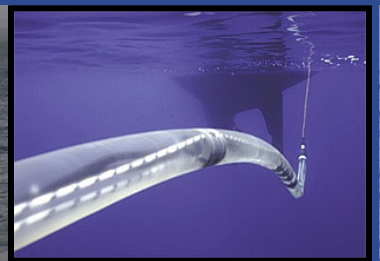
# Northeast Fisheries Science Center

## Protected Species Science Program Review

### North Atlantic Right Whale Passive Acoustic Research Program

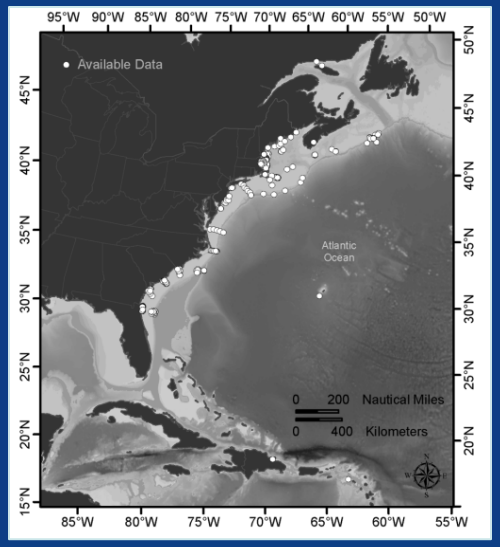
Drs. Sofie Van Parijs (NEFSC) & Melissa Soldevilla (SEFSC)



# Program Overview

## Passive Acoustics for Monitoring, Mitigation and Assessing Impacts of NARWs

### Migration & Distribution Patterns




*Map: Mike Thompson, NOAA/SBNMS*

### Real Time Acoustics

### Anthropogenic Impacts

# GARFO RESEARCH NEEDS – RELEVANCE OF PAM

- Investigate changing seasonal behavior and distribution
- Given changing distribution, adapt population monitoring methods
- Estimate cause-specific mortality (i.e., ship strike, entanglement)
- Develop criteria for assigning country of origin to entangling gear and associated serious injuries/mortalities
- Evaluate efficacy of ALWTRP measures
- Provide real-time monitoring of species in areas of concern to inform dynamic management decisions
- Strategic evaluation of methods – right balance of visual (vessel/aerial) surveys, passive acoustic moorings, gliders, etc.

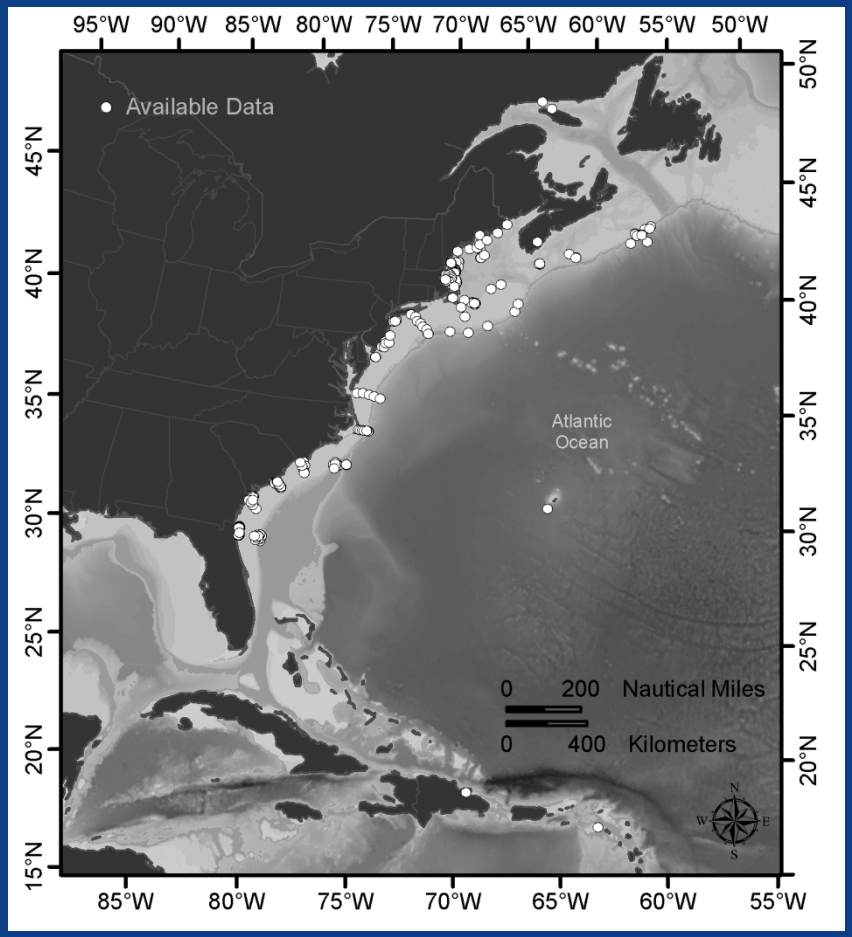
# Migration and Distribution Patterns

**Where are they and how is this changing?**

# Migration Corridors

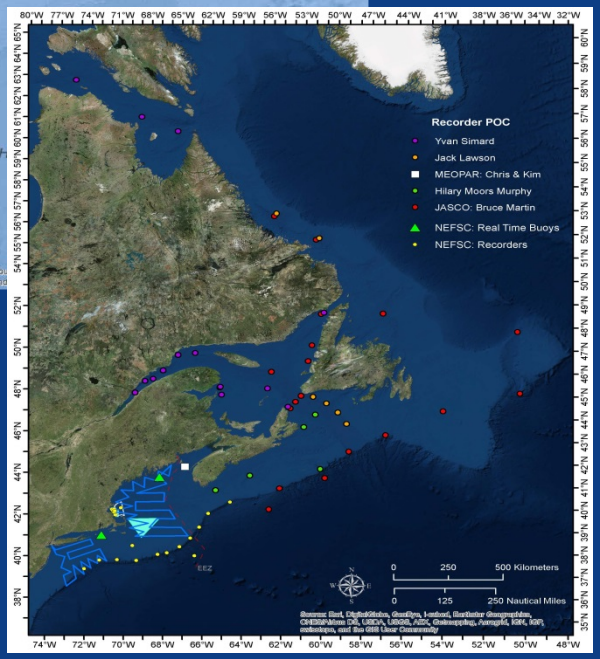
## Defining migration corridors for right whales

### Archival data (2003 To 2014)



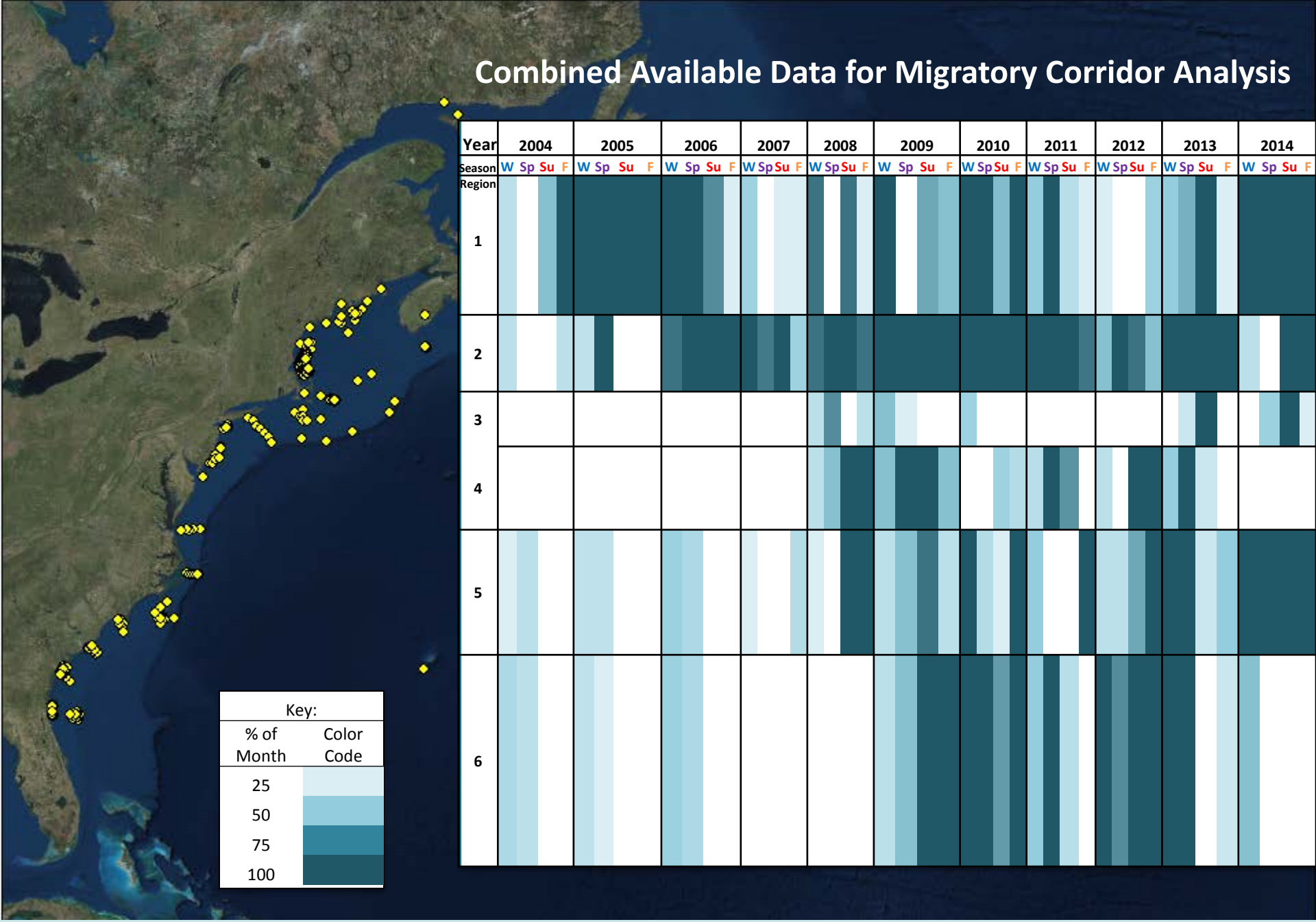

*Map: Mike Thompson, NOAA/SBNMS*

### New planned data collection



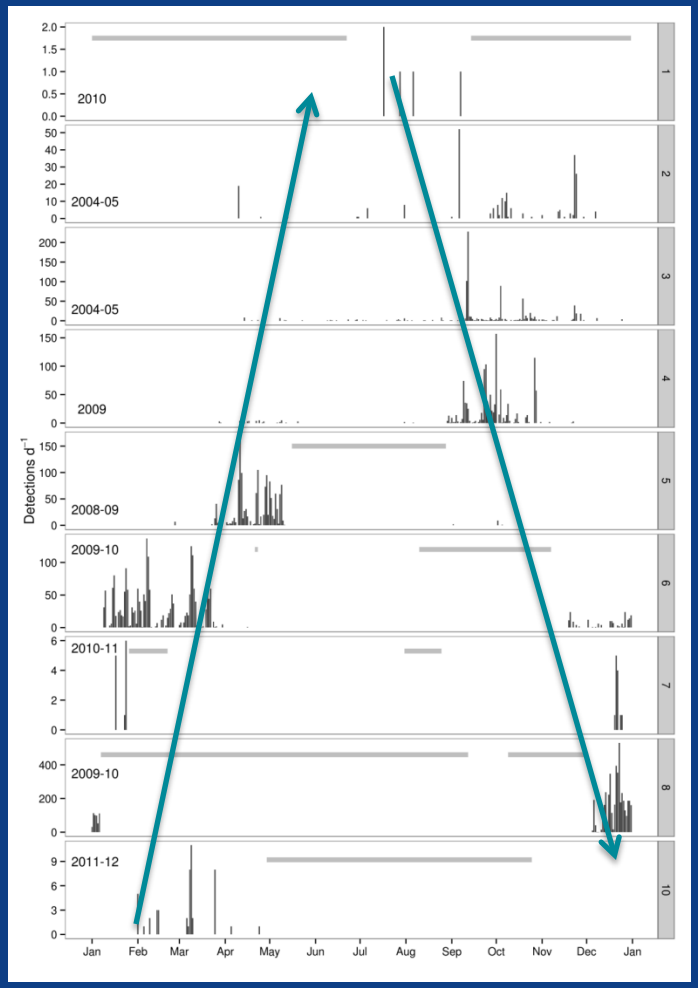

**Joint NE & SE effort & 14+ other collaborators!!**

# Combined Available Data for Migratory Corridor Analysis

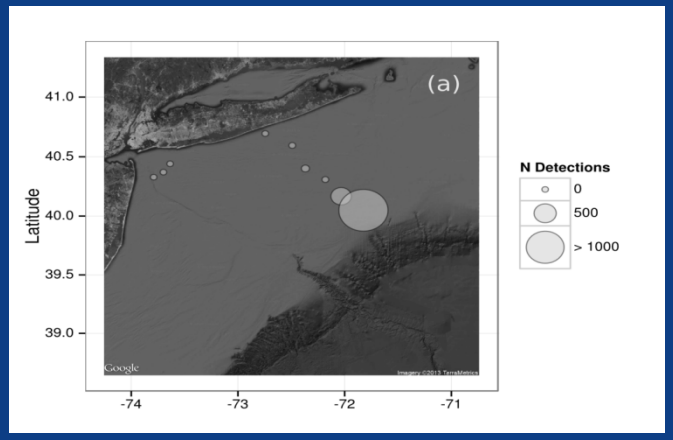


# Seasonal and Spatial

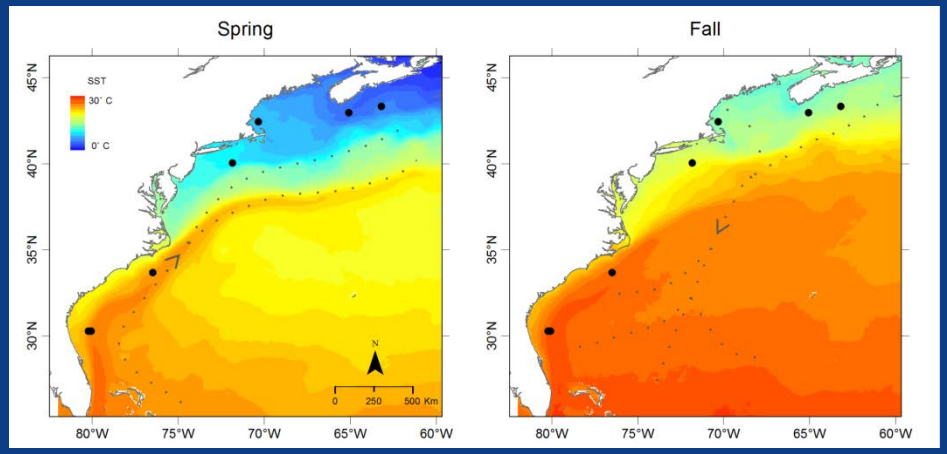
## Timing




## Distance from shore

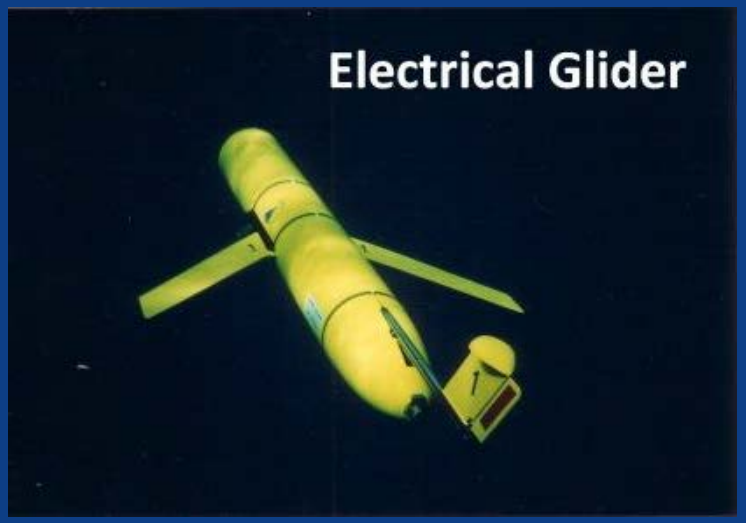



## Route



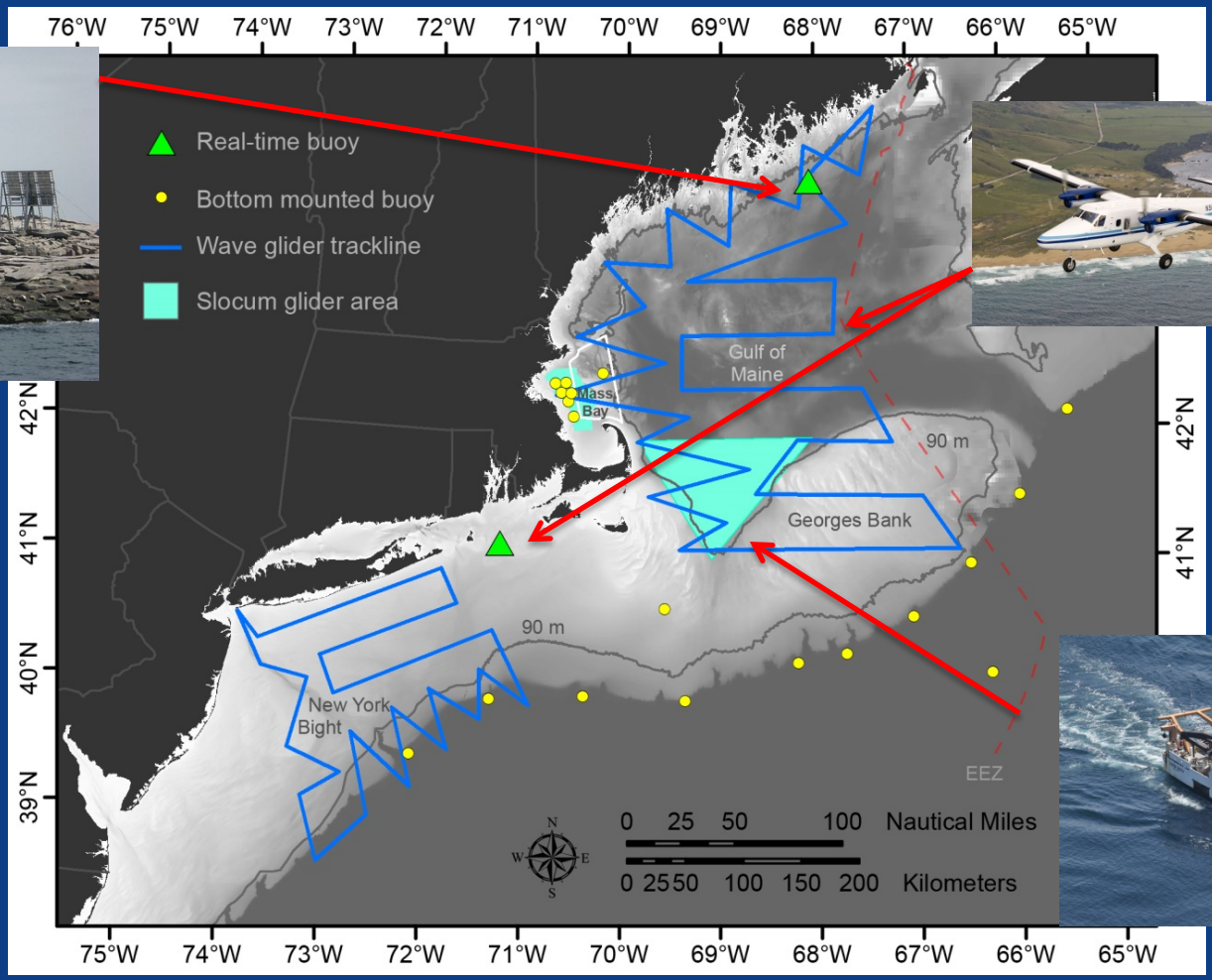

Denise Risch, et al. 2014. "Seasonal distribution of minke whale pulse trains in the North Atlantic." Moment Ecology

# REAL TIME ACOUSTICS



# Broad Sensing Network

## Establishment of a monitoring and mitigation network

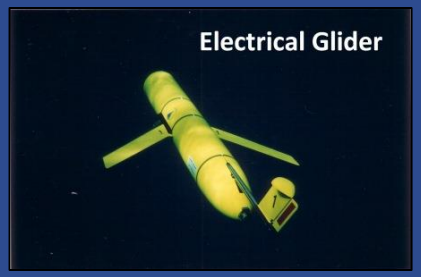


**2015 - 2017**

*Map: Mike Thompson, NOAA/SBNMS*

# REAL-TIME ACOUSTICS

**Live now at: http://dcs.whoi.edu/**



Validated by acoustician

Detected!

Possible

## ➢Monitoring:

- Where are they?
- Will it help find NARWs?
- Will it help reduce survey time?
-How reliable is it?

## ➢Mitigation:

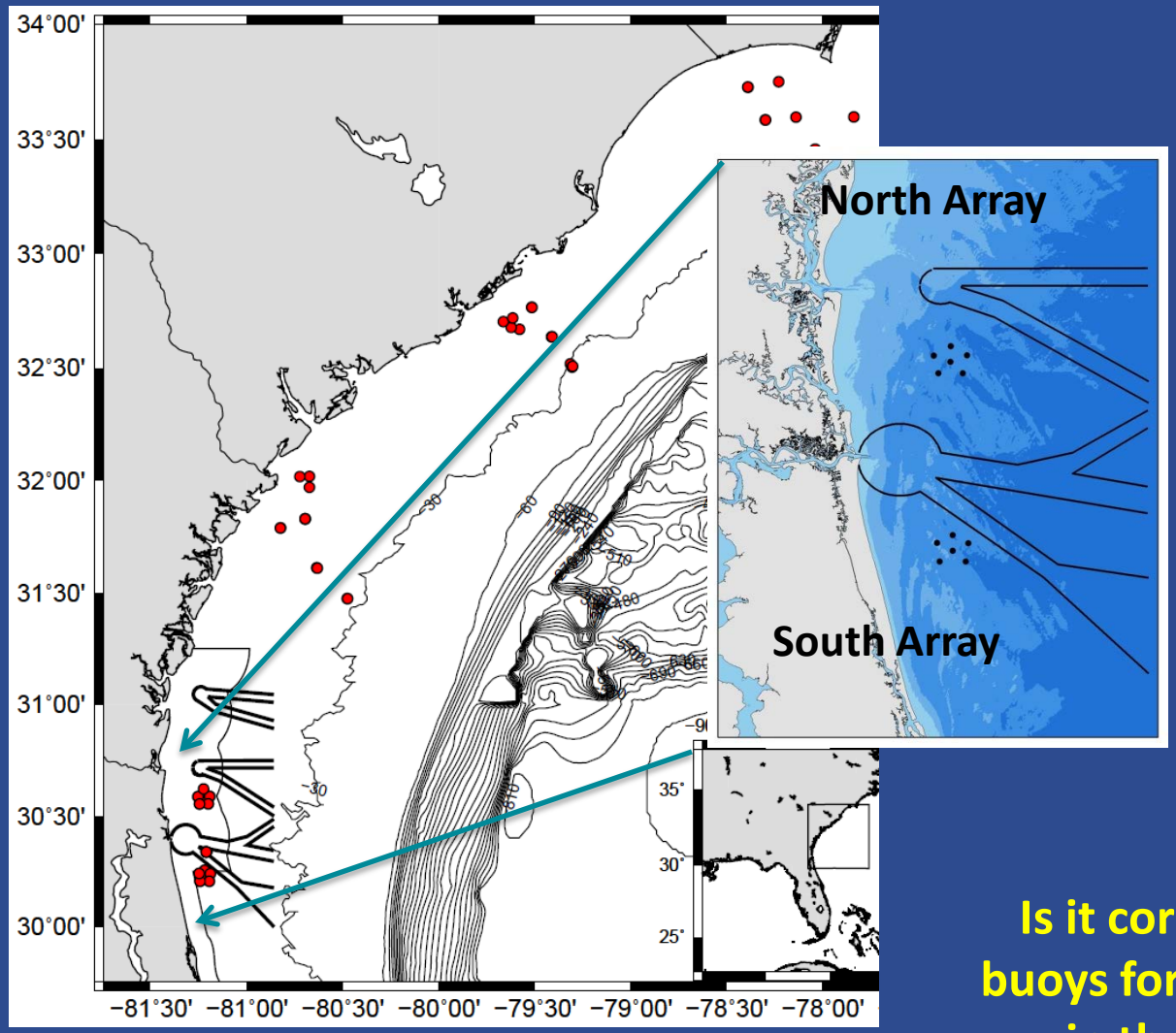
-Does the Coastguard
-Conduct an operation?

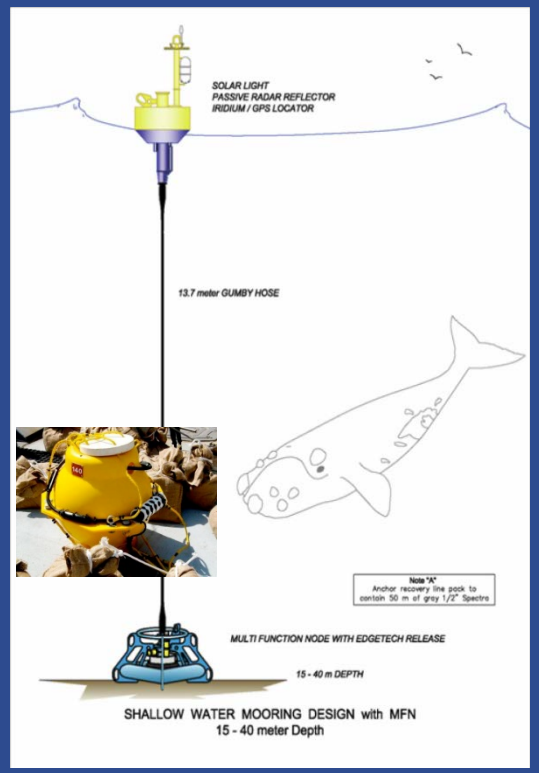
# Anthropogenic Impacts:

## Ship Strike and Noise

*Figure: Mike Thompson, NOAA/SBNMS*

# THE RIGHT TOOL FOR MITIGATION?



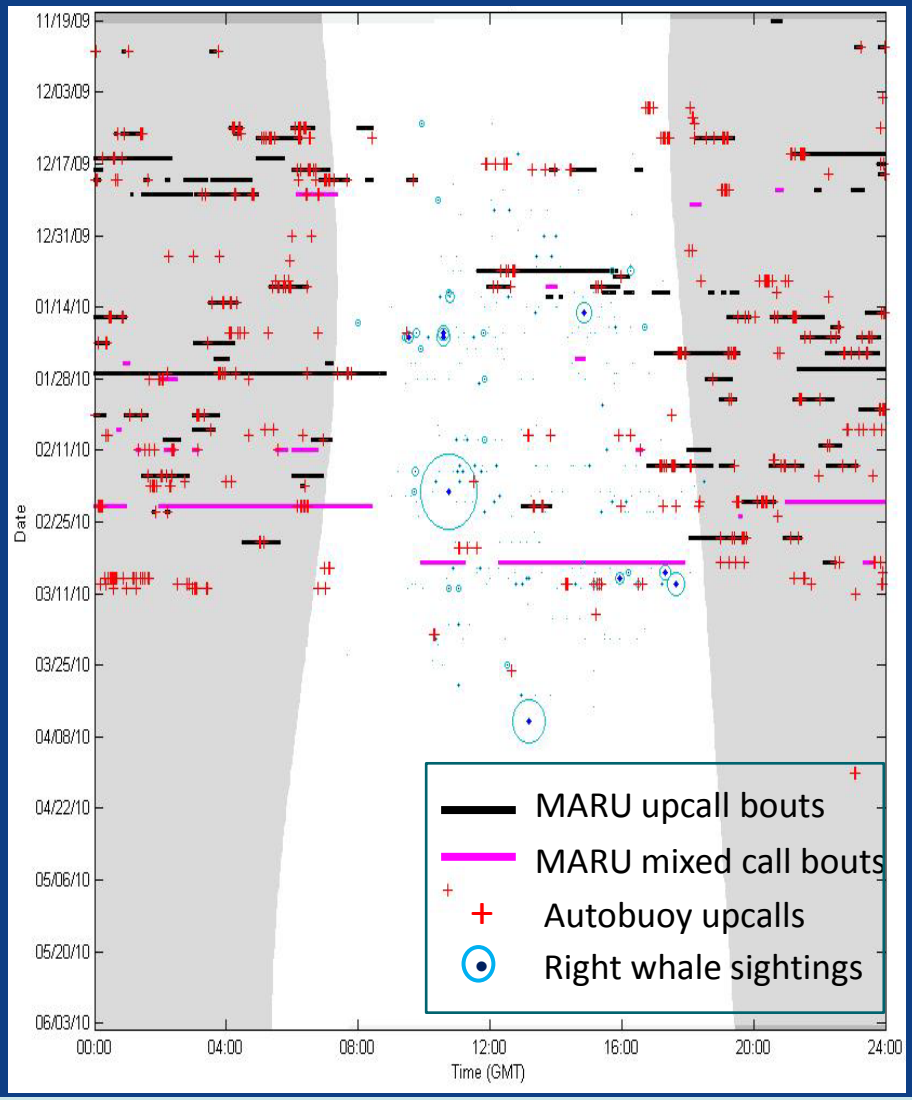




**Is it correct to use real time buoys for ship strike mitigation in the calving grounds?**

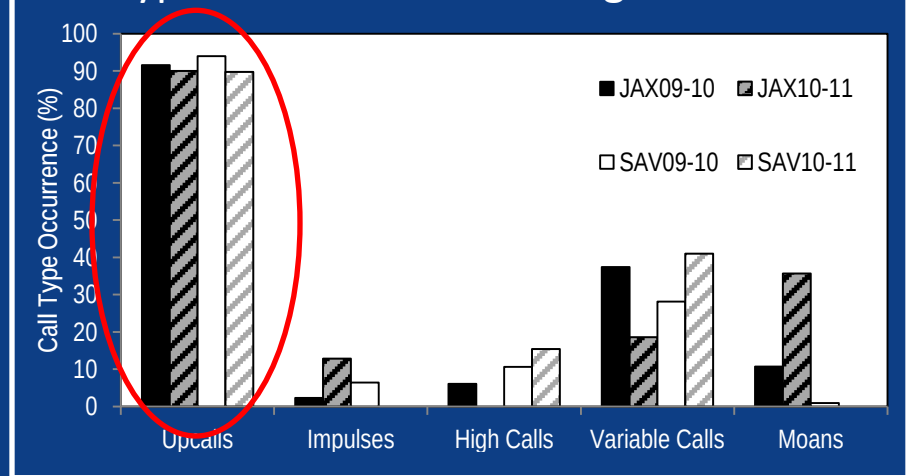
# Acoustic and Visual Comparison

## Comparison of Two Acoustic Methods and Aerial Surveys

**Answer = YES**




### Call Types Detected on Calving Grounds




### Visual and Acoustic Detection Comparison

| Days with: | JAX 2009 | SAV 2009 | JAX 2010 | SAV 2010 |
|---|---|---|---|---|
| Acoustic Effort (days) | 149 | 149 | 73 | 73 |
| Acoustic Detections (%) | 48 | 26 | 47 | 25 |
| Visual Effort (days) | 73 | 13 | 40 | 9 |
| Visual Detections (%) | 34 | 15 | 43 | 33 |

Soldevilla et al 2014 Endangered Species Research

# Detection distances

**Effective PAM requires understanding of how far we can hear species and call types.**

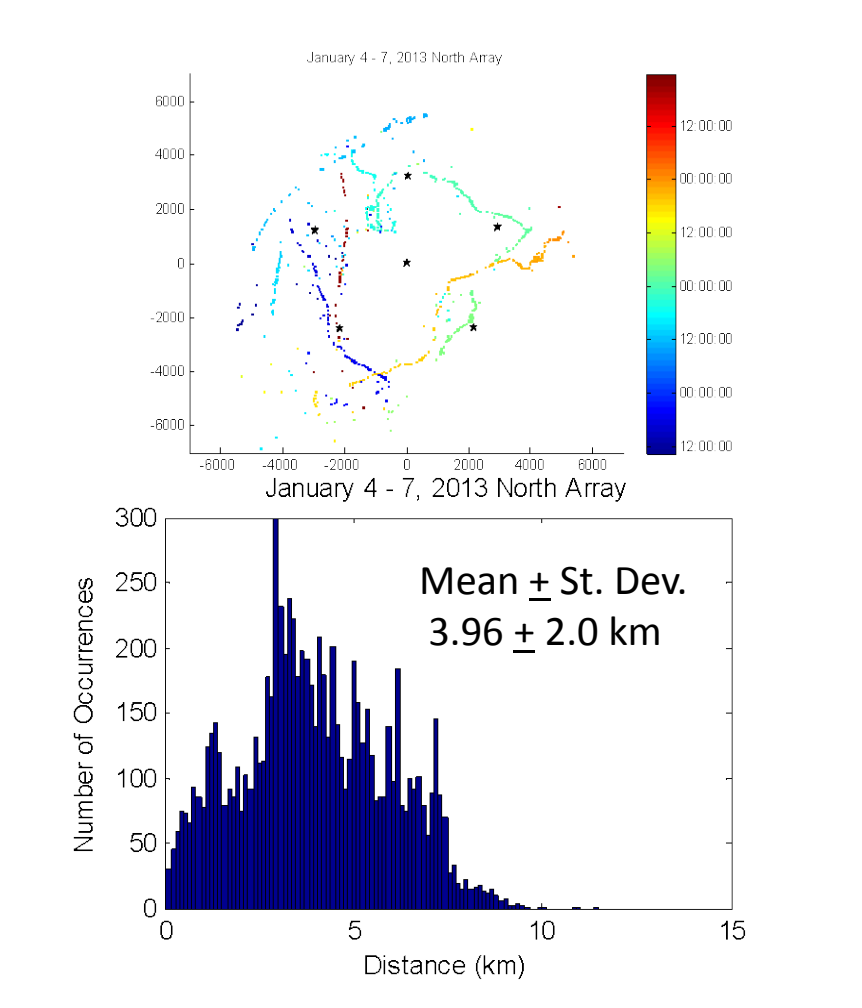
**Problems:**

**Each habitat (depth/sediment type/bathymetry) will have different variables.**

**To monitor over the Western Atlantic Ocean we need to cover several scenario's.**

**Results of 2 NARW important habitats:**

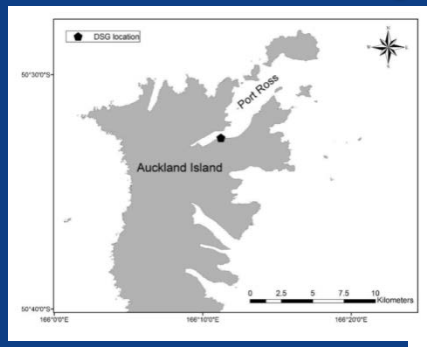
**SEUS – very shallow and sandy ~4km**
**MASS Bay – shallow and variable ~ 5 to 8km**




SEUS upcall distances

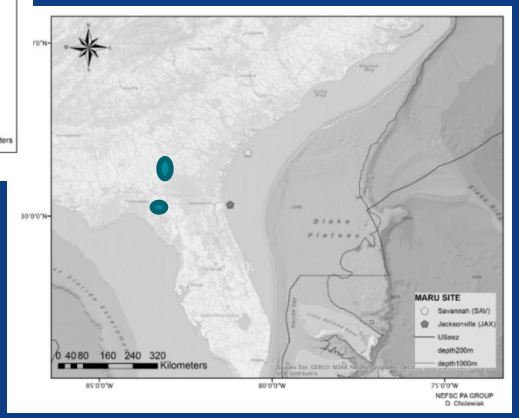
From Dr. Trudi Webster

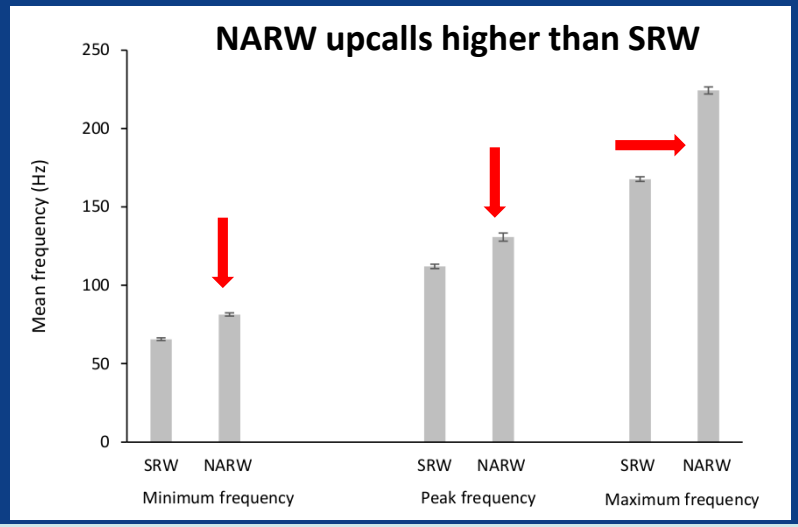
# Comparing populations/perspective

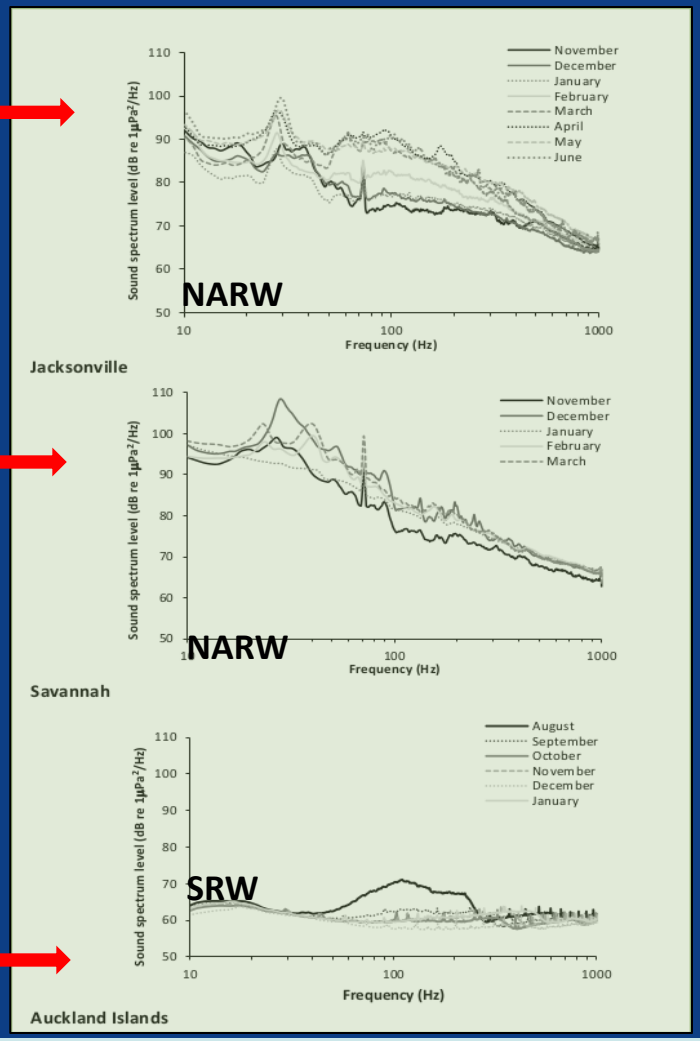



SRW calving area

NARW calving areas




## Difference in ambient noise