

## Atlantic Large Whale Take Reduction Plan:

## Improving Use of Available Data on the Distribution of Protected Species

Presentation to:

Atlantic Large Whale Take  
Reduction Team, Monitoring  
Work Group

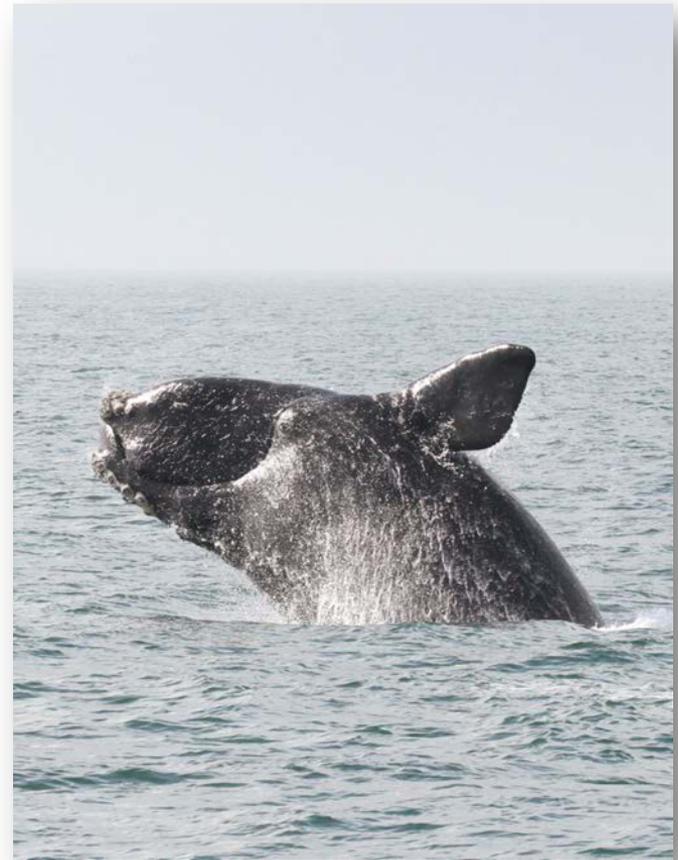
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# Goals of the Monitoring & Modeling Efforts

- ❖ Provide NMFS and the ALWTRT with data to build a common understanding of:
  - The seasonal distribution of commercial fishing gear off the Atlantic coast.
  - The seasonal distribution of North Atlantic right whales, humpback whales, and fin whales in these waters.
- ❖ Provide analytic support for NMFS' rulemaking process.
- ❖ Support achievement of the goals of the ALWTRP.



North Atlantic right whale (*Eubalaena glacialis*)  
Photo: Georgia Department of Natural Resources

# Data on Seasonal Distributions of Whales

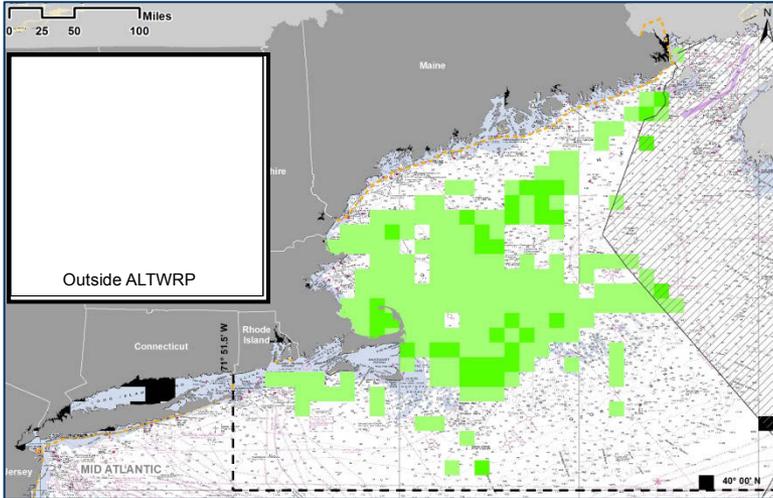
- ❖ Source: North Atlantic Right Whale Consortium (NARWC), based on 2011 recommendation of TRT work group.
- ❖ NARWC draws on an amalgamated dataset of shipboard and aerial surveys that meet the following minimum standards:
  - Provide sufficient records of the survey platform's time and position to reconstruct its trackline;
  - Have been conducted with at least one trained observer who recorded periods of dedicated observation or no observation;
  - Report the whale species, group size, and position for each sighting;
  - Provide data on sightings conditions.
- ❖ Only includes records that meet NARWC's standards for acceptable sightings conditions.
- ❖ Dataset provided for modeling purposes only includes sightings of live whales, and excludes records in which the identification of the species is uncertain.

# Data on Seasonal Distributions of Whales (cont.)

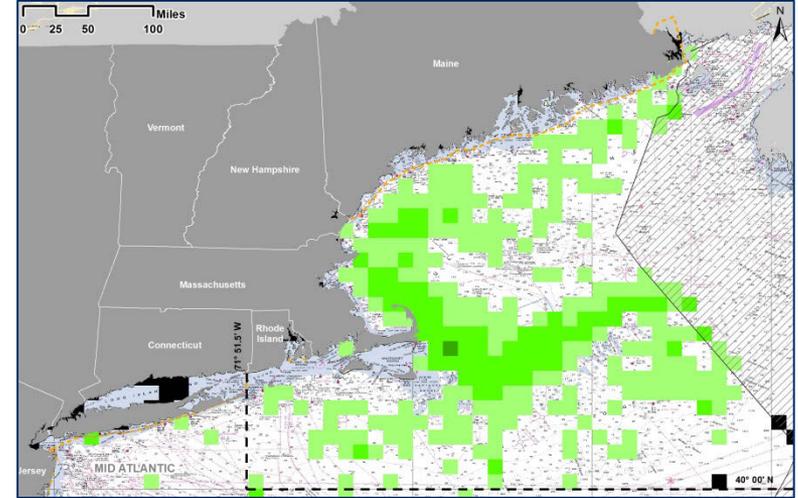
- ❖ Dataset incorporates records dating back to late 1978 (CETAP) and is periodically updated to include most recent surveys.
- ❖ Provides following information by location (10-minute grid cell) and month:
  - Effort (total kilometers surveyed);
  - Sightings (individuals of each species observed);
  - SPUE, i.e., individuals of each species observed per 1000 kilometers of valid effort.
- ❖ Model can present SPUE on an absolute or relative basis, indexed on a scale of 0 to 1000.
- ❖ Dataset provided for modeling purposes includes sightings of right, humpback, and fin whales.
- ❖ For management purposes, TRT and NMFS have chosen to develop recent regulatory measures based on the distribution of right whales and humpback whales.

# Survey Effort & SPUE Scores: Northeast

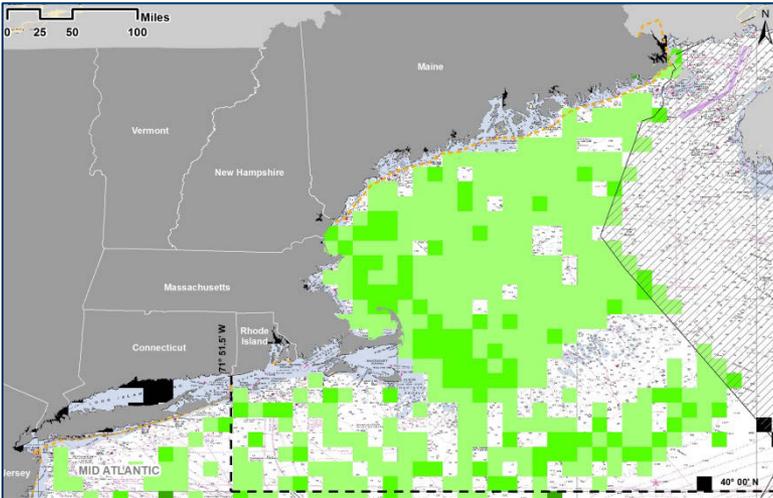
## Right Whale (Monthly Average)



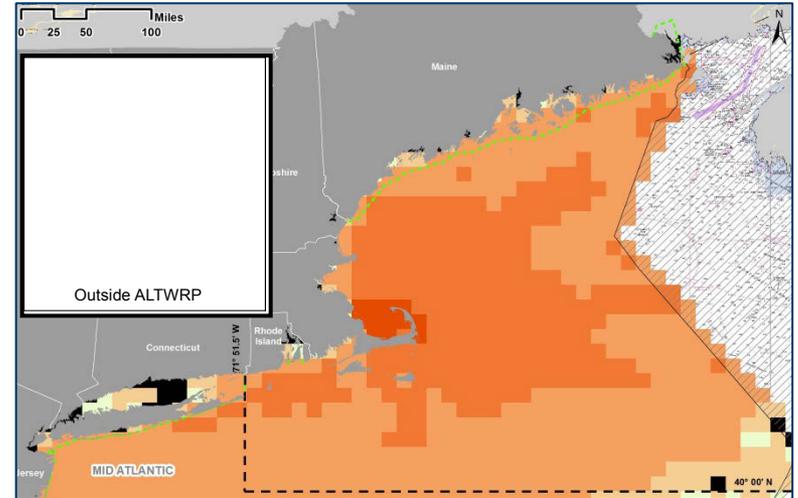
## Humpback Whale (Monthly Average)



## Fin Whale (Monthly Average)

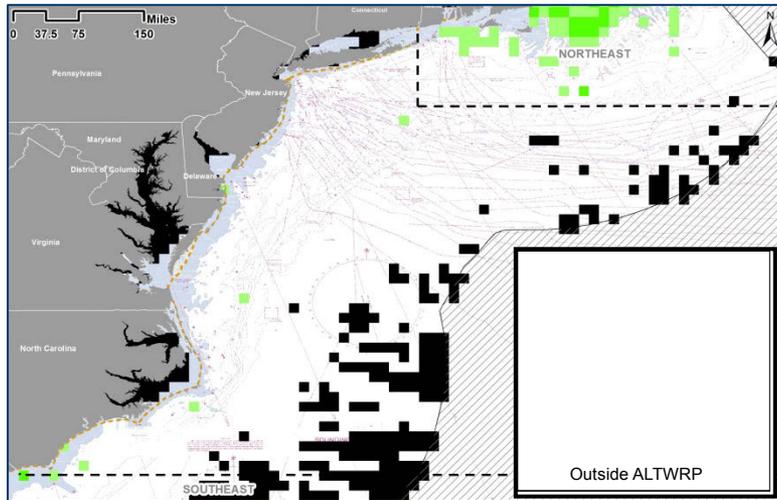


## Effort (Cumulative Across all Years)

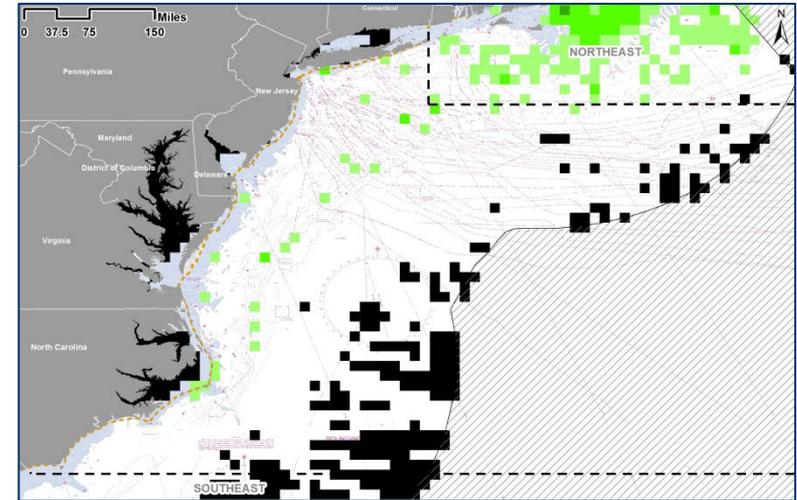


# Survey Effort & SPUE Scores: Mid-Atlantic

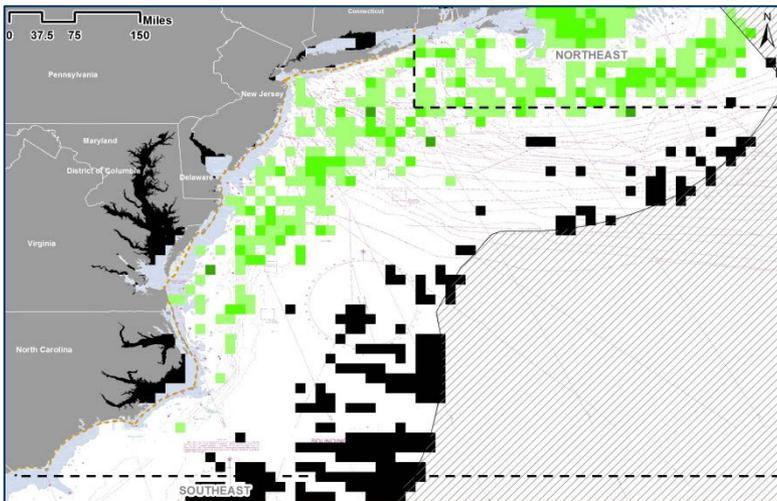
## Right Whale (Monthly Average)



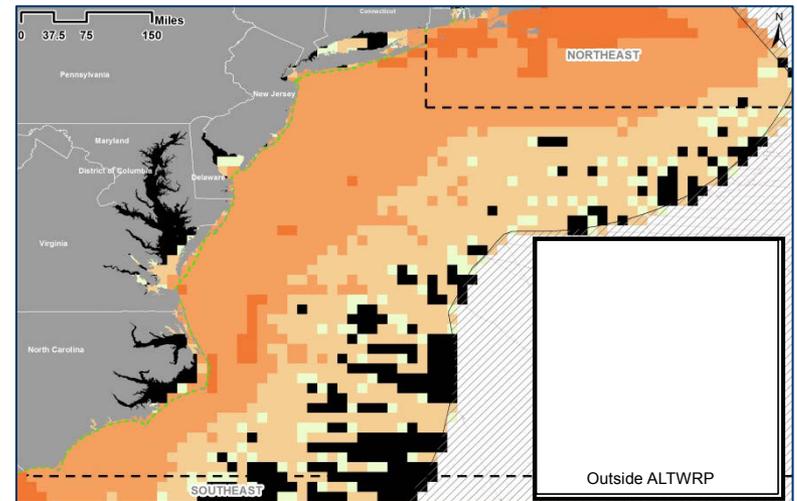
## Humpback Whale (Monthly Average)



## Fin Whale (Monthly Average)

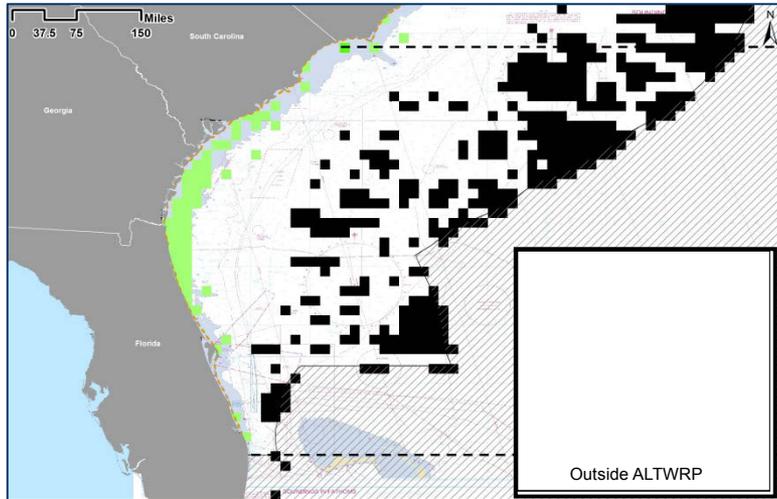


## Effort (Cumulative Across all Years)

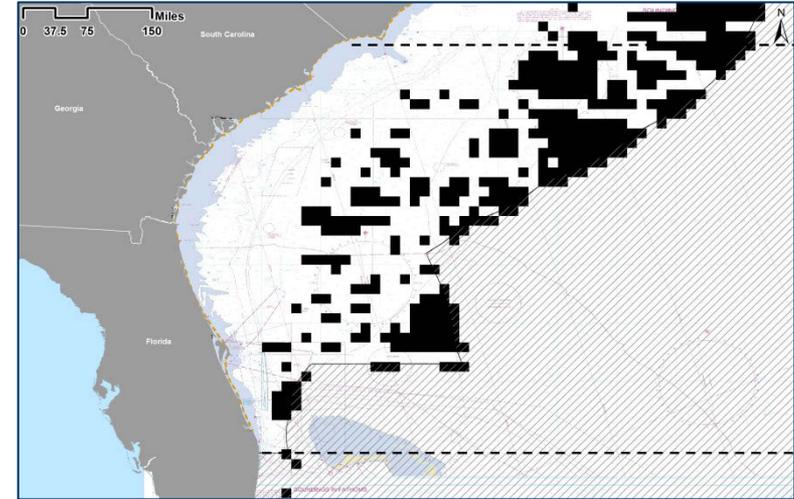


# Survey Effort & SPUE Scores: Southeast

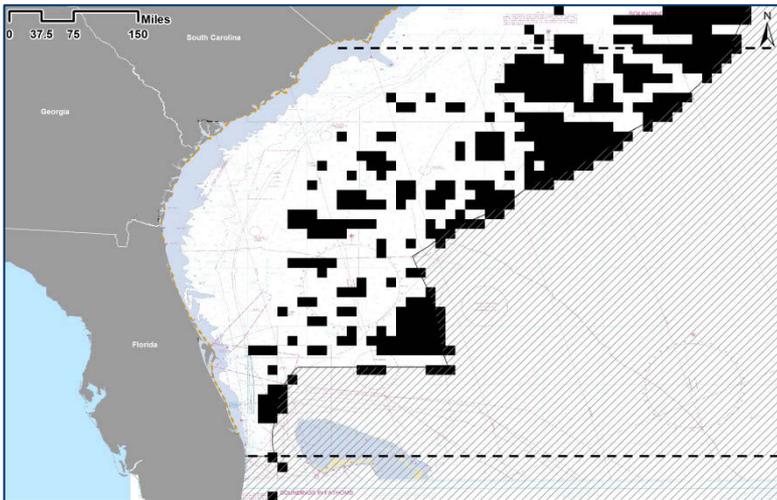
## Right Whale (Monthly Average)



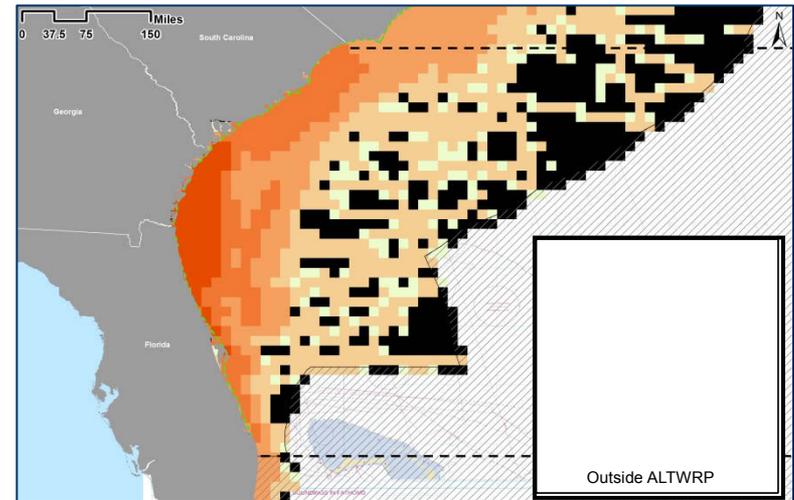
## Humpback Whale (Monthly Average)



## Fin Whale (Monthly Average)



## Effort (Cumulative Across all Years)



# Data Limitations: Whale Sightings

- ❖ Data are not precise:
  - Dataset gives equal weight to sightings reported from survey platforms - airplanes and ships - that are known to differ with respect to search efficiency.
  - Dataset does not adjust SPUE values to account for variation in search efficiency across species.
- ❖ Data are incomplete:
  - Survey effort in some areas/months is low or non-existent.
  - Opportunistic sightings indicate the presence of whales in some of these areas/months.
  - Other/emerging sources (e.g., acoustic data, gliders, satellite telemetry) are of growing interest to the TRT.
- ❖ Due to climate change or other factors, dataset may not be representative of the current distribution of the populations of interest.

# Examples of Alternative Approaches

- ❖ Wikgren, Kite-Powell and Kraus (2014), Modeling the distribution of the North Atlantic right whale *Eubalaena glacialis* off coastal Maine by areal co-kriging, *Endangered Species Research*, 24:21-31, April 9.
  - Draws on opportunistic sightings, survey, and satellite tag data.
  - Uses kriging to characterize the distribution of right whales off Maine.
- ❖ Brilliant et al. (2015), Quantitative estimates of the movement and distribution of North Atlantic right whales along the northeast coast of North America, *Endangered Species Research*, 27:141-154, April 15.
  - Relies on photo-identification of individual whales.
  - Provides estimate of distribution across international boundaries.

# Guidelines for Model Design and Development

- ❖ Maintain an open and transparent development process:
  - Involve the TRT in model design, data collection, and the development of key assumptions.
  - Adapt the model to evolve with the TRT's interests and needs.
- ❖ Working assumptions:
  - While NMFS can help drive research on the seasonal distribution of protected species, potentially useful data will continue to be available from other sources.
  - The model should be flexible enough to incorporate data from these sources.

# Questions for Monitoring Work Group

- ❖ What datasets - or criteria for screening datasets - should we consider in developing estimates of the spatial-temporal distribution of each species?
- ❖ What methods should we employ in developing these estimates?
- ❖ What variables - if any - should we consider in extrapolating beyond direct indications of a species' presence?
  - Proximity to known feeding or mating/calving areas?
  - Water temperature?
  - Water depth?
  - Distance from shore? Other?
- ❖ Is there value in extending the scope of the model to accommodate data on areas outside the EEZ?
- ❖ What criteria/parameters would we need to specify to allow the model to incorporate data from new sources as they emerge?

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