

North Atlantic Right Whales – Conservation & Safety

Introduction

North Atlantic Right Whales are an endangered species, with the current population estimated at approximately 400 animals. Legislation has created a number of protected and regulated areas for these whales, in an attempt to reduce the number of whale injuries and deaths caused by human activity. The following analysis aims to answer two important questions:

- How many whale sightings occur within several kilometers of major shipping routes?
- What proportion of whale sightings occur within areas designated for their protection?

This species was hunted to the brink of extinction and has been on the endangered species list since the early seventies. Without continued action on the part of the shipping and fishing industries, the US government and recreational vessel owners, the whales' chance of survival is not likely to improve.

Methods

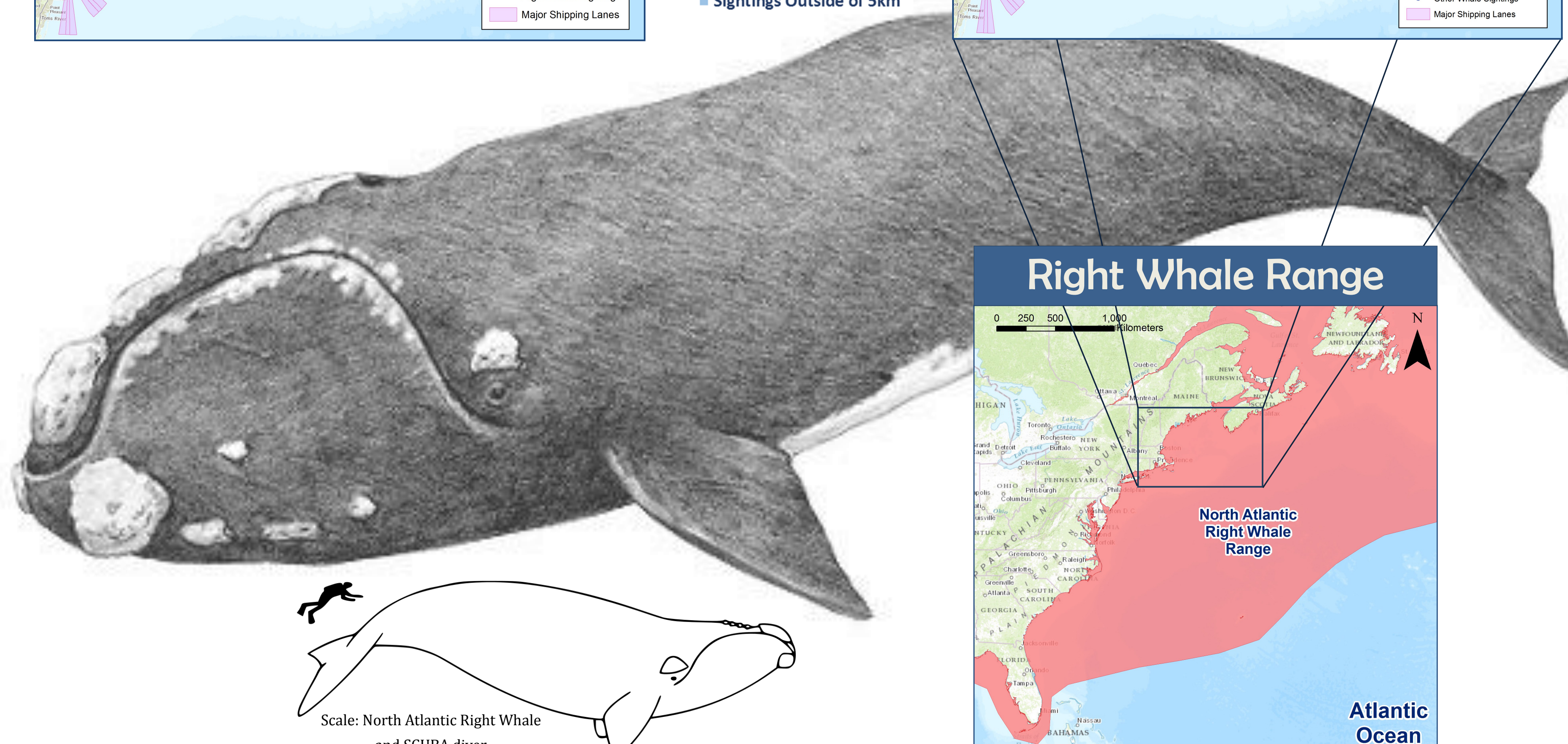
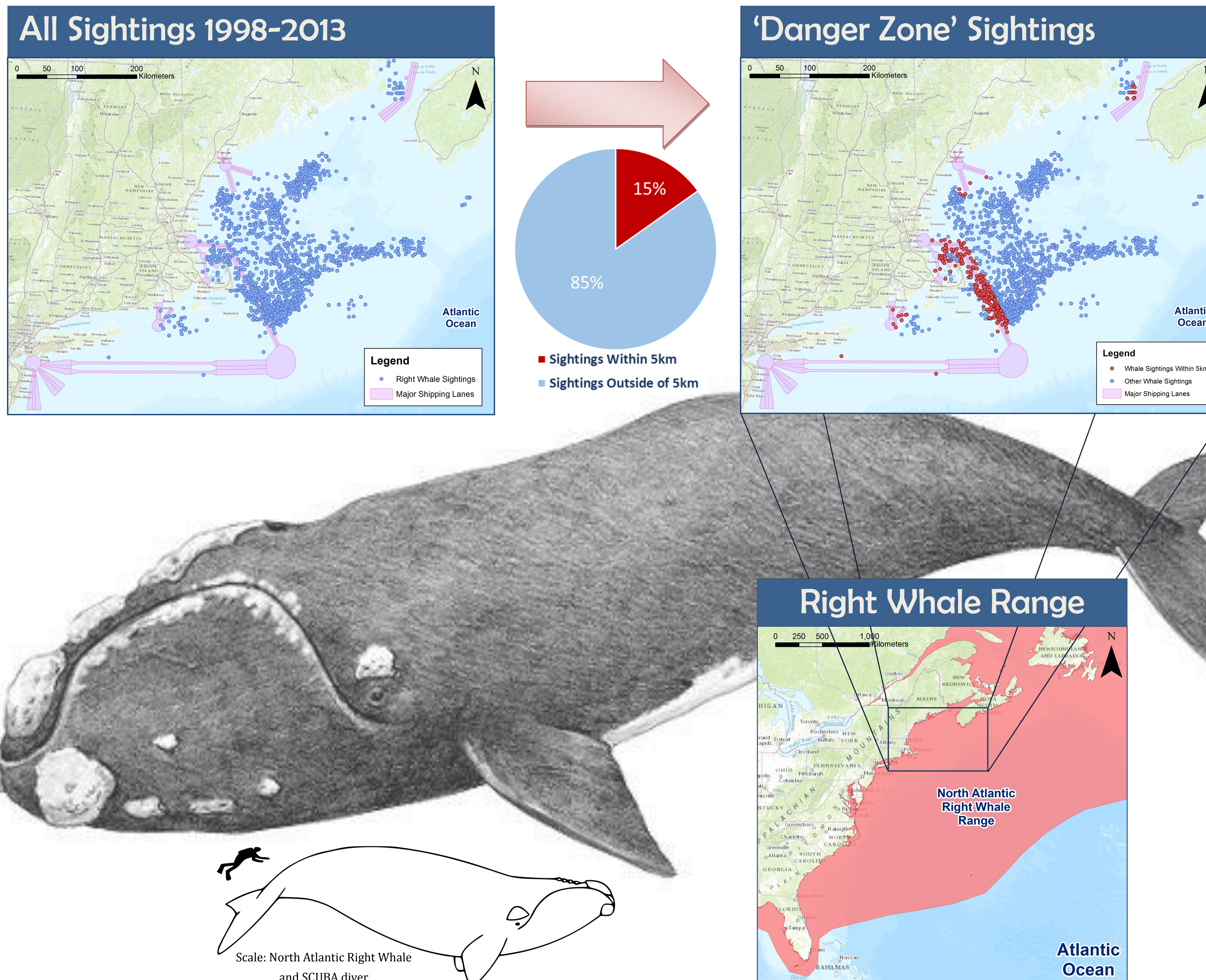
For the analysis of shipping lane proximity, a single class was created by combining several different shipping lane classifications. A buffer was applied to that new layer which selected the whale sightings which occurred within five kilometers. The number of sightings which fell within that buffer was compared to the total number of Northern Right whale sightings. For the Mandatory Ship Reporting (MSR) Zone, as well as Critical Habitat Areas and Areas to be Avoided (ATBA's), all points which fell within the respective polygons were selected. The numbers of points selected were then compared to the total number of whale sightings and the results exported into pie charts.

Protection & Conservation

- Areas to be Avoided (ATBA's)
- Critical Habitat Areas (Endangered Status)
- Mandatory Ship Reporting (MSR) Zone for the Protection of Right Whales

Each of these areas offers varying levels of protection based on different regulations, seasonal enforcement and the area of marine habitat each area covers. The MSR is an area in which vessels must report their position to land-based stations which provide them with positions of nearby whales. Critical Habitat Areas are not preserves, rather they are designated by the Federal Government to protect resources integral to a species' survival. Areas to be Avoided are seasonally implemented voluntary shipping route modifications, which urge mariners to steer clear. All of these areas rely on the cooperation of industry and individuals to make waterways safer for North Atlantic Right whales.

How many sightings occurred dangerously close to shipping lanes?



Whale Migration

North Atlantic Right Whales travel more than a thousand miles every year in search of food, to breed and raise their young. Despite their large size, these whales are relatively slow-swimming, moving at about 5 knots. The protected areas highlighted here make up the late winter, early spring and summer feeding grounds for the traveling whales. Other than mother-calf pairs, most Right Whales are observed traveling alone or in small groups. While some protected areas exist along the migration route, the majority of the coastal water the whales must navigate is unregulated and poses a greater risk of collision or entanglement in fishing gear.

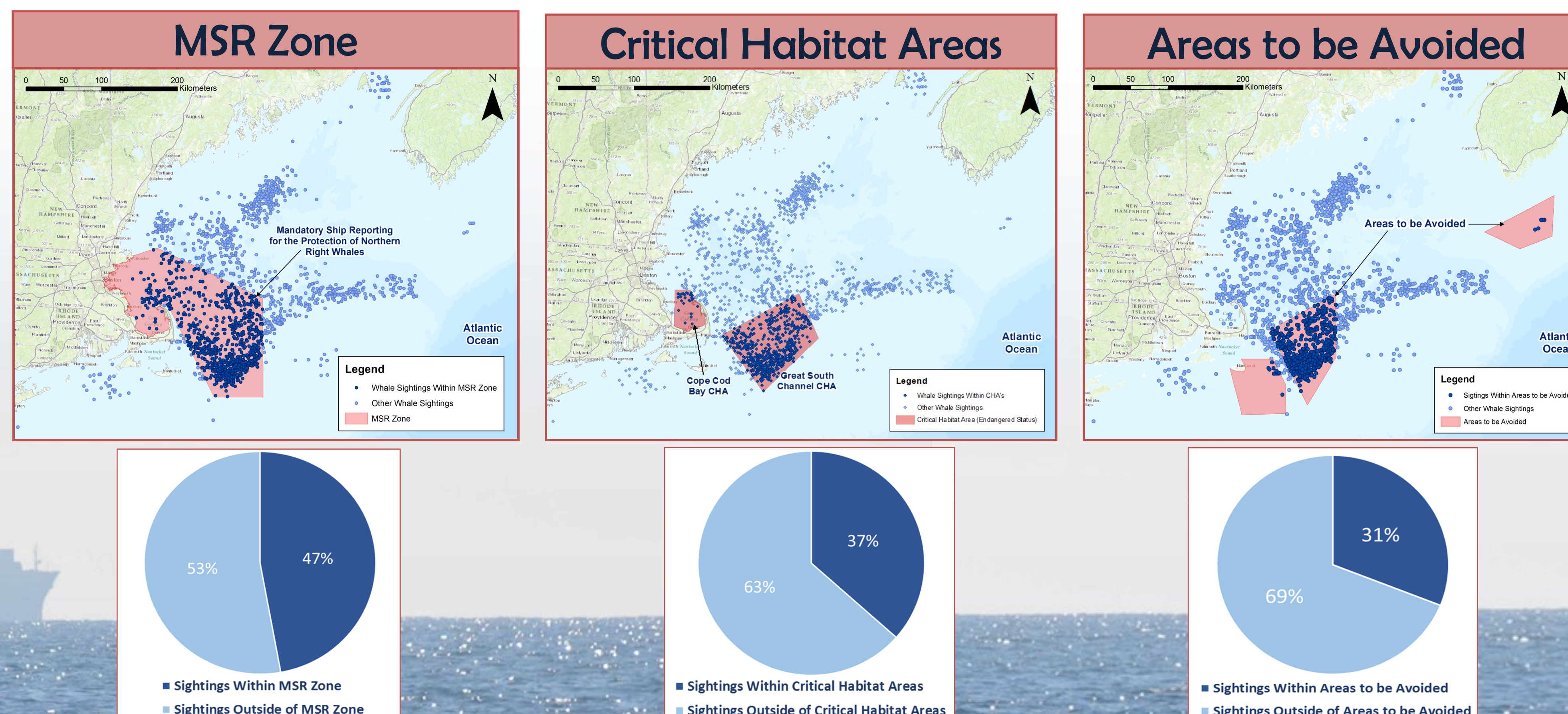


Limitations

The aerial surveys used to collect the whale sighting data have a number of limitations. Apart from the limited range of aircraft, the surveys were conducted primarily during the summer. Harsh weather and seasonal shifts in whale abundance (due to migration) lead to a lack of data collection during the winter months. Because these animals are constantly on the move, each data point only represents a whale's position for a moment in time. Additionally, the model most likely underestimates the number of whales which have been present in the area; so many factors influence each surveyor's ability to successfully locate and identify whales during surveys.

Results & Conclusion

While each of the areas assessed have a different set of regulations conservation goals in mind, this analysis shows that by protecting the southern-most portion of the focus area, both the Critical Habitat Areas and the ATBA's protect a comparable number of whales, based on this data set. The MSR zone, designed to encompass major shipping lanes in and out of Boston harbor, covers an area which encompasses nearly fifty percent of Right Whales sightings in the area. All three of these entities overlap and it would be interesting to gather more information about how each was delineated. Future conservation efforts could focus on currently unprotected areas of high whale sighting density (such as the dense grouping in the Bay of Maine) and the possible impacts of protecting those areas.



Cartography & Poster Design by Benjamin Sherman
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References: NOAA Fisheries - Accessed 4/13/2015, published online: <http://www.fisheries.noaa.gov/>

Data Sources: Whale Sighting Data: OBIS SEAMAP, NOAA, Duke University 2014. Shipping Zones: Publications, NOAA 2014.
Image Credits: http://ocean.si.edu/sites/default/files/styles/colorbox_full/public/photos/map7-2.02-P-03-G-02_NARW-full_0.png?itok=t0laywCD, http://commons.wikimedia.org/wiki/File:Right_whale_size.svg, <http://strathspey.ca/wp-content/uploads/2012/11/cargo-ship.jpg>

