

North Atlantic Right Whale Consortium 2013 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.

2013 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 2013 annual report card includes information from 01 November 2012 – 31 October 2013.

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 other

Consortium databases available) be fully funded on a stable basis. Since that review, funding for the Sightings database has steadily declined. Support in 2011–2013 was cut by half over the previous year and by two-thirds over the peak level in 2005, and the database contract was not renewed when it expired at the end of August 2013. At the present time, there is no funding for either addition and quality-control of new data, or for responding to data-sharing requests. We are investigating alternatives and options, including asking those requesting data to cover those costs, but no resolution has been reached as yet. 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: 2012

Estimate of Cataloged North Atlantic Right Whales: 2012 (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 63,527 sightings of 680 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 2011) the most recent estimate of the cataloged population available is for 2012.

In 2012, the best estimate of catalogued North Atlantic right whales was 510 individuals (database exported 25 October 2013). 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 492 cataloged whales that were presumed to be alive in 2012 because they were seen in that year, or any time in the prior five years (Knowlton et al. 1994). The estimate also includes 7 calves from 2011 or 2012 that were considered suitable for eventual inclusion in the catalog and 11 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).

2012 Report Card	
Low: 295 individuals	
295	Cataloged whales seen in 2012
Middle: 510 individuals	
492	Cataloged whales presumed alive in 2012
11	Intermatch whales likely to be added to Catalog
7	Calves from 2011 and 2012 likely to be added to Catalog
High: 682 individuals	
648	All Cataloged whales in 2012 minus those known dead
20	All active intermatch codes without 2011 & 2012 calves
14	All uncataloged 2011 and 2012 calves minus dead

Analysis 10/25/13

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.

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 counts whales that have been seen at least once in the last six years. It is a consistently measurable 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, all numbers were recalculated using data from October 25, 2013 except the report card from previous years. 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 regenerate 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.

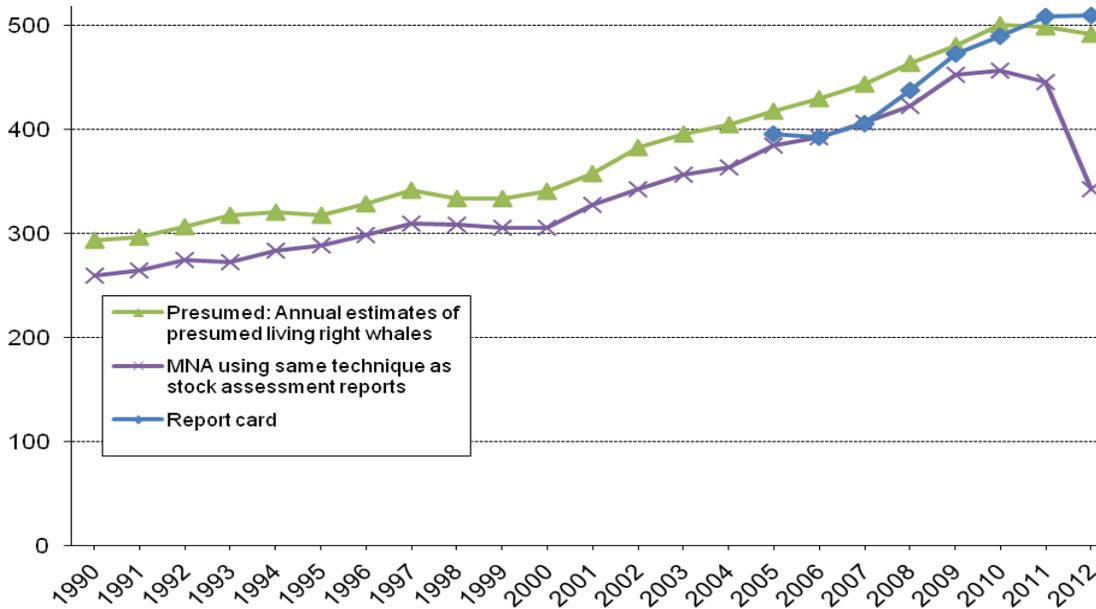


Figure 2. Assessments of the North Atlantic right whale population based on three available assessment methods.

Reproduction

There were 20 documented calves born in 2013 (Table 1). The average calving interval of 2013 moms was 4.6 years. There were seven first time moms in 2013.

Table 1. Summary of calving events and associated interval times for North Atlantic right whales 2004-2013.

Year	Calf Count	Average Interval	Median Interval	First time moms
2004	16	3.58	3	4
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

Mortalities

Between 01 November 2012 and 31 October 2013, two 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.

Table 2. Documented right whale mortalities, 01 November 2012 - 31 October 2013

Whale #	Date	Location	Sex	Age	Necropsy Field #	Cause	Comments
#4193	12/18/2012	Florida	Male	2	NEFL 1235	Malnourishment resulting from chronic entanglement	Floating with entangling line and buoy around peduncle. Last sighted alive 01/28/2012 (FL) and was not entangled at that time.
#1311	08/11/2013	13 miles SSE of Cape Point, Cape Hatteras	Male	30	NCUR130811 Level A and B data collected based on video provided from fisherman. Carcass not retrieved, not sampled.		Found by sports fishermen. Floating with line entering mouth and associated wrapping wounds around head. Significant shark scavenging on carcass. Last seen alive 04/21/13 (CCB) and was not entangled at that time.

Vessel Strikes, Entanglements, and Entrapments

Vessel Strikes:

Three right whales were sighted with new propeller wounds between 01 November 2012 – 31 October 2013 (Table 3). A fourth vessel-struck whale was reported and although no images were taken, is presumed to have been a right whale based on detailed description.

Table 3. Newly reported right whales with propeller wounds 01 November 2012 – 31 October 2013. Grey row represents probable right whale strike.

Whale #	Date of propeller wound sighting	Sex	Age (current)	Description
UNK	12/7/2012 (GA)	Unk	Unk	Whale struck by 46' boat, 60' pool of blood reported. Species ID probable right whale based on description. No images taken.
2013Calfof1612	01/29/2013 (FL)	Unk	1	Small prop cuts/skeg mark on right body. Injury sustained between 01/21/2013 (FL) and 01/29/2013 (FL)
3692	03/07/2013 (MIDA)	Female	Unk (Adult)	Prop cuts to right fluke. Possible additional damage to the right fluke tip (ie partially severed) but unable to fully document from the air. Injury sustained between 02/24/13 (SEUS) and 03/07/2013 (MIDA)
3705	04/08/13 (CCB)	Female	6	Right fluke partially severed. Injury sustained between 02/23/13 (CCB) and 04/08/2013 (CCB)

Entanglement and Entrapments

There were 7 active entanglement/entrapment cases reported between 01 November 2012 and 31 October 2013. Of these, 4 were new cases and 2 resulted in mortality. Table 4 includes these newly reported cases as well as pertinent updates to previously reported cases.

Table 4. Right whale entanglements and status updates 01 November 2012 – 31 October 2013. 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	03/17/2004	2 miles E Anastasia Island, FL	Male	10	Gear remains on right flipper, resighted 9/06/2013 (BOF)
3821	01/07/2012	Cape Cod Bay	Unk	5	Previously entangled in 2009. Resighted Jan-Feb 2012 (CCB), May 2012 (GSC), April 2013 (CCB). The whale is still entangled with a short loop of line with several cork floats exiting the posterior of the right mouth. No wraps were seen and photographs confirmed that the left side of the mouth is currently clear of line. The entanglement does not appear to be life threatening.
1719	01/19/2012	20 miles NE Brunswick, GA	Female	Unk, Adult	Confirmed gear-free March 18, 2013.
4193	12/18/2012	Florida	Male	2	<i>Discovered floating dead with entangling line and buoy around peduncle. Cause of death likely malnourishment resulting from chronic entanglement. Case #NEFL 1235 (see also mortality table).</i>
3123	07/14/2013	Offshore Virginia	Female	12	Sport fishermen sighted #3123 on 07/14/2013 carrying line through the mouth and heading down, into the water column, where the lines twisted together. Presumably some relatively heavy gear was on the end of these lengths of line, as was a buoy line leading to polyballs. Fisherman entered the water and made a cut to the line exiting the right side of the mouth causing visible gear to slide out of whale's mouth and sink. Further documentation and assessment of whale needed to confirm that the whale is gear free. Whale was previously entangled in 2011.
<i>1311</i>	<i>08/11/2013</i>	<i>13 miles SSE of Cape Point, Cape Hatteras</i>	<i>Male</i>	<i>30</i>	<i>Discovered floating dead by sport fishermen. Gear was seen extending from the whale's mouth but was not seen wrapped on any appendage. Significant shark scavenging noted. Case NCUR130811 (see also mortality table).</i>
3946	09/20/13	Roseway Basin	Female	4	Whale sighted with line running through the mouth extending to a tangle of line and a single, small buoy. Unsuccessful grapple attempts to attach telemetry buoy. Previously sighted with significant entanglement wounds on peduncle and flukes with evidence of entanglement on head. Injury occurred between 04/17/2012 and 12/12/2012.

Aerial and Vessel-based Sightings November 2012 – October 2013

Cataloged sighting information through 31 October 2013 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. Not all data have been received and/or entered. Survey platforms and sighting totals may change.

Major Contributing Organizations:

BRI: BioDiversity Research Institute	MMOME: Marine Mammals of Maine
CWI: Canadian Whale Institute	NEAq: New England Aquarium
CZWC: Captain Zodiac Whale Cruise	NEFSC: Northeast Fisheries Science Center
FFAW: Fish, Food and Allied Workers	OWW: Oshan Whale Watch
FWRI: Fish and Wildlife Research Institute	PCCS: Provincetown Center for Coastal Studies
GDNR: Georgia Department of Natural Resources	PCWW: Pirate Cove Whale Watch
HOS: Huntsman Ocean Sciences	S2S: Sea to Shore Alliance
JOWO: Jon Woodward	WCL: Whale Cruiser Limited

Southeast United States (sightings: 456, November - March; FWRI, GDNR, S2S)

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

Mid-Atlantic (includes south of Cape Cod) (sightings: 68, November - December, February - April, July - August; BRI, NEAq, S2S)

- Aerial and vessel surveys

Great South Channel (sightings: 78, January, March - May; NEFSC, PCCS)

- Aerial and vessel surveys

New England (sightings: 990, November - May; NEAq, PCCS)

- Aerial and vessel surveys and habitat sampling

Jeffreys Ledge (sightings: 4, February, April, May, October; JOWO, MMOME, PCCS)

- There were no systematic surveys on Jeffreys Ledge

Gulf of Maine (sightings: 8, November – December, July; NEAq, NEFSC, WHOI)

- Aerial and vessel surveys

Bay of Fundy (sightings: 15, July - September; HOS, NEAq, PCWW)

- Vessel surveys

Roseway Basin (sightings: 52, December, August – September; CWI)

- Aerial and vessel surveys

North (sightings: 6 (primarily opportunistic), November, April, August; CZWC, FFAW, NEA, OWW, WCL)

Partial Listing of Research Analyses Underway in 2013

- Using immunoassays to detect a variety of steroid and thyroid hormones in right whale blow samples.
- Description of the relationship between the zooplankton resource and right whales
- Profiling demography, occurrence and distribution of right whales in Cape Cod Bay
- Examining lateralized motor behavior in right whales
- Estimate the weight of North Atlantic right whales at sea
- Seasonal occurrence, distribution, and demographics of right whales in the Gulf of St. Lawrence.
- Examining demographics of right whales in the in the southeastern U.S. winter ground
- Examining Lagrangian estimates of *Calanus finmarchicus* transport and retention within the Gulf of Maine
- Assessing characteristics of right whale vision
- Call characteristics of mother-calf pairs
- Passive acoustic detection of right whales

- Foraging characteristics of right whales
- Modeling right whale habitat
- Assessing the efficacy of the ship strike rule
- Estimating health and survival of right whales

Management and Mitigation Activities

United States

NOAA called for 9 Dynamic Management Area (DMA) voluntary speed reduction zones to date in 2013. Two were off New Jersey in January and February, three were in the vicinity of Nantucket during the winter and spring, two were in the southwestern Gulf of Maine in May, and two were near the shelf break south of New England during early summer. A tenth DMA was missed on Jeffreys Ledge during the furlough of government employees in October.

Canada

The North Atlantic Right Whale Action Plan, which presents measures to reduce injury and mortality to right whales from entanglement in fishing gear, will be released for public comment in [November 2013]. Measures focus on both preventing and responding to entanglements.

DFO met twice in the Spring of 2013 with the Right Whale Recovery Network to identify priorities and partnerships for implementing the measures in the Action Plan.

Right Whale critical habitat (CH) was identified in the 2009 Recovery Strategy, in Grand Manan Basin and Roseway Basin. The *Species at Risk Act* (SARA) requires that CH be protected once it is identified. The regulatory process to put a CH Protection Order in place is underway; the Order will bring into force S.58(1) of the Species at Risk Act (SARA), which prohibits destruction of critical habitat.

The Marine Mammal Regulations under the *Fisheries Act* being have been amended and public comments received. The Regulations introduce a 100-metre vessel approach distance, with a schedule for increasing or decreasing this distance in specific circumstances. The MMR will require vessel operators to report accidental contact (e.g. ship strike, entanglement). Their approval and adoption are anticipated in November 2013.

Research projects that incorporate passive acoustic monitoring (PAM) for multiple whale species, including NARW, are being undertaken on the Scotian Shelf (Hilary Moors-Murphy) and in the Gulf of St. Lawrence (Yvan Simard). Right whale vocalizations have been recorded in both locations. In Quebec region DFO (Simard) has identified concentrations of zooplankton in the Gulf of St. Lawrence near Gaspé in 2010-2012. These projects are ongoing and data analyses are underway.

DFO (Lei Harris) collaborated with the New England Aquarium (Moirra Brown) on aerial surveys for NARW in the Gulf of Maine and Scotian Shelf. Poor weather limited the survey flights to September 2013, when few whales were located on Grand Manan Bank and in Roseway Basin.

An outreach campaign soliciting right whale sighting information from the public in areas outside of the known critical habitat is in its second year. Posters and pamphlets were 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 (see map). Sightings received are entered in DFO's Maritimes Region Cetacean Sightings Database, and shared with the New England Aquarium. To date small numbers of right whale sightings have been received, off Cheticamp and Canso (Cape Breton, Nova Scotia), off Brier Island in the Bay of Fundy, and in the Gulf of Maine.



Figure 1 Sites where DFO has distributed materials seeking information on right whale sightings in Atlantic Canada.

DFO works with the Canadian Coast Guard (CCG) to issue Notice to Shipping, “NOTSHIPS” reminders about the two right whale CH areas that are broadcast in September and October 2013. These broadcasts notify vessels to watch for right whales, to report sightings, and to avoid collisions.

The Canadian Coast Guard participates on the Canada-U.S. Atlantic Joint Preparedness Team (CANUSLANT) which conducted an oil spill response exercise in June 2013. It was held near the Grand Manan Basin right whale critical habitat area, and the exercise took into account potential risks to right whales, their prey and the critical habitat. The exercise report should be available in Autumn 2013.

DFO’S Conservation and Protection Fishery Officers (FOs) conduct dedicated patrols of fisheries near areas frequented by right whales and educate mariners about the importance of watching for right whales and how to avoid encounters with them. Two FOs received entanglement response training (Level 3) in March 2013 at the Provincetown Center for Coastal Studies.

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. DFO conducts vessel-based surveys annually at the beginning of the lobster season, which begins in late November. Five surveillance flights were conducted in November and December 2012, during which one right whale sighting was confirmed and 4 possible sightings (species unconfirmed) were recorded. This mitigation strategy has been incorporated into the management plan for the summer grey zone lobster fishery in 2013.

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/>).

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.