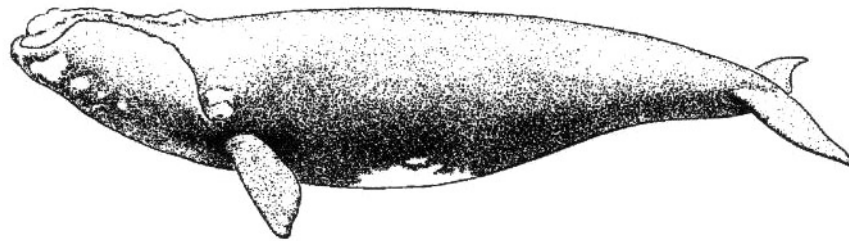


# **RIGHT WHALE VOLUNTEER SIGHTING NETWORK**



## **TEAM HANDBOOK**

Revised December 2013

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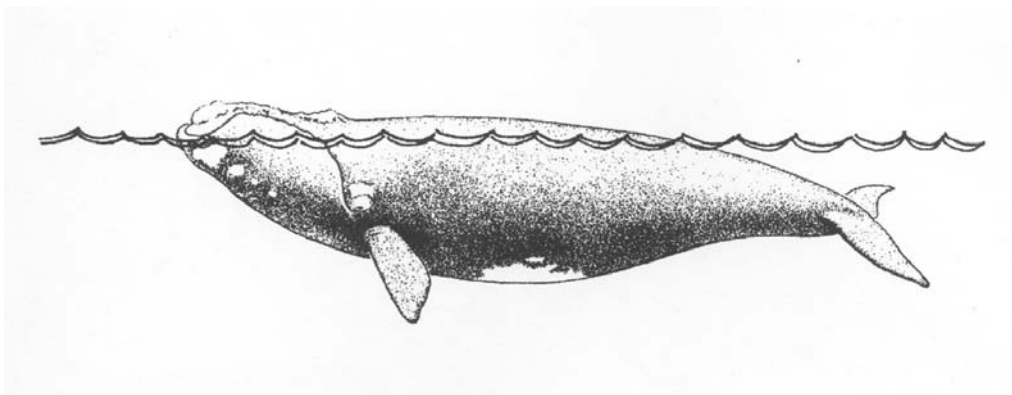
## Introduction

### This Handbook

You are a part of a volunteer network that aids in the monitoring and conservation of right whales and their habitat in Florida coastal waters. The effort is enhanced by knowledgeable volunteers. This handbook provides baseline information and program objectives — for yourself, and to pass on and help educate others in the course of your work.

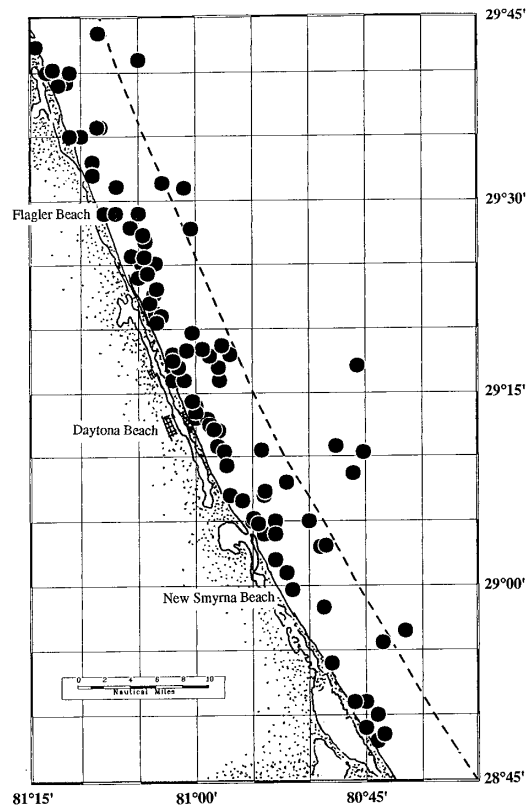
### Background

A remarkable event takes place in the coastal waters of northeastern Florida. Each year from December through March, right whales migrate to this area to give birth and nurse their calves in warm, protected waters, before again returning north to feeding grounds off New England and Canada. It is in these waters that a volunteer-based citizens network is growing and contributing to science, conservation, and stewardship of the species and its habitat.



The North Atlantic right whale, *Eubalaena glacialis*. This highly endangered species has a total population size of about 510, and gives birth to about 20 calves a year. The calving and nursing occur in coastal waters of northeast Florida from December through March. Adult whales are about 45 ft in length, and the calves about 16 ft. Because of the small numbers and low reproductive rate, protection and stewardship are essential.

In addition to the small population size and low reproductive rate, right whales face an additional challenge — human impacts. Whales become entangled in fishing gear, are struck by vessels, and sometimes are harassed by boaters. Therefore, monitoring of the population in these waters has two principal objectives: 1) mitigating human impacts (ship strikes and gear entanglement), and 2) studying distribution, abundance, demographics, reproduction, behavior, and habitat use so as to enhance conservation and recovery of the species.



In the coastal waters of northeastern Florida, particularly south of St. Augustine, the majority of right whale sightings (black circles) are near to the shore, often within the first five miles. About 82 percent of the near-shore habitat is monitored by the volunteer sighting network.

## Volunteer Roles

The volunteers in the Right Whale Sighting Network have multiple roles:

- search for and sight right whales
- assist with data recording and photography
- document potential human impacts
- help inform and educate the public
- provide stewardship for whales and their habitats
- serve as the eyes, ears, and voice for right whales in coastal waters of Florida

None of these tasks are easy.

This handbook seeks to aid the volunteer and strengthen the program by helping to create a knowledgeable volunteer and a knowledgeable and engaged public.

The handbook is an evolving project, and will be improved and enlarged over time.

## **Why the Volunteer Sighting Network?**

We are faced with a difficult task. Each year from December through March, a relatively small number of whales (generally around 150) occur in a large area (400 nautical miles of coastline from North Carolina to Florida). While near-daily aerial surveys take place in some areas, they are only partially effective. In other areas, aerial surveys are few and coverage is poor. Our solution to “a small number of whales distributed over a large area” is to increase the number of eyes looking — i.e., “if you want to catch more fish, use a bigger net.”

## **Guiding Principles**

Several guiding principles are central to our program:

- Government and scientists alone cannot provide the resources or information required. A large, effective, and complementary effort is being provided by volunteers (citizen scientists).
- Important and unique data are being provided from an area not regularly covered by the other programs that occur north of St. Augustine.
- Homegrown and grassroots projects are more creative, more likely to take hold, and more likely to produce results than externally directed government initiatives.
- Better information leads to better decisions.
- A remarkable event takes place in Florida coastal waters. This program helps ensure that this event will continue for this and future generations.

## **What are the goals ?**

- Successful co-existence of whales and humans in coastal waters of Florida
- An engaged and knowledgeable public

## **Program Components**

During the course of five seasons, the volunteer sighting network has evolved, and incorporated refinements and innovation. Currently, a number of interrelated components are essential to the overall success.

- Dedicated teams
  - Mobile
  - Condo
- Opportunistic sightings
- Right Whale Hotline
- Response teams
- Aircraft surveys and photo response

- Education and outreach
- Collaboration
- Data processing, analysis, synthesis, and presentation

*Dedicated teams.* A 50 nmi survey area is partitioned into six sectors, each with about five lookout points. Each morning, mobile teams (about three persons and a vehicle) meet at 08:00 and visit each point within their sector twice. Each team is equipped with cell phone, binoculars, clipboard, and survey/sighting forms. In addition, about five condo organizations have similarly organized teams, who look out from the upper floors of shorefront units.

*Opportunistic sightings.* Before and during the season, phone cards are widely distributed to residents, visitors, and workers who spend time at the beach. A wide variety of people are educated about the program, encouraged to be on the lookout, and encouraged to phone if a sighting is made.

*Right Whale Hotline.* A central call-in phone hotline is maintained by the Marine Resources Council (a collaborator). Sightings are called in, follow-up inquiries made, and area response teams are notified. The number is fully staffed during the season.

*Response teams.* When a sighting is reported, a response team with experienced individuals, cameras, and GPS units is deployed. Photo-documentation, and data on movements and behavior are recorded. Teams track the whales as long as possible, sometimes for the entire day.

*Aircraft surveys and response.* Since 2002, we have utilized a twin-engine, slow-flight aircraft, the AirCam (developed originally for *National Geographic*), for both surveys and sighting/photo responses.

*Education and outreach.* Volunteer training and public education is achieved through talks and seminars, and a resource center that has been established at the Guana-Tolomato-Matanzas National Estuarine Research Reserve (GTM NERR) Science Center in the Town of Marineland. The resource center has a library of books and videos, and exhibits of baleen, copepods, and whale lice.

*Collaboration.* We routinely collaborate with other scientists, managers, agencies, and institutions involved with right whale protection in this area. This includes the Marine Resources Council, the New England Aquarium, the states of Georgia and Florida, the Army Corps of Engineers, the National Marine Fisheries Service, the Navy, the Coast Guard, and the GTM NERR.

*Data processing, analysis, synthesis, and presentation.* Photos are archived, sorted, selected, and submitted to the New England Aquarium. Data are likewise quality controlled and processed. Presentations and publications are prepared. We have found that for every hour in the field, several hours of follow-up are required.

## **Volunteer Networks**

There are numerous examples of volunteer networks providing valuable information to the science and management of environmental resources (*e.g.*, Audubon bird counts, Monarch butterfly migration studies, Chesapeake Bay Water Quality network, and the Florida manatee watchers). Well-known too are groups like "Riverkeepers" and "Baywatchers" that have grown in number all over the country. The rise of citizen science represents a valuable form of data collection for science, and has been shown to play a critical role in the gathering of long-term data on wildlife and habitats. With continuing improvement and refinement, the shore-based right whale sighting network is another example of valuable and cost-effective citizen involvement in environmental conservation and recovery efforts.

## **The Three C's: Callosities, Cyamids, and the Catalog**

Of all the information essential to an informed and knowledgeable volunteer, this is perhaps the most important — as it forms the basis for why right whales are individually recognizable, why we work hard to take photographs, and how the photographs are catalogued to tell us much about the whale's life history and movements.

### **A. Callosities**

Callosities are the areas of roughened skin, or eruptions, on the head of a right whale. They are found on the top of the head, on the lips, on the chin, and on the side of the lower jaw.

A newborn calf already has the callosities, although it may take up to six months for the pattern to completely develop and permanently “set.” Therefore, the pattern that is central to individual identification of the whale and the photographs that will be entered into the catalog is not completely reliable or useful until the calf is older.

In an adult right whale, the callosities can be quite dramatic and the topography (elevation above the skin surface) on the order of several inches. [\*see color figures appended\*]

The callosities, like the skin, are black in color. It is the cyamids (described below) that give them the white or orange color.

### **B. Cyamids**

There are many unusual relationships in both the plant and animal kingdoms — one is the relationship between right whales and cyamids.

What are cyamids, exactly?

They are called “whale lice,” but in fact they are not lice at all but amphipod crustaceans — and are related to the small shrimp-like creatures that live on seaweeds.

They are small, generally less than an inch long.

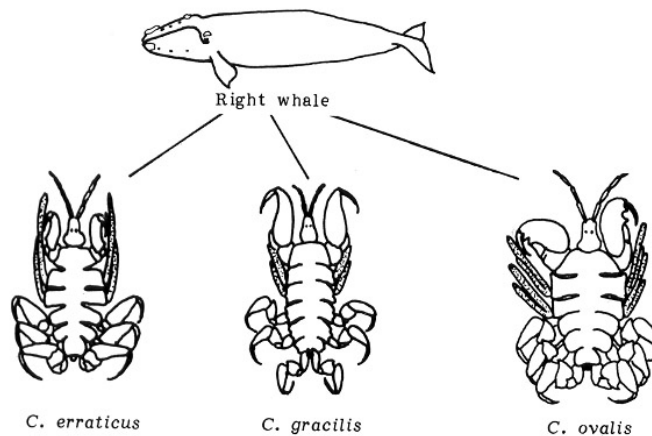
They cannot swim and spend their whole lives aboard whales. It would probably be fatal for a cyamid to become dislodged/washed off, and therefore one of their most distinctive features are the sharp curved hooks at the end of each of their 10 legs. These small creatures can truly be called whale riders or hitchhikers.



Although whale lice are capable of moving freely over a whale's body, they seem to prefer certain locations. They congregate in areas of reduced water flow — in folds of skin around the flipper, eye, blowhole; in ventral grooves; in margins of the lips; in wounds; and on the callosities.

The dense granular clusters of whale lice — almost like living “blankets” — that inhabit the callosities make the patches appear white.

There are three species of whale lice on right whales — *Cyamis ovalis*, *Cyamis gracilis*, and *Cyamis erraticus*. The former two are white and generally found on healthy whales in normal callosities. The latter, *Cyamis erraticus*, is orange and generally found in wounds and in other areas of an unhealthy whale ... as well as on young calves.



Three species of cyamids, or “whale lice” are ectoparasites on right whales. They appear as blankets or patches of white on and around the callosities, and patches of orange on young calves and in wounds of older whales. They are generally ½ to 1 inch in length. (Source: Rowntree 1983)

### C. The Catalog

Whales have fingerprints.

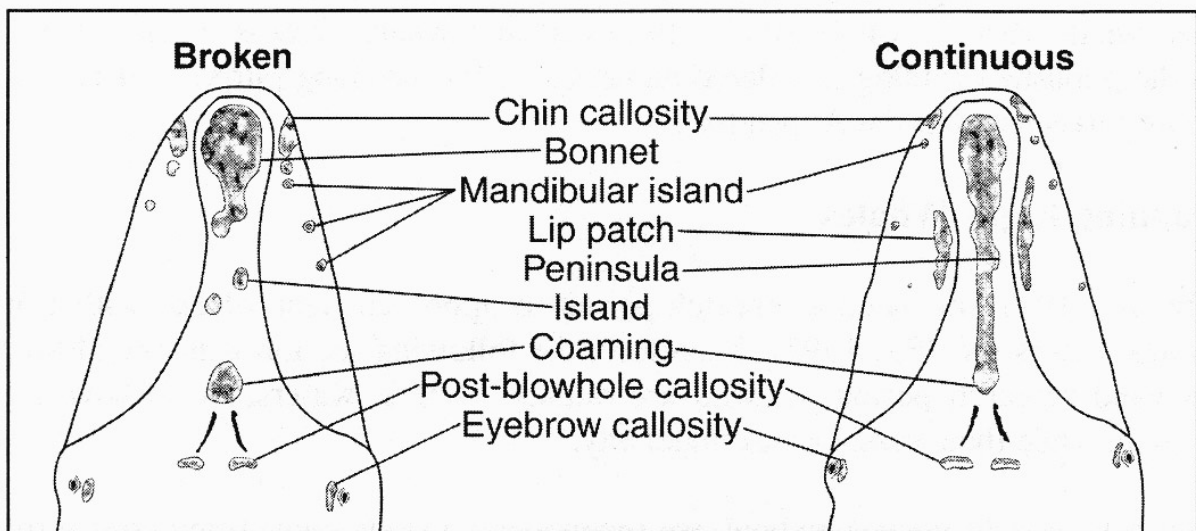
In the early 1970s, Roger Payne, working with right whales off the coast of Argentina, was the first to recognize that the white patches on the heads of right whales could be used to identify and track individual right whales.

In the mid-1980s, photographs of individual North Atlantic right whales collected by various investigators were compiled at the New England Aquarium in Boston, Massachusetts, to form one comprehensive photo-identification database.

In 1990, the first catalog of right whales in the western North Atlantic was published. It contained 211 of the then 290 catalogued individuals. An update in 1999 contained 382 of the 392 whales catalogued.

Since that time, the paper catalogue has been replaced by an electronic computer-searchable catalog, and the former 35mm slides and photo prints replaced almost entirely by digital images.

Analyzing the photos and identifying right whales follows a set of standard terms and categories. The two major divisions are “broken” and “continuous” (see figure below). After that, terms like “B 5” (2 islands, left forward) and “C 4” (1 pair symmetrical peninsulas) are applied. Lastly, scars and marks aid in identification.



The two major types of callosity patterns are “broken” and “continuous.” Beyond this, there is a set of standard terms that are used to describe the patterns and assist in identifying and cataloguing individual right whales. (Source: New England Aquarium)

When attempting to match a photograph to the catalog of known individuals, the categorization of the callosity pattern (as above) allows the matcher to narrow the search, so that only a small subset of the catalogued whales is reviewed. (Each year, a small percentage, 2 to 4 %, of the non-calf photographed whales are not catalogued, are considered “new,” and subsequently added.)

Identified whales are catalogued by number, and occasionally named. Although somewhat arbitrary, a whale's number does relay some information. The first two digits generally indicate the first year a whale was sighted. For example, whales beginning with numbers beginning with 10 were first sighted in 1980 or earlier; 16XX were first sighted in 1986; 27XX were first sighted in 1997. More recent examples include female 3515 born in 2005 and male 4193 in 2011.

Starting in 1989, the last two digits generally relate to whom a whale's mother is, if known (*i.e.*, the calf inherits the last two digits of its number from its mother). For example, whale 1934 is whale 1034's 1989 calf.

The first whale in the catalog is #1001, a female named "Fermata." She was first photographed in 1979, and has had five calves. (There is more on Fermata in the next section.) As an example of recent numbering, a calf born in 2003 to mother #2114 is #3314.

The catalog and associated database are invaluable, as a great deal is learned about the individual whales, the population as a whole, and the habitats occupied.



This newborn calf shows areas of roughened skin that in a living animal would soon host the small cyamids that will give these patches their white color. Here, only the charcoal black skin is seen, and no cyamids are present.



Close up views of callosity patterns on adult right whales. The combination of the areas of black, roughened, and erupted skin and the blanket of white cyamids gives the appearance of white patches when seen from a distance. In the bottom photo, individual cyamids can be discerned. (Photos: 6 Mar 2003, J. Hain)



From a distance, callosities appear as white patches on the heads and chins of right whales. Up close, however, there is a jagged topography. The black, thickened skin eruptions that are inhabited by the white cyamids (whale lice) may be several inches in elevation. (Photo: S. McKenney)

## **Two M's: Migration and Mystery**

A characteristic common to many animals, both terrestrial and marine, is that of lengthy migrations. Often the migration is between warm and cold climate, and/or a feeding and a birthing/nursing habitat.

It is a fascinating topic, as the travel requires an expenditure of energy, a navigational ability, and an individual and cultural memory.

For right whales, many individuals migrate some 1500 nautical miles from Canada (including the Bay of Fundy and the Nova Scotia shelf) to waters off the southeastern U.S. (including NC, SC, GA, and FL). A round trip may involve some 3000 nmi. [\*refer to color figure appended\*]

An annual cycle may include southern coastal waters from January through March, Cape Cod and Georges Bank in spring, and the Bay of Fundy in August and September.

There are many variations, and the pattern is generalized rather than rigid. For example, not all members of the population migrate to the SEUS in winter, and perhaps 2/3 of them are unaccounted for (one of the mysteries). Also, not all individuals feed and/or socialize in the Bay of Fundy and Scotian Shelf in late summer/early fall, and perhaps 1/3 to 1/2 are unaccounted for (another of the mysteries).

### **Making the Connection**

In the previous chapter, we described how callosity patterns are used to catalog individuals. We also described that whale #1001, Fermata, is the first whale in the catalog. But wait, there is more to the story.

Sightings data from the Caldwells and others at Marineland and elsewhere showed that right whales occurred and calved in Florida. These records included a newborn calf that stranded on Neptune Beach (just north of Jacksonville Beach) in January 1970. Likewise, sightings data from researchers at the Woods Hole Oceanographic Institution and several institutions in Canada showed right whales off New England and to the north in Canadian waters. Right whales would disappear from northern waters in the fall, and return the following spring with calves. And, calves were reported during winter in the south.

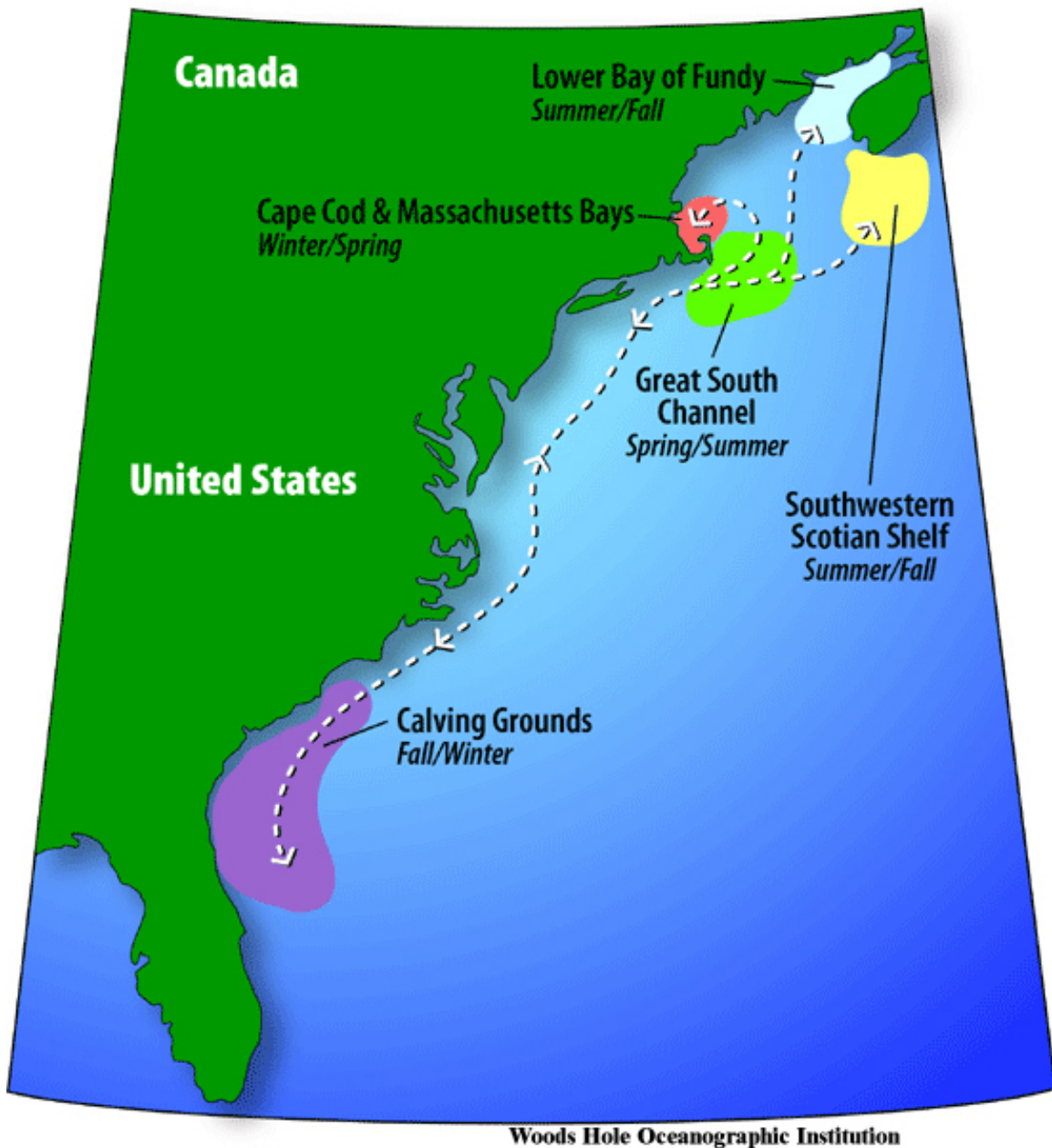
In February 1979, researchers from the Georgia Department of Natural Resources, along with a film crew photographed a mother/calf pair off Jekyll Island. It turned out that the mother was later photographically matched to sightings off Cape Cod and Canada — the first proof of the long distance north-south migration of right whales. This became known as the “Georgia Match,” and the whale was subsequently catalogued as #1001, Fermata!

Since that time, north-south right whale matches are routinely made — and a general pattern has been established. However, there are still mysteries and unknowns.

For example, some reproductive-age females are seen and photographed with their recently born calves on southern wintering and nursing grounds, but then not seen again for several years, until they once again appear with a calf in the south. They disappear to some as yet unknown area(s) for periods of several years.

Similarly, some whales are seen and photographed often — in the areas and habitats frequented by scientists. Other whales in the population are rarely seen, and we can only conclude that their behavior and/or migratory patterns and/or habitats are different.





Right whales may travel 1500 nautical miles between summer feeding grounds in the north and winter calving and nursing grounds in the south. The generalized migration route and the five major known habitats are shown. However, at any given time, some percentage of right whales are unaccounted for, suggesting that there are other routes and other habitats.

## **Human Impacts**

### **Volunteer Role**

This is an important section for you as a volunteer spotter. Not only are you asked to search for and record sightings, you are also asked to search for and record carefully evidence of human impacts.

These may be of several types:

- Injuries or propeller scars
- Entanglement in fishing gear
- Close approaches by boaters

This section provides background and information on what to look for.

### **Historical Synopsis**

Almost from the beginning — when the pilgrims arrived at Cape Cod in 1620 — right whales were hunted. At first, the emphasis was on whales that occasionally stranded on the beach, but this soon evolved into active pursuit. Much of the oil and baleen was shipped back to England to pay off the settlers' debts. For several centuries, right whales were taken from shore off Cape Cod, Long Island, North Carolina and elsewhere.

Some whaling did occur off the coasts of Georgia and South Carolina in the 1800s by the American pelagic whaling fleet. A few tens of right whales appear to have been taken in late winter/early spring in the 1870s and 80s.

How many right whales existed originally, or how many existed at the low point in the population, is unknown. However, it is generally believed that the original number may have been in the tens of thousands and the low point in the early 1900s, when they had been “fished down,” was likely in the low hundreds.

### **The Last Right Whale Harpooned — A Black Eye for Florida**

In March of 1935, a female right whale (later numbered as #1045) and her calf were swimming along the Florida shoreline off Pompano. They were sighted from land by a group of fishermen, who launched a small boat. They managed to harpoon the calf, and shoot both the mother and calf with a rifle. The pursuit lasted more than six hours, during which time the mother stayed by the calf's side. The one or two-month old calf died and the mother swam away. The calf (which was towed into Ft. Lauderdale) was the last right whale intentionally killed in U.S. waters before they became protected later that year.

Some 24 years later, the mother was filmed in Cape Cod Bay among a group of right whales. Another two decades were to pass before she was re-sighted, this time off Nantucket, Massachusetts. As people became aware and research and photographic efforts increased, she was re-sighted on several occasions. The last sighting of this individual was near Georges Bank in August 1995. She had a deep wound in her head believed to be from a ship strike. Sixty years had passed since the sighting in 1935. She was the oldest known right whale and has not been seen since.

## **Current Impacts**

Right whales have been protected by international agreement since 1937 (when treaty was ratified). Since that date, it has been illegal to hunt right whales. However, humans are still impacting right whales — but just in a different way.

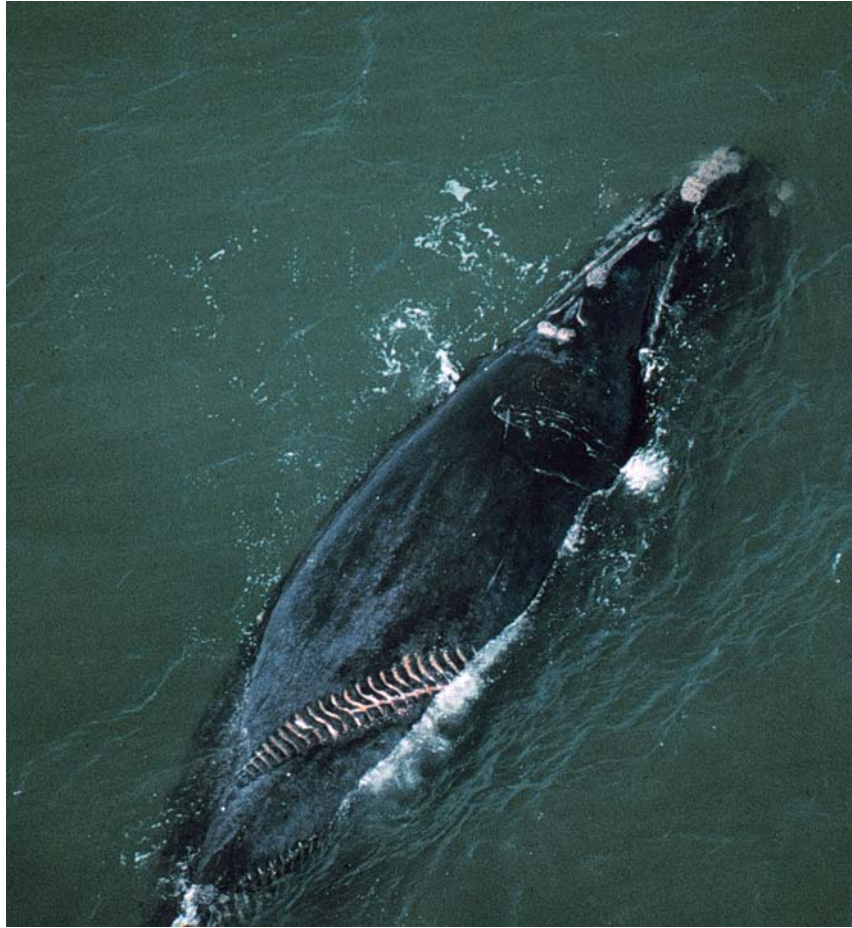
Researchers at the New England Aquarium and elsewhere report that nearly 40 percent of dead right whales were killed by vessel collisions, and 12 percent by entanglement in fishing gear. Both may be underestimates, as many right whale mortalities occur at sea and are unreported and undocumented.

Additionally, there may be disturbance and harassment by boaters, and more subtle effects such as habitat loss and health issues attributable in part to marine pollution.

As you are observing right whales, search for evidence of injury or propeller scars as well as gear entanglement [\*refer to color figures appended\*].

Also be aware of close approaches by boaters and other water craft. (Federal law prohibits approaches within 500 yards of a right whale.) Document the event, and record the vessel name if possible, but generally avoid confrontation. Our goal is to educate boaters and turn them into allies rather than adversaries. [\*refer to color figures appended\*].

Finally, while walking on the beach, be on the lookout for the unusual. There have been a number of right whale strandings in Florida, including several calves. Only by recovering the carcass can we determine if death was due to natural or unnatural causes. Volunteers have reported such events on a number of occasions. [\*refer to color figure appended\*].



Propeller scars on right whales. (Photos: New England Aquarium, above, and Florida Marine Research Institute, below)

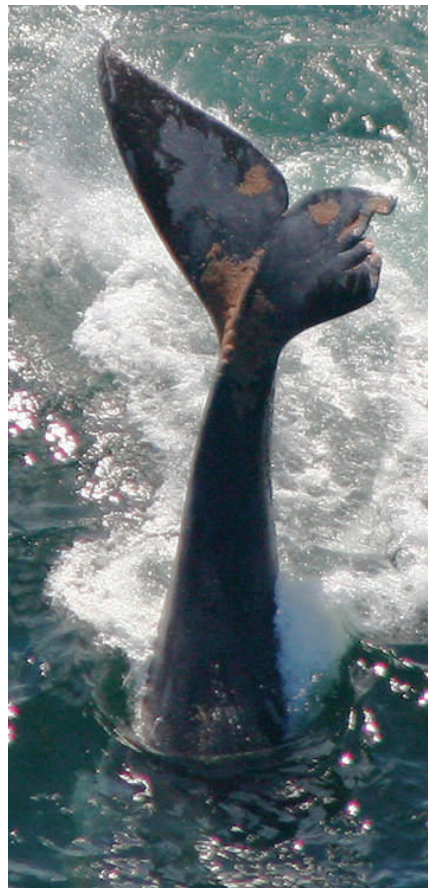
## When a right whale gets struck in the head ...



On 30 December 2006, a dead and floating right whale was sighted off Jekyll Island, Georgia. A necropsy was performed the next day on the 41-ft, 2-year-old male that was born in 2005 to female #1408 (named Columbine). He had 20 propeller slashes along the right side of the head and back. (Photos: Florida Fish & Wildlife Conservation Commission)



A right whale struck by a vessel on 10 March 2005 photographed in September 2005 with fluke seriously injured and orange cyamids present (evidence of an unhealthy animal). (Photos: M. Zani and T. Voorheis)





A right whale entangled in fishing line. Over time, these entanglements may become serious and perhaps fatal as feeding and movement is impaired, and constricting lines affect blood flow and muscle function. (Photos: Center for Coastal Studies)



A seriously injured right whale, 6 March 2003, off New Smyrna Beach. (The head and most of body are submerged to the left of the picture, and some of the flukes are seen to the right — you are looking at the area of the peduncle or tail stalk.) The black epidermis on the tail stalk is abraded away, probably by fishing line, and the white dermis beneath is exposed. Orange cyamids sit in the deepest part of the wound. To the right a remnant of fishing line is draped over the flukes. (Photo: J.Hain).





Additional examples of right whales entangled in fishing gear. Line is caught in the mouth and around the body, and is seen trailing behind the whale. Occasionally the whale will be seen towing buoys — as in upper photo.



Boat approaches to right whales are prohibited by law. Perhaps more importantly, we need to educate boaters to maintain a respectful distance and avoid disturbance and harassment, particularly in sensitive situations (mother and calf). (Photos: J. Albert, above, J. Hampp, below).



While walking the beach, be on the lookout for the unusual. On 13 February 2001, volunteers found what they thought to be a carcass of a right whale calf on Flagler Beach. They were correct, and the remains were recovered and analyzed.

## The “Other” Whales – Humpbacks

There is one other large whale occasionally seen in these waters – the humpback whale, *Megaptera novaeangliae*. They are approximately the same length as right whales. And, sometimes their blows are similar.

However, this species is very different in appearance and can be readily distinguished. There are at least five characteristics to look for.

This species has a DORSAL FIN, the underside of the flukes is WHITE, it has elongate WHITE flippers, there are protuberances on the head as though it was “bolted together,” and it has a series of “throat pleats.”

Recall that the right whale is just the opposite – it has NO dorsal fin, the underside of the flukes is BLACK, it has stubby, rectangular BLACK flippers, and the throat is smooth and has no pleats.

This species may occur at any time here in Florida, but it seems that they are more common early in the season (November, December) and late in the season (March, April).

It seems that the ones we get are young animals, juveniles, who are at the outskirts of what might be considered the normal winter range for this species.

Several photos are on the following page.

## Distinguishing Characteristics of Humpback Whales

**\*\* They are very different when you know what to look for \*\***



Distinct dorsal fin



Head looks like it was bolted together  
With "stovebolts."



The underside of the flukes is white, as are the very elongate (almost 10 ft in length) flippers.



When seen stranded on the beach and belly up,  
the "throat pleats" are clearly visible.



Photos: P. Eckstein and M. Myers

## **Educational Resources**

3 January 2006

### **Professional/Adult**

Best, P.B., J.L. Bannister, R.L. Brownell, Jr. and G.P. Donovan (eds.). 2001. Right Whales: Worldwide Status. Special Issue 2, The Journal of Cetacean Research and Management. The International Whaling Commission, Cambridge, England. 309 pp.

Chadwick, D. 2008. Right whales: On the brink, on the rebound. National Geographic 214(4): 100-121. October 2008

Gromling, F. 2003. Frank's Whales. Ocean Publishing, Flagler Beach, Florida.

Johnson, T. 2005. Entanglements: The Intertwined Fates of Whales and Fishermen. University Press of Florida: Gainesville. 290 pp.

Katona, S.K. and S.D. Kraus. 1999. Efforts to conserve the North Atlantic Right Whale. Pp. 311-331, *In*, J.R. Twiss and R.R. Reeves (eds.). Conservation and Management of Marine Mammals. Smithsonian Institution Press: Washington, D.C.

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Wynne, K. and M. Schwartz. 1999. Guide to marine mammals & turtles of the U.S. Atlantic and Gulf of Mexico. Rhode Island Sea Grant, University of Rhode Island, Narragansett, Rhode Island. 114 pp.

### **Young readers**

Anonymous. The North Atlantic Right Whale (coloring book). Georgia Ports Authority/Georgia Department of Natural Resources. Brunswick, Georgia. 20 pp.

Kraus, Scott and Kenneth Mallory. 1993. The Search for the Right Whale. Crown Publishers, New York. 36 pp.

McNulty, Faith. 1999. How Whales Walked Into The Sea. Scholastic Press. New York. 30 pp.

Papastavrou, Vassili. 1993. Whale. Eyewitness Books. Dorling Kindersley, New York. 64 pp.

Tobin, Deborah. 1999. Tangled in the Bay: The Story of a Baby Right Whale. Nimbus Publishing, Halifax, Nova Scotia. 33 pp.

Ward, Nathalie. 1997. Do Whales Ever ... (What you really want to know about whales, porpoises, and dolphins). Down East Books. Camden, Maine. 32 pp.

## **Video**

From Whaling to Watching: The Northern Right Whale. 1997. Georgia Department of Natural Resources. Brunswick, Georgia.

Right Whales – Natural South. Produced by SaltRun Productions and aired on Turner South Network, February 2003. 24 min.

Right Whales. Part 12. Champions of the Wild. National Film Board of Canada. 1998. 25 min.

## **Newsletters/Blogs**

Right Whale Volunteer News – Published twice a year by the Marine Resources Council, 3275 Dixie Highway, NE, Palm Bay, Florida 32905.

Marineland Right Whale Survey Project Blog – Posts Project sightings, presentations, and resource information at [marinelandrightwhale.blogspot.com](http://marinelandrightwhale.blogspot.com).

Right Whale News – Published 4x a year by Associated Scientists at Woods Hole. Copies available for download at [www.narwc.org](http://www.narwc.org).

## **Websites**

[www.aswh.org](http://www.aswh.org) – see “Marineland Right Whale Project”

[www.narwc.org](http://www.narwc.org) – the Right Whale Consortium site

[www.mrcirl.org](http://www.mrcirl.org) – the Marine Resources Council, contains MRC newsletters

[www.neaq.org/rwcatalog](http://www.neaq.org/rwcatalog) - excellent information on catalog and family trees