

Field Studies of Whales, Dolphins, and Sea Turtles for  
Offshore Alternative Energy Planning in Massachusetts: 2011-2017



Scott D. Kraus, Ph.D.

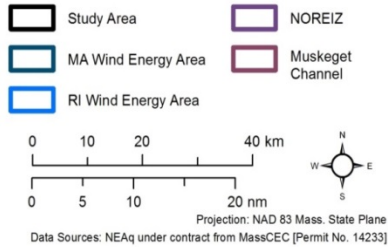
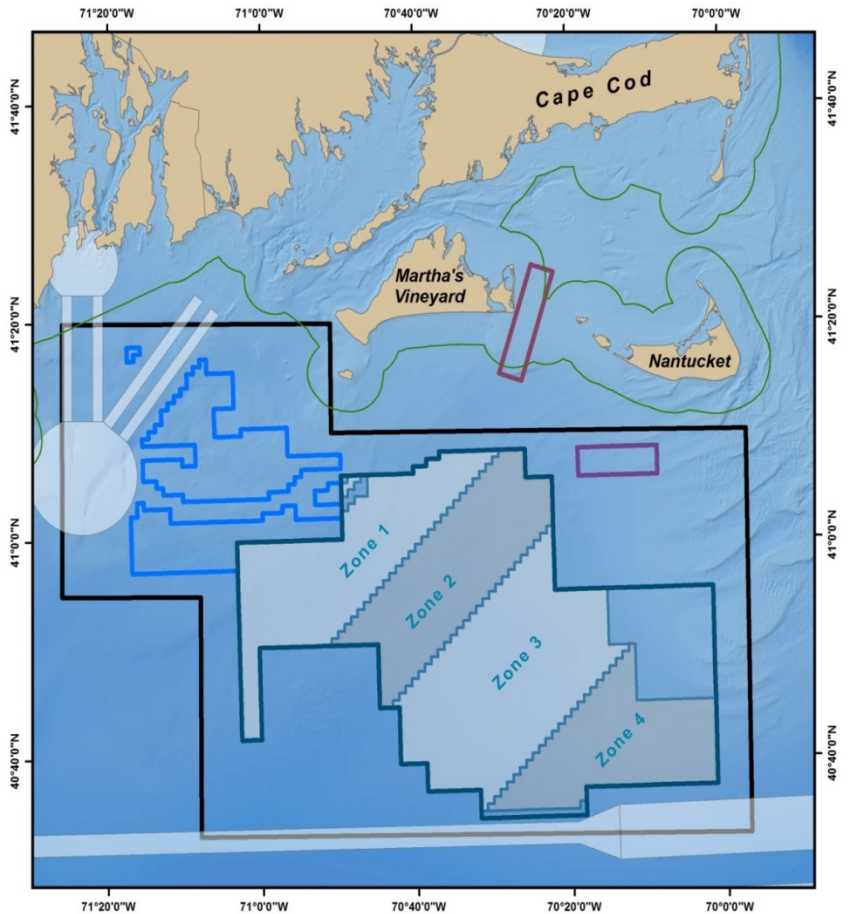
Ester Quintana, Ph.D

Paul Nagelkirk

Anderson Cabot Center for Ocean Life

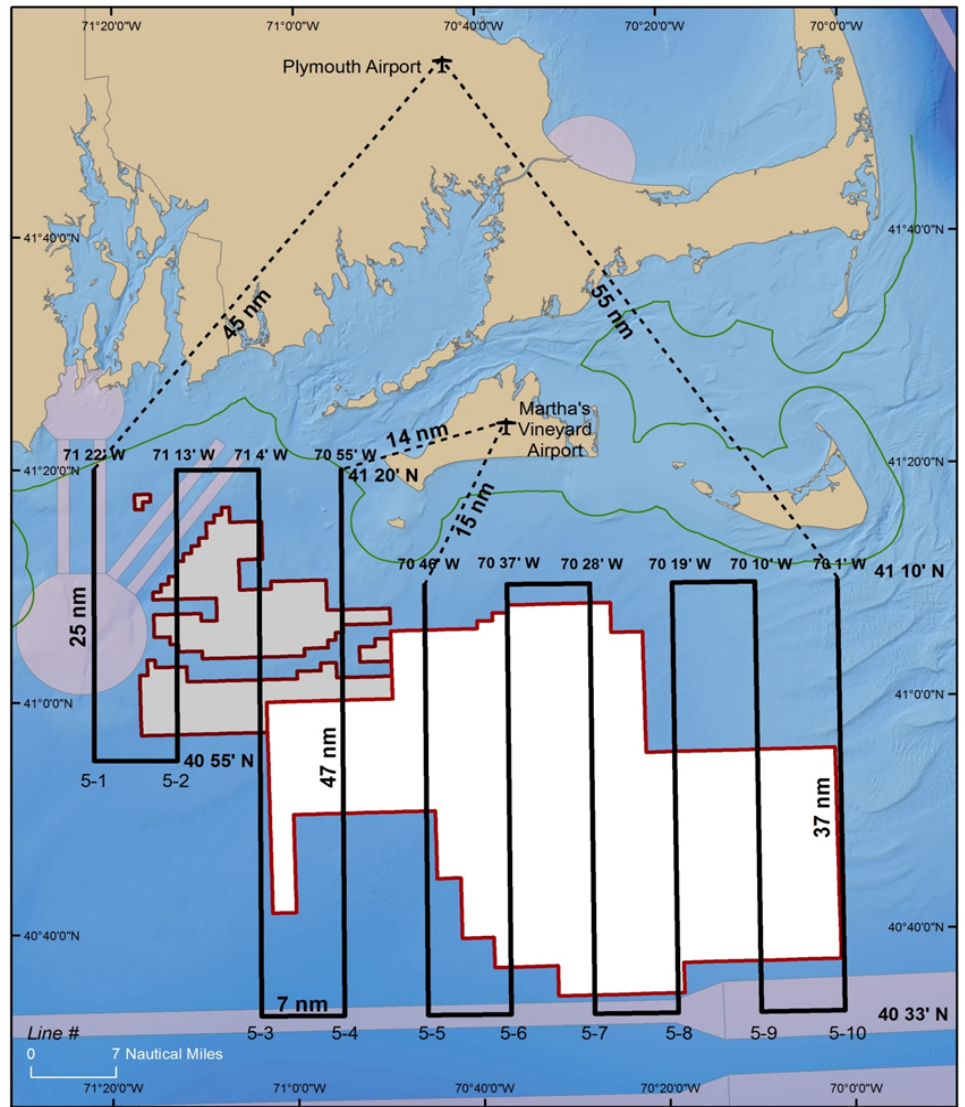
New England Aquarium

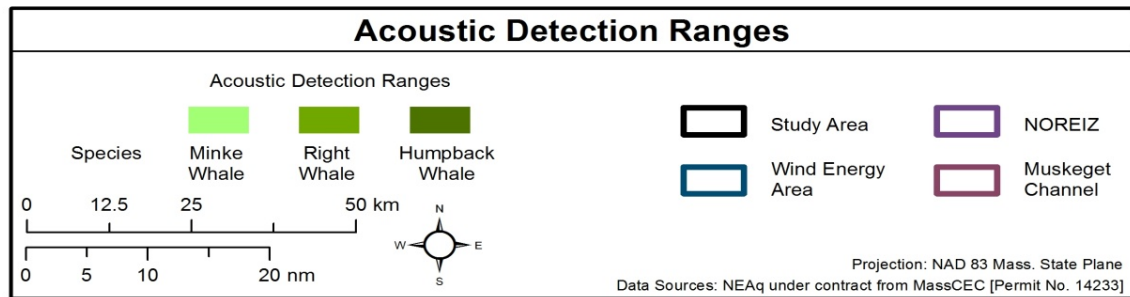
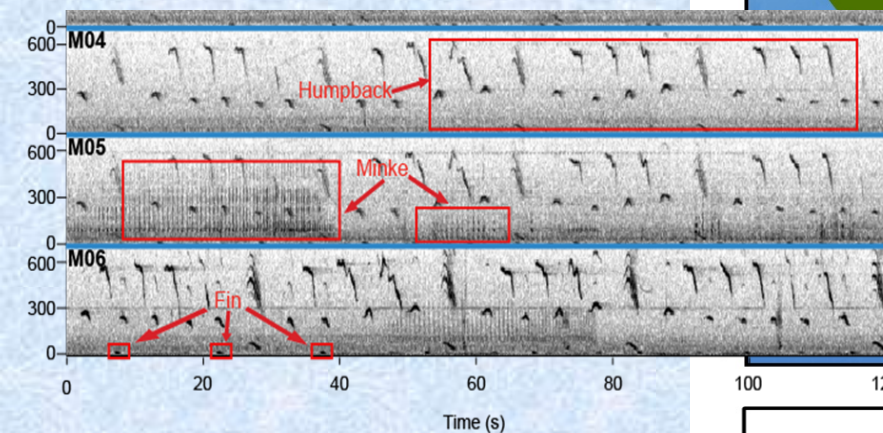
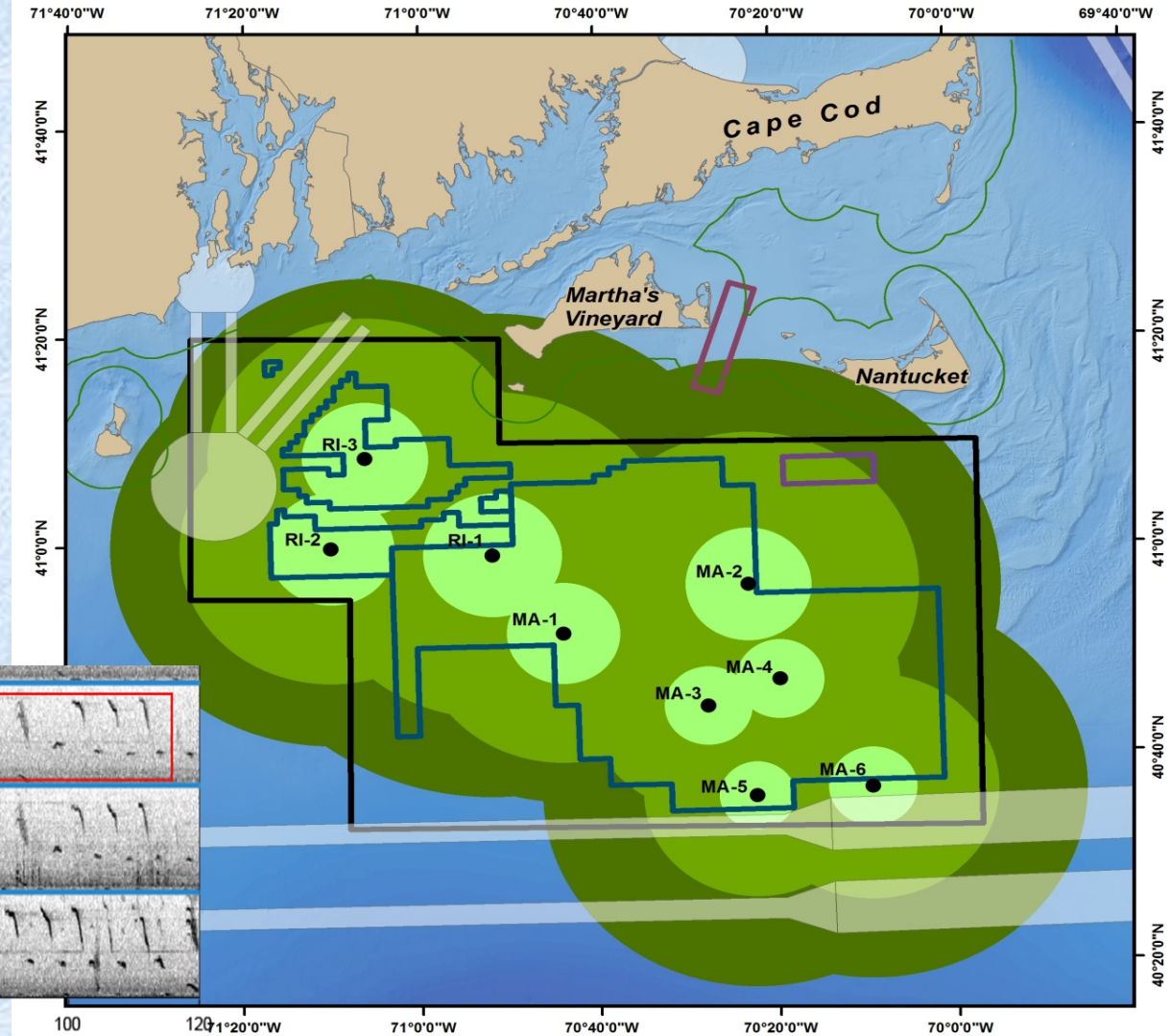
Boston, MA 02110



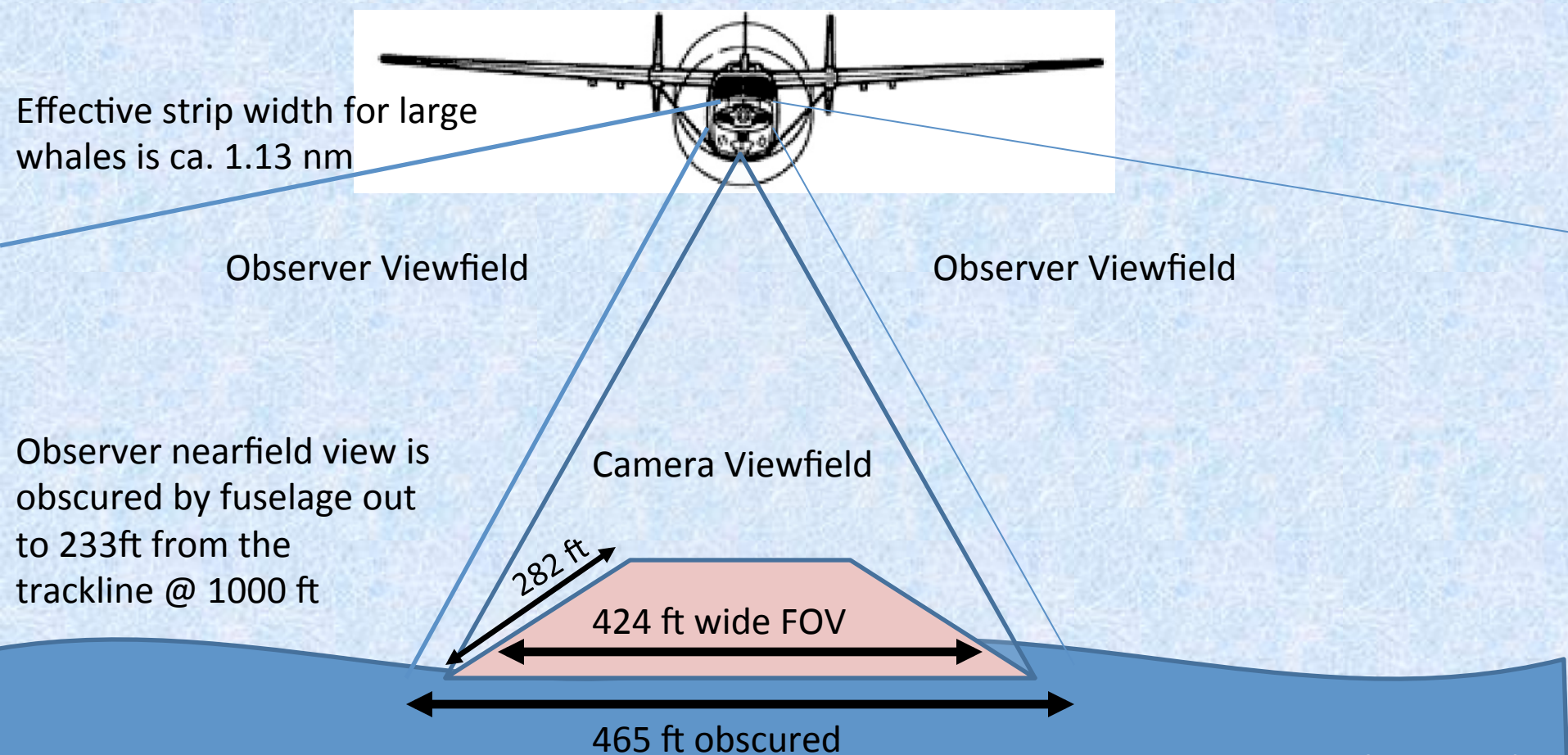
**Option #5**

**Start line: W to E - Line #5-1: 41 20' N, 71 22' W**  
**E to W - Line #5-10: 41 10' N, 70 1' W**





# Cessna Skymaster O-2 Observer and Camera Viewfields



Effective strip width for large whales is ca. 1.13 nm

Observer Viewfield

Observer Viewfield

Observer nearfield view is obscured by fuselage out to 233ft from the trackline @ 1000 ft

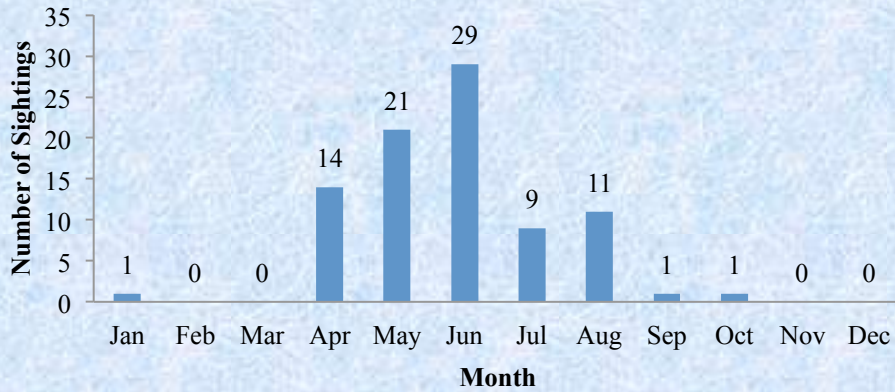
Camera Viewfield

282 ft

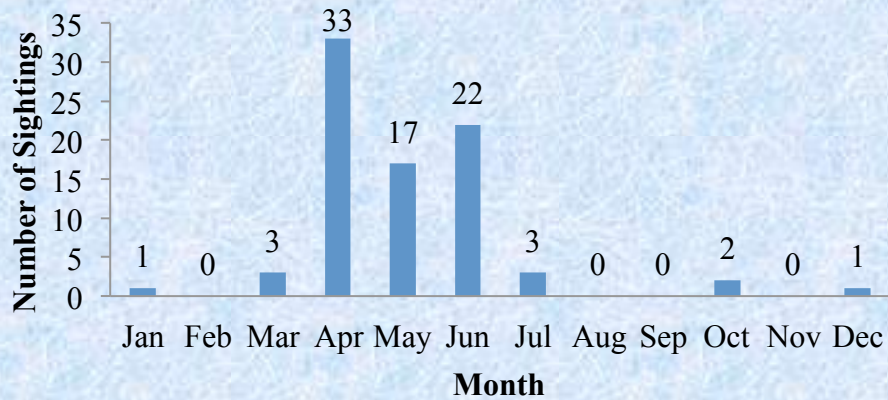
424 ft wide FOV

465 ft obscured

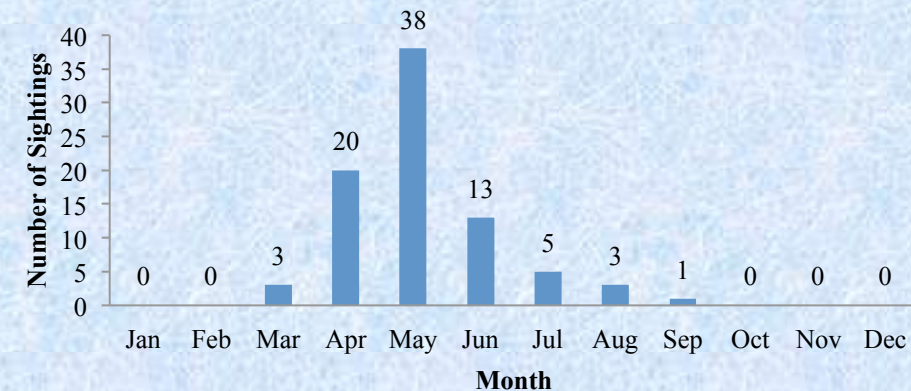
Probability of detection of animals or groups declines with their distance from the transect. In line-transect (or distance) sampling theory,  $f(0)$  is the probability density function of right-angle sighting distances (for that species and platform) valuated at a distance of 0. The reciprocal of  $f(0)$  is the "effective strip width," a statistical estimate of the area effectively searched on either side of the transect.



Fin whale sighting totals by month, combined across all survey years (October 2011 – June 2015).

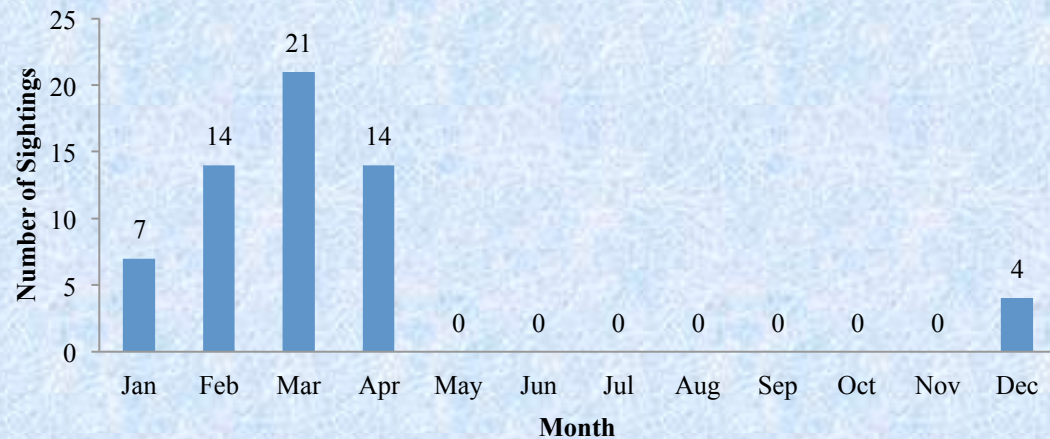


Humpback whale sighting totals by month, combined across all survey years (October 2011 – June 2015).

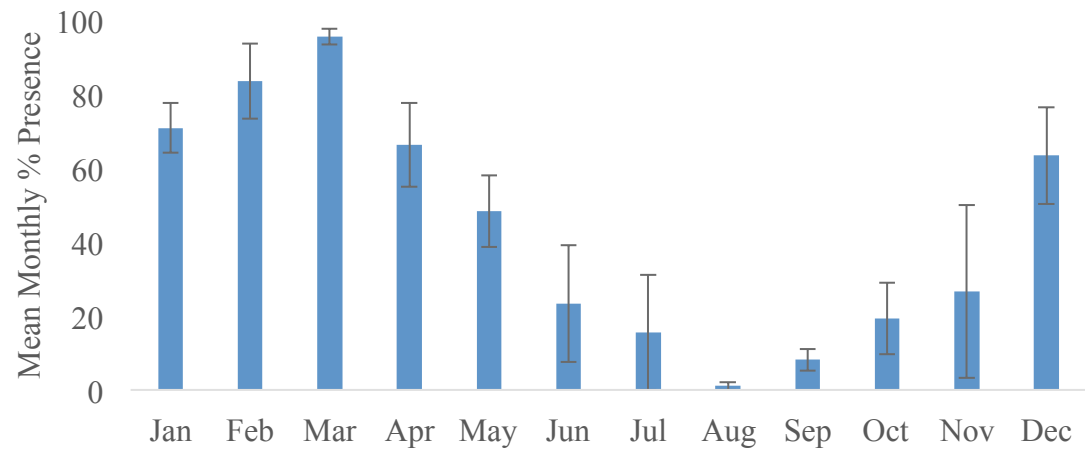


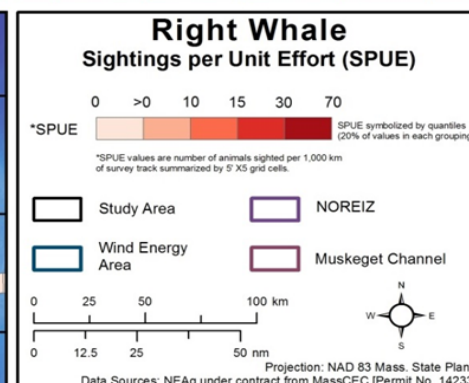
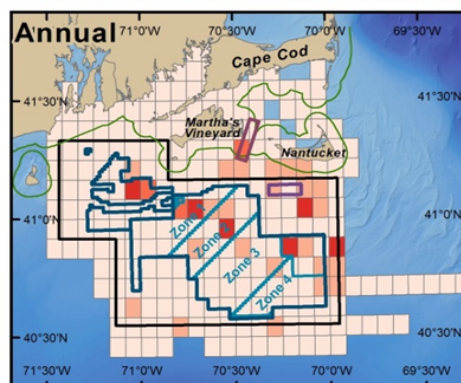
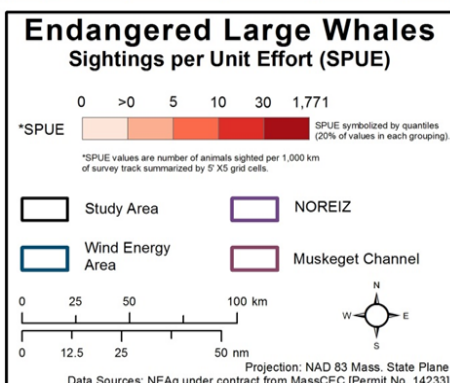
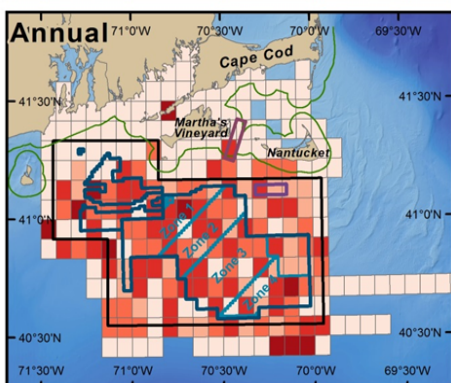
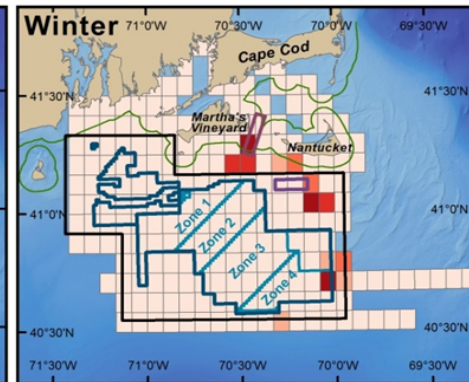
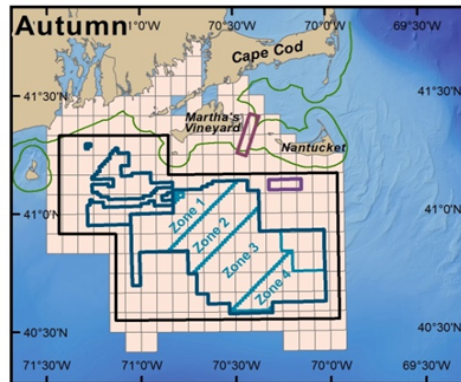
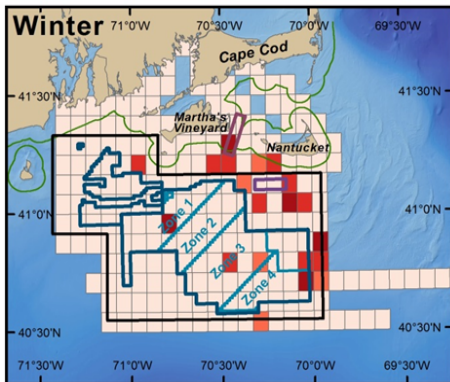
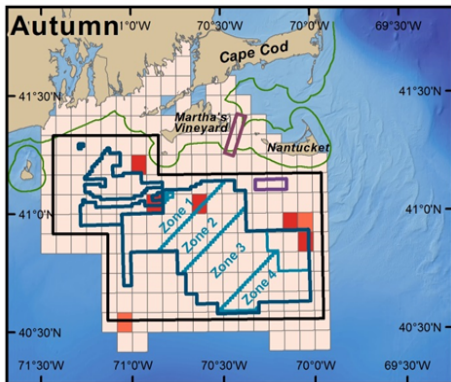
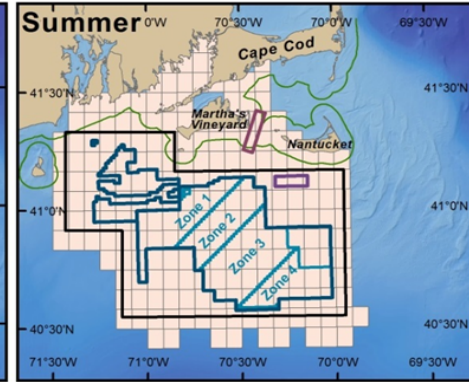
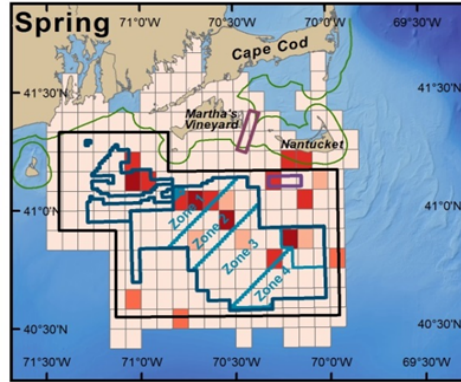
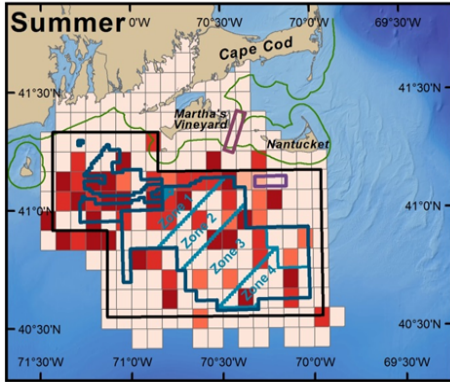
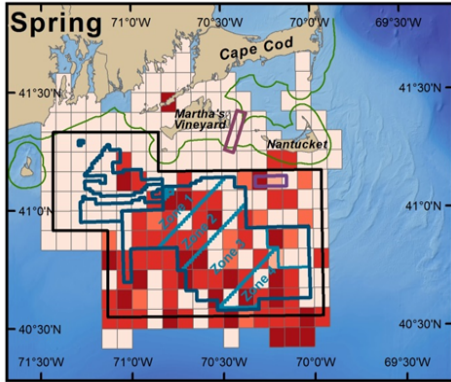
Minke whale sighting totals by month, combined across all survey years (October 2011 – June 2015).

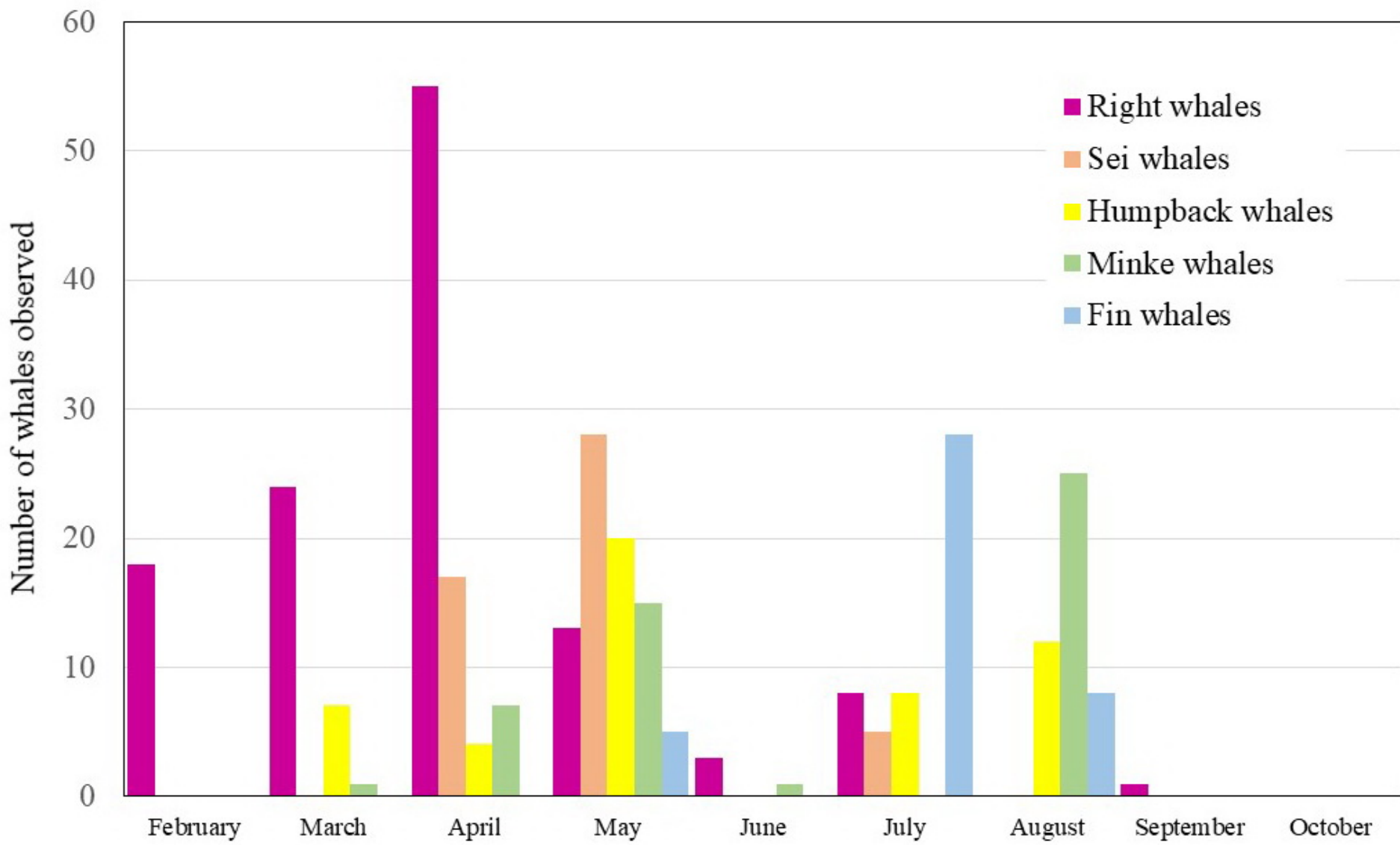
Right whale sighting totals by month, combined across all survey years (October 2011 – June 2015).



Right whale mean monthly acoustic presence  $\pm$  standard error for all years combined.

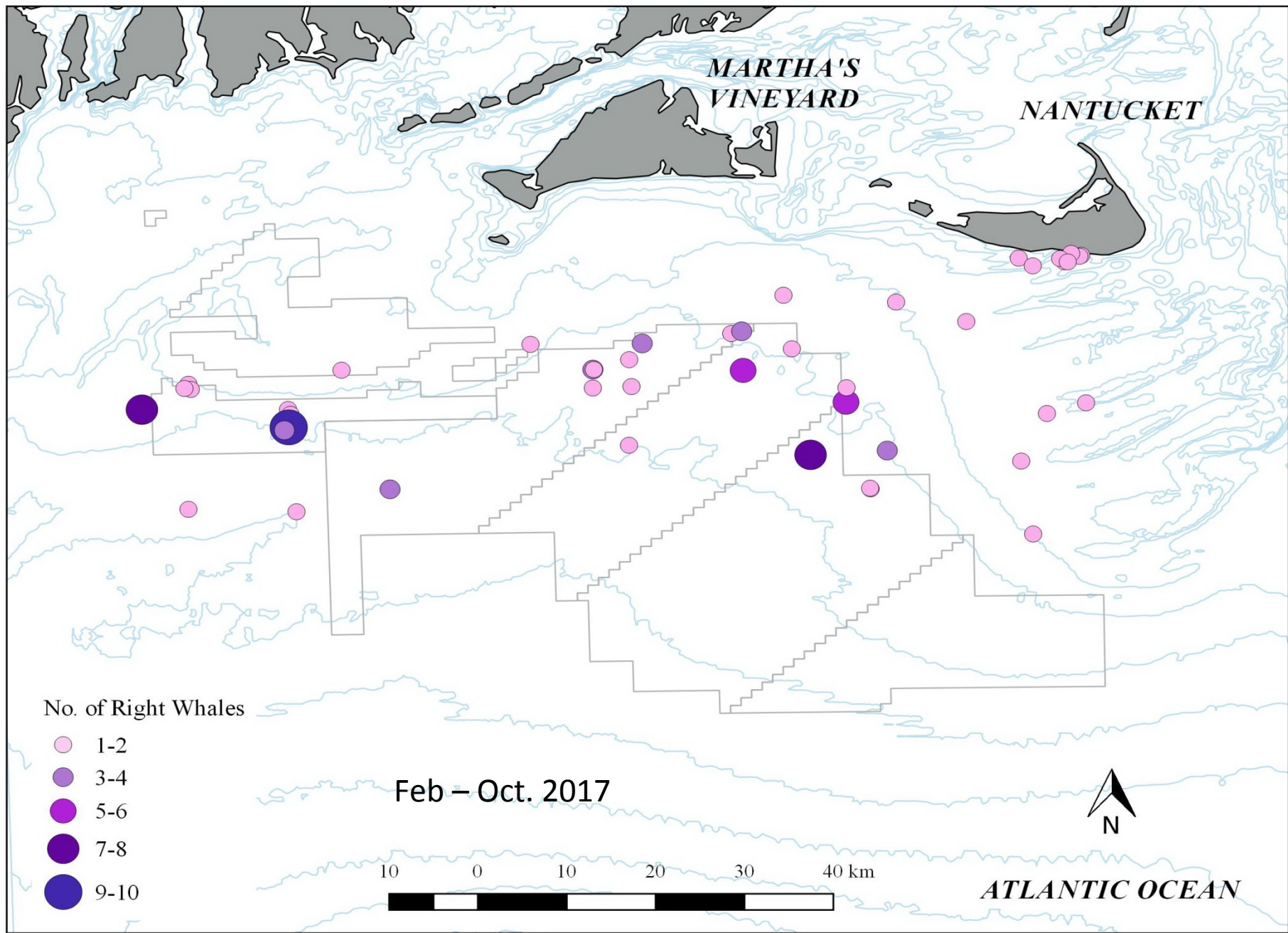


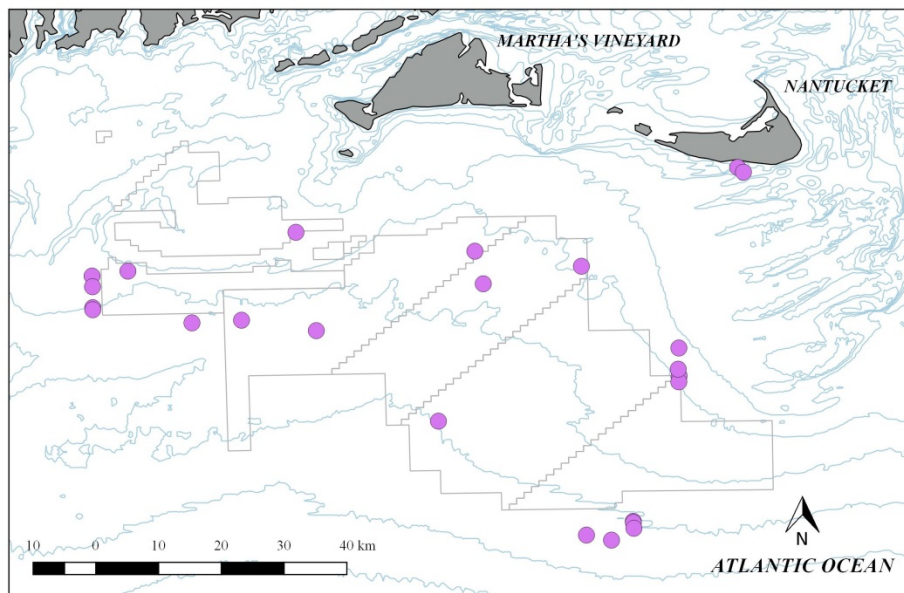




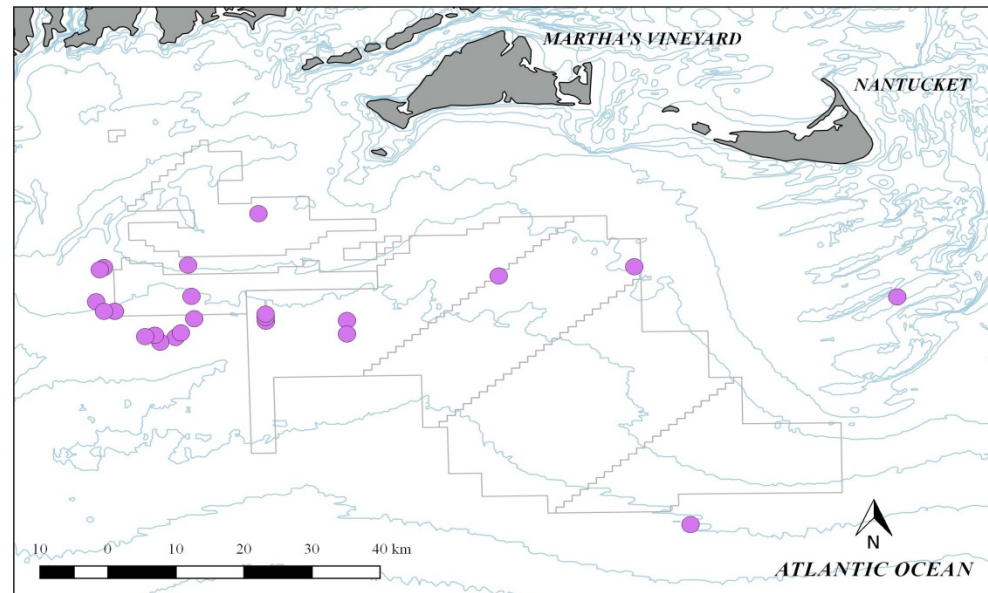
MA CEC WEA Survey Results 2017



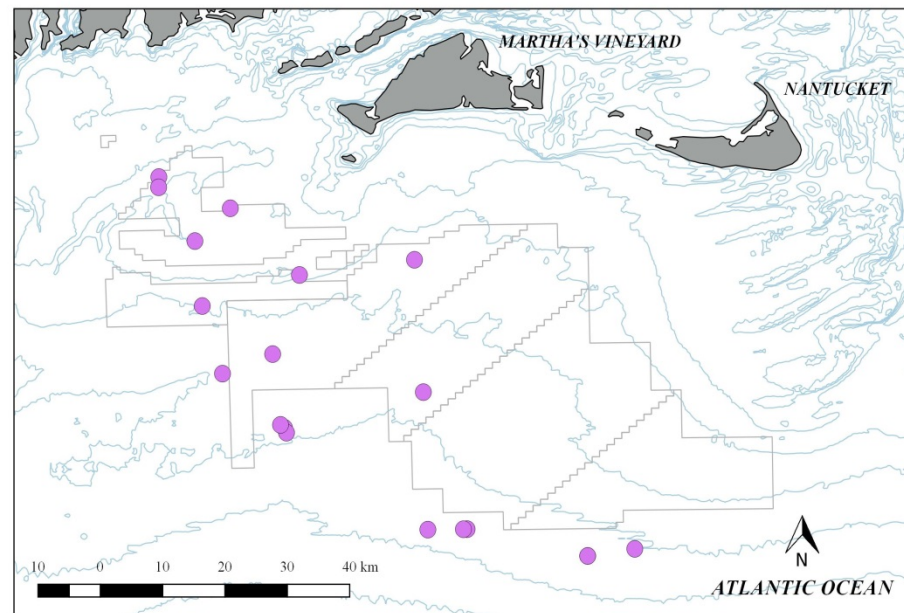




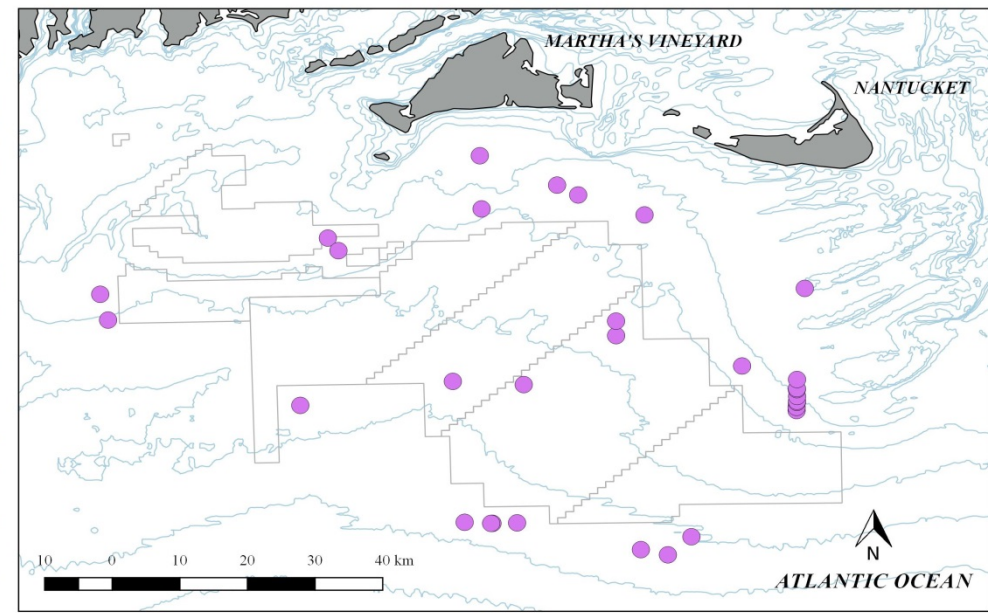
Humpback Whales 2017



Finback Whales, 2017



Sei Whales 2017



Minke Whales 2017

## **Recommendations**

1) The seasonality and spatial distribution of marine mammals in the area suggests seasonal and spatial management of survey and construction activities should be considered for implementation during environmental review and permitting.

2 The long-term impacts of offshore wind farm facilities should be carefully assessed using a statistically robust design to understand the consequences of such development on marine mammal and sea turtle distribution, abundance, behavior, and communications.

3) Focused oceanographic studies are needed to interpret the occurrence of endangered whales in the SA. There are two questions:

- Can offshore wind facilities affect whale habitat or behavior, thereby changing distribution and/or behavior?

- Are whale distributions food dependent, and any changes in distribution and/or behavior are due to changes in prey species in the area?

Distinguishing between these two hypotheses will be important in the context of managing future development.