



New England
Aquarium

Protecting the blue planet

Right Whale

RESEARCH NEWS

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In this issue:

Dynamics of Large Whale
Entanglements

Who's Who on the Calving Ground

Quest for the Right Whale
Mating Ground

In Memoriam: Lindy Johnson

Update on Right Whale Mortality,
Injury and Entanglement

Slash

Operator Reponse to New Vessel
Restrictions and Routing

Sponsored Whale Update

Can Right Whales See Fishing Gear?

New Additions

Editor

Marilyn Marx

Contributors

| | |
|-------------------|----------------|
| Moira Brown | Scott Kraus |
| Marianna Hagbloom | Kerry Lagueux |
| Philip Hamilton | Marilyn Marx |
| Kathleen Hunt | Heather Pettis |
| Amy Knowlton | Tim Werner |

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.



Editor's Note:

Dear Right Whale Sponsors,

We have a few announcements to make! First, as you can see, *Right Whale Research News (RWRN)* is now in color! The main reason for this is to highlight the beautiful color images we include in every issue. In addition we have made a few changes to the format of some of the articles by condensing and streamlining information. Please let us know what you think. We will no longer include the "Whales You Can Sponsor" page and order form, but if you would like to sponsor another whale for yourself or a friend, there are still several ways to do that. You can request a full-color sponsorship brochure by calling 617-973-6582 or sending an email to rwhale@neaq.org, or you can order online at www.neaq.org/whaleadoption.

If you love getting *RWRN* and want to continue to receive this twice yearly newsletter, you now have the option to renew your subscription for \$20 per year. You will be able to keep apprised of our efforts to study and protect North Atlantic right whales.

Finally, if you would prefer to have your *RWRN* come electronically via email rather than sent through the mail, then please send an email to rwhale@neaq.org.

—Marilyn Marx



The peduncle and fluke of Couplet (Catalog #2123) bear the white scars from an entanglement interaction. At least 82% of North Atlantic right whales have entanglement scars.

Photo: M. Marx/NEAq

Dynamics of Large Whale Entanglements

Amy Knowlton and Tim Werner

Unfortunately, right whales get entangled a lot. Our study of scarring on all cataloged right whales now shows that at least 82% of the population bears the scars or carries gear from entanglement. Most animals have suffered multiple entanglement interactions—960 events in 601 right whales have been documented from 1980 to 2008. Some of the scars are minor, suggesting they just brushed up against the rope, but all too many of these events become either complex entanglements or result in serious wounds that can lead to sub-lethal impacts from stress or infection.

Very few of the interactions between whales and fishing gear are witnessed, so how do we mitigate a problem that we

Continued on page 2

Dynamics of Large Whale Entanglements

Continued from page 1

know so little about? The Consortium for Wildlife Bycatch, housed here at the New England Aquarium, decided to look at the evidence that *is* available: the rope removed during disentanglement or from carcasses. In February 2011, we hosted a three-day workshop with fishermen, rope engineers, whale researchers, disentanglement experts and federal and state government managers, to try to “reverse engineer” the process by which these animals may have become entangled in the gear. We provided 40 case studies (18 right whales and 22 humpback whales), which included a drawing showing how the rope was entangling the whale, life history information about the individual, parameters about the rope (diameter and breaking strength based on testing done by a rope engineer), and a suite of images of the animal and gear. The fishermen shared their insights about what type of fishing gear the rope might be from, and the scientists were able to analyze the data from the whale perspective to see what might be learned. Taking all 40 case studies into account, we discovered that commercial fishing ropes of all diameters and breaking strengths led to severe injury. Younger right whales were observed entangled in ropes of lower breaking strengths whereas the ropes that entangled adults were of higher breaking strengths. This preliminary finding may be very useful when focusing on ways to reduce or eliminate entanglement interaction.

This workshop is only the beginning of a very important dialog between fishermen and scientists. By joining forces to first understand as much as we can about these unfortunate and often life-threatening entanglement events, we may find ways to keep them from happening while still allowing fishermen to fish.



Giza (Catalog #3020) and her calf in the waters off northern Georgia in March.

Photo: Wildlife Trust, NOAA permit #594-1759.

Who's Who on the Calving Ground

Philip Hamilton

Although the New England Aquarium team did not fly aerial surveys on the calving ground this winter for the first time in 26 years (See *Twenty-six years of surveys...* in *RWRN Vol.19(2) Dec. 2010*), we were contracted to help identify the whales seen there and to perform rapid health assessments of some whales. The near-real-time matching helps identify females that are due to give birth, whales that need to be biopsy darted for a genetics sample and entangled whales to determine when they were last seen gear free. The survey teams—Florida Fish and Wildlife Commission (FWC), EcoHealth Alliance, Georgia Department of Natural Resources (GDNR), Northeast Fisheries Science Center (NEFSC), Associated Scientists, Marine Resource Council and Marineland Florida—all have experienced matchers, so often our job is to confirm the matches they make in the field. However, many of the younger animals are difficult to identify because their callosities often change during the first year and many are not yet in the North Atlantic Right Whale Catalog.

The surveys have just finished up for all areas and the grand total is 140

individuals seen, plus 20 newborn calves of the year. Four of the moms were with their first calves and the other 16 had given birth to a combined 36 calves previously. A number of adult males were also in the area, including 10 males over 20 years of age and one probable male that is more than 46 years old! The latter whale, **Catalog #1036**, had never been seen in the South previously. About half of the whales were young (under 5), continuing a recent trend of many juveniles returning to the calving grounds. Sadly, many whales were seen on the calving ground this year with wounds from human impacts (See *Update on Right Whale...*). Teams from FWC, GDNR and NEFSC did a great job collecting genetics samples—including samples from 13 calves, two mothers that never come to the Bay of Fundy (where much of the genetic sampling takes place), and four others. It is heartening to see so many right whales on the calving ground, and we hope that they all make it safely back to their northern feeding grounds.

Quest for the Right Whale Mating Ground

Moira Brown

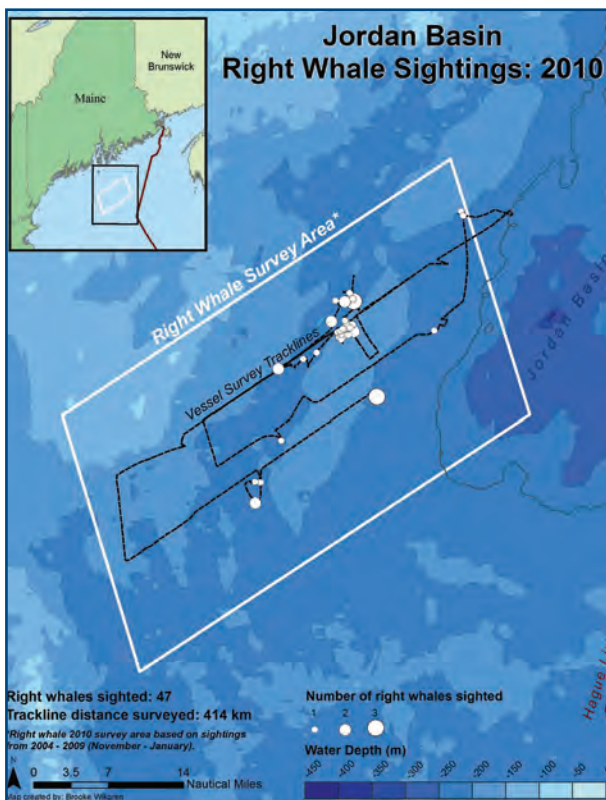
In our last newsletter we described a new joint international research program for a vessel survey effort in the central Gulf of Maine that would look for right whales during November and December 2010 (See *Quest for the Mating Ground...* in *RWRN Vol.19 (2) Dec. 2010*). The goal of the research program was to survey the area southwest of Jordan Basin to locate and obtain photographs of right whales for individual identification. These data would then be used to test the hypothesis that this area is a mating ground for the critically endangered North Atlantic right whale.

Given that there are usually very few calm days in the Gulf of Maine in the winter, we were lucky to have completed three full survey days—Nov. 16, Nov. 30 and Dec. 18, 2010—using a 112-foot catamaran, demonstrating that

it is possible to conduct surveys in this offshore area with an appropriate vessel, at a time of the year with limited daylight and few good weather days. Right whales were found in the Jordan Basin area on all three surveys; 32 were photographed and 28 of those have been matched to known individuals in the North Atlantic Right Whale Catalog. There were nine males (eight adults, one juvenile), five females (one adult, four juveniles), and four of unknown sex (all adult and believed to be male). The one adult female seen (**Catalog #2791**) is a known reproductive female that was available to become pregnant at the time of the sighting. Therefore, if this is a mating ground, with an estimated gestation time of 12 months, she could potentially give birth to a calf in the winter of 2012. We will be keeping an eye out for her with a calf during the next calving season.

The data from this survey effort alone are not sufficient to test the mating ground hypothesis. However, when combined with the results from other surveys, there is a growing body of data to suggest that the Jordan Basin area has a seasonal concentration of right whales including receptive females and adult males that coincides with the estimated time of conception for this species. The seasonally consistent aggregation of right whales in the Jordan Basin area warrants further investigation and suggests that additional protective measures to reduce the threat of vessel strikes are needed, as the U.S. measures now in place for these offshore areas are voluntary and rely on regular surveys for implementation.

Right whale sightings and vessel survey track lines from the *M/V Friendship V* in the Jordan Basin area in November and December 2010.



In Memoriam Lindy Johnson



Lindy in 2006 after spending a day with right whales in the Bay of Fundy

Lindy Johnson, a dear friend to our program and a strong supporter of right whale protection, passed away on October 23, 2010, at the age of 49 after a four-year battle with cancer. Lindy started her career as an attorney advisor with the Office of General Counsel for International Law at NOAA in 1992. She was considered an international expert in all matters concerning the protection of the marine environment, and she worked tirelessly on a wide variety of marine issues. Her legacy is the many international environmental treaties that she negotiated, and in particular, her work on protecting North Atlantic right whales from vessel strikes. Her care, compassion and humanity are an example to us all.

In an effort to honor Lindy's passion for safeguarding the oceans, the New England Aquarium has set up the Lindy Johnson Fellowship Fund, which will support a variety of projects aimed at protecting the marine environment and its inhabitants. Through this fund we hope to create a cadre of individuals who can carry forward the work that was so important to Lindy, her family and colleagues.

For more information on the Fellowship Fund or to make a donation please contact mbrown@neaq.org.

Update on Right Whale Mortality, Injury and Entanglement

By Heather Pettis, Marilyn Marx and Amy Knowlton

Since our last newsletter in December there have been an alarming number of right whale deaths, entanglements and injuries. Here we briefly summarize the events.

Mortalities

Between January and March 2011 there were five confirmed right whale deaths (two caused by entanglement, one possibly by vessel strike, and the remaining two not able to be determined), and two orphaned calves that were too young to survive on their own. Two of the identified dead were reproductive females: **Catalog #1308** (a mother of the year; her calf is one of the orphans mentioned above), and **Slash (Catalog #1303)** (see page 5).

Injuries

Since December 18, 2010, four right whales have been sighted with new injuries as a result of vessel strikes.

For three of these animals (**Catalog #3140**, **#3966** and the **2010 calf of #3123**), the wounds appear to be caused by small to moderate-size vessels and do not appear life-threatening. But the extensive wounds seen on **Catalog #3853**, a 3-year-old of unknown sex, in January off the coast of South Carolina, may prove fatal. The whale has not been resighted.

Entanglements

Five whales with new entanglements were sighted between December 2010 and February 2011.

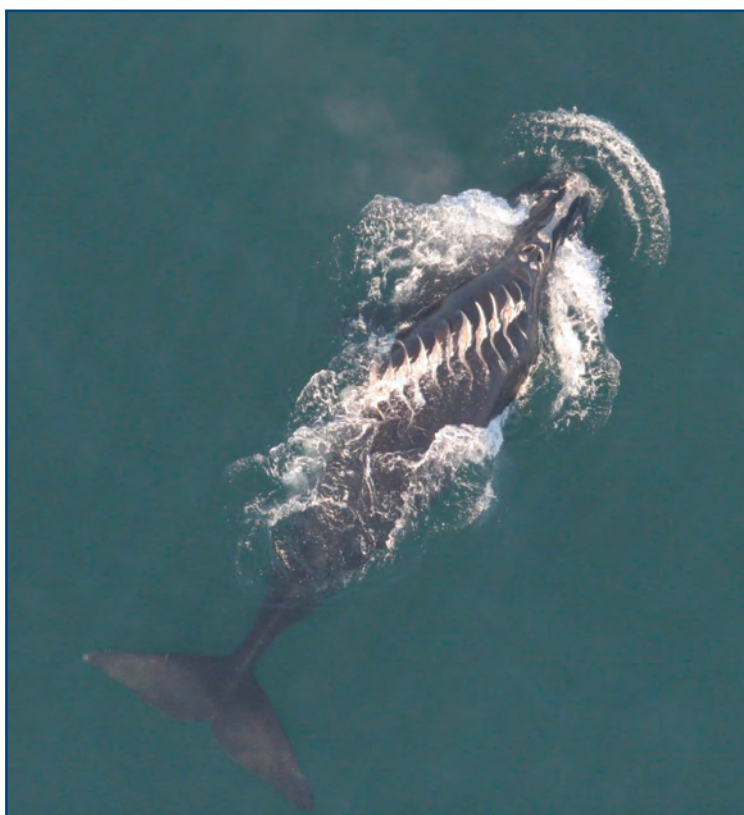
- **Catalog #3911**: 2-year-old female sighted on December 25, 2010, with a complex, life-threatening entanglement. After unsuccessful disentanglement attempts, sedation was finally used and the constricting entanglement wraps were cut on January 15, 2011, but two weeks later she was found dead. Cause of

death was starvation and shark attack precipitated by chronic entanglement.

- **Catalog #3760**: entangled with gillnet in mouth and around head. Successfully disentangled by Georgia Department of Natural Resources.
- **Catalog #3010**: seen entangled off Florida with line coming out of left side of mouth. Unclear if entanglement is still present.
- **Catalog #3712**: seen entangled off Florida, also with line coming out of left side of mouth. Gear still present at last sighting in early February.
- **Unknown ID**: seen on only one day with rope tightly bound around right flipper and in very poor condition, evidence of a long-term, chronic entanglement. May be the same as one of the entanglement mortalities mentioned above.

Previous entanglements

- **Catalog #2470**: disentangled in May 2010 by PCCS and has been seen recently in good condition.
- **Catalog #3120**: entangled in gillnet gear in the fall of 2010, has been resighted, but his flippers may still be entangled and his health condition appears to be declining.
- **Catalog #3930**: seen last year with deep and severe entanglement wounds around his tail; a recent sighting in January confirmed that he's alive but his flukes are badly damaged and the fluke tips point upward and nearly touch. Whether he can survive long term with this sort of deformity remains to be seen.



The seriously injured **Catalog #3853** off the coast of South Carolina. There is a mandatory speed limit for ships 65 feet and longer, but these propeller wounds are probably from a smaller vessel.

Photo: EcoHealth Alliance, NOAA permit #594-1759.

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 (PCCS). They are the pioneers in disentanglement techniques. Together with their network partners they have saved many whales from a slow and painful death.
www.coastalstudies.org





The distinctively scarred ventral fluke of Slash made her easy to identify.

Photo: Susan Parks/WHOI (SARA permit, SA-2005-03)

Slash

Marilyn Marx

There is sad news in the right whale world: The great old whale **Slash (Catalog #1303)** is dead. A boat captain discovered her carcass floating off Virginia on March 17, but it was never relocated so we don't know for sure how she died (but shipstrike is suspected). She was first photographed in 1979, and she was named for her injured right fluke, the result of a shipstrike. Over the years we saw her with six calves (though she may have had more). She was a protective mother: She rarely came near the boat when she was with a calf; we would see her distinctive flukes lifted in the distance, leading her calf away from potential danger.

Her death brought to mind all our whale buddies over the years that have been killed or just never seen again—it's such a long list, and so disheartening. The population is so small that when you see the same whales season after season, year after year, decade after decade, each one becomes as familiar as an old friend. It's very sad to think that we'll never see Slash's memorable, scarred tail again...

Operator Response to New Vessel Restrictions and Routing

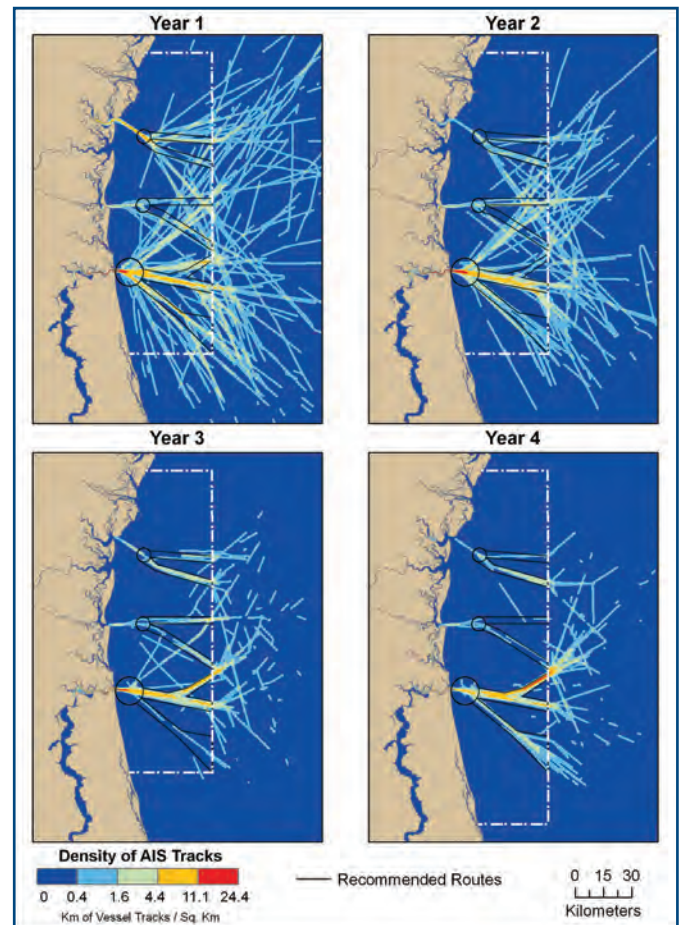
Kerry Lagueux

Vessel strikes are the leading cause of mortalities for North Atlantic right whales, and the southeast U.S. (SEUS) calving ground is where this species is the most vulnerable. (See *Update on Right Whale Mortality...*). In an article soon to be published in the scientific journal *Endangered Species Research*, New England Aquarium right whale research team scientists assessed vessel operator compliance to the mandatory speeds and recommended routes that were implemented to protect the right whale from vessel collisions (See *Mandatory Speed Rule...* in *RWRN Vol.18(1) May 2009*). Researchers used the Automatic Identification System (AIS) to collect data on large ocean-going vessels during the aerial surveys for the duration of the calving season in the SEUS from 1995 to 2009.

AIS is an automated vessel-tracking system that supplements marine radar to identify the location and identity of surrounding vessels for maritime safety. Vessels transmit and receive AIS signals, and each transmission includes information on the location of the vessel, speed, direction, name, destination, type and size. Vessels transmit signals every two to eight seconds, so the researchers were able to characterize the behavior and use patterns of the vessels with high spatial and temporal resolution.

The study found vessels only complied with speed restrictions when

mandatory speed restrictions were in place (compared to *recommended* speed restrictions). However, vessels seemed to comply with recommended routes, thereby reducing the potential overlap between right whale high-use areas and vessels. The combination of both the mandatory ship restrictions and the recommended routes shows the most conservation impact, having the potential to reduce the annual mortality rate by 72% in this important habitat.



Density of AIS vessel tracks in the Southeast US calving ground showing the improved compliance to the recommended routes during the study time frame. The percentage of use inside the recommended lanes increased from a baseline of 43% before implementation to 96% in the final year of study.

Sponsored Whale Update

Marianna Hagbloom

Shackleton (Catalog #2440) has been doing a lot of feeding in Cape Cod Bay this spring, having been sighted by the Provincetown Center for Coastal Studies (PCCS) three times: March 8, 13 and 17. He was also recently confirmed in a May 2010 Northeast Fisheries Science Center (NEFSC) sighting in the Great South Channel, where he was photographed feeding with another right whale.

Calvin (Catalog #2223) has also been spending time in Cape Cod Bay this year. PCCS sighted her on February 17 and March 8, and on March 17 she was observed there in a surface active group.

Snowball (Catalog #1131) was spotted by NEFSC on May 22, 2010, in the Gulf of Maine.

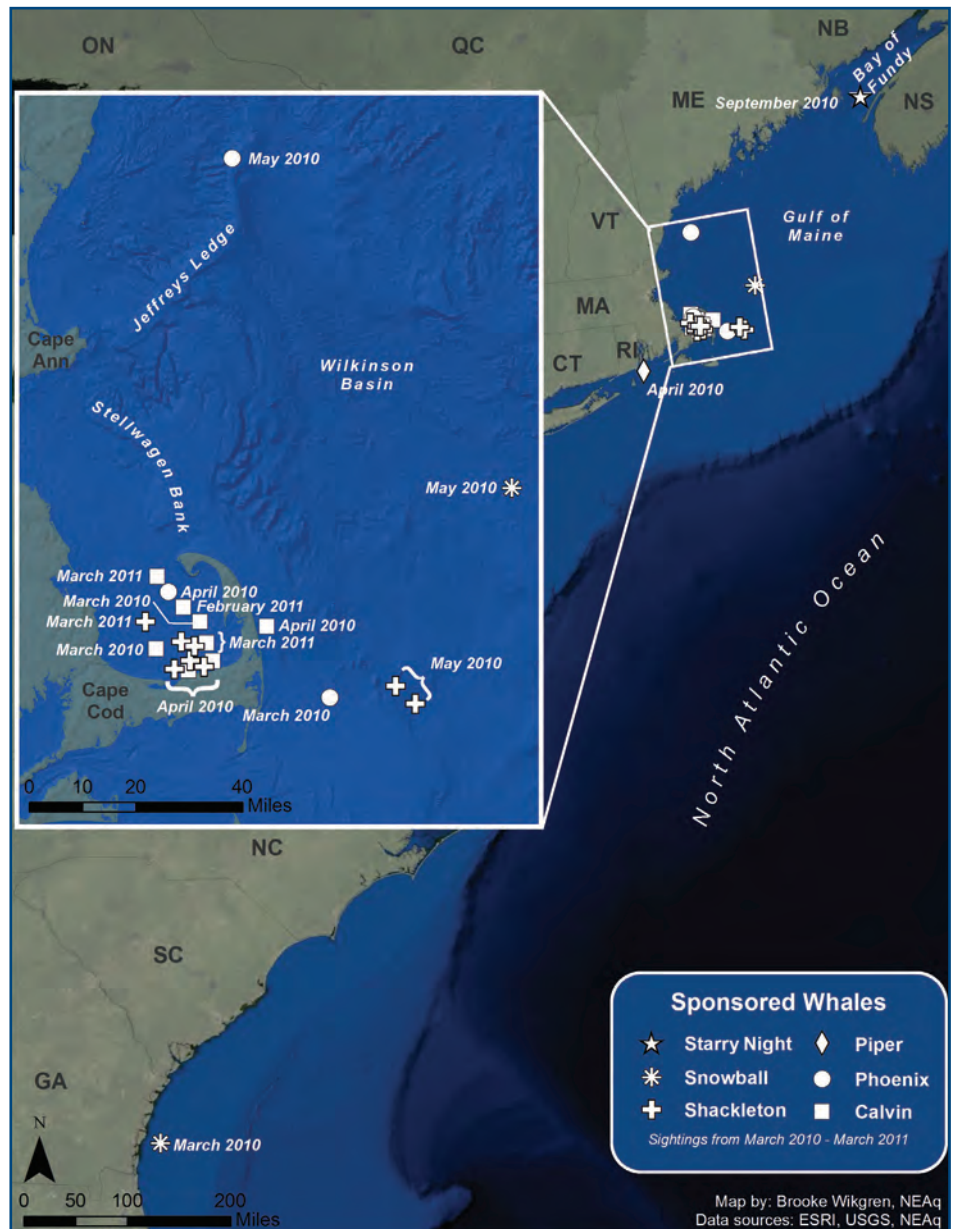
Phoenix (Catalog #1705) was also confirmed in an NEFSC sighting on May 5, 2010, on Jeffrey's Ledge. She was observed feeding with another whale for over two hours!

We haven't confirmed any new sightings of **Starry Night (Catalog #1028)** or **Piper (Catalog #2320)** since our last update, but because we are continuously analyzing photographs, we're hoping to have updates for these two in our next newsletter!

Check out the map to see where all the sponsored whales have been sighted in the past year!



Snowball (Catalog #1131), alone and swimming fast in the Gulf of Maine in May 2010. Photo: NEFSC. Permit #775-1875-00.



Sponsored whale sightings March 2010 through March 2011

Map by: Brooke Wikgren, NEAq
Data sources: ESRI, USGS, NEAq

Can Right Whales See Fishing Gear?

Scott Kraus

Every year North Atlantic right whales are killed or injured by entanglement in fixed fishing gear along the East Coast of North America (See *Update on Right Whale Mortality...*). Further, at least 82% of the animals in the North Atlantic Right Whale Catalog show scars apparently caused by ropes or nets. Because fixed fishing gear is distributed very broadly both near shore and offshore all along the coast of North America, and all types of fixed fishing gear have been recovered from entangled right whales, reducing mortalities in right whales from fishing gear entanglements has been challenging, and, to date, largely ineffective.

Right whale researchers suspect that vision is the primary mode of sensory detection for prey-finding and navigation, so we are starting a project to evaluate right whale visual capabilities, to determine whether the existing sensory capacity of right whales can be used to help them avoid entanglements at depth and in conditions of poor visibility. We plan to use variously colored and illuminated non-entangling rope mimics (thin PVC pipe) to determine if right whales are responsive to different color and light characteristics. Most of these tests will occur in the spring of this year and next year in Cape Cod Bay, since it offers the potential to observe right whales feeding at the surface. Surface-feeding will allow us to evaluate behavioral responses by looking for changes in whales' paths near the rope mimics.

We will be working both in daylight and at night using binoculars, video cameras and night-vision equipment to monitor whale behavior. Whale behavior will be evaluated to determine responses to these different colored fake ropes, hopefully teaching us something about this last frontier in whale biology (vision), while also leading to fishing gear that is less harmful to whales.

Update: As we go to press with this newsletter we have already had four days in Cape Cod Bay for our vision project. We've been very lucky to have had both good weather and many skim feeding right whales!



A right whale skimfeeds off Race Point on Cape Cod.

Photo: Amy Knowlton/NEAq, NOAA Permit #15415

New Additions

Kathleen Hunt

In 1999, I was working in Seattle, studying the hormones of birds, elephants and bears, when New England Aquarium scientist Rosalind Rolland contacted me with an interesting idea. Is it possible, she wondered, to measure whale hormones from fecal samples? Roz had realized it would be immensely useful to develop some way to measure reproductive and stress hormones in North Atlantic right whales (NARW), given their erratic reproduction and the stressful situations that they encounter. And she'd managed to collect some fecal samples. The feces turned out to be a gold mine; I successfully developed several hormone assays for right whale feces, and we found that we can accurately assess a whale's stress level, sex, and reproductive status from fecal hormones alone. The technique was immensely promising, and we began dreaming of setting up a hormone laboratory in Boston, where I could do all the analyses on-site.

Twelve years later, we've finally secured funding to build our long-dreamed-of lab. And we've landed several grants to continue and expand our research on stress in marine species. One grant is funding analysis of archived NARW fecal samples, focusing on potential stressful effects of ship noise. A second grant will take us to the Bay of Fundy to see if we can measure hormones in NARW respiratory vapor. The third will extend our NARW hormone techniques to beaked and sperm whales, focusing on possible effects of Navy sonar.

So, after an epic mid-winter drive from the Pacific Northwest, I arrived in Boston in January. I am now merrily buying lab equipment, and preparing for my first Bay of Fundy field season. I'm thrilled to be joining the right whale research team, and my thanks go to all the donors who have made this possible.



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Thank you!

Thanks to all of the individuals, organizations and schools that continue to support our research with annual sponsorships and donations. Your contributions are critical to our work and we truly appreciate your generosity. Sponsorship funds are used by the New England Aquarium Right Whale Research Program to support activities that directly contribute to the conservation of North Atlantic right whales.

This year funds were used for:

- Field station and research vessel phone usage fees
- Field station insurance
- Travel to Washington, D.C., to launch the New England Aquarium/Lindy Johnson Fellowship Fund (See In Memoriam on page 3)
- Travel to the Southeast Implementation Team Meeting in Florida
- Personnel time to research and write a journal article about right whale and shark interactions.



Gift Ideas

Are you looking for a special gift for someone?

Consider some fun and interesting options from our right whale collection! Choose from plush whales, T-shirts, and books. Plus with every purchase you'll be helping to support right whale research! You can see these items at the bottom of the whale sponsorship page. www.neaq.org/whaleadoption

For more information call 617-973-6582 or email rwhale@neaq.org.