canada). In most habitats, we see a mix of juveniles and adults, and because juveniles make up more than a third of the population, we expect to see quite a few young animals in most areas. The fact that we saw almost none during the Jordan Basin survey suggests that the area is important only to adults; sounds like a mating ground to me! We hope to see some (or all) of those seven females with calves next year to further support the hypothesis. Stay tuned!

Columbine (Catalog #1408) one of several adult females sighted in Jordan Basin in December. The last of her 4 calves was born in 2008.
Photo: Monica Zani /NEAq, NOAA Permit #14233

The captain, crew, whale researchers and volunteer observers aboard the *Friendship V* after the successful survey to Jordan Basin in December. Photo: Canadian Whale Institute.

Update on Injury, Entanglement and Mortality

Heather Pettis

To keep tabs on how right whales are doing, we keep track not only of the number of calves born in a given year but also the number of mortalities, injuries and entanglements that have been detected. What a grand thing it would be if this article was not necessary to include in each newsletter! However, that is not the case this time around; we unfortunately have had all three types of cases since our last update (See *Update on Injury…* in *RWRN Dec 2011*). The following is a brief summary of the right whale injuries, entanglements and mortalities documented since December 2011, as well as updates on previously entangled and injured whales.

Mortalities

- **2012 Calf of 1301:** In December 2011 **Half Note (Catalog #1301)** was first seen with a newborn calf. The pair was photographed together again on January 10, 2012, but on January 24, **Half Note** was sighted without her calf. In the following weeks **Half Note** was seen alone multiple times indicating that the calf had died. Although the cause of death is unknown, the calf appeared emaciated at its last sighting on January 10. It is interesting to note that of the five calves born to **Half Note**, only one has survived. (See *An Unusual Season…*)
- **Unknown ID:** On March 2, 2012, a dead right whale was observed floating approximately 70 miles east of Cape Ann, Mass. After a successful relocation effort, scientists were able to obtain at-sea samples and photographs that will hopefully allow us to identify the whale. Sea conditions precluded the whale being towed to shore for a full necropsy.

Injuries

- **2011 Calf of 2746:** This 1-year-old whale was sighted in January off of the coast of Florida with new propeller wounds on the left side of its body. It had been injured sometime in the four months since its previous sighting, in August 2011 in the Bay of Fundy. We hope that the wounds heal quickly and don't result in future infections.
- **Catalog #1331** (adult male): Documented in late November 2011 with a series of new propeller wounds on his right side. The wounds do not appear to be very deep and are likely not life threatening.

Previously Injured Whales

- **Gannett (Catalog #2660,** 16-year-old female) and her calf (**2011 calf of 2660**): As previously reported, **Gannett** and her calf of the year were seen separated in July (calf alone) and September (**Gannet** alone) and both had extensive and severe new entanglement wounds. Neither whale has been seen since. Right whale mother and calf pairs typically remain together through the summer season so it was very disconcerting that **Gannett's** calf was alone so early. Whether the calf was able to survive without its mother and whether either survived the severe entanglement wounds remains to be seen.

Entanglements

- **Catalog #1719** (adult female): Documented in January off the coast of Georgia with fishing line caught in her mouth. She was resighted a few days later off of the coast of South Carolina and remains entangled.
- **Catalog #3821** (4-year-old, unknown sex): This whale is no stranger to entanglements as it was previously entangled and subsequently disentangled in 2009. Its most recent entanglement was documented in Cape Cod Bay in January. The whale had both netting and line wrapped around its body. The Disentanglement Team from the Provincetown Center for Coastal Studies (PCCS) was able to make some cuts to the line, but the whale remains entangled.
- **M040** (temporary ID code): Documented in Cape Cod Bay in February with line and webbing wrapped around body. This entanglement is considered life-threatening but disentanglement attempts were unsuccessful.

Previously Entangled Whales

- **Kingfisher** (**Catalog #3346**, 9-year-old male): First documented with an entanglement in 2004, he continues to be the longest persistent right whale entanglement case. **Kingfisher** was seen in January in Cape Cod Bay and the Gulf of Maine and is still carrying gear on his right flipper.
- **Catalog #3123** (11-year-old female): First documented entangled in April 2011, this whale was sighted in March 2012 near Cape Cod and is confirmed to be gear free.
- **Catalog #3111** (11-year-old male): First documented with a flipper entanglement in the Bay of Fundy in September 2011. A disentanglement response was made by the Campobello Whale Rescue Team but it was unclear whether or not the whale was fully disentangled. He was resighted by PCCS in late March 2012 near Cape Cod and while no gear was visible, his left flipper was not clearly seen and so its entanglement status remains unknown.

To learn more about disentanglement efforts for right whales and other large whales, visit the website of our colleagues at the Provincetown Center for Coastal Studies, who are the pioneers in disentanglement techniques. Together with their network partners they have saved many whales from a slow and painful death.

http://www.coastalstudies.org/what-we-do/whale-rescue/update_disentanglement.htm/

Gannet (Catalog #2660), with severe scarring around her flukes, dives in the Bay of Fundy in September 2011. Gannet and her calf of the year were both sighted alone with extensive new entanglement scars. Neither whale has been seen since. Photo: Tracy Montgomery/NEAq.

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The Biennial Marine Mammal Conference

In November 2011, the 19th Biennial Conference on the Biology of Marine Mammals was held in Tampa, Florida. These biennial conferences are attended by over 2,000 marine mammal researchers from around the world and are a valuable forum for sharing research findings, reviewing emerging issues facing marine mammal populations, attending workshops on focused topics and meeting face to face with international colleagues.

For this Biennial Conference, four of our team members attended the meeting and two gave oral presentations. Senior Scientist Roz Rolland presented a paper entitled "Evidence that ship noise causes chronic stress in right whales" (for more on this paper see *Right Whales and 9/11*). And Research Scientist Amy Knowlton presented "Breaking strength and diameter of rope taken off entangled North Atlantic right whales in relation to wound severity and age" (see *Entanglement Study*).

The next Biennial will be held in Dunedin, New Zealand, in December 2013.

Thank you!

We would like to thank all the individuals, organizations and schools that continue to support our research with annual sponsorships and donations. In these difficult economic times, with federal research budgets shrinking, your support is more critical than ever before and we truly appreciate your generosity. Sponsorship funds are used by the New England Aquarium Right Whale Program to support activities that directly contribute to the conservation of North Atlantic right whales.

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