

North Atlantic Right Whale Consortium 2011 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, and continued analyses of existing databases has increased significantly over the past fifteen 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 and provincial authorities.

The Consortium's mission is to ensure the survival of North Atlantic right whales. To accomplish this goal, the Consortium membership is committed to long-term research and management efforts and to coordinate and integrate the wide variety of databases and research efforts related to right whales to provide the relevant management 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 and provincial authorities, the Canadian Right Whale Network, the U.S. Right Whale Implementation Teams, the Atlantic Large Whale Take Reduction Team, the NMFS 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.

2011 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 2010 annual report card includes information from November 1 2010 – October 31 2011.

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 in 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. The Board maintains that these efforts remain critical to right whale conservation.

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 other Consortium databases available) be fully funded on a stable basis. Since that review, funding for the Sightings database has been cut by half over the previous year and by two-thirds over the peak level in 2005. The Identification database has received annual budget increases of 3-4%, but on average, the number of sightings contributed annually has increased more than that. As a result, in high sighting years, identification processing falls farther behind. If the population continues to increase and survey effort remains stable, this will lead to an increasing problem in timely processing of data.

Population Status: 2010

Estimate of Cataloged North Atlantic Right Whales: 2010 (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 500,000 slides, prints, and digital images collected during the 58,000 sightings of over 620 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 2009) the most recent estimate of the cataloged population available is for 2010.

In 2010, the best estimate of catalogued North Atlantic right whales was 490 individuals. 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 456 cataloged whales that were presumed to be alive in 2010 because they were seen in that year, or any time in the prior five years (Knowlton et al. 1994). The estimate also includes 21 calves from 2009 or 2010 that were considered suitable for eventual inclusion in the catalog and 13 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).

2010 Report Card

Low: 268 individuals 268 Cataloged whales seen in 2010
Middle: 490 individuals 456 Cataloged whales presumed alive in 2010 13 Intermatch whales likely to be added to Catalog 21 Calves from 2009 and 2010 likely to be added to Catalog
High: 680 individuals 600 All Cataloged whales in 2010 minus those known dead 24 All active intermatch codes without 2009 & 2010 calves 56 All uncataloged 2009 and 2010 calves minus dead

Analysis 10/21/11

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 10/21/11.

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 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 report card number is the only number that assesses animals that are not yet cataloged and is the best number for the previous year. The fact that all but the last report card number are below the blue line means that the numbers in the report card are conservative. The stock assessment numbers, which represent minimum number of cataloged whales alive, are published annually but are conservative and have a substantial delay.

It is important to note how close the older report card numbers (ie 2006-2007) are to the stock assessment estimations. This suggests that the report card method of estimation is able to provide information on the minimum population size 2-3 years sooner than the stock assessment reports are published with that given year's count.

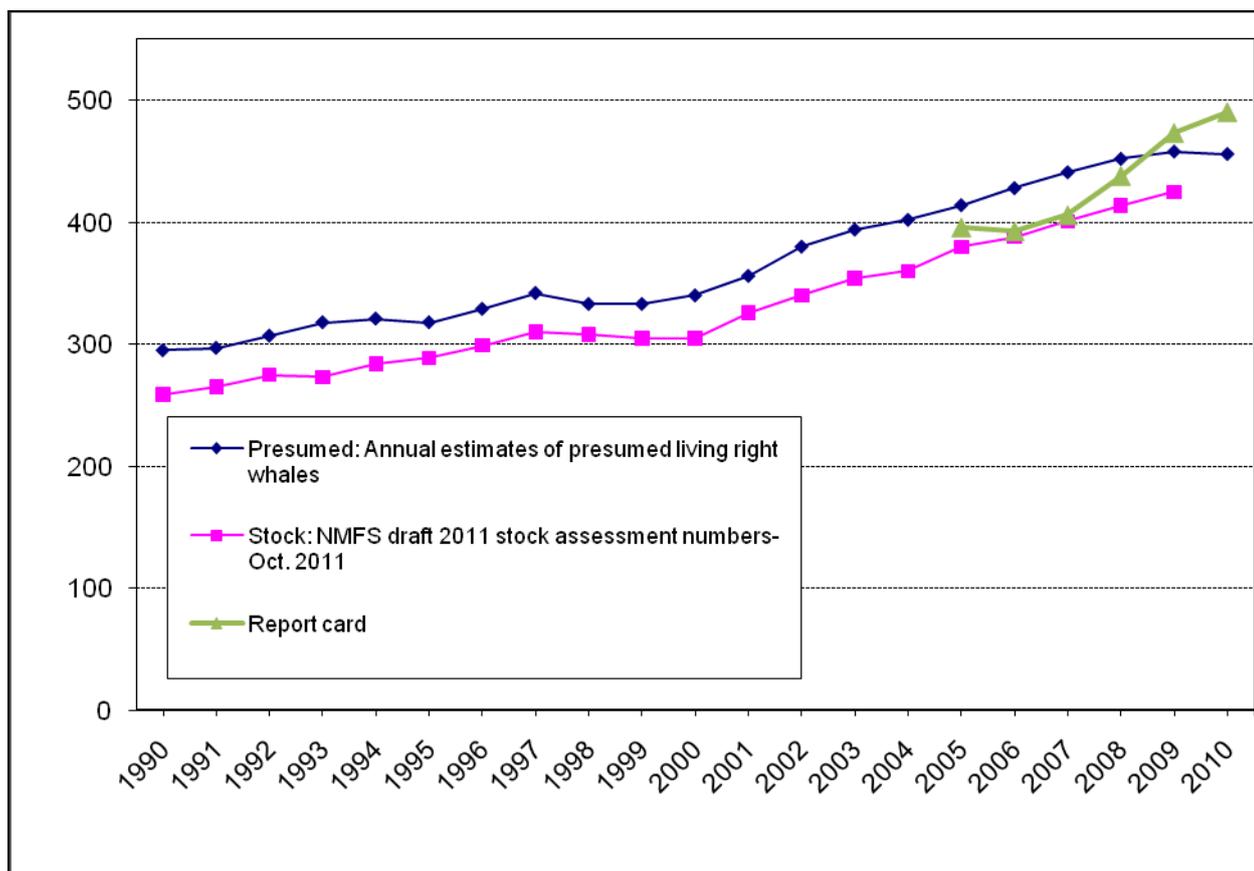


Figure 2. Assessments of the North Atlantic right whale population based on three available assessment methods.

Reproduction: 2011

22 calves were born this year.
 Average calving interval of 2011 moms was 3.78 years.
 There were five first time moms.

Mortalities

Between 01 November 2010 and 31 October 2011, five right whale mortalities were documented (Table 1). Since the 2005 Report Card, 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.

Table 1. Documented right whale mortalities 01 November 2010- 31 October 2011

Whale	Date	Location	Sex	Age	Necropsy Field #	Cause	Comments
3911	02/01/2011	30 miles SSE of St. Augustine Inlet	Female	2	EgNEFL1103	Proximate: weight loss and cachexia from chronic entanglement. Ultimate: shark predation secondary to weakened state from chronic entanglement.	Entangled, disentanglement efforts and sedation
--	02/19/2011	Floating off SC	unk	unk	--	--	Carcass not recovered

Table 1 continued

--	03/16/2011	Cape Island, SC	unk	unk	SC118	Injuries related to an entanglement around the right pectoral fin.	Entangled, Possibly BK01SEUS10, thought to be Mn at necropsy
1303	03/17/2011	Floating off Virginia, relocation efforts unsuccessful	Reproductive Female	unk, first seen 1979	--	--	Carcass not recovered
1308	03/27/2011	Nags Head, NC	Reproductive Female	28	NCARI006	Skull fractures consistent with vessel strike.	Mother of year, calf assumed to have died

Non-Fatal Entanglements and Vessel Strikes

These cases are classified as non-fatal because the animals were alive when last seen.

Entanglements:

There were 39 known entanglement sightings involving 15 cases/individuals, 11 of which were new cases, reported between 01 November 2010 and 31 October 2011. Table 2 includes these newly reported cases as well as pertinent updates to previously reported cases. Whales carrying gear are bolded.

Table 2. Right whale entanglements and status updates 01 November 2010 – 31 October 2011. Newly reported entanglements (carrying gear) are bolded.

Whale#	Date of First Entanglement Sighting	First location	Sex	Age (current)	Comments
1980	02/03/2008	Cape Hatteras, NC	Male	Adult, first sighted 1989	Sighted gear free 04/19/2011
3911	12/25/2010	Offshore of Jacksonville, FL	Female	2	Sedation and disentanglement Found floating dead 2/01/2011
3120	10/20/2010	Jeffreys Ledge	Male	10	Confirmed gear free 9/17/2011
3010	01/19/2011	15miles E of St. Augustine, FL	Female	11	Likely entangled between 12/31/2010 and 01/19/2011, confirmed gear free 04/26/2011
3712	01/31/2011	9miles ESE of St. Augustine, FL	unk	4	Sighted possibly gear free 04/10/2011, further assessment necessary
3760	02/13/2011	34 ESE of Brunswick, GA	unk	4	Gillnet through mouth, disentangled 02/13/2011, sighted gear free 04/25/2011
BK01SEUS10	02/13/2011	22 SSE of Tybee, GA	unk	unk	Flipper wrap, likely same as dead whale necropsied 03/16/2011
3893	03/17/2011	12 miles SSE of Provincetown, MA	unk	3	Seen entangled 04/19/2011, later discovered entanglement present 03/17/2011. Resighted 04/25/11 suggests likely gear free

Table 2 continued

SO44	04/22/2011	2 miles WSW of Pamet Harbor, Truro, MA	unk	unk	Disentangled
3302	04/22/2011	2miles east of Southern Wolf Island, Bay of Fundy	Male	8	Entanglement first noticed in BOF 09/26/2011, later noticed in April sighting. Line very difficult to see
3123	04/29/2011	off Billingsgate Shoal, Cape Cod Bay	Female	10	Red line at low right mouthline, resighted 09/18/2011 still entangled
2010CalfOf3360	09/18/2011	Jeffreys Ledge	unk	1	Gillnet mesh and line at head and flukes, whale observed struggling at surface
3111	09/27/2011	10miles E of Grand Manan Island, BOF	Male	10	Line trailing from head and flipper, disentanglement attempt, unclear if successful cuts were made

Vessel Strikes:

Six right whales were sighted with new propeller wounds between 01 November 2010 – 31 October 2011. Additionally, one whale was discovered with new propeller wounds on 02/20/2010 but was not previously reported (Table 3).

Table 3. Newly reported right whale propeller wounds 01 November 2009 – 31 October 2010. One whale, Eg #3650 acquired propeller wounds outside of this time frame but was not previously reported on.

Whale#	Date of propeller wound sighting	Sex	Age (current)	Description
3650	02/20/2010	Female	5	Small series of cuts on left side
3140	12/18/2010	Male	10	Deep wound forward of peduncle, likely from skeg or prow
3966	12/21/2010	Male	2	White scars on left flank
2010CalfOf3123	01/19/2011	unk	1	Wounds on right peduncle
3853	01/20/2011	unk	3	Massive cuts across length of back
3945	02/21/2011	Male	2	Wounds over blowholes
CT01MB2011	08/03/2011	unk	unk	Moderately deep cuts of right shoulder

Aerial and Vessel-based Sightings November 2010 – October 2011

Cataloged sighting information through 31 October 2011 and includes survey, research, and opportunistic sightings. Major contributing organizations (>10% total sightings for region) listed after total number of sightings. Not all data have been received and/or entered. Survey platforms and sighting totals may change.

Major Contributing Organizations:

FWRI: Fish and Wildlife Research Institute
NEAQ: New England Aquarium
NEFSC: Northeast Fisheries Science Center
PCCS: Provincetown Center for Coastal Studies
WCNE: Whale Center of New England
WT: Wildlife Trust

Southeast United States (sightings: 722; FWRI, WT)

- Aerial surveys December through March 2009-2010
- Biopsy darting and vessel photo-ID

New England (sightings: 862; PCCS)

- Aerial surveys and habitat sampling January – May

Jeffrey's Ledge (sightings: 35; NEFSC, WCNE)

- Aerial and vessel surveys November – December 2010, April 2011

Great South Channel (sightings: 134; NEFSC, PCCS)

- Aerial surveys January – May

Gulf of Maine (sightings: 110; NEFSC, NEAq)

- Aerial surveys November 2010 – January 2010
- Vessel surveys November – December 2010

Bay of Fundy (sightings: 672; NEAq)

- Vessel surveys August-September
- Biopsy, fecal, and exhalation sampling

Mid-Atlantic (sightings: 102; NEFSC, PCCS, WT)

- Aerial surveys December 2010 – April 2011

Partial Listing of Research Analyses Underway in 2011

- PCAD modeling of right whale calving and survival.
- Estimate the length of the fasting portion of lactation.
- Investigate the correlation between annual variation in nutritional quality of *C. finmarchicus* in the Bay of Fundy and number of right whale calves produced in subsequent years.
- Investigate the ability of the Geographic Information System (GIS) based spatial habitat model Biomapper to predict habitat suitability of right whales.
- Estimating the NARW population size using Bayesian statistical modeling.
- Modeling the North Atlantic Right Whale reproductive cycle as a function of the *Calanus finmarchicus* abundance index in the Gulf of Maine and the surrounding region.
- Marine Spatial Planning (MSP) project to consider offshore wind power development off the Delaware coast.
- Investigating right whale habitat connectivity.
- Analysis of North Atlantic right whale social behavior.
- Mitigating risk to whales from lobster fishing.
- Occurrence of marine megavertebrates in the Nantucket Sound/Muskeget Channel (northeast USA) proposed marine renewable development areas.
- Examining timeframe of body condition decline in.
- Evaluation of right whale capabilities.
- Investigating the effects of entanglement on right whale survival and reproduction.

Management and Mitigation Activities

- NMFS announced the availability and solicited comments on a draft national policy, comprised of a Policy Directive and associated Procedural Directive, for distinguishing serious from non-serious injuries of marine mammals (76 FR 42116).

The draft Directives were developed by reviewing injury determinations from 1997–2008, current scientific information, and a new analysis of existing NMFS data. Deadline for comments was August 17, 2011.

- As required by the Marine Mammal Protection Act (MMPA), NMFS incorporated public comments into revisions of marine mammal stock assessment reports (SARs). The 2010 reports were finalized and made available to the public (76 FR 34054).
- NMFS reviewed the Alaska, Atlantic, and Pacific regional marine mammal stock assessment reports (SARs) in accordance with the Marine Mammal Protection Act. SARs for marine mammals in the Alaska, Atlantic, and Pacific regions were revised according to new information. NMFS solicited public comments on draft 2011 SARs. Comments must be received by November 22, 2011 (76 FR 52940).
- During the 2010/2011 right whale calving season, four Dynamic Management Areas (DMA) were established in the Southeast U.S. based on criteria described in the preamble of the federal register notice announcing the final rule to implement speed restrictions to reduce the threat of vessel collisions with North Atlantic right whales (73 FR 60173). Size of DMAs is determined by number and distribution of right whales. Mariners were encouraged to avoid these areas or reduce speeds to 10 knots or less while transiting through these areas.
- NOAA's National Marine Fisheries Service (NMFS) intends to expand large whale conservation efforts by amending regulations that implement the Atlantic Large Whale Take Reduction Plan (ALWTRP). As part of that process, NMFS is developing an Environmental Impact Statement (EIS). NMFS conducted 15 public scoping meetings during July and August to involve the public in developing ideas to reduce the risk of serious injury or mortality of large whales that interact with vertical lines (buoy lines) from commercial trap/pot and gillnet fishing gear. The feedback from the scoping meetings will inform the development of the EIS. NMFS is committed to publishing a final rule to address vertical line entanglement by 2014.
- Fisheries and Oceans Canada (DFO) has been preparing an Action Plan which, based on the recommendations of the Recovery Network, focuses on the threat of entanglement in fishing gear. An early draft of the Action Plan has been reviewed by stakeholders and recovery partners in the spring of 2011. During the summer and fall the document has been developed further and is undergoing internal DFO review. DFO expects to make a new draft available for stakeholder and Network review in the fall of 2011, and to publish the document in the spring of 2012.
- DFO has been developing a Protection Order under the Species at Risk Act that prohibits the destruction of any part of right whale critical habitat in Canadian waters.
- Meanwhile DFO has been continuing its activities to reduce the likelihood of right whales encountering fishing gear.
 - o DFO continues to support the Lobster Mitigation Strategy in Lobster Fishing Areas 36, 37 and 38.
 - o In partnership with Dalhousie University scientists, DFO has completed analyses of the relative risk of right whales interacting with different fisheries in Maritimes region.
 - o Efforts to train Fishery Officers to conduct disentanglements, while being met with some setbacks, are continuing. Caches of gear have been distributed, and interest from Officers is high.
 - o DFO support for non-government disentanglement teams (mainly Campobello Whale Rescue Team) continues. Able to secure a second fast rescue craft (FRC) for them, which has benefited the team's efforts.
 - o Trying to increase surveys (be it vessel-based or aerial) just before and during the opening of the lobster season in November.

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.