

North Atlantic Right Whale Consortium 2014 Annual Report Card

NORTH ATLANTIC RIGHT WHALE CONSORTIUM BACKGROUND

The North Atlantic right whale (*Eubalaena glacialis*) remains one of the most endangered large whales in the world. The interest in addressing the problems hampering the recovery of North Atlantic right whales using innovative research techniques, new technologies, analyses of existing databases, and enhanced conservation and education strategies has increased significantly over the past sixteen years. This increased interest necessitated better coordination and collaboration among all stakeholders to ensure that there was improved access to data, research efforts were not duplicative, and that findings are shared with all interested parties. The North Atlantic Right Whale Consortium, initially formed in 1986 by five research institutions to share data among themselves, was expanded in 1997 to address these greater needs. Currently, the Consortium membership is comprised of representatives from more than 100 entities including: research, academic, and conservation organizations; shipping and fishing industries; whale watching companies; technical experts; U.S. and Canadian Government agencies; and state authorities.

The Consortium membership is committed to long-term research and management efforts and to coordinating and integrating the wide variety of databases and research efforts related to right whales to provide the relevant management, academic and conservation groups with the best scientific advice and recommendations on right whale conservation. The Consortium is also committed to incorporating new and updated methods with its membership, providing up-to-date information on right whale biology and conservation to the public, and maintaining effective communication with U.S. and Canadian Government agencies, state authorities, the Canadian Right Whale Network, the U.S. Southeast Right Whale Implementation Team, the Atlantic Large Whale Take Reduction Team, the Atlantic Scientific Review Group, and members of Congress. The Consortium membership supports the maintenance and long-term continuity of the separate research programs under its umbrella, and serves as executor for database archives that include right whale sightings and photo-identification data contributed by private institutions, government scientists and agencies, and individuals. Lastly, the Consortium is interested in maximizing the effectiveness of management measures to protect right whales, including using management models from other fields.

The Consortium is governed by an Executive Committee and Board members who are elected by the general Consortium Membership at the Annual Meeting.

2014 ANNUAL NORTH ATLANTIC RIGHT WHALE REPORT CARD

North Atlantic Right Whale Consortium members agreed in 2004 that an annual “report card” on the status of right whales would be useful. This report card includes updates on the status of the cataloged population, mortalities and entanglement events, and a summary of current management and research efforts that have occurred over the previous 12 months. The Board’s goal is to make public a summary of current research and management activities, as well as provide detailed recommendations for future activities. The Board views this report as a valuable asset in assessing the effects of research and management over time. The 2014 annual report card includes information from 01 November 2013 – 31 October 2014.

Essential Population Monitoring

In the 2009 Report Card to the International Whaling Commission (IWC) the Consortium Board identified key monitoring efforts that must be continued and maintained in order to identify trends in the population as well as assess the factors behind any changes in these trends (Pettis, 2009). The key efforts are: (1) Photographic Identification and cataloging of right whales in high use habitats and migratory corridors, including, but not limited to, the southeast United States, Cape Cod Bay, Great South Channel, Bay of Fundy, Scotian Shelf, and Jeffreys Ledge, (2) Monitoring of scarring and visual health assessment from photographic data, (3) Examination of all mortalities, and (4) Continue using photo-ID and genetic

profiling to monitor population structure and how this changes over time. Over the last several years, surveys in areas listed above have indicated that right whale distribution and patterns of habitat use have shifted, in some cases dramatically from expectations based on previous studies. These shifts have been observed throughout the range of North Atlantic right whales and have direct implications on research and management activities, as well as on each of the key efforts identified above. As such, the Board believes that identifying potential extralimital and new critical habitats and developing alternative survey effort strategies to respond to the distributional changes should be a priority.

Additionally, the Consortium Board regards the Consortium databases as essential to recovery efforts for the North Atlantic right whale population. In a review of the federal recovery program for North Atlantic right whales, the Marine Mammal Commission agreed with the Board's sentiment, stating that "both databases play critical roles in right whale conservation" and that the Identification Catalog "is the cornerstone of right whale research and monitoring" (Reeves et al. 2007). The review went on to recommend that both databases ("both" here and above refers to the Identification and Sightings databases; there are several Consortium databases available) be fully funded on a stable basis.

Population Status

Estimate of Cataloged North Atlantic Right Whales: 2013 (see detailed explanation of calculation at end of report)

The ability to monitor North Atlantic right whale vital rates is entirely dependent on the right whale identification database. Curated by the New England Aquarium, the database consists of over 700,000 slides, prints, and digital images collected during the 65,976 sightings of 685 individual right whales photographed since 1935. Each year, 3,000 to 5,000 sightings consisting of 20-30,000 images are added to the identification database. Due to the lag time in processing data (data are currently completely processed through 2012) the most recent estimate of the cataloged population available is for 2013.

In 2013, the best estimate of cataloged North Atlantic right whales was 522 individuals (database exported 20 October 2014). Low and high estimates were also calculated (Figure 1 below). This "best estimate" is based upon the number of photographed whales, but it excludes potential unphotographed whales, and therefore should **not** be considered a "population estimate". This photo-identification estimate includes 489 cataloged whales that were presumed to be alive in 2013 because they were seen in that year, or any time in the prior five years (Knowlton et al. 1994). The estimate also includes 18 calves from 2012 or 2013 that were considered suitable for eventual inclusion in the catalog and 15 other whales that did not match the catalog, but were re-identified in at least one subsequent year (excluding sightings in field seasons that spanned the calendar year).

Low: 272 individuals
272 Cataloged whales seen in 2013
Middle: 522 individuals
489 Cataloged whales presumed alive in 2013
15 Intermatch whales likely to be added to Catalog
18 Calves from 2012 and 2013 likely to be added to Catalog
High: 686 individuals
648 All Cataloged whales in 2013 minus those known dead
17 All active intermatch codes without 2012 & 2013 calves
21 All uncataloged 2011 and 2012 calves minus dead

Figure 1. Estimates of the number of cataloged whales in the North Atlantic Right Whale Identification Catalog. A detailed explanation of calculations can be found at the end of this report. Analysis completed 10/20/14.

Population Over Time

Below are assessments of the number of photo-identified right whales within the population over time based on three available methods. The presumed alive method counts whales that have been seen at least once in the last six years. It is a consistently measureable and easily available value, but is not an accurate estimate of recent cataloged population size due to delays in data processing. The Minimum Number Alive (MNA) is the number used in the NMFS stock assessment reports and counts whales seen in a given year, plus any whale not seen that year- but seen both before *and* after. The MNA number is also not accurate for recent years for the same reason as the presumed alive, plus the fact that there have been fewer “after” years to detect a whale. The report card number is the only number that assesses animals that are not yet cataloged and is the best number for the previous year.

For the graph below, the numbers for presumed alive and MNA for all years were recalculated using data from October 20, 2014; only the numbers from past report cards were not regenerated. The report card numbers are always higher than the other two methods for the last two years. However, the fact that the old report card numbers for 2009 and 2010 are now close but below the regenerated presumed alive numbers indicates that the report card method provides a conservative, relatively accurate count, and is able to do so several years in advance of the other analyses. Also, the 2009 stock assessment report put the population number in 2005 and 2006 50 animals lower than the report card (see 2010 Report Card). But the updated MNA’s show them now to be nearly identical. The report card was able to do that several years ahead of the SARS reports.

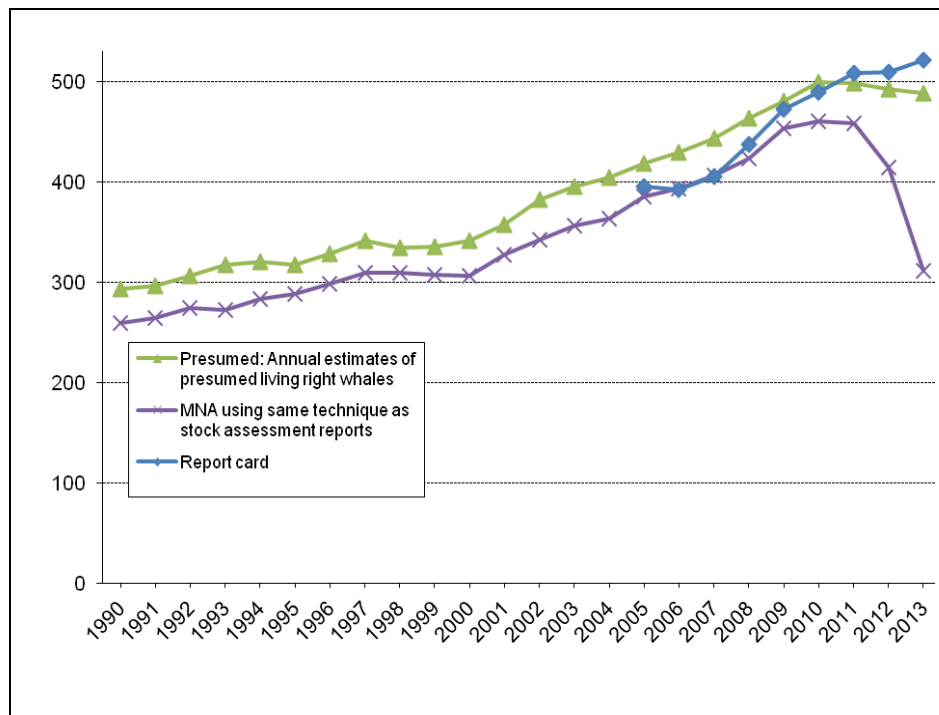


Figure 2. Assessments of the North Atlantic right whale population based on three available assessment methods.

Reproduction

There were 11 documented calves born in 2014 (Table 1). The average calving interval of 2014 moms was 4.4 years and there was one first time mom in 2014.

Table 1. Summary of calving events and associated interval times for North Atlantic right whales 2005-2014.

Year	Calf Count	Average Interval	Median Interval	First Time Moms
2005	28	3.65	3	5
2006	19	3.21	3	5
2007	23	4.54	3	10
2008	23	3.19	3	7
2009	39	3.97	4	8
2010	19	3.33	3	4
2011	22	3.74	3	3
2012	7	5.40	4	2
2013	20	4.62	4	7
2014	11	4.40	4.5	1

Mortalities

Between 01 November 2013 and 31 October 2014, four right whale mortalities were documented (Table 2). The Consortium Board recognizes necropsies as significant data collection events that provide valuable information on which management and conservation measures can be (and have been) made. The Board views consistent necropsy response and support (both financial and personnel) as critical to monitor both right whale recovery and the efficacy of management actions. **Genetics confirmed the 8/26/2014 carcass to be Eg #3966. The table below was updated with that information on 22 October 2015 and therefore the number of 2014 mortalities was three.**

Table 2. Documented right whale mortalities, 01 November 2013 - 31 October 2014

Whale #	Date	Location	Sex	Age	Necropsy Field #	Cause	Comments
#3966	07/12/2014	18nm SE Tuckernuck Island, MA	Male	5	IFAW14_122Eg	Undetermined	Video of floating carcass discovered on Youtube. Details of sighting obtained and carcass relocated on 07/17/2014. At sea examination. Skin, muscle, blubber collected. Whale last sighted alive on 09/09/2013 in Mass. Bay. *on 8/26/2014 a very badly decomposed carcass was found in Newport, RI. Flipper bones, vertebrae and skull collected. Genetic sampling confirmed this carcass to be #3966. Report card updated 10/22/2015 with this information.
	08/26/2014	Newport, RI	Unk	Unk	IFAW14_142Eg	Undetermined	Very decomposed carcass. Flipper bones, vertebrae and skull collected. Possibly #3966, need genetic confirmation. *Genetics confirmed this carcass to be #3966. 10/22/2015

	09/04/2014	115 nm South of Newfoundland	Unk	Unk		Likely Entanglement	Entangled, not sampled
	09/27/2014	35 nm SE Martha's Vineyard	Unk	Unk	IFAW14-156Eg	Likely Entanglement	Entangled, not sampled

Vessel Strikes, Entanglements, and Entrapments

Vessel Strikes:

There were no right whales sighted with new propeller wounds between 01 November 2013 – 31 October 2014.

Entanglement and Entrapments

There were 10 active entanglement/entrapment cases reported between 01 November 2013 and 31 October 2014. Of these, 7 were new cases and 2 resulted in mortality. Table 3 includes newly reported cases as well as pertinent updates to previously reported cases.

Table 3. Right whale entanglements and status updates 01 November 2013 – 31 October 2014. Newly reported entanglements (carrying gear) are bolded and those cases resulting in mortality are italicized.

Whale #	Date of First Entanglement Sighting	First location	Sex	Age (current)	Comments
3346	3/17/2004	2 miles E Anastasia Island, FL	Male	11	Gear remains on right flipper, resighted 06/29/2014 (George's Basin) and 8/20/2014 (Roseway Basin)
3821	1/07/2012	Cape Cod Bay	Unk	6	Previously entangled in 2009. Resighted Jan-Feb 2012 (CCB), May 2012 (GSC), April 2013 (CCB) and Apr 2014 (CCB). There was no evidence of significant change in entanglement configuration at last sighting.
3946	9/20/2013	Roseway Basin	Female	5	Sighted gear free on 03/25/14 (CCB).
4057	2/16/2014	40 mile east Jacksonville, FL	Male	4	Partially disentangled. Line remains in mouth. Resighted 4/12/2014 in CCB, still entangled.
1142*	4/01/2014	100 miles east of NJ	Female	Unk, Adult	Sighted with rostrum wrap. *Identification has not yet been confirmed and likely will not be without additional sightings.
	6/29/2014	100 miles south of Yarmouth, Nova Scotia	Unk	Unk	The entanglement is extensive and appears to involve rope only. There is at least one wrap of the rostrum, but likely two. Line exiting the left mouthline include two lengths of line, one ending at a bitter end 20 feet aft of the flukes, the other at depth, ending in a large mass of what appears to be line. Exiting the right mouthline is a loop of line cleating the right flipper. Whale in very poor condition: thin, pale, and extensive cyamid coverage. Whale identification unlikely.
4001	9/04/2014	8 miles SE Grand Manan	Male	4	Rostrum wrap, likely lethal.
	<i>9/04/2014</i>	<i>115 nm South of Newfoundland</i>	<i>Unk</i>	<i>Unk</i>	<i>Observed floating dead by aerial pollution patrol. Entangling line present on rostrum and body. Carcass not recovered (see also mortality table).</i>

3279	9/17/2014	10 miles SE Grand Manan	Male	12	Line over the head, cutting into the nares. The anchoring points at either end of this length of line are unknown but presumed to be the flippers and/or the mouth. Scarring at the peduncle suggests that there was or is some trailing line, at least to the flukes.
	9/27/2014	35 nm SE Martha's Vineyard	Unk	Unk	Found floating dead, with entangling line. Carcass not recovered (see also mortality table).

Aerial and Vessel-based Sightings November 2013 – October 2014

Cataloged sighting information through 31 October 2014 is summarized below and includes survey, research, and opportunistic sightings. Months with sightings and major contributing organizations (>10% total sightings for region) are listed after total number of sightings. Summaries of survey type (if available) are listed below each region. Not all data have been received and/or entered. Survey platforms and sighting totals may change.

Major Contributing Organizations:

- | | |
|---|--|
| CCG: Canadian Coast Guard | NEAq: New England Aquarium |
| CCS: Center for Coastal Studies | NEFSC: Northeast Fisheries Science Center |
| CWI: Canadian Whale Institute | S2S: Sea to Shore Alliance |
| DFO: Department Oceans and Fisheries Canada | UNCW: University North Carolina Wilmington |
| FWRI: Fish and Wildlife Research Institute | VAQF: Virginia Aquarium and Marine Science Center Foundation |
| GDNR: Georgia Department of Natural Resources | |
| MICS: Mingan Island Cetacean Society | |

Southeast United States (sightings: 222, December - March; FWRI, GDNR, S2S)

- Aerial surveys, biopsy darting, acoustic studies and vessel based photo-ID

Mid-Atlantic (includes south of Cape Cod) (sightings: 36, February - April, July - September; NEAq, NEFSC; VAQF/UNCW)

- Aerial surveys

Great South Channel (sightings: 15, January - May, July; NEFSC, CCS)

- Aerial surveys

Massachusetts Bay/Cape Cod Bay (sightings: 640, December – April, October; CCS)

- Aerial and vessel surveys and habitat sampling

Jeffreys Ledge (sightings: 1, April; NEFSC)

- There were no systematic surveys on Jeffreys Ledge

Gulf of Maine (sightings: 43, January, March – April, July; DFO, NEAq)

- Aerial surveys

Bay of Fundy (sightings: 204, July - September; NEAq)

- Vessel surveys

Roseway Basin (sightings: 66, June, August – September; CWI)

- Vessel surveys

North (sightings: 30, November, June - September; CCG, DFO, MICS)

- Vessel surveys

Partial Listing of Research Analyses Underway in 2014

- Investigate association trends based on age, sex, reproductive status and on individual level in Cape Cod Bay
- Investigating the role of tidal cycle in spatial and temporal variation in right whale sightings within and transitions between the Grand Manan and Roseway Basin Critical Habitat Areas
- Seasonal occurrence, distribution, and demographics of North Atlantic Right Whales in the Gulf of St. Lawrence and around Newfoundland and implications for management.
- Distribution, relative density, habitat use patterns and movements of right whales in the Mid-Atlantic region
- Assessing the structure and function of marine mammal vibrissae including those of the North Atlantic right whale
- Using immunoassays to detect a variety of steroid and thyroid hormones in right whale blow samples.
- Assessing characteristics of right whale vision
- Passive acoustic detection of right whales
- Foraging characteristics of right whales
- Modeling right whale habitat
- Estimating health and survival of right whales
- Assessing role of anthropogenic injury on right whale visual health

Management and Mitigation Activities

United States

-On 9 December 2013, a 5-year “sunset” provision contained in the rule was removed. NOAA Fisheries received a petition to exclude federally-maintained port entrance channels from the requirements of the rule; and on 30 January 2014 we published a Federal Register notice of receipt of, and requesting public comment on, the petition. Public comment period went until 03 March 2014. Comments in response to this request and next steps are currently under consideration.

-NMFS recently published an amendment to the Atlantic Large Whale Take Reduction Plan on June 27, 2014 (79 FR 36586) to address large whale entanglement risks associated with vertical line (or buoy lines) from commercial trap/pot fisheries. This amendment included gear modifications, gear setting requirements, a seasonal closure (Massachusetts Restricted Area) and gear marking for both the trap/pot and the gillnet fisheries.

-NOAA called for 8 Dynamic Management Area (DMA) voluntary speed reduction zones between 01 November 2013 and 31 October 2014:

- 12/13 3nm south of Provincetown
- 1/15 26nm south of Nantucket
- 3/1 21nm south of Nantucket
- 3/5 4nm southeast of Nantucket
- 4/2 28nm south of Nantucket
- 4/7 13nm northeast of Nantucket
- 7/30 70nm east of Portland
- 8/8 13nm south of Portsmouth

Canada

The Department of Fisheries and Oceans Canada (DFO) coordinates a national Marine Mammal Response Program (MMRP) that supports the work of organizations and networks involved in marine

mammal incident responses on all Canadian coasts. The Marine Mammal Response Program works with partners to:

- Track and responds to marine mammal entanglements, strandings (dead & live), ship strikes, contaminated animals (oiled), and other threats;
- Gathers information through necropsies, sampling and sightings to quantify threats affecting marine mammal species, with a special focus on species assessed as at risk;
- Provide data and information to support Species at Risk recovery planning initiatives, mitigation options, and policy development; and,
- Collaborates with the appropriate authorities on enforcement cases.

DFO Fishery Officers (FOs) have spent 192 *dedicated* hours in right whale patrols since April 2013; this excludes patrol time included as part of multi-species patrols. All FOs receive training on basic marine mammal response protocols and species identification. FOs work to educate mariners about reporting incidents and sightings and how to avoid negative interactions. In 2014, a total of 22 FOs received basic whale disentanglement training so that they can provide assistance to response partners when incidents occur.

DFO (Lei Harris) collaborated with the New England Aquarium (Moirra Brown) for the development of a species identification field guide for aerial surveys. The guide includes aerial images and sightings cues for large whales, turtles and basking sharks to aid airborne DFO Fishery Officers in identifying marine species.

This year, 2014, is the third year of the “Wanted! North Atlantic Right Whales” outreach campaign soliciting right whale sighting information from the public in areas outside of the known critical habitat. Posters and pamphlets have been distributed to over 300 wharves, community bulletin boards, Canadian Coast Guard (CCG) vessels, ferries, whale watch companies and DFO area offices in Prince Edward Island, Nova Scotia, New Brunswick, Quebec, and Newfoundland. In 2014, the Canadian Whale Institute and Canadian Sea Turtle Network assisted with the distribution of materials. In addition, information is being distributed to fishermen directly with their fishery logbook. Sightings received are entered in DFO’s Maritimes Region Cetacean Sightings Database, and shared with the New England Aquarium. DFO works with the Canadian Coast Guard (CCG) to broadcast notices to shipping, “NOTSHIPS” reminders about the two right whale CH areas. These broadcasts notify vessels to watch for right whales, to report sightings, and to avoid collisions.

Bay of Fundy Right Whale / Lobster Mitigation Strategy

This Strategy was developed in 2007 as an initiative of lobster fishery associations in the Bay of Fundy. The Grand Manan Fishery Association has a telephone hotline and a website and for reporting and mapping right whale sightings (<http://gmfa.nb.ca/right-whale-sightings/>). DFO research projects that incorporate passive acoustic monitoring (PAM) for multiple whale species, including NARW, are ongoing on the Scotian Shelf (Hilary Moors-Murphy) and in the Gulf of St. Lawrence (Yvan Simard). These projects are ongoing and data analyses are underway. The collaborative project with JASCO Applied Sciences now has two years (Oct 2012-Sept 2014) of near-continuous data collected from three locations along the eastern Scotian Slope.

References

Pettis, Heather. North Atlantic Right Whale Consortium Annual Report Card (01 November 2007 – 30 April 2009). International Whaling Commission Annual Meeting, May 2009. Reference Document *SC/61/BRG1*.

Reeves, Randall R., Andrew J. Read, Lloyd Lowry, Steven K. Katona, and Daryl J. Bonnes. Report of the North Atlantic Right Whale Program Review. 2007. Marine Mammal Commission. Bethesda, Maryland.

Population Estimate Calculation

We have developed standardized criteria that can be applied each year to get a low, middle (best estimate) and upper number of whales in the population as determined from Catalog data. One term needs to be explained to understand these numbers. Whales are given temporary intermatch codes if 1) two or more sightings match each other, and 2) neither have been matched to a catalog whale. Some of these whales will eventually be matched to existing cataloged whales and others will be determined to be “new” to the Catalog and assigned a number. Once an intermatch whale is given a Catalog number, or matched to another intermatch code whale, the intermatch code is made inactive.

LOWER

To determine the lower bound, we simply count the number of unique cataloged whales identified the year before. Because of delays in processing data, this number is lower than the eventual total number of whales seen alive in that year.

MIDDLE

The middle bound is determined by summing three categories:

- 1) All whales presumed to be alive in that year (i.e., seen in the last six years),
- 2) Intermatch whales that are likely to be added to the Catalog. This is calculated by first finding all intermatch codes that span two or more years (both those that are active and those that were matched and made inactive), removing all calves and any SEUS whales whose sightings span two years only because they are seen in December and January of the same field season. Then, we determine which of those intermatch whales have Catalog numbers and what percent of those were new to the catalog (i.e. had not been matched to an existing cataloged whale). The remaining, unidentified intermatch whales are then multiplied by that fraction to determine how many are likely new to the Catalog (e.g., if only 20% of the matched intermatch whales were new, then 20% of the unmatched intermatched whales are likely new). That number is then added to the count of calves born more than two years earlier that are unmatched with active intermatch codes (indicating there is enough information to potentially match them in the future). Process changed Oct. 2009.
- 3) Calves from the last two years that have not been cataloged. We make an assessment of whether there is enough photographic information to match them to future sightings and thus assign them a Catalog number. We then sum those that will likely be cataloged.

UPPER

The upper bound is also the sum of three categories:

- 1) All Cataloged whales minus those whose carcasses were identified.
- 2) All active intermatch whales minus calves from the last two years.
- 3) All calves from the last two years minus those known to be dead.