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FISHERIES

**Southeast
Fisheries
Science Center**

North Atlantic Right Whales: Overview of Studies of in the Southeast and Mid-Atlantic

Dr. Lance P. Garrison

Presentation to Marine Mammal Commission
May 7, 2015

Topics Covered

- Re-analysis and re-design of SEUS aerial surveys
- Review of data on mid-Atlantic RW habitat and threats
- LIMPET tag telemetry development study



Coordination and Setting Priorities: Southeast Implementation Team

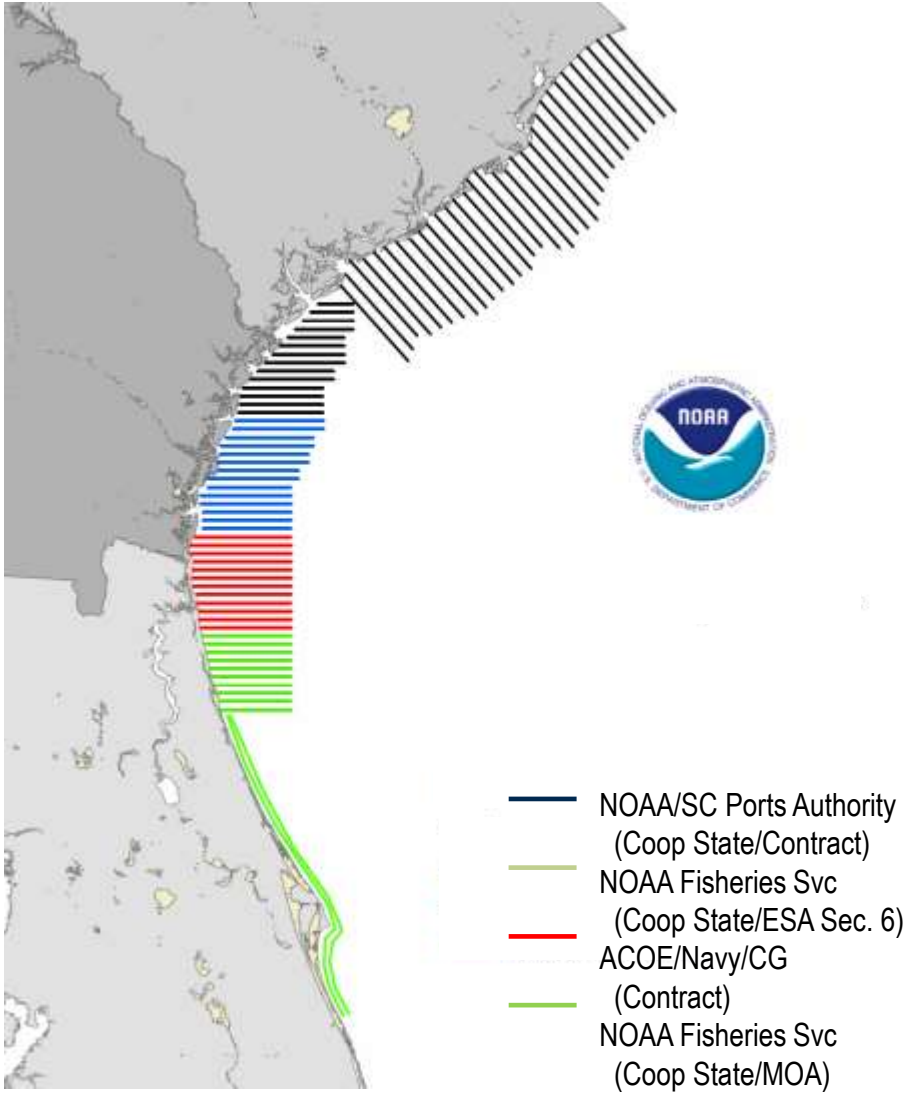
Terms of Reference

1. Coordinate and effect recovery plan implementation in Southeast U.S. while making efficient use of available resources via recommendations to NOAA Fisheries Service SERO.
2. Involve stakeholders in implementation of the recovery plan.
3. Promote creative solutions.
4. Monitor effectiveness of recovery plan implementation and adapt accordingly.
5. Identify and prioritize information needs that can be best addressed through enhanced partnerships.



Recent Efforts: Reviewing and recommending revisions to aerial survey design and objectives, developing strategy for assessing right whale use of mid-Atlantic habitats.

Data Collection: Aerial Surveys (1992-2013)



NOAA Fisheries funds the majority of the SE survey effort; however, other entities provide funds as well.

GA/SC (black): Funded by NOAA and South Carolina Ports Authority (part of project submitted for ESA Section 7 consultation). GA/SC Surveys phased out after 2013/2014 calving season

NEWS (blue): NOAA Cooperative State funds provided to GDNR through ESA Section 6 grant process.

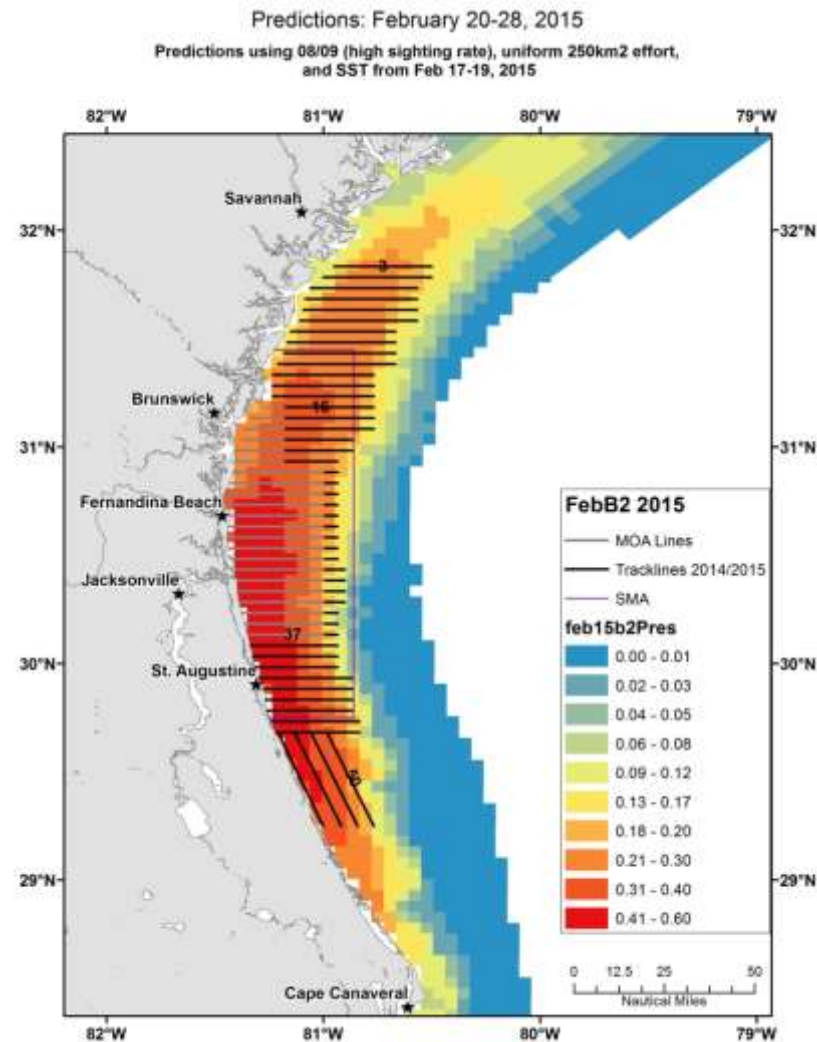
CEWS (red): ACOE/Navy/CG (requesting agencies) provides funds to NOAA (servicing agency) via Economy Act MOA.

SEWS (green): NOAA Cooperative State funds provided to FWCC through ESA Section 6 MOA.

Aerial Survey Design

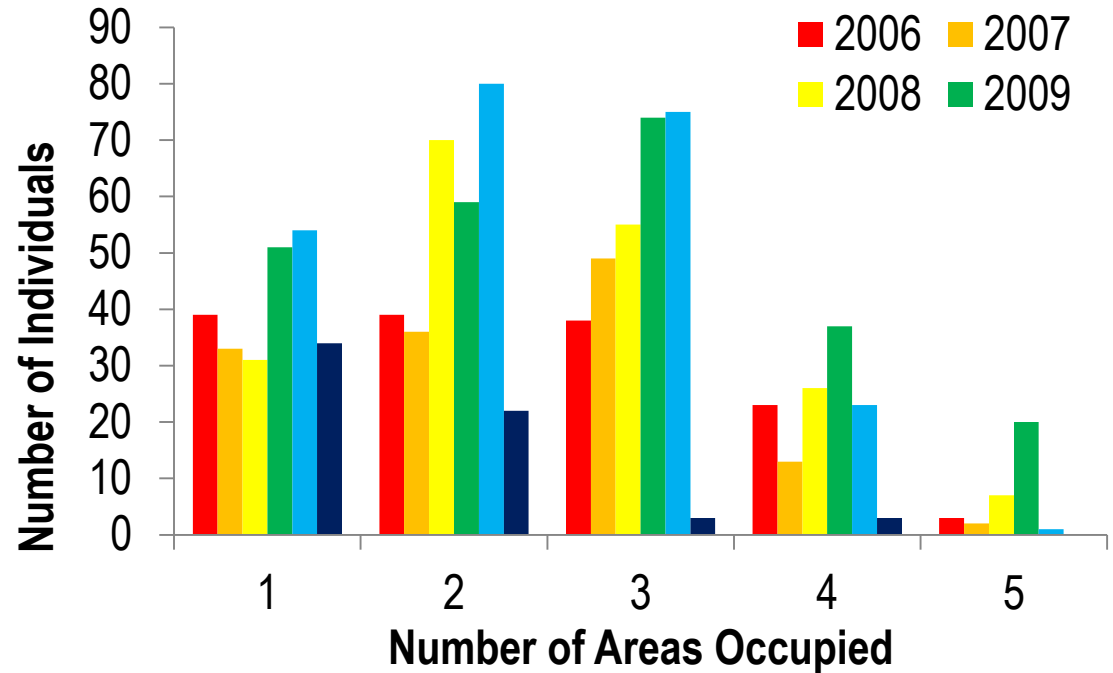
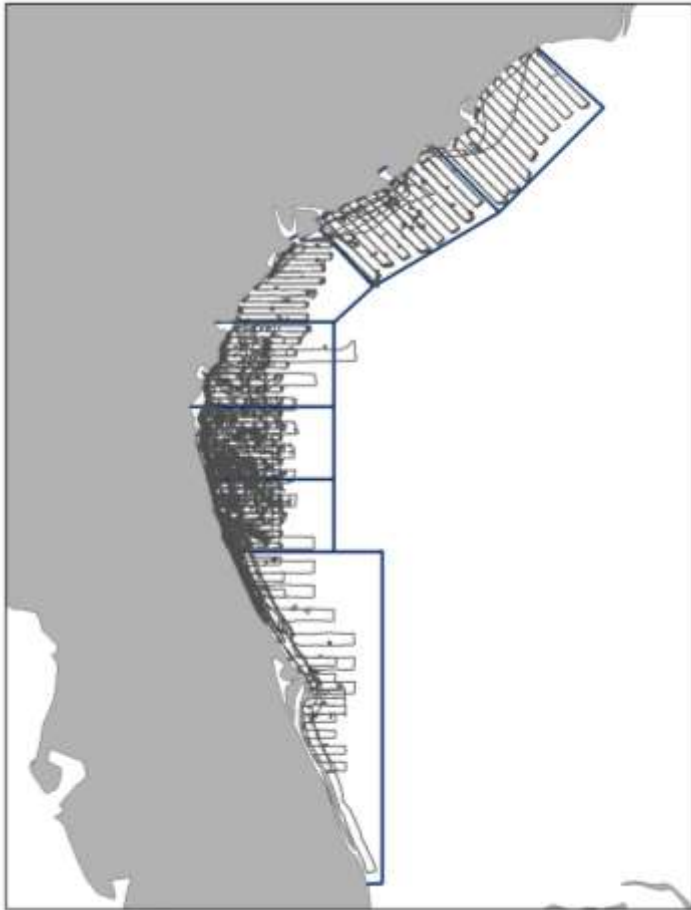
SEIT Recently Reviewed the Objectives and Design of the Aerial Survey Program

- Reduced focus on ship strike mitigation given the vessel speed restrictions and other management efforts in place.
- Increased focus on demographic data collection including documenting presence of animals in SEUS, documenting calving rates
- Reflects anticipated reduced effort levels and implement a more adaptive design.



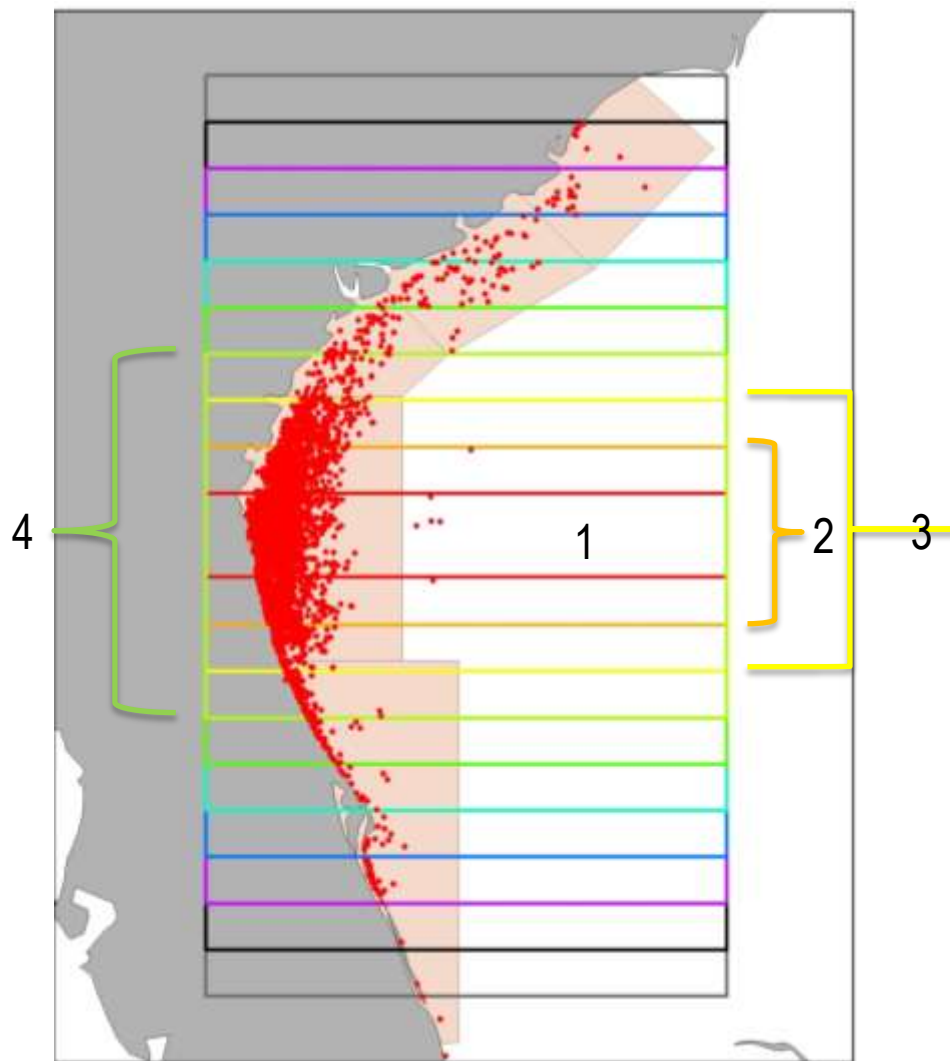
SEUS RW Aerial survey tracks overlaid with model predictions of right whale occurrence. FWRI

Aerial Survey Design: Site Fidelity



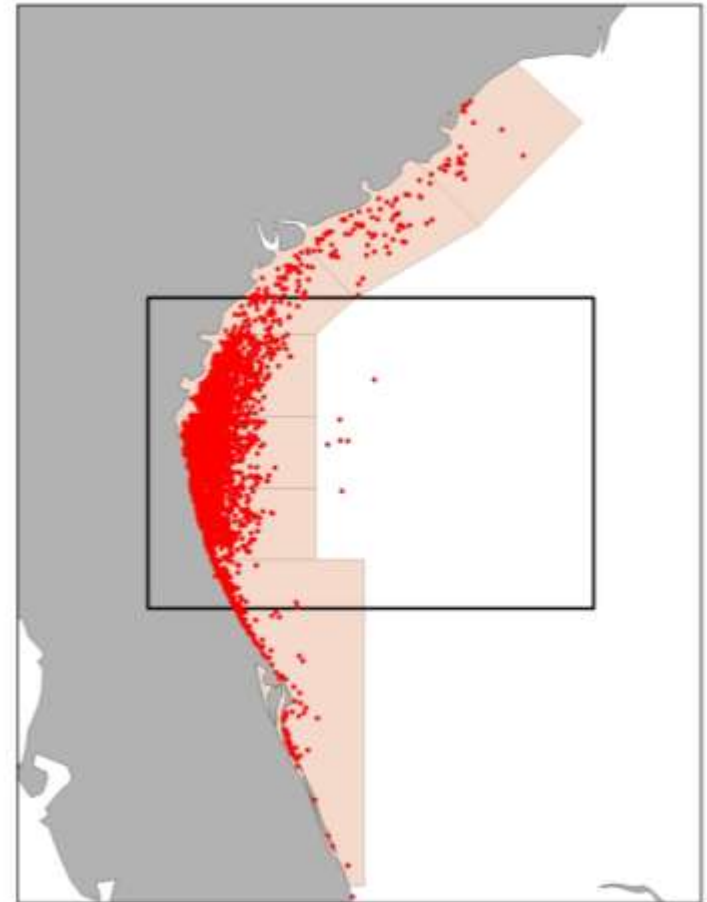
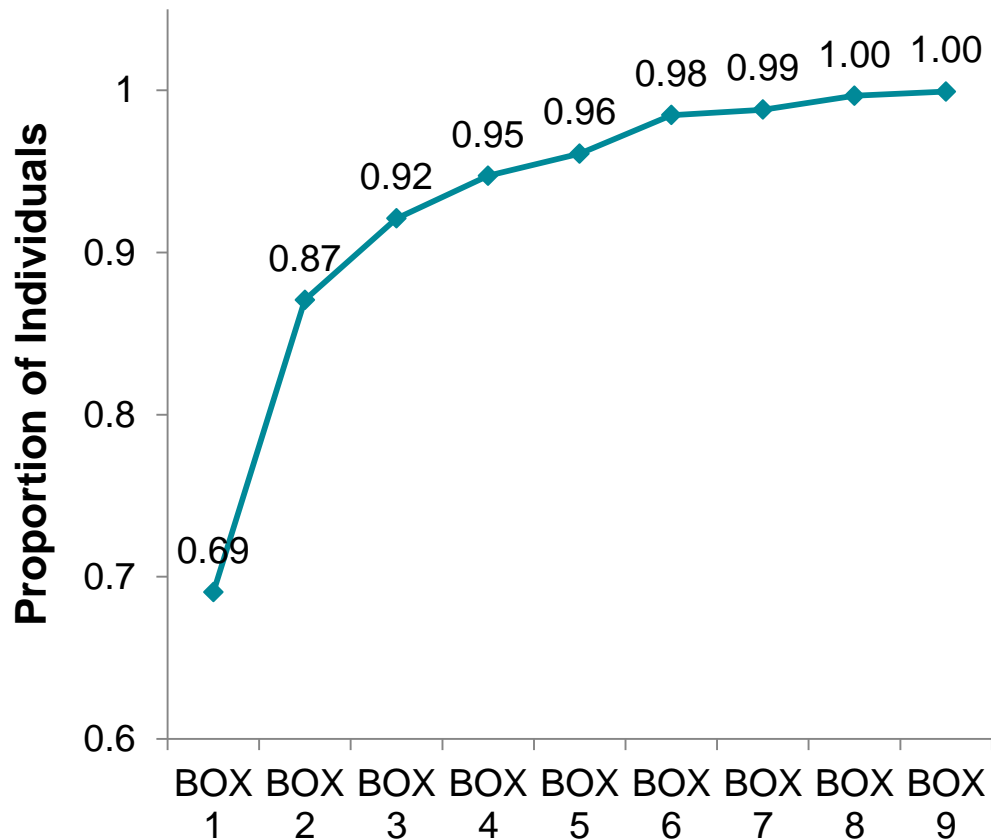
24% of animals are sighted only one survey area in a given year. Most are observed in 2 or 3 survey areas.

Aerial Survey Design: Latitudinal Extent



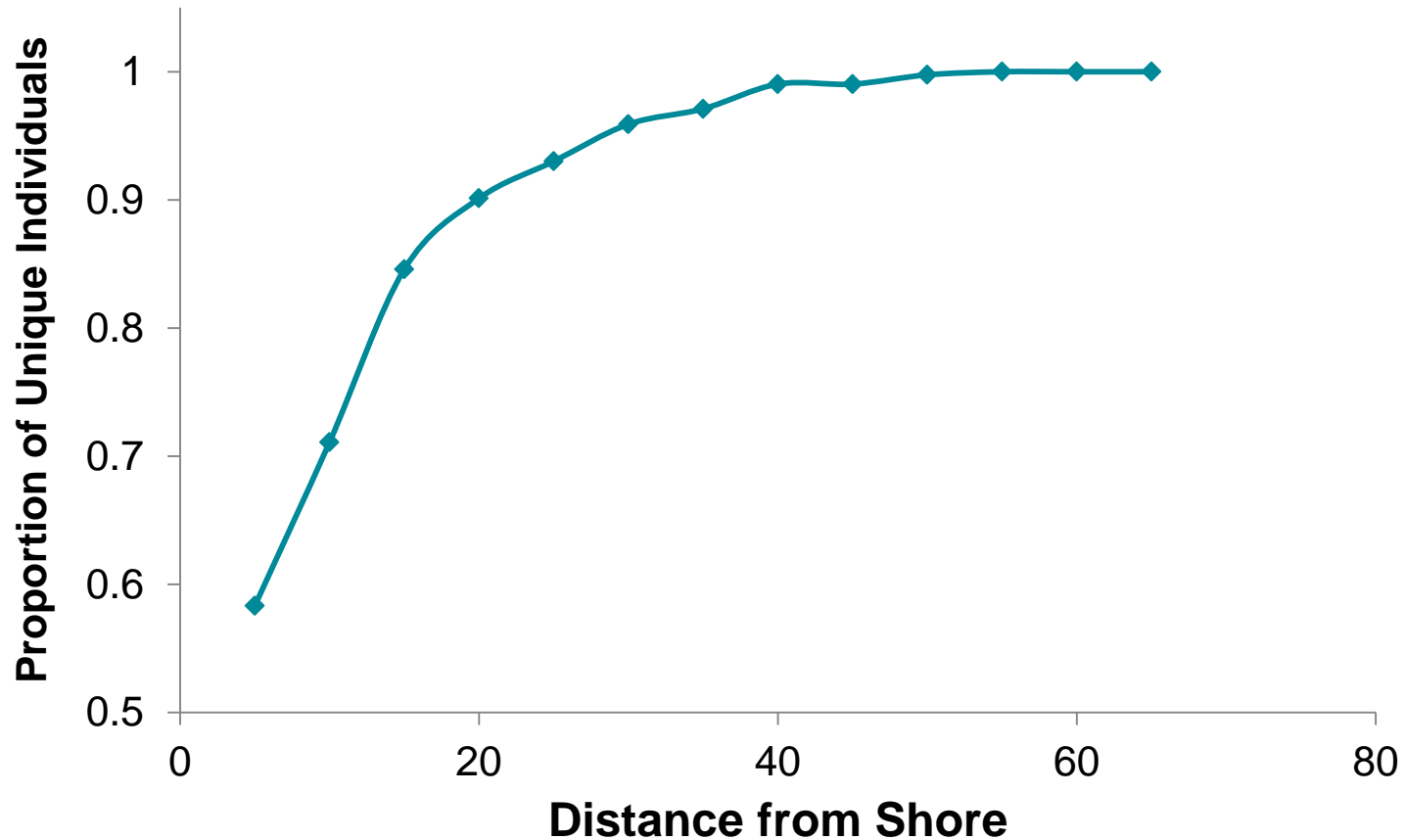
- How much of the area must be surveyed in a given year to ensure detection of nearly all unique individuals?
- Series of 10 concentric boxes centered on the center of mass of RW sightings. Each box adds 20 nautical miles on the northern and southern ends of the boxes.
- For each box, count the proportion of unique individuals detected relative to the extent of the survey.

Aerial Survey Design: Latitudinal Extent



Survey extent corresponding to Box 4 accounts for 95% of unique individuals observed in SEUS

Aerial Survey Design: Offshore Extent



58% of individuals detected within 5 km from shore. 99% of individuals detected within 40 km from shore

Aerial Survey Design: Offshore Extent

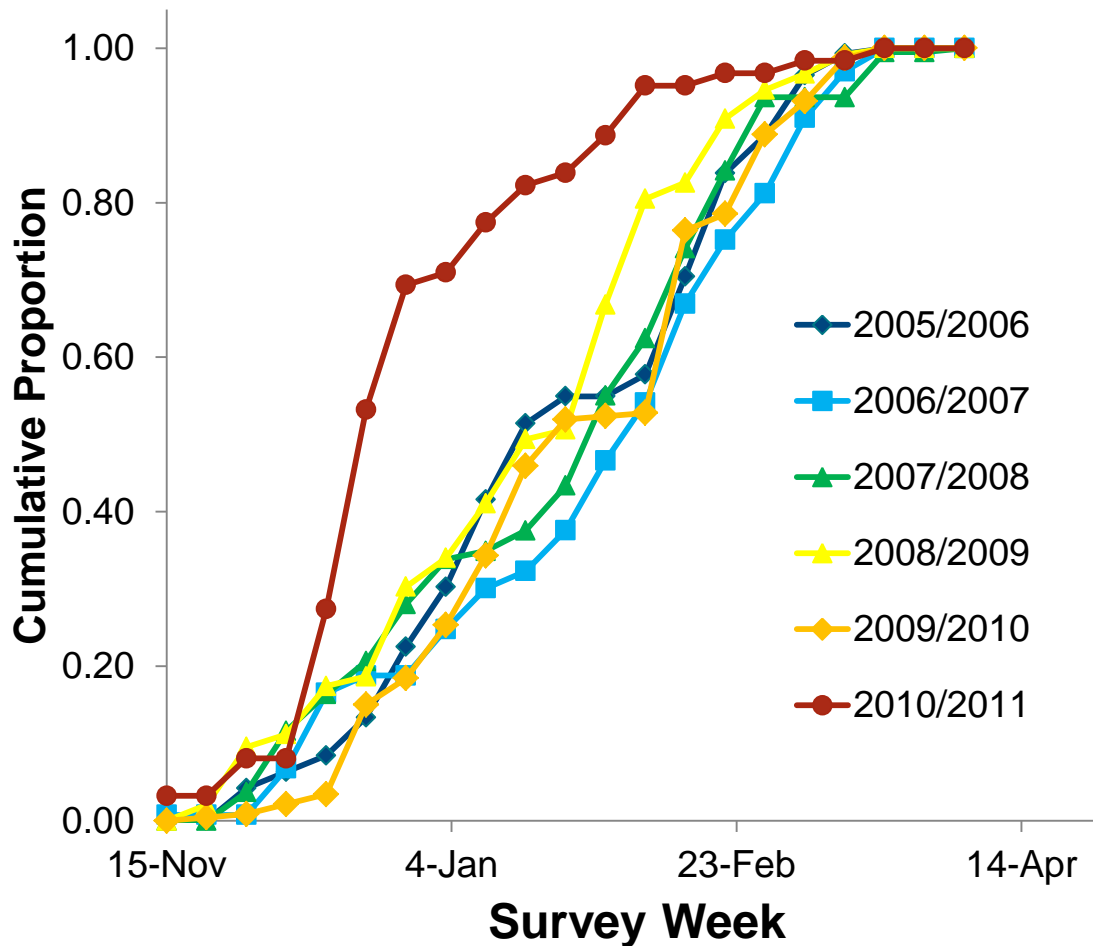
Proportion of Sightings by Distance from Shore

DFS	Southern	SEWS	CEWS	NEWS	SCGAS	SCGAC	SCGAN
0-5	0.82	0.33	0.05	0.00	0.00	0.01	0.19
5-10	0.11	0.21	0.08	0.04	0.11	0.06	0.05
10-15	0.03	0.14	0.18	0.14	0.16	0.15	0.26
15-20	0.01	0.13	0.16	0.23	0.18	0.15	0.21
20-25	0.01	0.07	0.20	0.16	0.12	0.02	0.05
25-30	0.01	0.04	0.12	0.14	0.17	0.18	0.14
30-35	0.01	0.02	0.07	0.10	0.05	0.07	0.05
35-40	0.00	0.03	0.04	0.07	0.11	0.10	0.05
40-45	0.00	0.02	0.03	0.06	0.09	0.05	0.00
45-50	0.00	0.00	0.01	0.03	0.00	0.14	0.00
50-55	0.00	0.00	0.03	0.02	0.00	0.00	0.00
55-60	0.00	0.00	0.01	0.00	0.00	0.04	0.00

Distance from shore ranges encompassing 95% of sightings are highlighted

Aerial Survey Design: Discovery Curves

Seasonal Discovery Curves

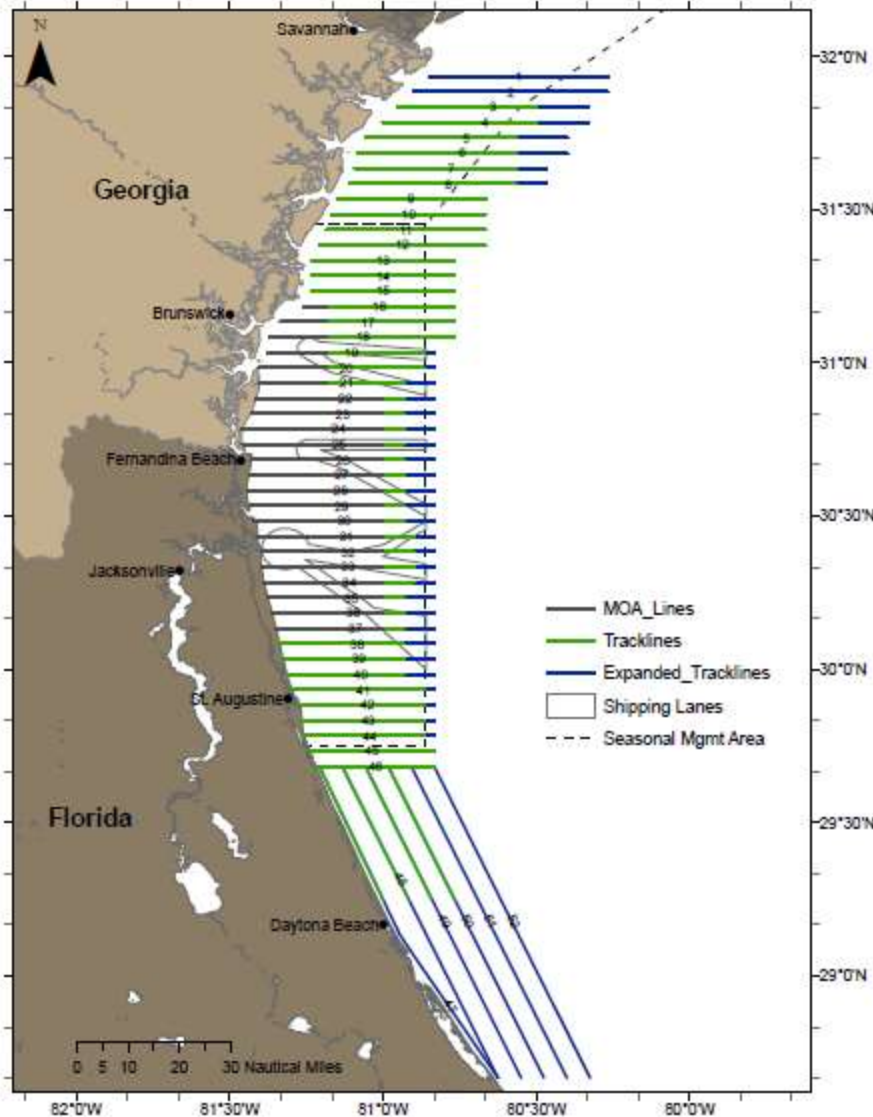


- New individuals are being observed late into the survey season with most curves not reaching asymptotes until mid to late March
- There appears to be a mid-season “surge” in new individuals in late-Jan to mid-Feb in most years
- 2010/2011 was clearly an odd year with most new animals seen early in the season and an early asymptote.

Aerial Survey Design: Summary of Results

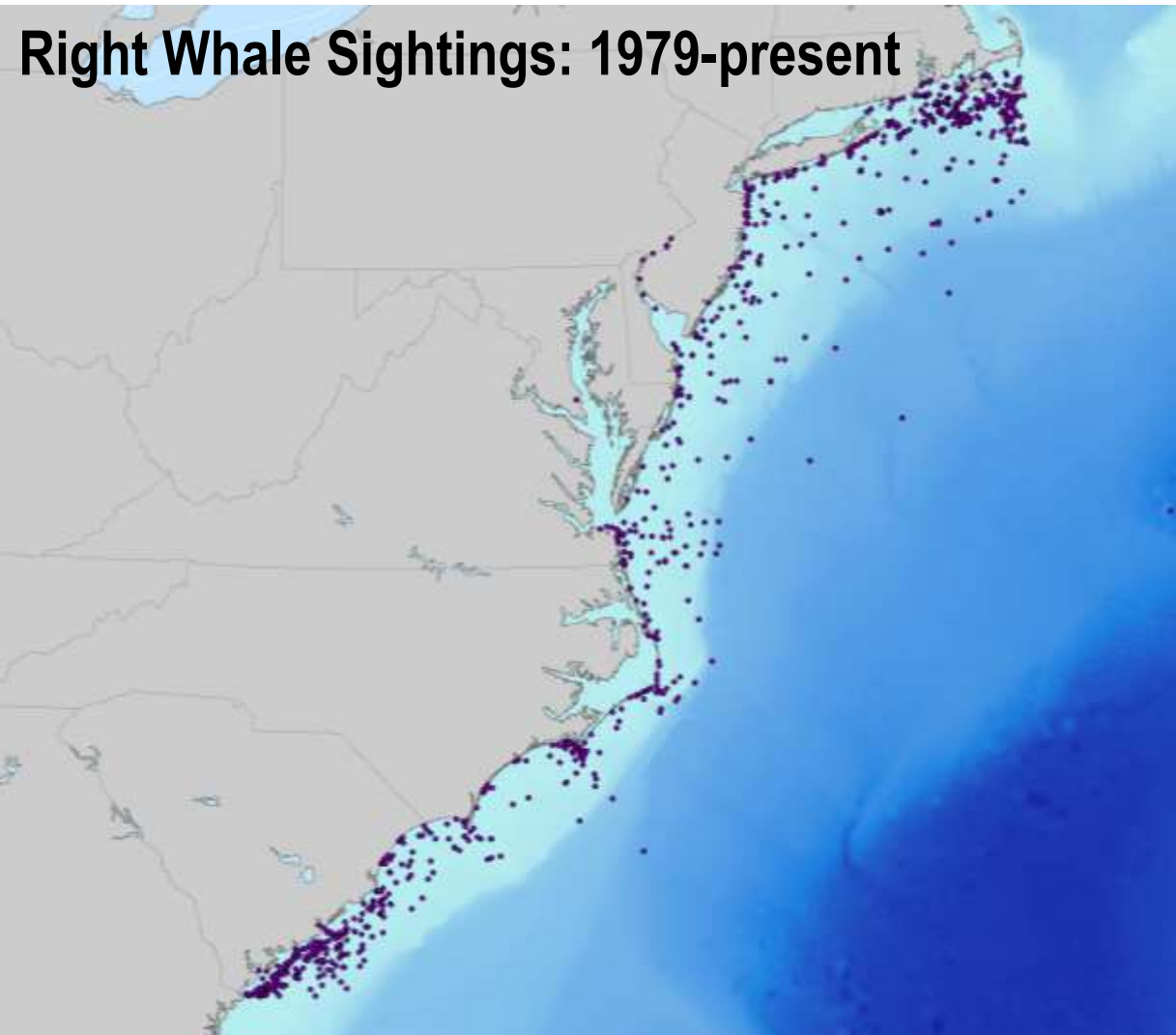
- Limited site fidelity within SEUS allows reduced coverage while maintaining high detection rates
- Apparent late season surge in the number of adults that have limited residence time within SEUS. Adults and calves arriving early in the season typically have long durations (60+ days)
- Suggested survey period from 1 December – 15 March
- Proposed survey design can likely be covered by two survey teams
- Explore an adaptive framework where the area of focus depends upon whale distribution.

Aerial Survey Design: Implemented Survey



- Expanded “universe of lines” to allow flexibility to respond to changes in whale distribution.
- Close coordination between survey teams to decide on tracklines flown – driven by weather, recent survey effort, recent whale sightings, and predicted whale distribution.
- Bi-weekly predictions of right whale distribution generated by FWRI to inform survey decisions
- “Core area” lines still flown as often as possible to meet Section 7 agreement requirements
- Implemented during 2014/2015 and will have ongoing review.

Mid-Atlantic Data Compilation



Contract to Dr. Caroline Good to summarize available information on right whale habitat and distribution in the mid-Atlantic and data on anthropogenic threats.

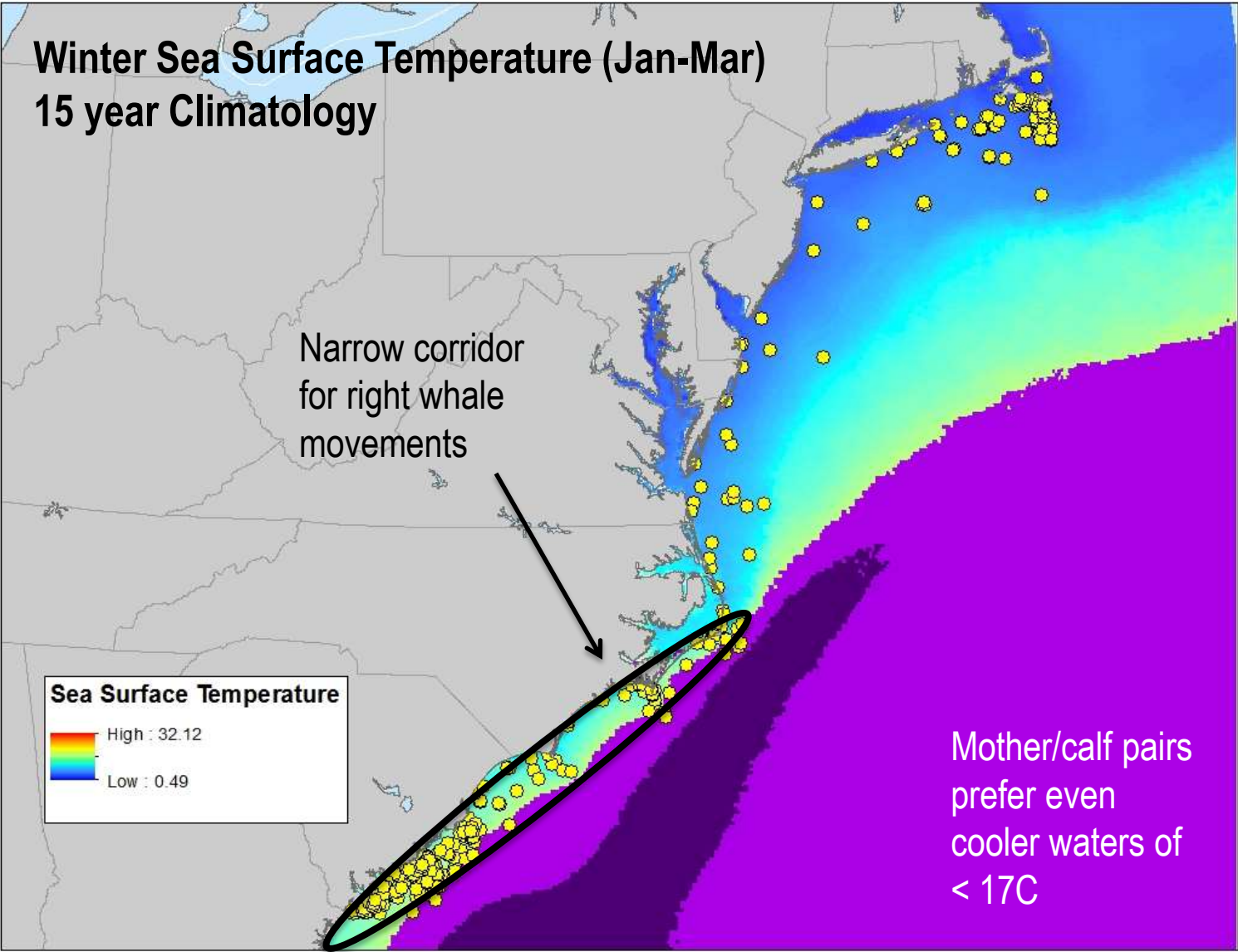
Phase I:

- historical distribution
- modern day distribution
- habitat preferences
- optimal migratory pathways
- demographic differences in distribution

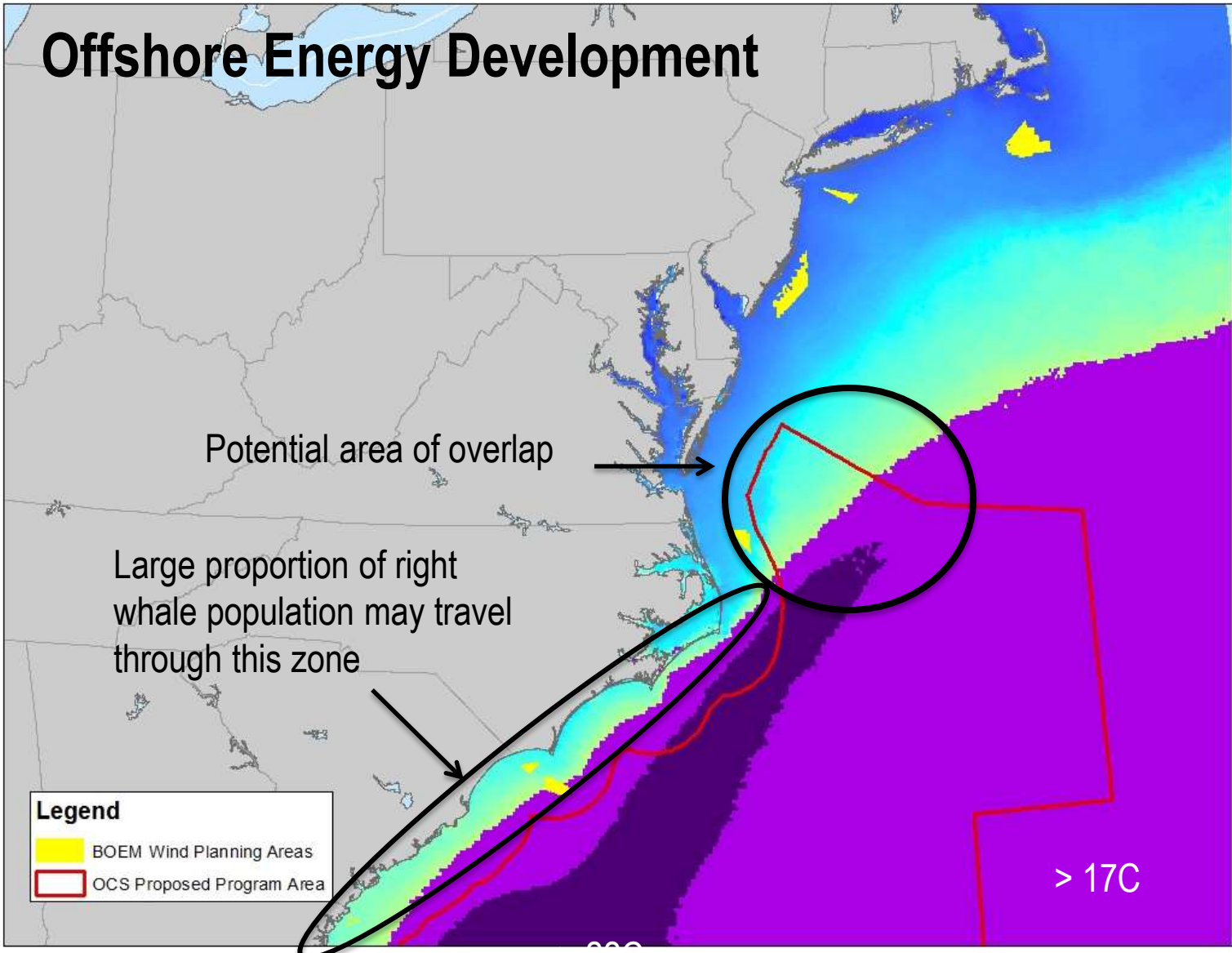
Phase II:

- anthropogenic threats
- spatio-temporal overlap of stressors
- overlap with right whale habitat

Mid-Atlantic Data Compilation



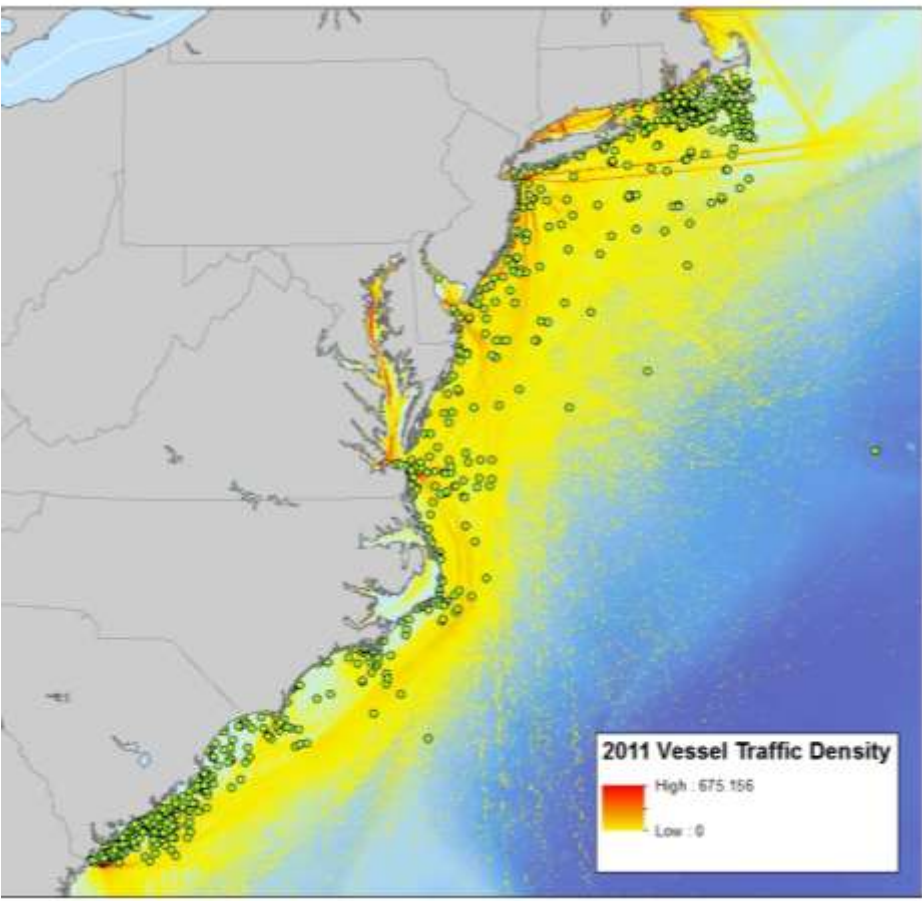
Mid-Atlantic Data Compilation



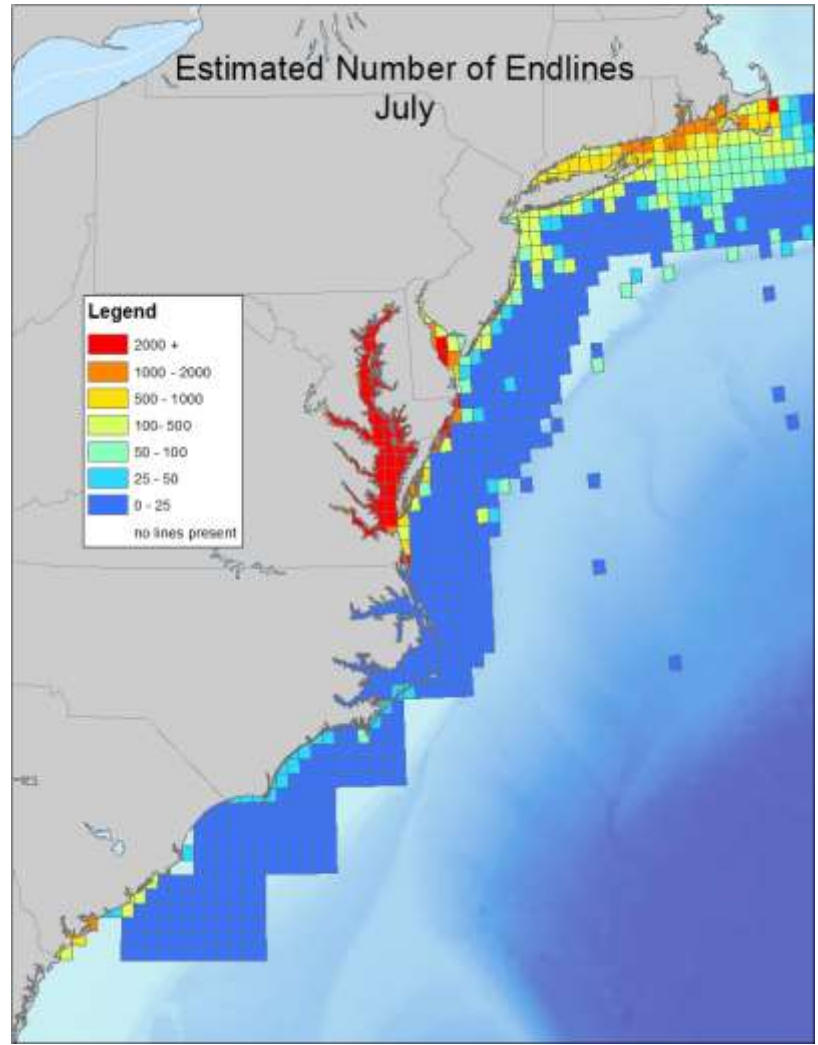
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Mid-Atlantic Data Compilation

Vessel Traffic



Fishing Effort



LIMPET Tag Development

Development and application of an improved satellite tag and attachment package

Dr. Russ Andrews

**School of Fisheries and Ocean Sciences, University of Alaska Fairbanks
and
The Alaska SeaLife Center**

Dr. Lance Garrison & Anthony Martinez – NMFS Southeast Fisheries Science Center

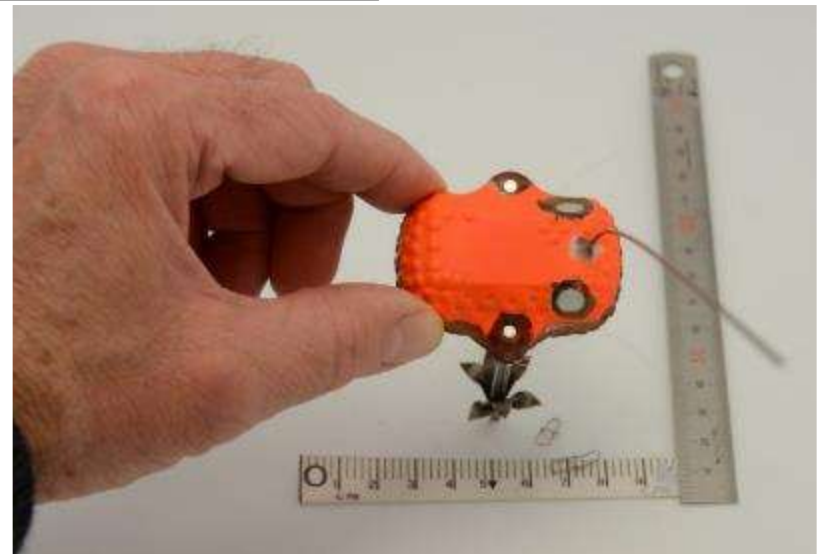
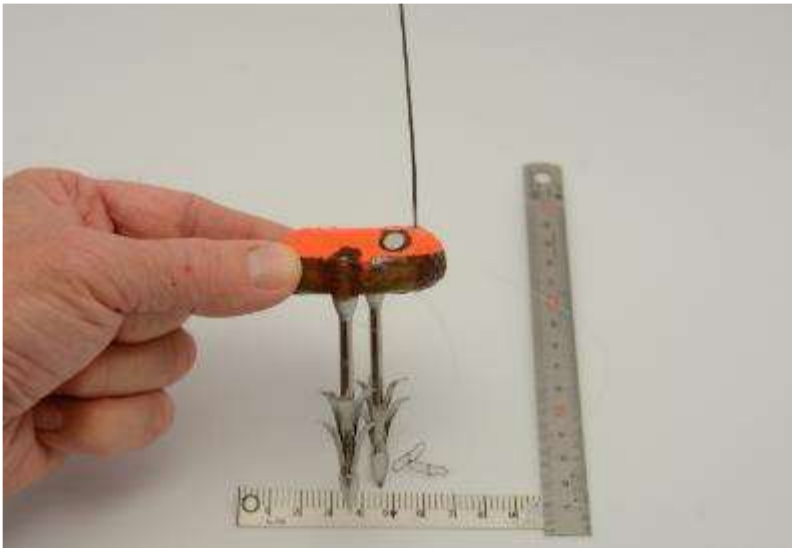
Tom Pitchford and Katie Jackson – Florida Fish and Wildlife Conservation Commission

Clay George – Georgia Department of Natural Resources

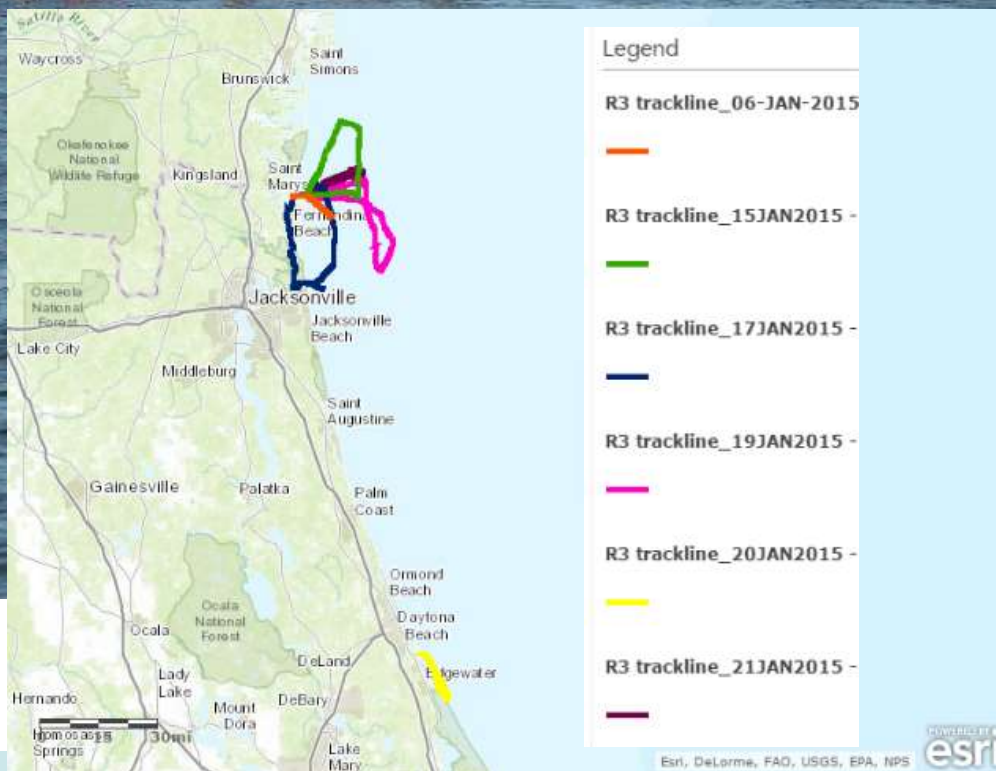
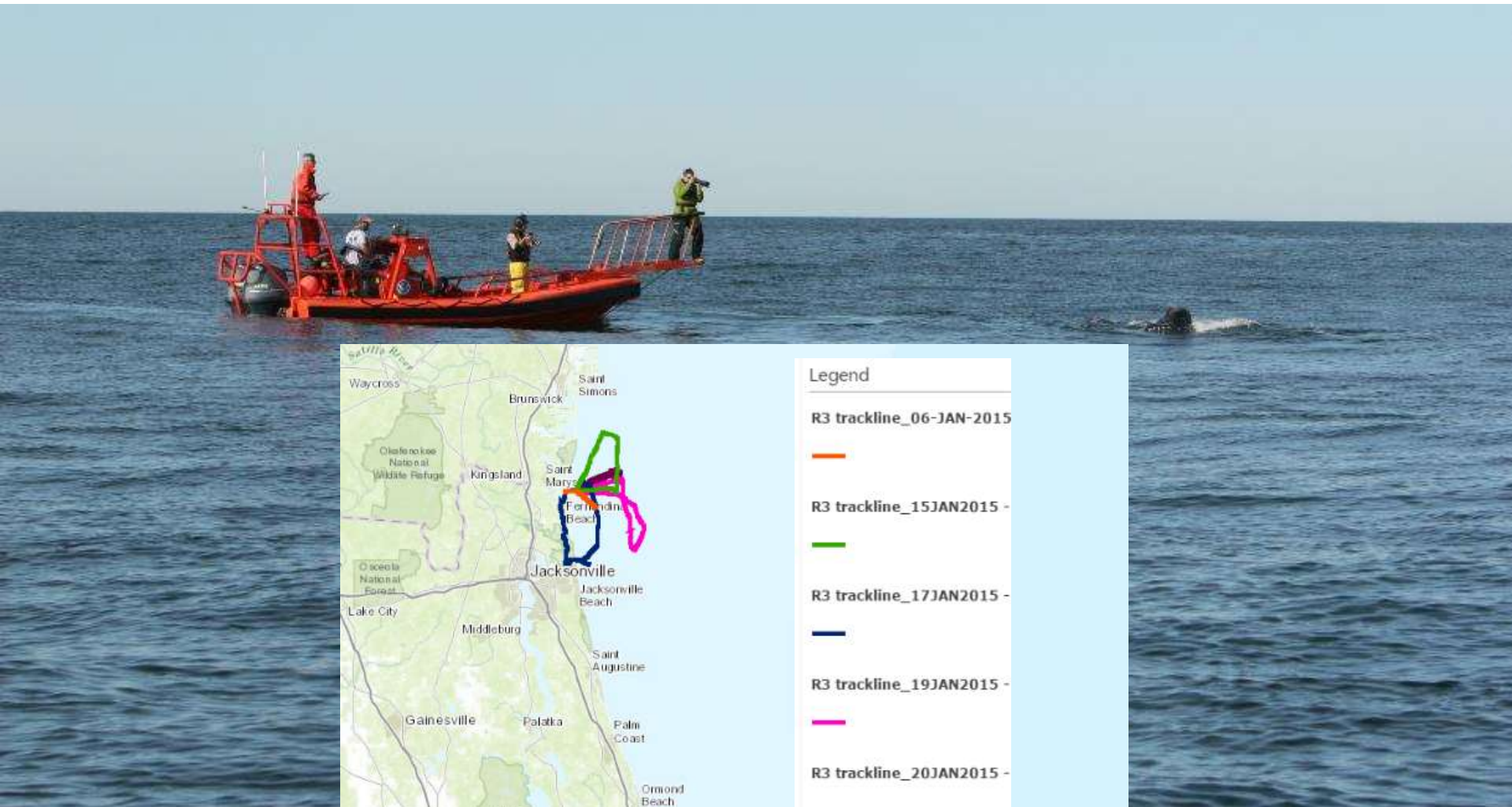
Cynthia Taylor – Sea to Shore Alliance

Barb Zoodsma – NMFS Southeast Regional Office

LIMPET Tag Development



LIMPET Tag Development



LIMPET Tag Development



Support from Volunteer Sighting Network

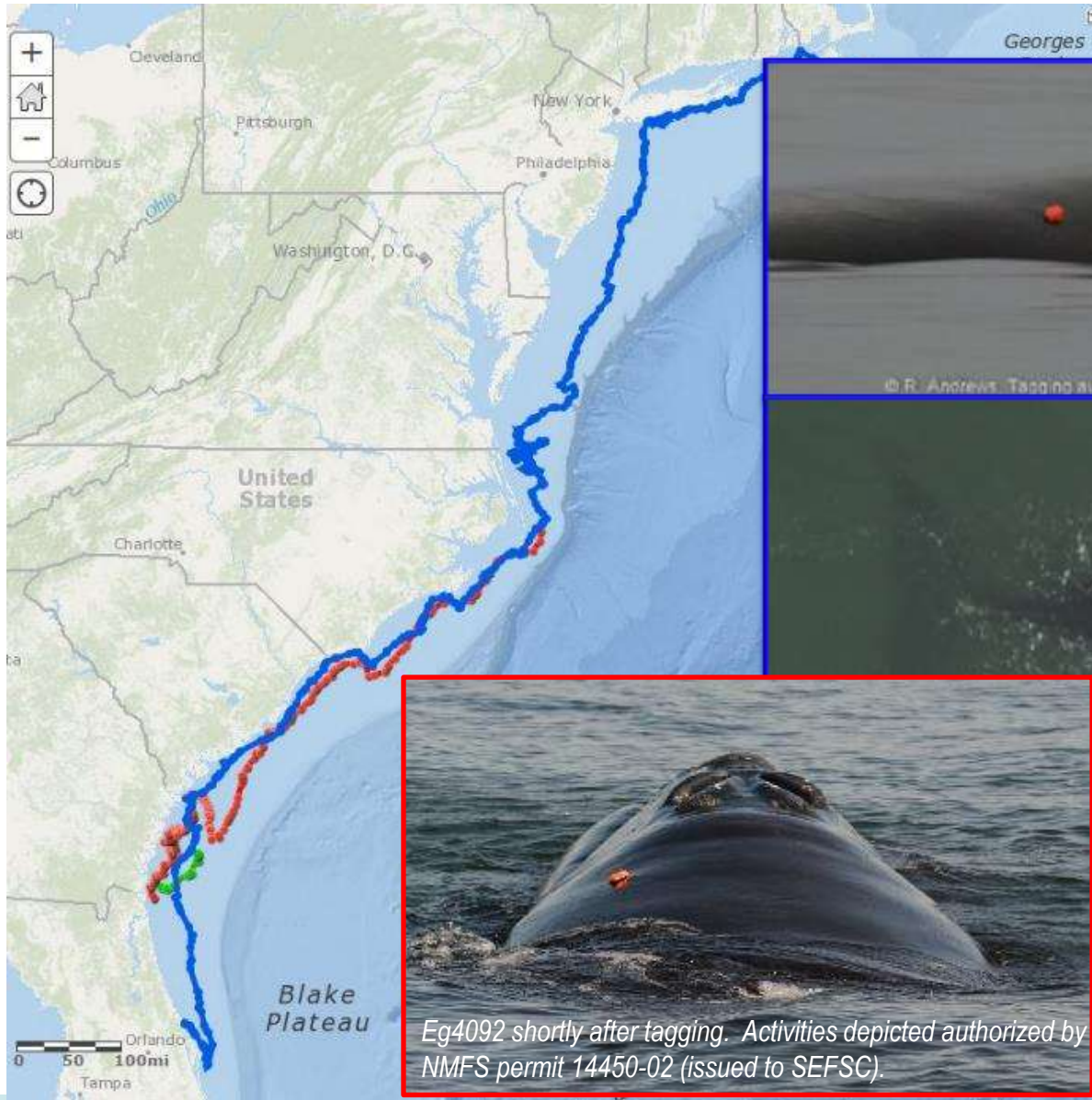


S078



Sighted 20 January 2015 at 10:13 a.m. off New Smyrna Beach by Sally Thomas volunteer

LIMPET Tag Development



© R. Andrews. Tagging authorized by NMFS Permit 14450-02 (issued to NOAA CEFSC)

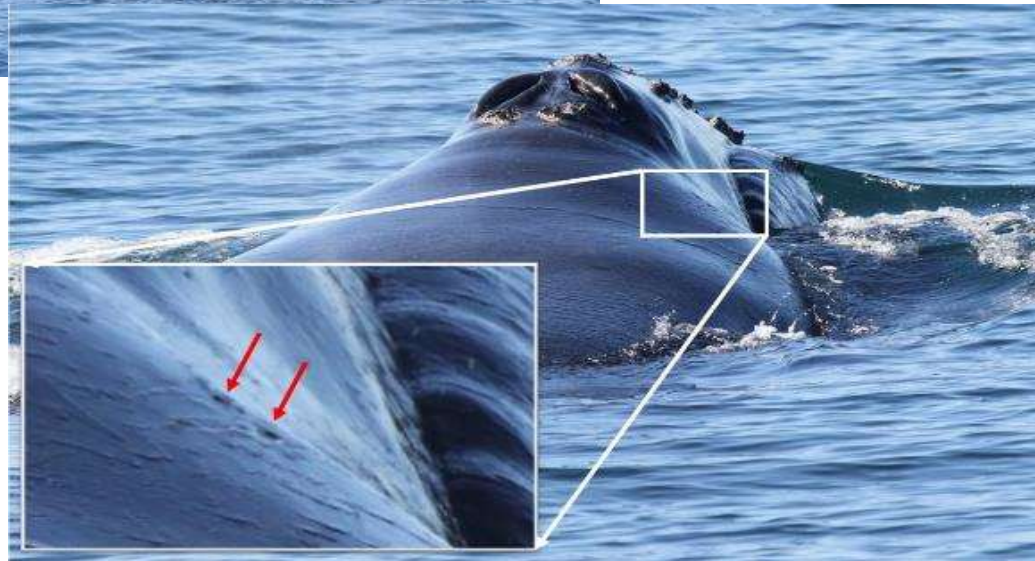


B shortly after tagging, taken by FWC under authority Permit #15488 issued to Georgia DNR

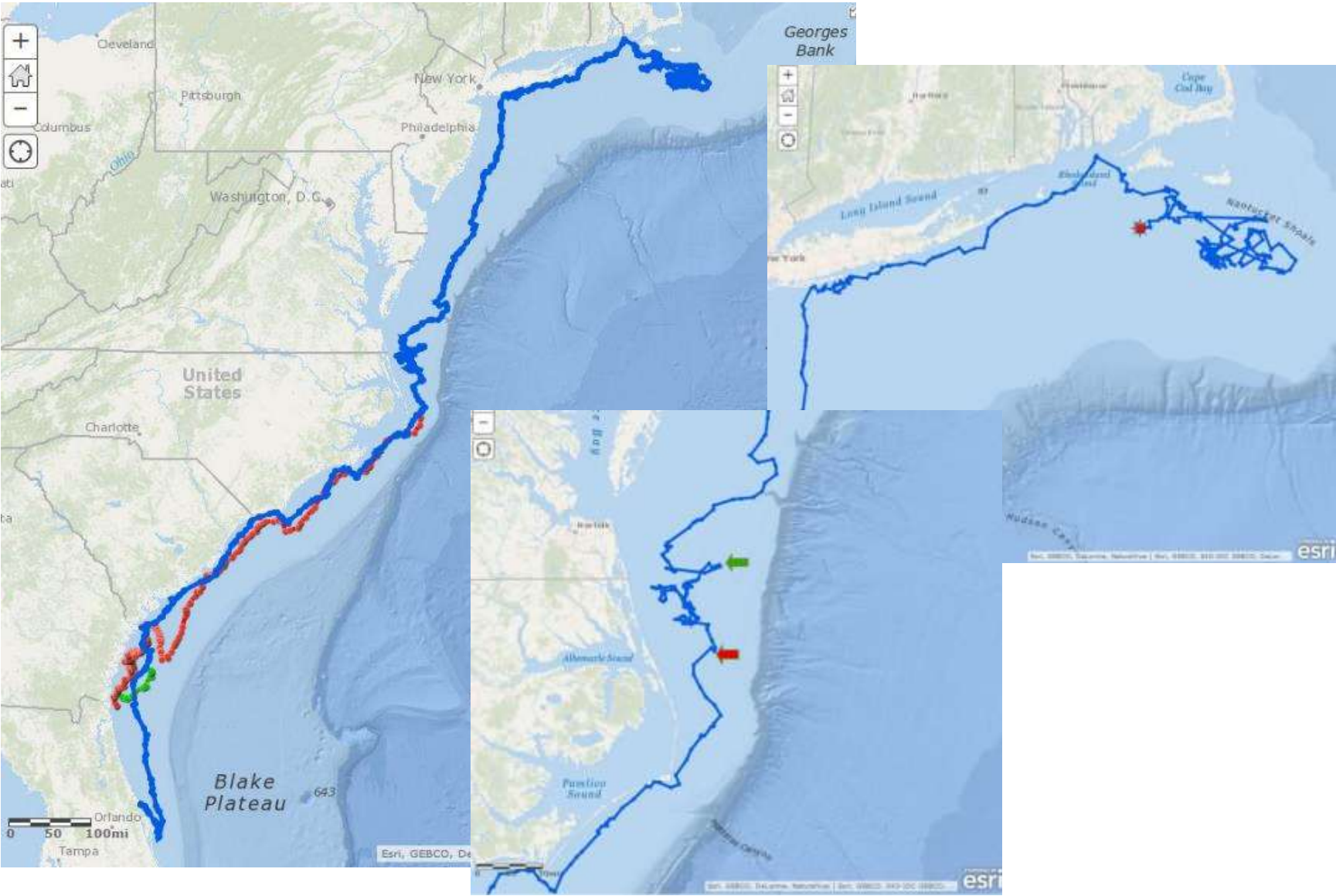


Eg4092 shortly after tagging. Activities depicted authorized by NMFS permit 14450-02 (issued to SEFSC).

LIMPET Tag Development



LIMPET Tag Development



Continuing Work

Aerial Surveys:

- Continue to evaluate effectiveness of adaptive survey efforts and compare detection rates to prior years.

Mid-Atlantic Studies:

- Develop descriptive models of habitat and timing, location of movements.
- Identify areas of potential risk to right whales
- SEIT developing monitoring strategy for the mid-atlantic

Limpet Tag Studies:

- Two more years on project to evaluate potential modifications to tag anchor/design
- Develop follow-up plans for tagged animals
- Assess utility for examining fine-scale movements in the SEUS and informing models of migratory habitats.