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North Atlantic Right Whale Sighting Survey (NARWSS)

The North Atlantic Right Whale Sighting Survey (NARWSS) is a NOAA Fisheries program, which locates and records the seasonal distribution of North Atlantic right whales (*Eubalaena glacialis*) off the northeastern coast of the United States. NARWSS flights conducted in 2013 followed systematic tracklines with randomized starting locations within 12 primary survey blocks: Cashes Ledge, Coastal Maine, Franklin Basin, Georges Basin, Georges Shoal, Great South Channel, Howell Swell, Jeffreys Ledge, Jordan Basin, Lindenkohl Basin, Rhode Island Sound, and Stellwagen Bank (Figure 1). During 2013, NARWSS flew 185 hours over 48 surveys, including directed flights over right whales reported near Atlantis Canyon, Cultivator Shoal, Great South Channel, and Nantucket Sound. NARWSS detected 45 right whales (including possible duplicate sightings of the same individual), with 30 right whales sighted within survey blocks and 15 right whales sighted during transit to or from survey areas. Table 1 summarizes survey effort and right whale sightings by month. Figures 3a-d display the locations of right whales and survey effort by season. In 2013, NARWSS did not conduct aerial surveys from February - April or August - October. Figure 2 and Table 2 provide a comparison of NARWSS flights, flight hours, and right whale sightings from 2002 through 2013. In 2013, right whale sightings were an order of magnitude lower than in previous years (0.17 right whales per hour of survey effort in 2013 compared to the previous average of 1.47 right whales per hour of survey effort). Table 4 summarizes internal and external requests for NARWSS survey data.

Right Whale Sighting Advisory System (RWSAS)

In 2009, the Right Whale Sighting Advisory System (RWSAS) was reengineered to support new regulations to reduce the probability of lethal injury to right whales from collisions with ships (50 CFR Part 224). The regulations establish speed restrictions of 10 knots or less for all vessels of length 65 ft (19.8 m) or greater within Seasonal Management Areas (SMAs). The SMAs encompass high-risk vessel collision areas along the U.S. Atlantic seaboard where right whale sightings predictably and consistently occur each year[1]. When three or more right whales are sighted in close proximity to each other but outside of SMAs, a Dynamic Management Area (DMA) is established for 15 days to accommodate the whales' movements (Clapham and Pace 2001), and mariners are requested to either avoid the area or travel through it at 10 knots or less. The size of the DMA depends on the number of right whales sighted in the area. Mariners are notified of DMAs via email, an interactive Google Map website[2], the Whale Alert iPad/iPhone app, Broadcast Notice to Mariners (BNM), NOAA Weather Radio, and the Mandatory Ship Reporting system (MSR). Unlike SMAs, compliance is voluntary for DMAs. In 2013, 11 DMAs (including extensions) were triggered by validated reports, of which none came from NARWSS. The RWSAS collected sighting reports from aerial research surveys, shipboard research surveys, commercial whale watch vessels, the Coast Guard, and other sources (commercial ships, fishing vessels, and the general public). The most common source of reports in 2013 was aerial surveys (400 reports - 52%; see Table 3 and Figures 4a, 4b, 5). Most sightings were in the Northeast (New York through Maine), where the number of reports per month ranged from 2 in June to 467 in April (Table 3a and Figure 4a). Most reports in the Mid-Atlantic (New Jersey through Virginia) and Canada were from the other sources (commercial ships, fishing vessels, and the general public) (Tables 3b, 3c and Figures 4a, 4b, 5). Logging acoustic detections into the RWSAS was discontinued in 2009 in favor of publicly available automated acoustic detection websites maintained by the Bioacoustics Research Program at the Cornell Lab of Ornithology[3], which provide the information in near real-time.

[1] http://www.nmfs.noaa.gov/pr/shipstrike/
[2] http://www.nefsc.noaa.gov/psb/surveys/
[3] http://www.listenforwhales.org/

References Cited

Clapham PJ, Pace RM. 2001. Defining triggers for temporary area closures to protect right whales from entanglements: issues and options. Northeast Fish. Sci. Cent. Ref. Doc. 01-06; 28 p.

Cole TVN, Gerrior P, Merrick RL. 2007. Methodologies of the NOAA National Marine Fisheries Service aerial survey program for right whales (*Eubalaena glacialis*) in the Northeast U.S., 1998-2006. US Dep Commer, Northeast Fish Sci Cent Ref Doc 07-02; 11 p.

Table 1. Summary of North Atlantic Right Whale Sighting Survey (NARWSS) flights conducted in 2013 by month including the survey block, number of flights, flight hours, and right whale (*Eubalaena glacialis*) sightings. All flights followed systematic tracklines with randomized starting locations within survey blocks. Shaded cell indicates month and survey area in which a Dynamic Management Area (DMA) was in effect, triggered by a confirmed report of 3 or more right whales in close proximity to each other outside of any active Seasonal Management Areas (SMA). The DMA on Stellwagen Bank was triggered by a report from the Center for Coastal Studies.

	Total Number of Flights in Each Survey Block														
Month	**Cashes Ledge**	**Coastal Maine**	**Franklin Basin**	**Georges Basin**	**Georges Shoal**	**Great South Channel**	**Howell Swell**	**Jeffreys Ledge**	**Jordan Basin**	**Lindenkohl Basin**	**Rhode Island Sound**	**Stellwagen Bank**	**Flights**	**Flight Hours [1]**	**Right Whales [2]**
January	1	1							1		1		**4**	**13.7**	**0**
February															
March															
April															
May	2		2	1	1	4	1	1	1		1	1	**15**	**61.5**	**22**
June		1				3		1		1		1	**7**	**27.9**	**6**
July	1			1		2			1				**5**	**19.1**	**1**
August															
September															
October															
November	1	1	1			2		1	1			1	**8**	**34.9**	**1**
December	1							1	1		1		**4**	**14.0**	**0**
Flights	**6**	**3**	**3**	**2**	**1**	**11**	**1**	**4**	**5**	**1**	**3**	**3**	**43**		
Flight Hours[1]	**27.3**	**13.7**	**9.4**	**6.9**	**4.5**	**42.5**	**4.7**	**14.7**	**19.4**	**4.3**	**9.7**	**14.1**		**171.0**	
Right Whales[2]	**1**	**0**	**0**	**0**	**0**	**27**	**0**	**0**	**0**	**0**	**0**	**2**			**30**

[1] Flight Hours - includes transit, survey, and circling to photograph whales; does not include directed flights or flights that were aborted because of bad weather conditions

[2] Right Whales - includes duplicate individuals; does not include whales seen on transit

Additional DMAs: off Atlantic City, NJ, in January and February; off Nantucket, MA in February, April, and July; southeast of Portsmouth, NH, in May; east of New York, NY, in June; south of Providence, RI, in July; and Cape Cod Bay, MA, in December

Table 2. Comparison of North Atlantic Right Whale Sighting Survey (NARWSS) flights conducted from 2002 through2013 including the number of flights, total flight hours, and the number of right whale (*Eubalaena glacialis*) sightings.

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number of flights [1]	103	101	82	129	86	62	53	66	59	55	64	48
Number of flight hours[2]	527	485	397	617	449	374	295	330	280	247	275	185
Number of right whales [3]	798	453	294	831	411	841	639	584	476	473	270	31

[1]Number of flights – includes various types of flights depending on year (randomized systematic, directed, and exploratory)
[2]Number of flight hours - includes time on transit, survey, and circling to photograph whales
[3] Number of right whales – includes possible duplicate individuals; does not include whales seen on transit

Table 3. The total number of right whale (*Eubalaena glacialis*) sighting reports to the Right Whale Sighting Advisory System (RWSAS) in 2013 by reporting source and month within the (a) Northeast region- Maine through New York, (b) Mid-Atlantic region- New Jersey through Virginia, and (c) Canadian waters.

(a) Northeast

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Reports	%
Aerial Survey	13	18	19	276	63	1	1		1		1	3	396	56%
Shipboard Survey	1	17	5	105	20								148	21%
Whale Watch			2	40	7		1		3	2			55	8%
Coast Guard			2	8				2		2			14	2%
Other	14	16	3	38	7	1	3	3	2	3	1	3	94	13%
Total Reports	28	51	31	467	97	2	5	5	6	7	2	6	707	100%

(b) Mid-Atlantic

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Reports	%
Aerial Survey														0%
Shipboard Survey														0%
Whale Watch														0%
Coast Guard	1	1									1	1	4	18%
Other		3	5			4	5					1	18	82%
Total Reports	1	4	5			4	5				1	2	22	100%

(c) Canada

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Reports	%
Aerial Survey									4				4	10%
Shipboard Survey								4	4	1			9	22%
Whale Watch							1	6					7	17%
Coast Guard														
Other				1	1	3	2	7	5	1	1		21	51%
Total Reports				1	1	3	3	17	13	2	1		41	100%

Table 4. Summary of data requests made in 2013 for North Atlantic Right Whale Sighting Survey (NARWSS) and Right Whale Sighting Advisory System (RWSAS) data.

Organization	Database	Data Requested	Date
Canadian government	NARWSS	Beaked whale sightings	Dec 2013
Center for Coastal Studies	NARWSS	Basking shark sightings	Dec 2013
NOAA Fisheries PSB Acoustics	NARWSS	Right whale sightings in 2012 and 2013	Oct 2013
Cornell University	NARWSS	Right whale sightings in Stellwagen Bank	Jul 2013
NOAA Fisheries PSB Acoustics	NARWSS	Beaked whale sightings	Jun 2013
NOAA Fisheries PSB Acoustics	NARWSS	Blue whale sightings 2009 – 2013	Apr 2013
Marine Biological Laboratory	RWSAS	Right whale sightings in Cape Cod	Mar 2013
NOAA Fisheries PSB Acoustics	NARWSS	Right whale sightings in SBNMS 2006-2007	Mar 2013
Center for Coastal Studies	NARWSS	Right whale sightings in Rhode Island Sound	Mar 2013
OBIS SEAMAP	NARWSS	All NARWSS data from flights in 2012	Jan 2013

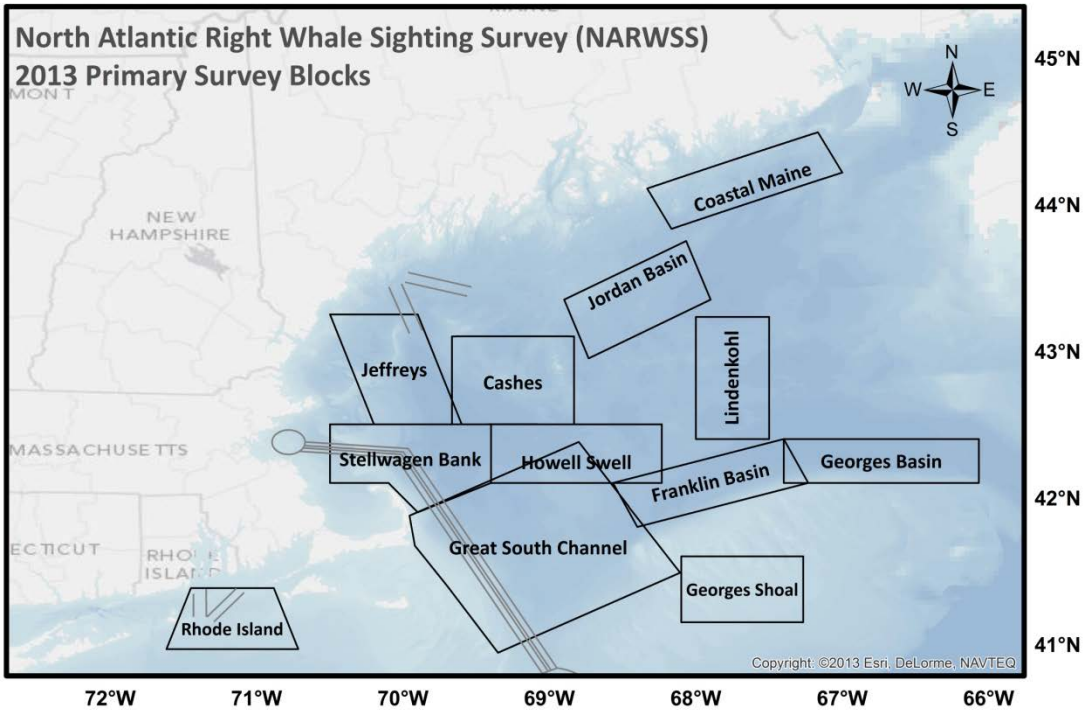

Figure 1. North Atlantic Right Whale Sighting Survey (NARWSS) blocks regularly surveyed in 2013. Shipping lanes are denoted in gray.

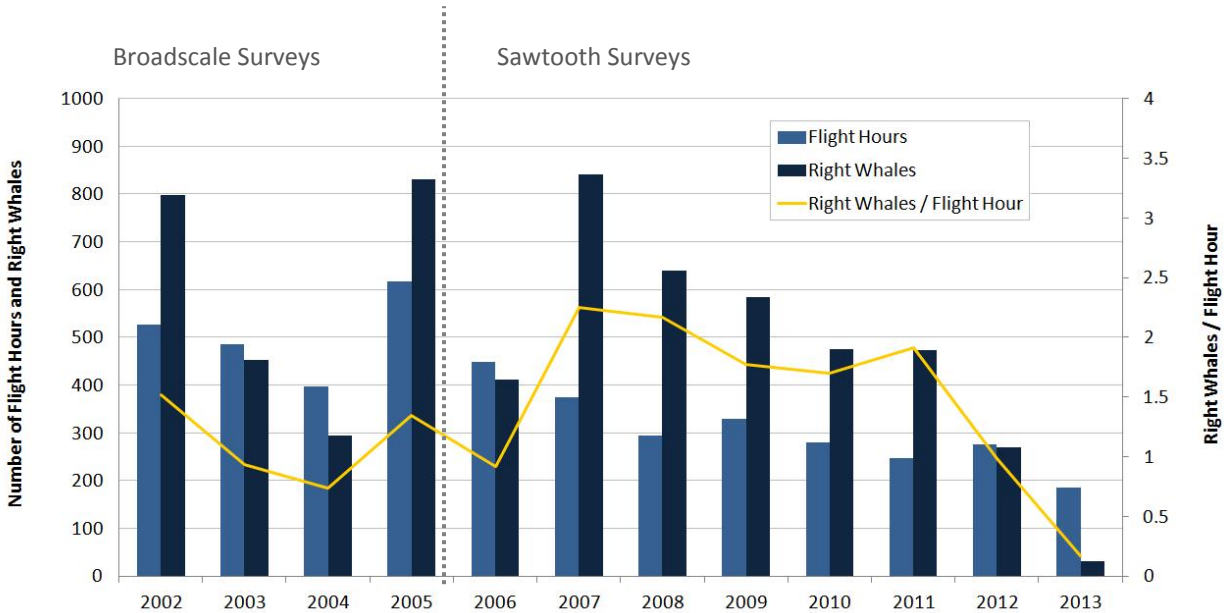

Figure 2. Comparison of North Atlantic Right Whale Sighting Survey (NARWSS) hours flown and right whale (*Eubalaena glacialis*) sightings from 2002 through2013 with the number of right whales seen per flight hour overlaid. The number of right whales sighted per flight hour increased in 2007 when the sawtooth survey design replaced broad scale systematic surveys that covered the entire Gulf of Maine. From 2002 through 2005 there were 2 concurrent survey aircraft, and from 2006 through 2013 there was 1 survey aircraft.

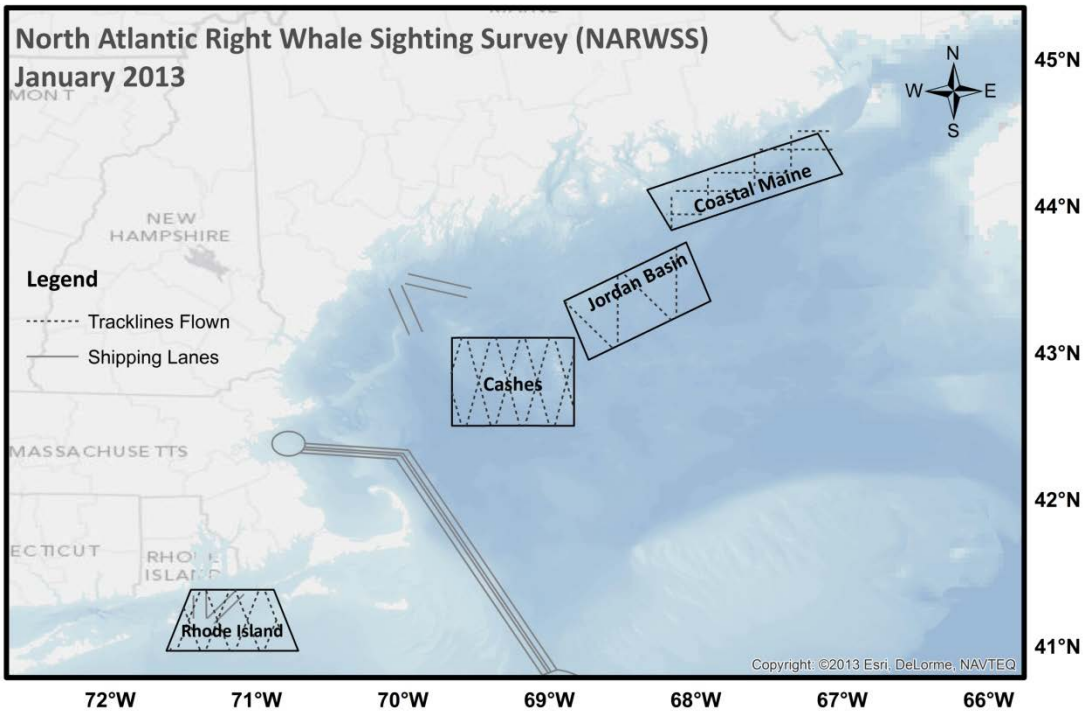

Figure 3a. North Atlantic Right Whale Sighting Survey (NARWSS) tracklines flown in January 2013. There were no right whales (*Eubalaena glacialis*) seen during survey effort. The 7 right whales seen during a transit over Cape Cod Bay are not shown on the map. No surveys were flown in February or March of 2013.

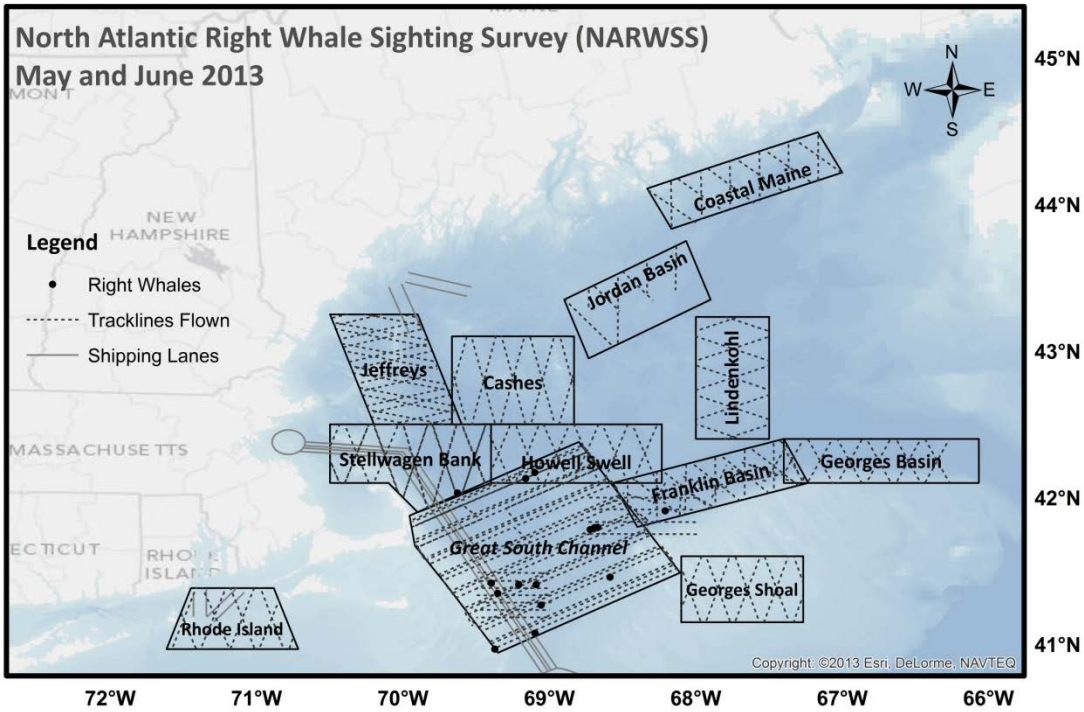

Figure 3b. North Atlantic Right Whale Sighting Survey (NARWSS) tracklines flown and right whale (*Eubalaena glacialis*) sightings from May through June 2013.The short east-west lines in the Great South Channel were directed flights to assist the NOAA Ship Gordon Gunter North Atlantic Right Whale Biology Cruise. No surveys were flown in April of 2013.

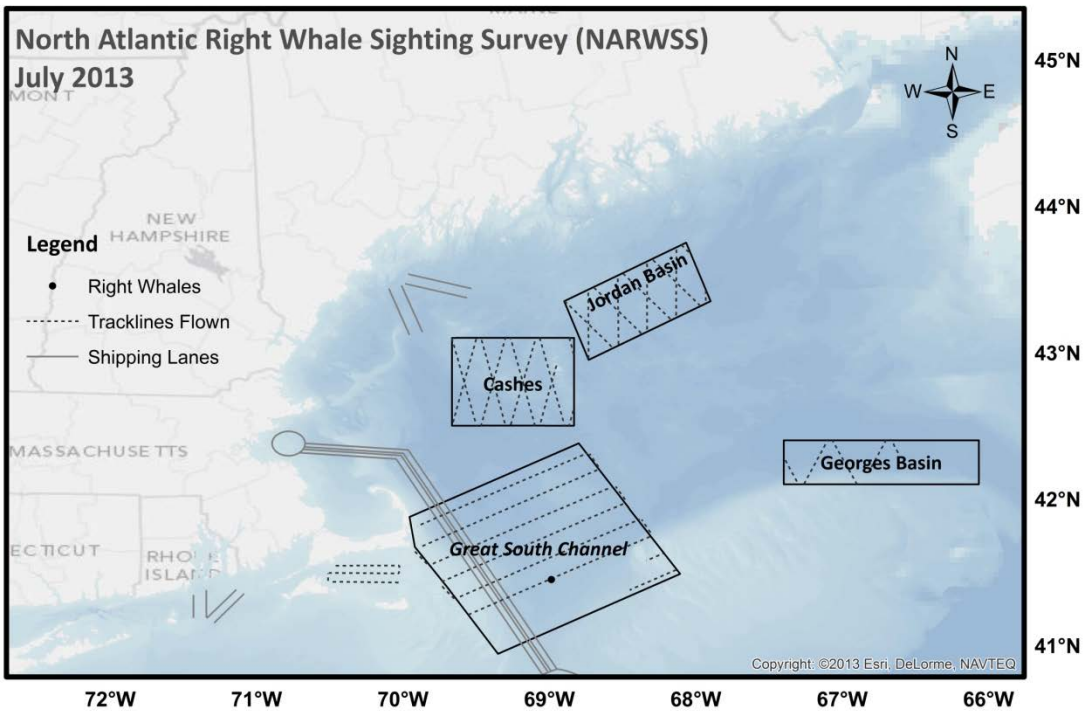

Figure 3c. North Atlantic Right Whale Sighting Survey (NARWSS) tracklines flown and right whale (*Eubalaena glacialis*) sightings from July of 2013. The short east-west lines in Nantucket Sound were a directed survey to relocate reported right whales. No surveys were flown in August or September of 2013.

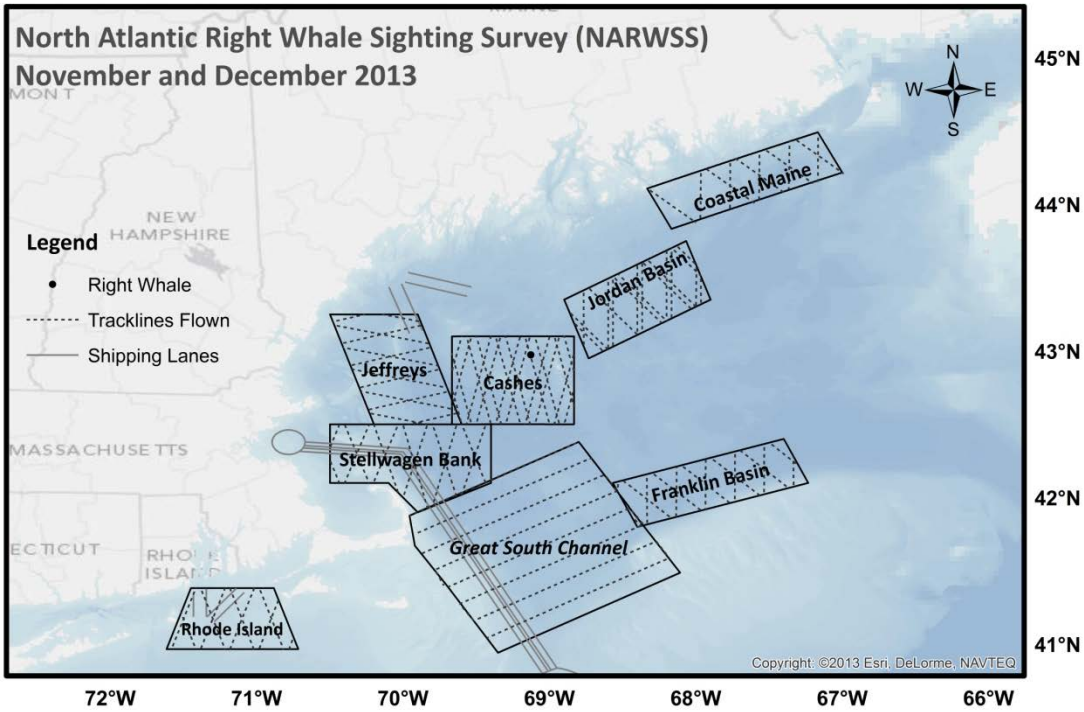

Figure 3d. North Atlantic Right Whale Sighting Survey (NARWSS) tracklines flown and right whale (*Eubalaena glacialis*) sightings from November and December of 2013. No surveys were flown in October of 2013.

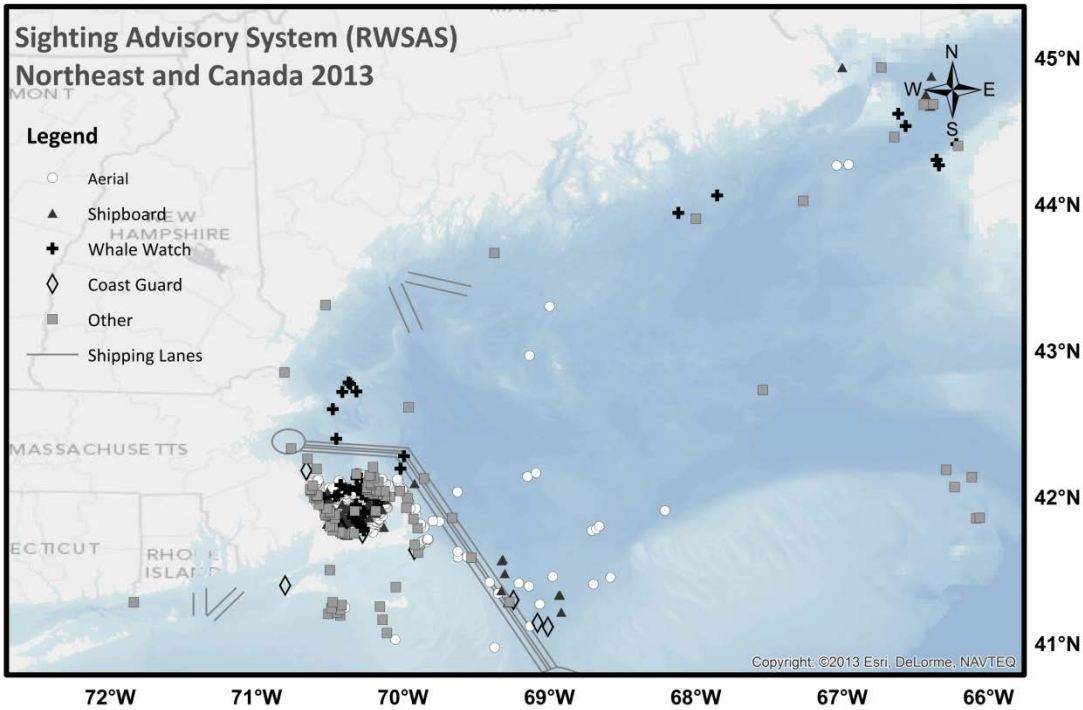

Figure 4a. Locations of all right whales (*Eubalaena glacialis*) reported to the Right Whale Sighting Advisory System (RWSAS) within northeastern US and Canadian waters in 2013, shown by reporting source. The category "Other" includes reports made by the general public, commercial ships, and fishing vessels. Unconfirmed reports were excluded.

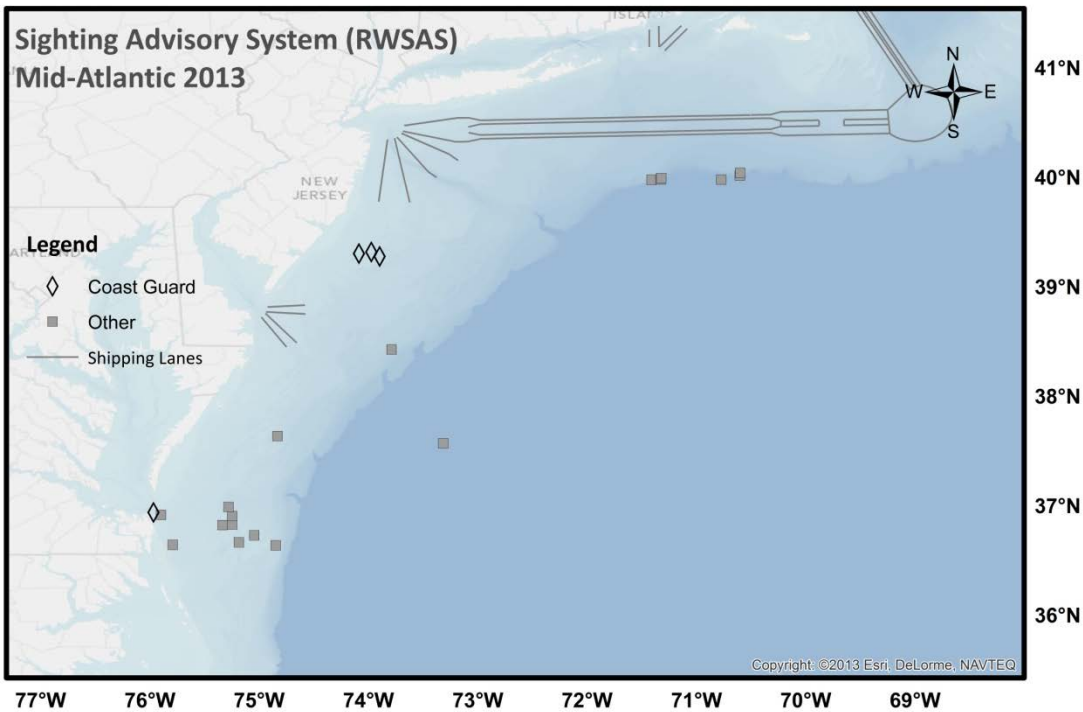

Figure 4b. Locations of all right whale (*Eubalaena glacialis*) sightings reported to the Right Whale Sighting Advisory System (RWSAS) within the Mid-Atlantic region in 2013, shown by reporting source. The category "Other" includes reports made by the general public, commercial ships, and fishing vessels. Unconfirmed reports were excluded.

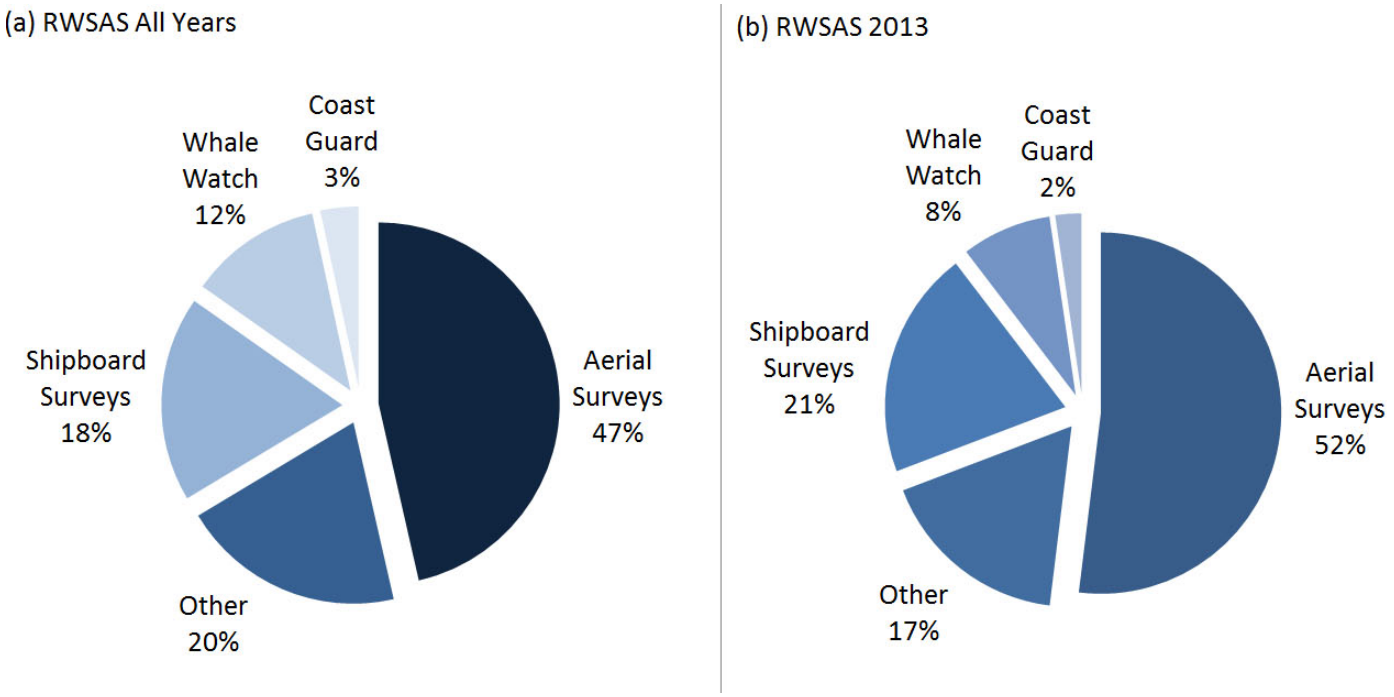

Figure 5. Right Whale Sighting Advisory System (RWSAS) sighting reports by category from (a) all years and (b) 2013.

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