



# **North Atlantic Right Whale Calving Area Surveys: 2014/2015 Results**

by

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## Introduction

Aerial surveys are flown December 1 through March 31, annually, in the Southeast United States to detect North Atlantic right whales in their primary calving area. The purpose of the aerial surveys is to contribute to (in prioritized order):

- Population monitoring via detection and identification of individual right whales including cow/calf pairs occurring in the Southeast United States each year
- Monitoring trends in human-related serious injuries and mortality
- Vessel-strike reduction

Given these prioritized objectives, we focused aerial surveys in areas where we expected the highest number of right whale detections.

Additionally, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), U.S. Navy, U.S. Coast Guard, and U.S. Army Corps of Engineers have agreed to implement the "Early Warning System" (EWS) –a system of aerial surveys and communications designed to provide mariners with information on whale locations. The goal of the EWS is vessel-whale collision mitigation.

This report briefly summarizes results from the NOAA Fisheries-administered aerial surveys and the EWS.

## Methods

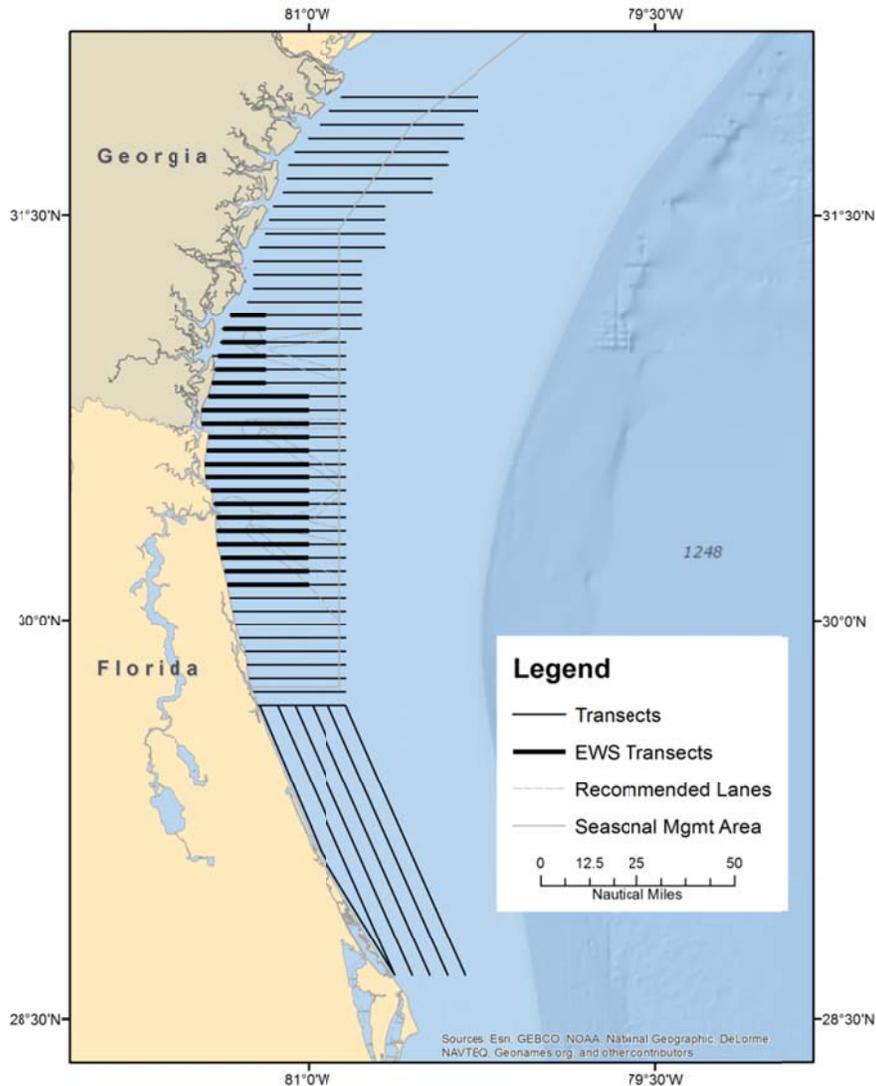
### Aerial Surveys

#### Teams/Platform

Two dedicated teams flew aerial surveys in 2014/2015. Sea to Shore Alliance (S2S), contracted by the Georgia Department of Natural Resources (GDNR), was based out of St. Simons Island, Georgia, and flew aboard a NOAA-owned De Havilland Twin Otter. The flight team consisted of 2 observers and a dedicated data recorder. The Florida Fish and Wildlife Conservation Commission (FWC) was based out of St. Augustine, Florida and flew aboard a Cessna Skymaster. The FWC flight team consisted of 2 observers; one of these also served as the data recorder. Two pilots were seated at the controls in each aircraft.

#### 2014/2015 Survey Zone and Frequency

The geographic area from which flight lines were selected ranged from about Savannah, Georgia, southward to just north of Cape Canaveral, Florida. Transects oriented east-west and parallel to shore were used (**Error! Reference source not found.**). Generally, each team attempted to fly every day there was good visibility and sea state (less than 4 on the Beaufort Wind Scale).



**Figure 1. Transects available to be flown by aerial survey teams during the 2014/2015 North Atlantic right whale calving season. Thick black lines represent EWS transects.**

### Daily Survey Area

The 2014/2015 aerial survey zone was too large for 2 aerial survey teams to survey in a single day. In general, EWS transects were a daily priority, but other criteria were used as well and included:

1. EWS transects
2. Avoiding airspace conflicts with military operations
3. Weather
4. Predicted whale locations<sup>1</sup>

<sup>1</sup> The FWC produced bimonthly predictions of right whale distribution using methods described by Gowan and Ortiz (2014). This paper validated hindcasted predictions, but not forecasted predictions (i.e., before sea surface temperature data for the period are available).

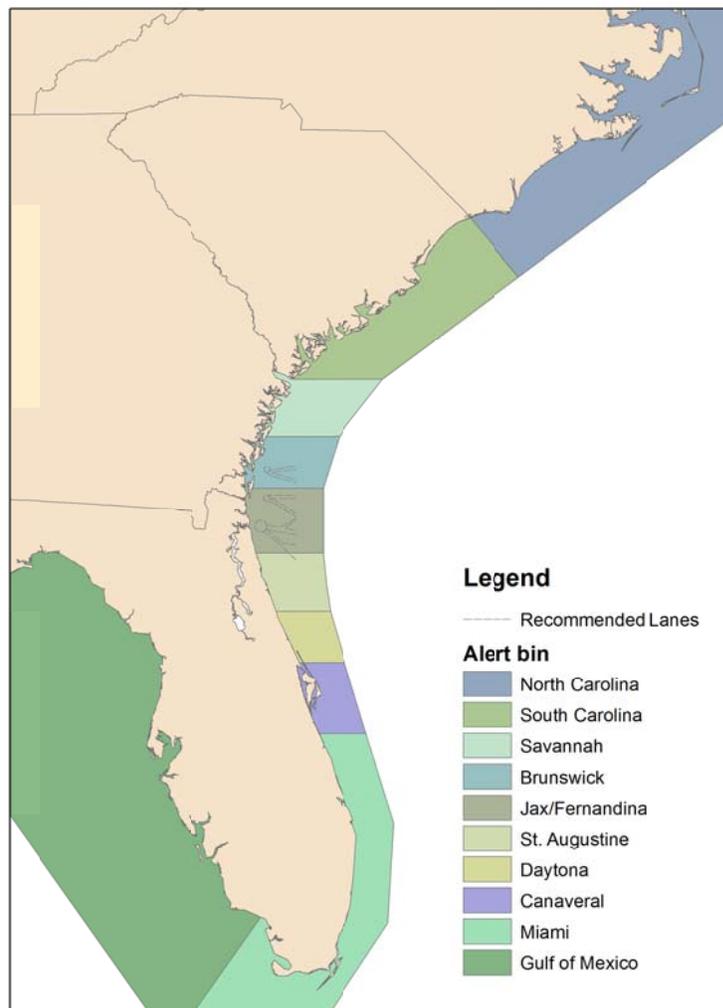
5. Recent whale sightings
6. Distributing effort throughout the survey area
7. NOAA-affiliated, boat-based biopsy/tagging projects
8. Aircraft availability/hours

### Aerial Survey Data

Survey data collection methods followed those described in Keller et al. (2012) and Gowan and Ortega-Ortiz (2014).

### Whale Alerts

Whale alerts were generated from aerial survey sightings as well as reported public sightings verified by or relayed through a reliable source. We issued whale alerts to marine users and other users in near-real time using geographically based email distribution lists<sup>2</sup> (Figure 2).



**Figure 2. Areal coverage of whale alert email distribution lists.**

<sup>2</sup> Users received email or text message alerts; text messages were possible if users provided a short message service (SMS) to email gateway.

## Results

### Aerial Surveys

The FWC conducted 51 surveys (17 complete and 34 partial), and S2S conducted 38 surveys (17 complete and 21 partial). Search effort was unevenly distributed throughout the survey season (Table 1) and area (Figure 3).

**Table 1. Number of Nautical Miles (nmi) Flown While On Effort<sup>3</sup>**

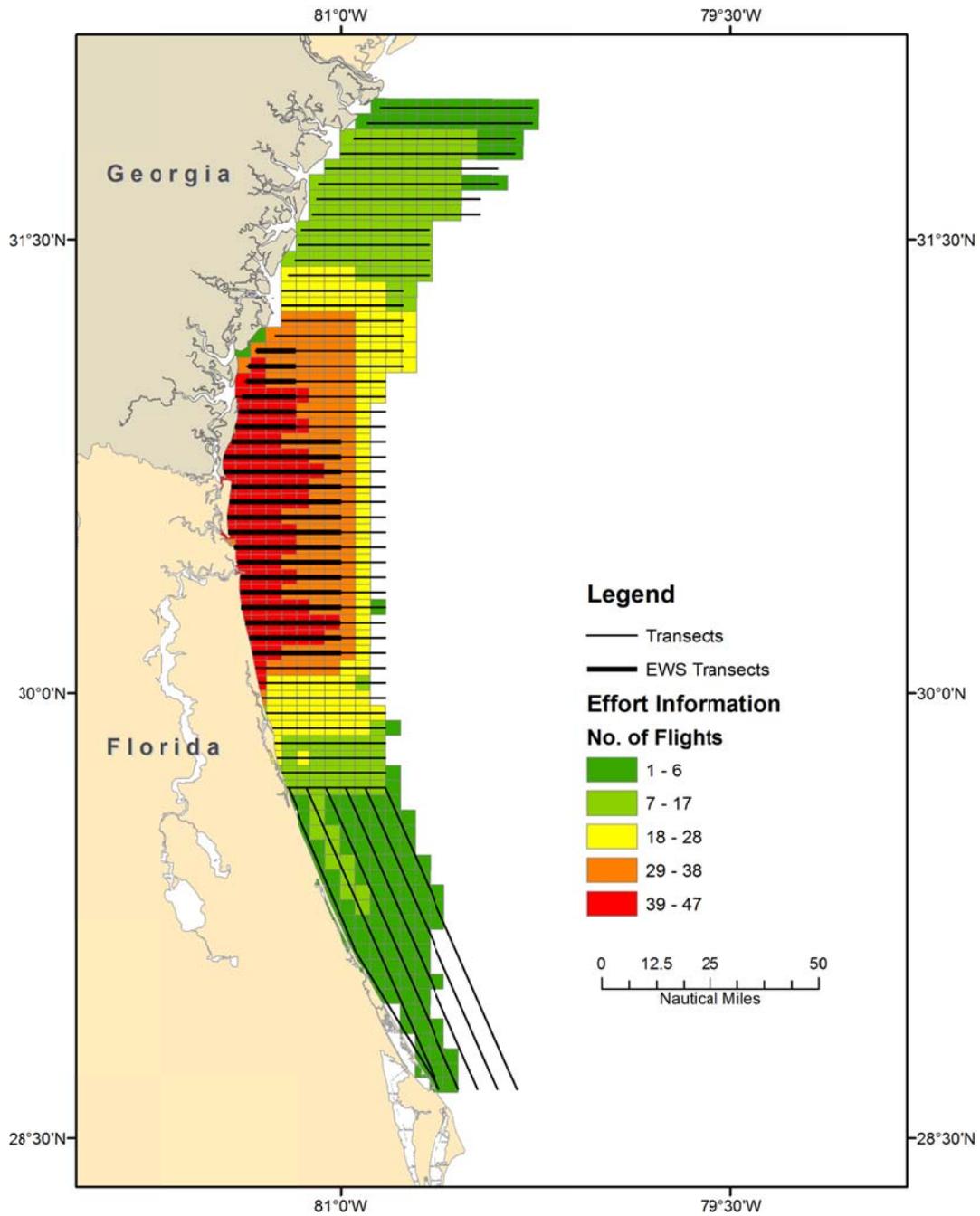
Month	On-Effort Trackline Distance (nmi)
December	8987
January	6575
February	7146
March	8825

The 2 survey teams observed or verified 78 right whale sightings<sup>4</sup> -18 of those were first reported to us from various sources (volunteer sighting network, public, dredge, U.S. Coast Guard, etc.). Most sightings were associated with the area of highest effort (Figure 4) and varied by month (Table 2).

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<sup>3</sup> “On effort” is defined as those times when the following conditions are met: Beaufort sea state < 4, visibility at least 2 nmi (3.7 kilometers), altitude < 1200 feet (366 meters), and not circling a sighting, or on verification survey.

<sup>4</sup> A “sighting” consists of 1 or more right whales.



**Figure 3. Density distribution of the number of surveys flown over the 2014/2015 survey area. Effort is displayed as number of flights in 3- by 3-nmi grid cells (grey outlines). Transects are black, and EWS transects are thick black.**

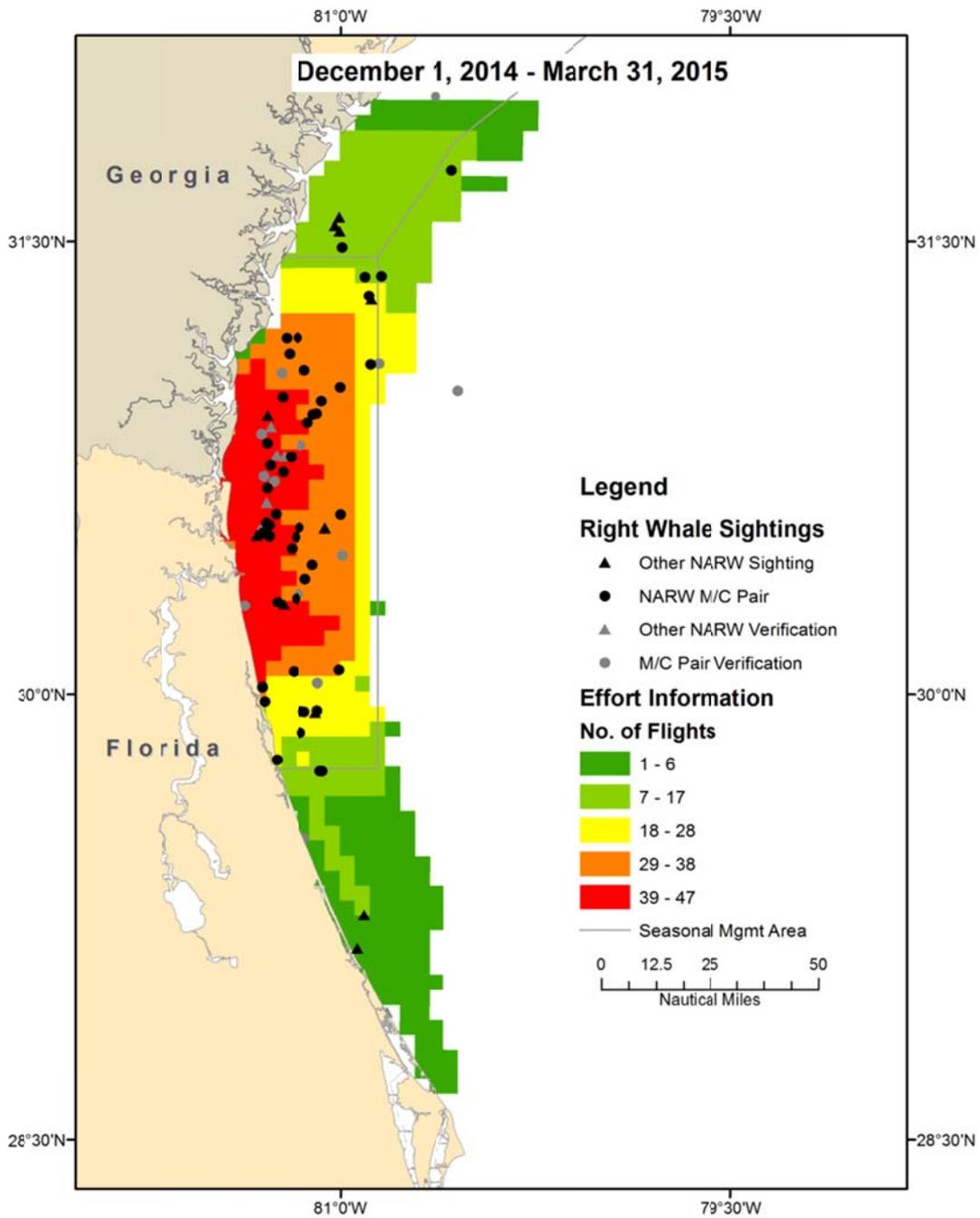


Figure 4. Geographic distribution of right whales sighted while on effort (black symbols) or reported to us and verified (grey symbols) during 2014/2015. Circles represent sightings of mother/calf pairs, and triangles represent sightings of other right whales.

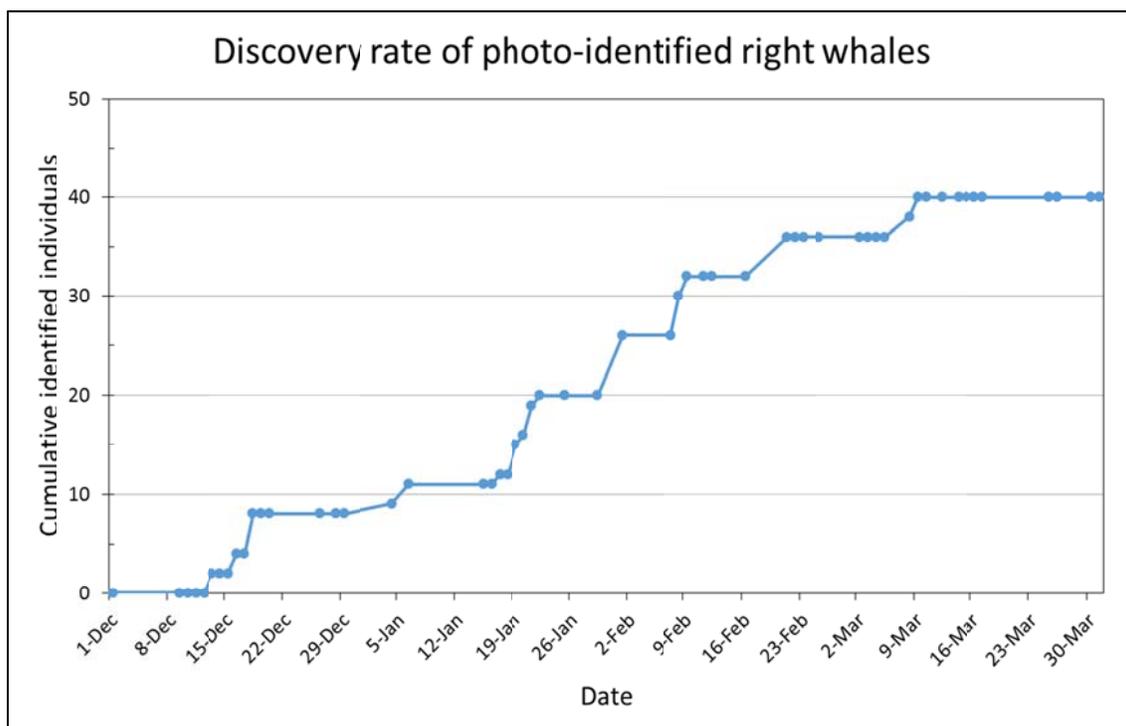
**Table 2. Monthly Number of Right Whales and Right Whale Sightings** (detected per nautical mile of on-effort trackline).

Month	Number of Right Whale Sighting Events*	Number of Right Whales**	Sighting Events/1,000 nmi	Individual Right Whales/1,000 nmi
December	10	21	1.1	2.3
January	16	24	2.4	3.7
February	30	60	4.2	8.4
March	22	44	2.5	5.0

\* A right whale sighting consists of 1 or more right whales.

\*\* Individuals may have been re-sighted within the same or different months.

First sightings of individual right whales (i.e., detected for the first time in the season) were made throughout the calving season and into early March (Figure 5).



**Figure 5. Rate of right whale discovery by the S2S and FWC aerial survey teams in the calving area.**

Seventeen mother/calf pairs were detected in the Southeast United States during the 2014/2015 season (Table 3). We sighted 15 mother/calf pairs and 2 other females that subsequently calved. These 2 females were later seen with calves by other sighting entities:

- One mother/calf pair was photo-documented by a dredge observer on February 5, 2015, just outside the Brunswick shipping channel and about 7 nmi outside the COLREGs.

- One mother/calf pair was observed by the Marine Resources Council volunteer sighting network about 15 nmi south of Cape Canaveral on March 10, 2015.

The mean calving interval was 5.5 (median = 6).

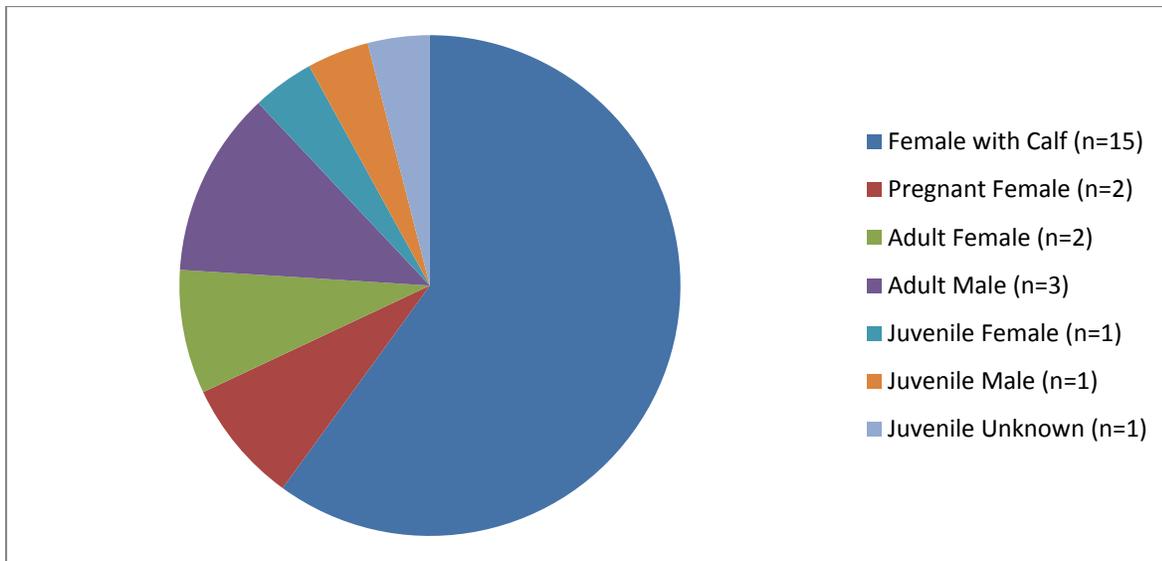
**Table 3. Catalog Numbers, Ages, and Other Known Calving Information for Calving Females observed in the Southeast United States during the 2014/2015 Calving Season**

(Note: Numbers reflect known calving information –some calving events may have gone undetected).

Whale ID	Age <sup>1</sup>	Number of Calves Known to Have Been Produced by a Given Female <sup>1</sup>	Age At First Known Calving <sup>1</sup>	Last Known Calving Year <sup>1</sup>	Presumed Calving Interval <sup>1</sup>
3646	9	1	9		
3693	> 9	1	> 9		
3420	11	1	11		
3232	13	1	13		
3292	13	2	6	2008	7
3139	14	2	8	2009	6
2790	> 18	4	> 8	2011	4
2605	19	3	11	2010	5
2611	19	3	11	2009	6
2223	23	3	13	2009	6
2145	24	5	10	2009	6
1950	> 26	5	> 8	2010	5
1701	28	6	9	2010	5
1703	28	4	14	2008	7
1611	29	4	15	2009	6
1604	> 29	5	> 7	2011	4
1620	> 29	6	> 10	2010	5

<sup>1</sup>Data Source: North Atlantic Right Whale Consortium Sightings Database, 4/28/2016

Thirteen right whales from other demographic groups were observed in the Southeast U.S. calving area. We observed 8 other right whales (excluding females with calves and pregnant females) (Figure 6). Research vessels and a volunteer sighting network detected 5 additional right whales (2 adult males, 2 juveniles, and 1 adult of unknown sex).



**Figure 6. Demographic information of North Atlantic right whales seen by either the FWC or S2S aerial survey teams in the Southeast United States during the 2014/2015 calving season.**

In all, 30 different right whales (excluding calves) were seen in the Southeast U.S. calving area during the calving season.

The only other large whale species sighted was 1 humpback whale located near St. Augustine in early February.

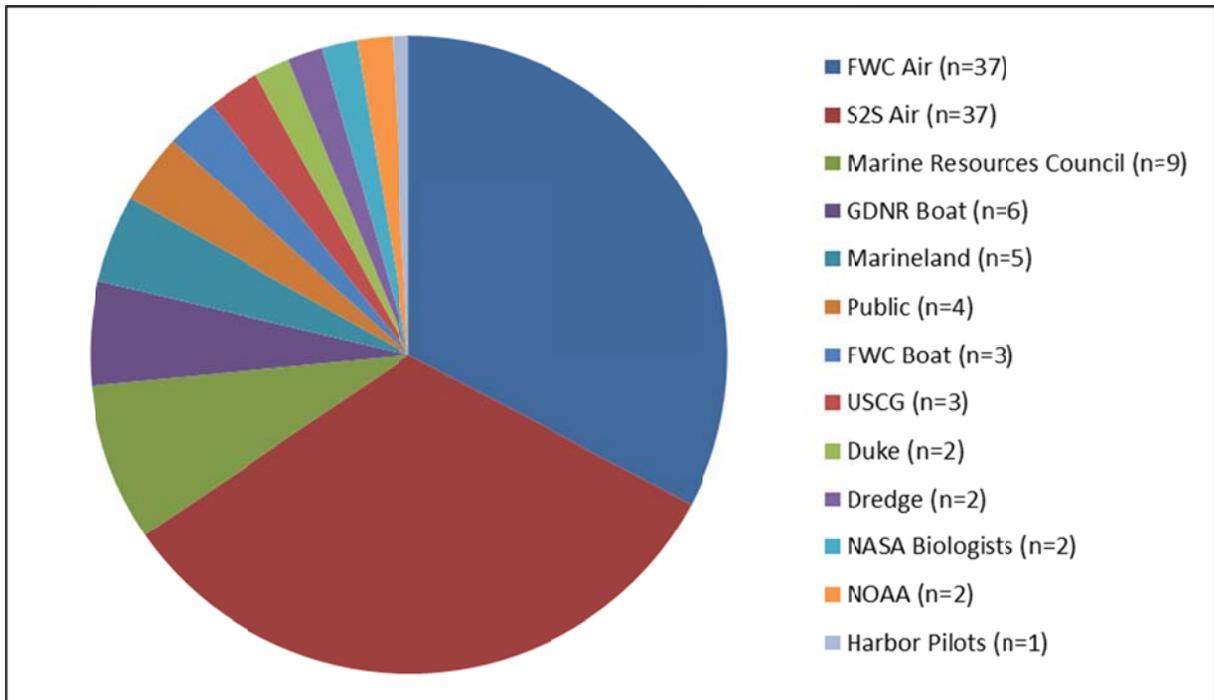
### Whale Alerts

One hundred and sixty three subscribers representing various industries, agencies, and organizations were receiving whale alerts at the end of March 2015 (Table 4). Some entities (e.g., Navy and Coast Guard) subscribed using an email address that automatically distributed whale alerts to several recipients.

A total of 113 whale alerts were issued for the 2014/2015 season. Sightings were generated from a number of sources (Figure 7).

**Table 4. Number of Representatives from Various Organization Types Receiving Whale Alerts at the End of the 2014/2015 Right Whale Calving Season**

Recipient Type	Count
Commercial Fishing	1
Commercial Shipping/Harbor Pilots	35
Law Enforcement (federal, state, local)	19
Resource Managers (Federal, State, Local)	32
U.S. Army Corps of Engineers/Dredge/Dredge Observers	22
U.S. Coast Guard	6
U.S. Navy	10
Volunteer Sighting Networks	5
Whale Researchers	25
Other	8
<b>Total</b>	<b>163</b>



**Figure 7. Right whale sighting sources for whale alerts** (includes sightings that were verified, but those may not have been verified by an aerial survey team).

## Miscellaneous

### Injured and Entangled Whales

No entangled whales were observed by either survey team.

The New England Aquarium maintains a list of right whales that are either injured or in poor condition and warrant monitoring. The following right whales are included on that list and were observed in the calving area.

#### Observed by us:

- Catalog #3360 observed with previously known entanglement wounds on the peduncle and fluke (no gear).
- Catalog #3670 observed with recent entanglement injuries on the head, peduncle, fluke, and body (no gear).

#### Observed by others:

- Catalog #3333 observed by GDNR with previously known entanglement wounds on peduncle, fluke, and head (no gear).
- Catalog #3942 observed by the Marineland Right Whale Project with previously known entanglement scars on head, peduncle, and fluke (no gear).

## Mortalities

No dead whales were observed by either survey team.

## Dynamic Management Areas

No Dynamic Management Areas were established within the Southeastern United States during the 2014/2015 calving season.

## Key Points

- Weather and the EWS lines were substantial governors on when and where surveys were flown.
- Seventeen mother/calf pairs were documented in the Southeast United States during the 2014/2015 season.
- The mean and median calving interval was 5.5 and 6.0, respectively.
- Thirteen right whales from other demographic groups were sighted in the calving area.
- The New England Aquarium is monitoring the health of 4 of the 30 juvenile or adult right whales (13%) that were observed in the calving area.
- Individual whales were seen for the first time and, therefore, potentially arriving in the calving area as late as early March.

## Acknowledgements

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