

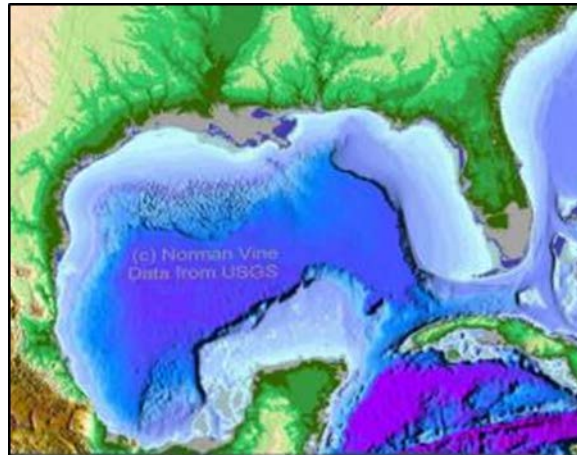


NOAA
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GoMMAPPS Marine Mammal Assessment Research

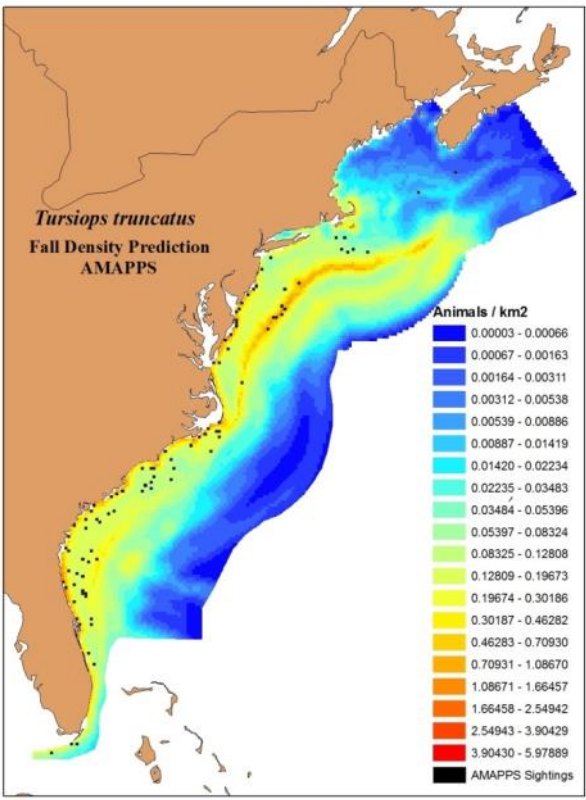
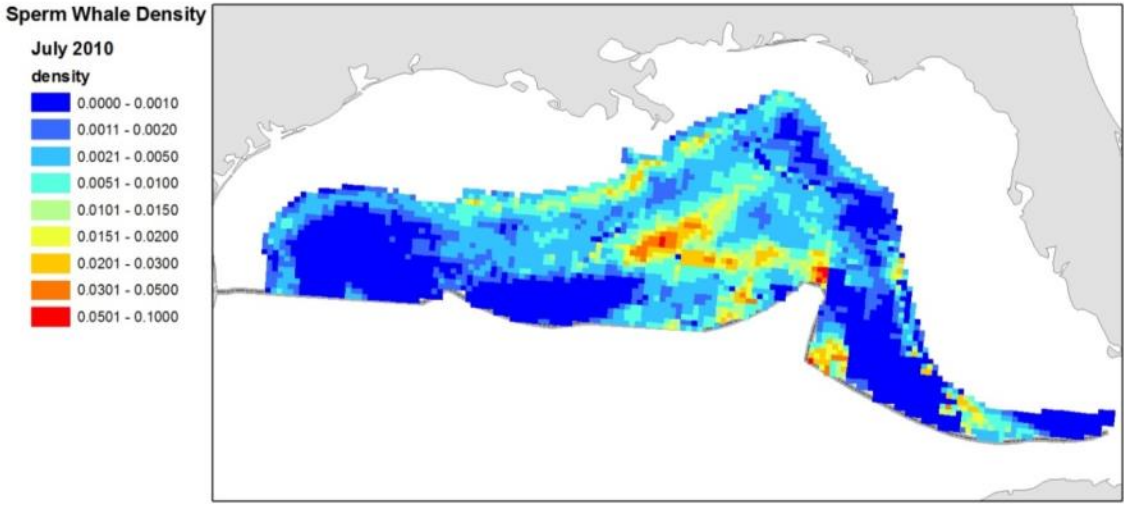
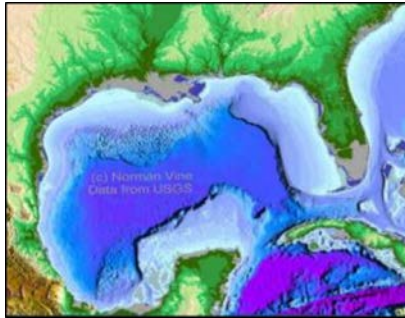
Jenny Litz, Keith Mullin, Lance Garrison, Anthony
Martinez, Kevin Barry, Melissa Soldevilla, Gina
Rappucci, and Laura Aichinger-Dias



5 February 2018
GoMMAPPS Workshop
New Orleans, LA

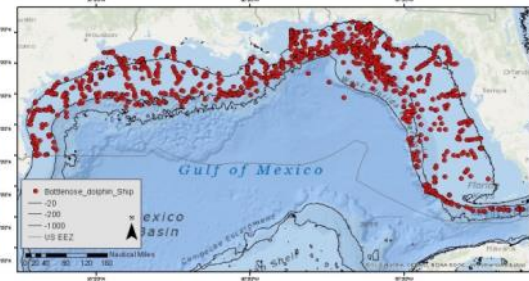
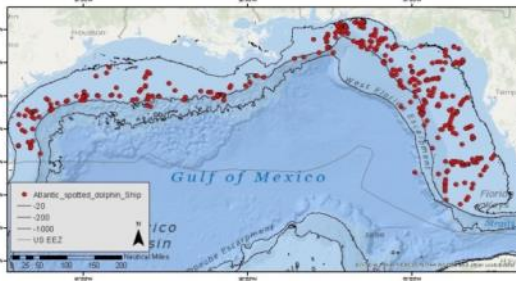
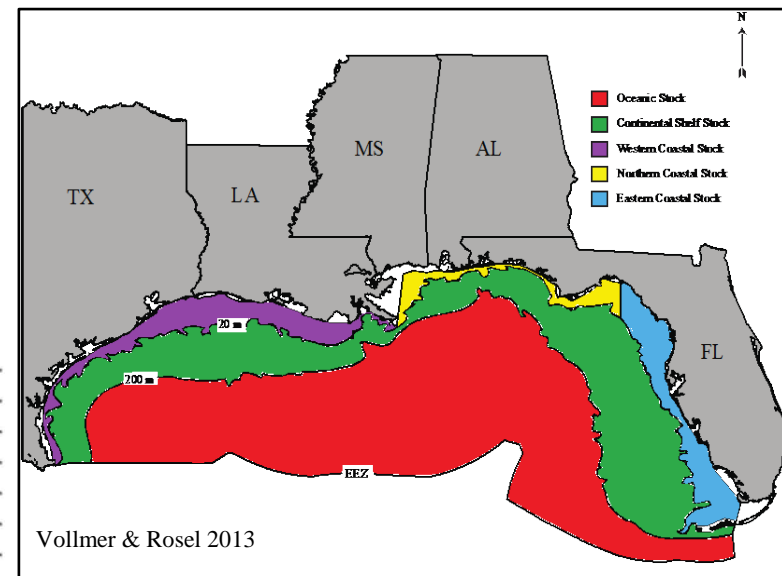
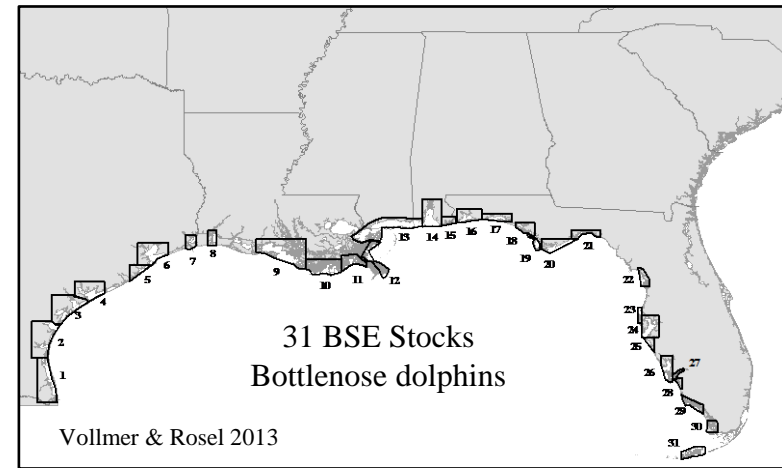
GoMMAPPS Marine Mammals: Objectives

- Collect broad-scale information on distribution and abundance
- Develop seasonally- and spatially-explicit density estimates for priority species
- Provide information to managers to assist with decisions related to offshore energy development
- Update abundances for NMFS stock assessments



Gulf of Mexico Habitats and Cetacean Species & Stocks

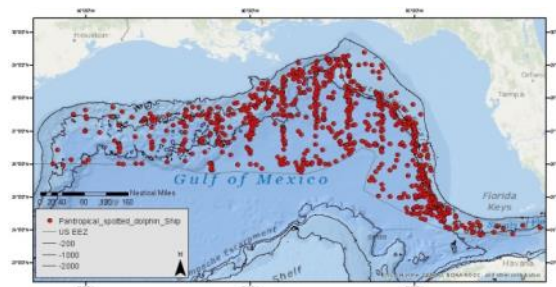
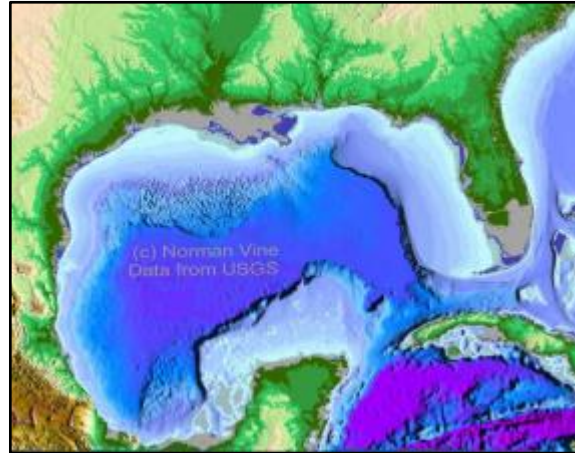
- Bays, Sounds & Estuaries (BSE)
 - Bottlenose dolphins – 31 stocks
- Coastal Waters (0 – 20 m)
 - Bottlenose dolphins – 3 stocks
- Continental Shelf (20 – 200 m)
 - Atlantic spotted dolphins – 1 stock
 - Bottlenose dolphins – 1 stock
- Oceanic Waters (≥ 200 m)
 - 21 species – 21 stocks (tropical cetacean community)



Gulf of Mexico Oceanic Cetaceans

21 species routinely inhabit oceanic waters; currently – 21 stocks

- Bryde's whale (ESA listing proposed)
- Sperm whale (ESA-listed)
- Dwarf sperm whale
- Pygmy sperm whale
- Cuvier's beaked whale
- Blainville's beaked whale
- Gervais' beaked whale
- Short-finned pilot whale
- Killer whale
- Pygmy killer whale
- Melon-headed whale
- False killer whale
- Risso's dolphin
- Bottlenose dolphin
- Rough-toothed dolphin
- Fraser's dolphin
- Atlantic spotted dolphin
- Pantropical spotted dolphin
- Striped dolphin
- Clymene dolphin
- Spinner dolphin



GoMMAPPS Marine Mammal Activities

Broad-scale multi-year seasonal abundance & distribution data

- Continental shelf (0–200 m) – Seasonal aerial surveys
- Oceanic waters (> 200 m) – Seasonal ship surveys

Data Analyses

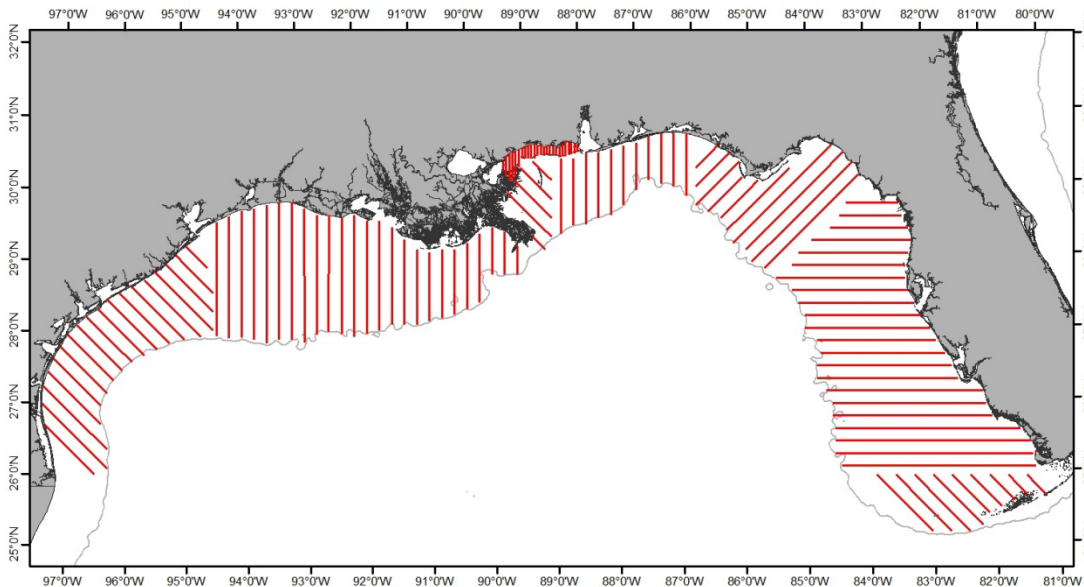
- Assemble and evaluate historical aerial and ship surveys
- Estimate bias-corrected population size of species/stocks
- Develop models that incorporate habitat characteristics to translate current & past surveys into spatially-explicit maps of species density & uncertainty

Data Management/Dissemination

- Distribution of data to public archives – OBIS/SEAMAP
- Future dissemination of spatial maps

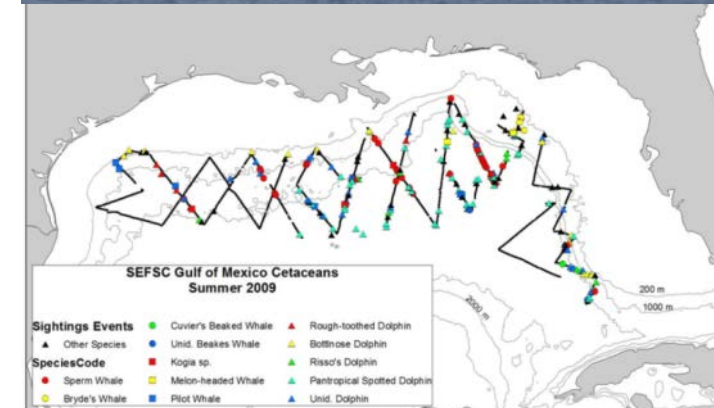
Continental Shelf: Aerial Surveys

- Visual line-transect surveys (60 days)
- 3 surveys (summer '17, winter '18, fall '18)
- Two-team method to account for perception bias
- Bottlenose dolphins, Atlantic spotted dolphins & sea turtles
- Exploring digital photography tools for species id confirmation



Ship-based Surveys

- Seasonal line-transect survey (~60 days duration)
- 3 surveys (summer '17, winter '18, summer/fall '18)
- Visual teams
 - Two-teams to account for perception bias
- Biopsy samples (opportunistic)
 - Stock structure
- Oceanographic data
 - Continuous surface sampling underway
 - Vertical Profiles with CTD and XBT
 - Acoustic backscatter: EK60
- Passive acoustic sampling
 - towed array and sonobuoys
- Plankton sampling added at night
- Seabird survey

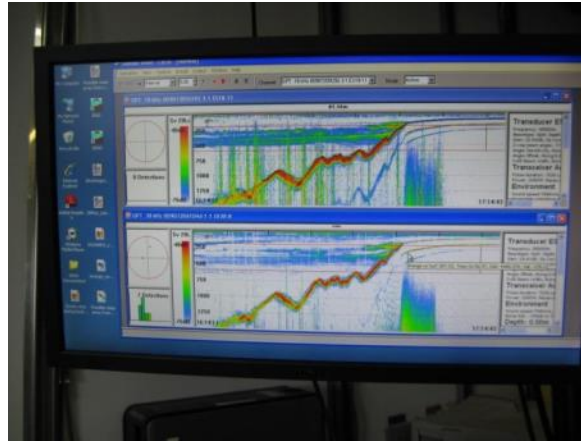


Vessel surveys: *In-situ* Oceanographic Sampling

XBT Stations



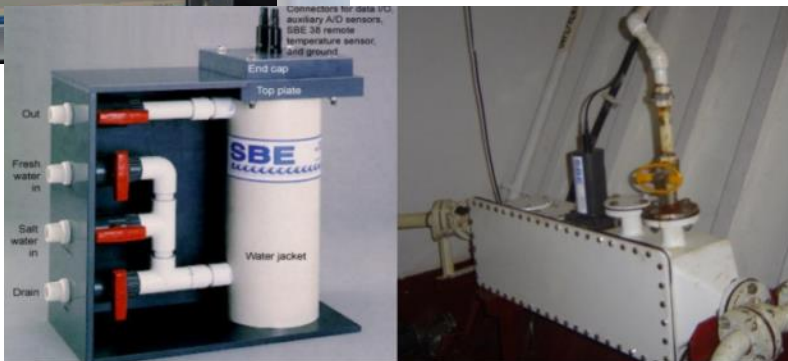
EK60 at night



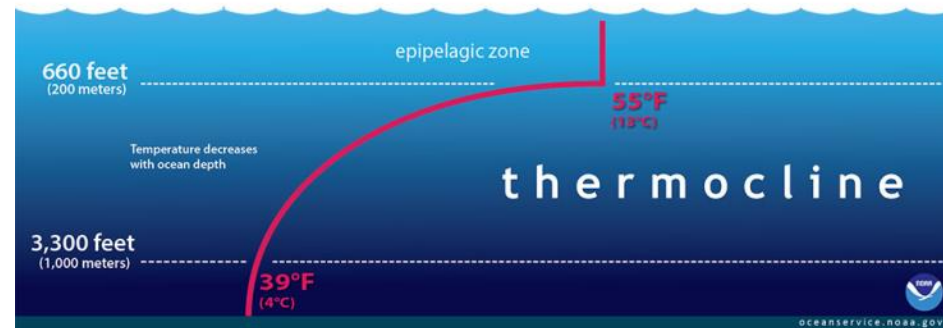
CTD Stations



Continuous Underway Sampling



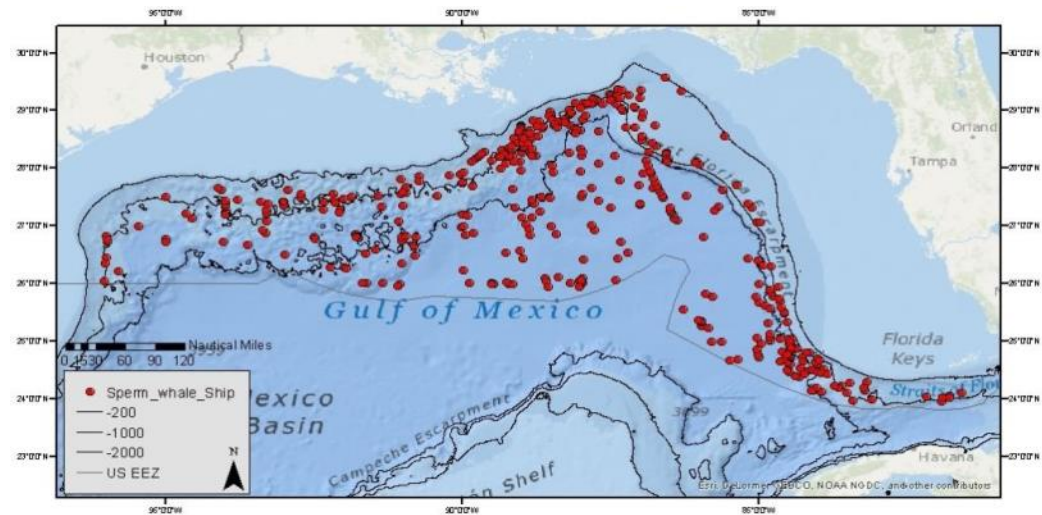
(left) Overall view of the SBE 21 SEACAT Thermosalinograph model. (right) Thermosalinograph installed onboard the NOAA ship Ronald H. Brown.



Outcomes: Spatially Explicit Density Maps

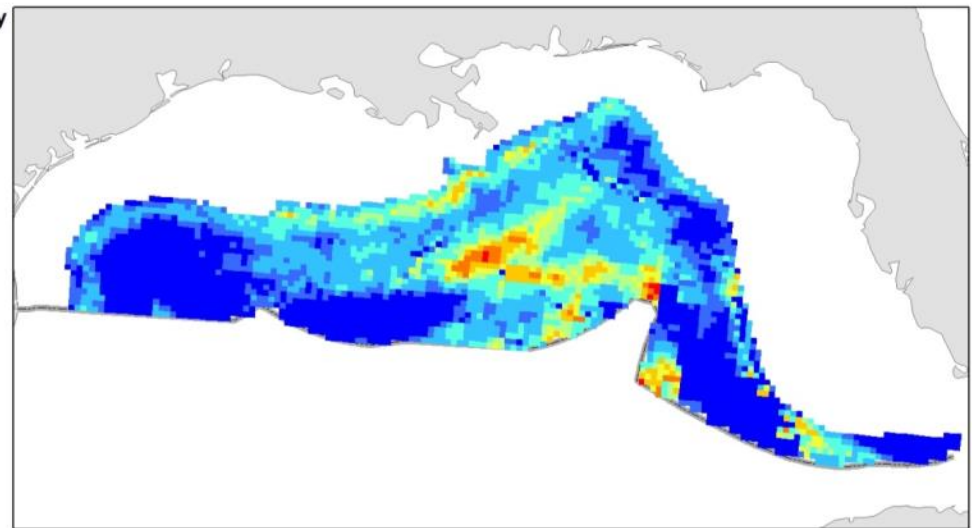
Integrate:

- Historical survey data
- Seasonal survey data
- In situ* oceanographic data
- Remote sensing data
- Topographic data



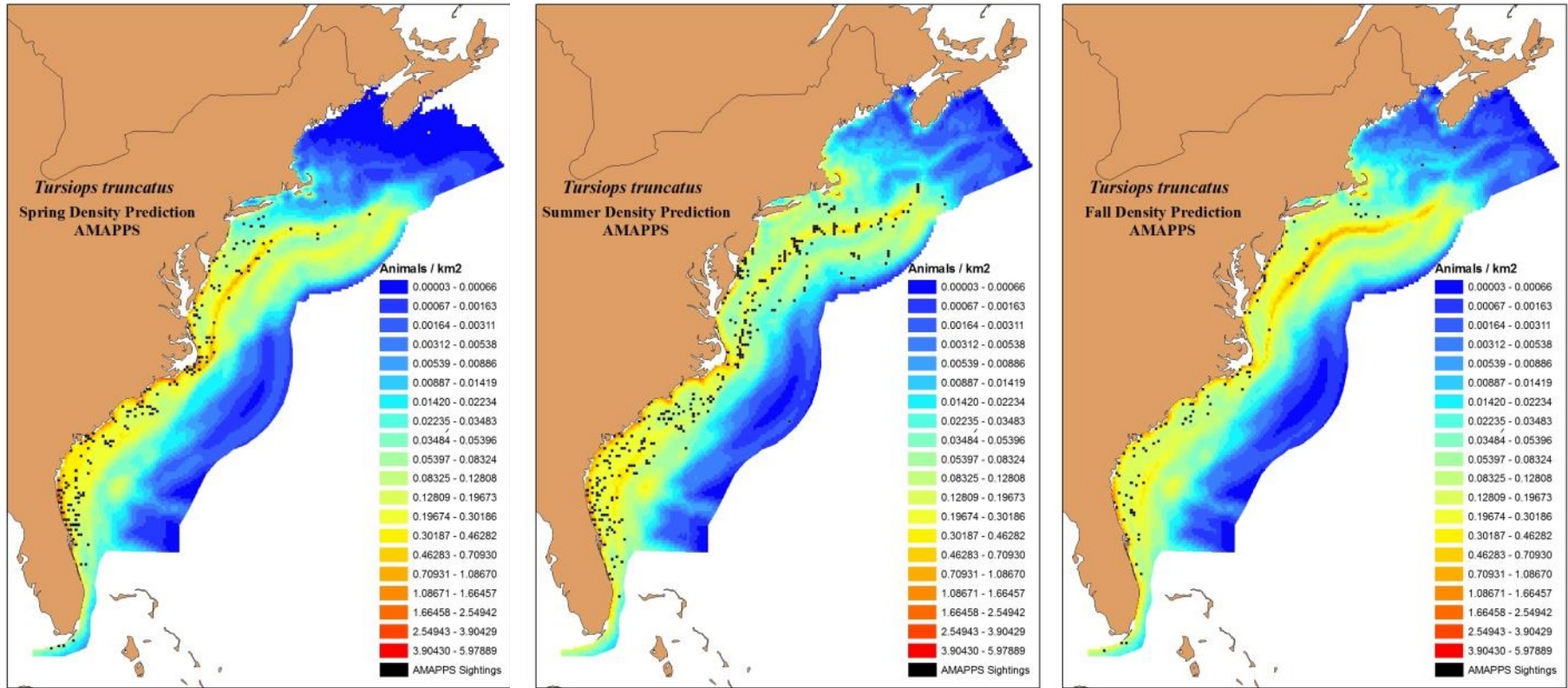
Sperm Whale Density

July 2010
density



Outcomes: Spatially Explicit Density Maps

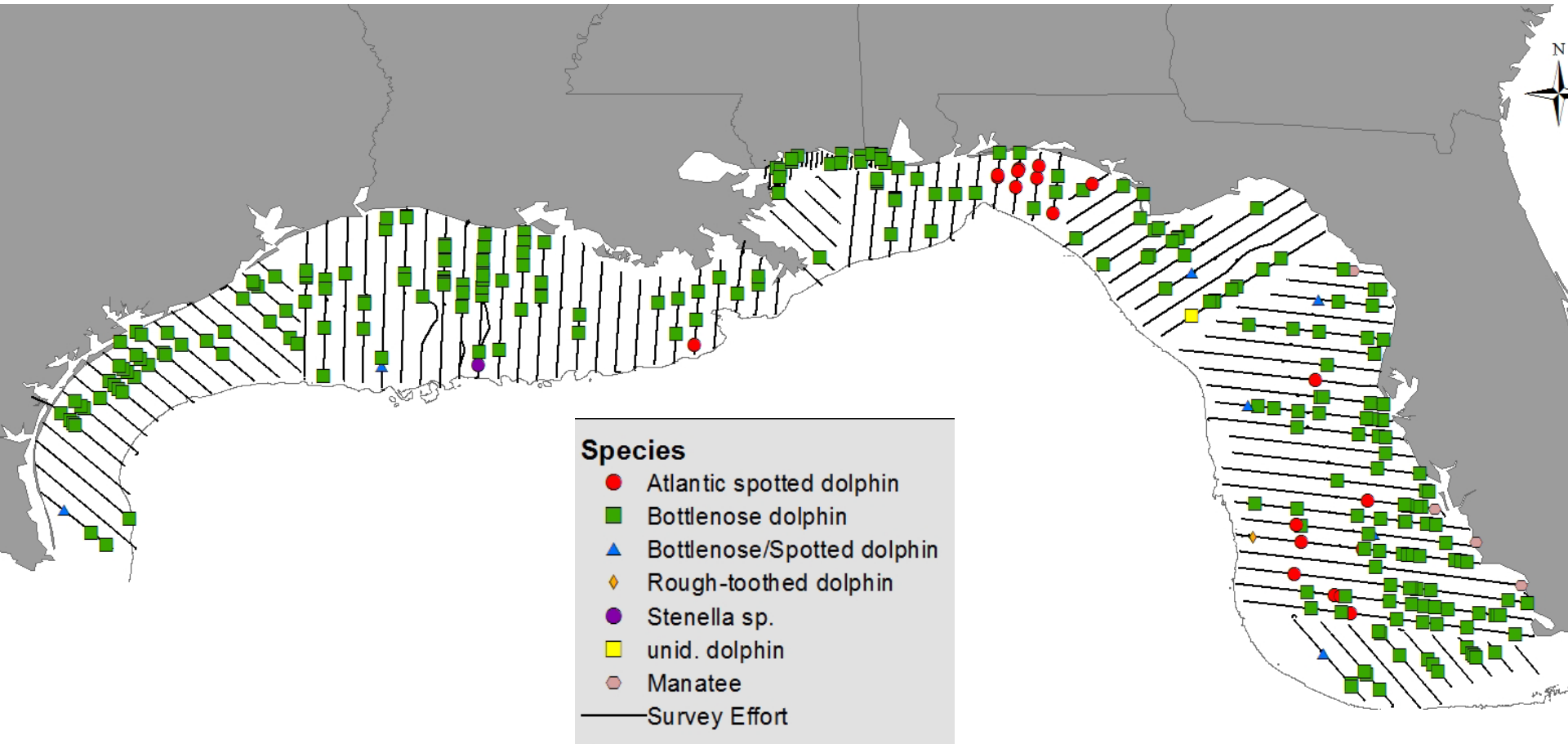
AMAPPS example: Bottlenose dolphin density and spatial distribution



- AMAPPS seasonal maps of density from vessel and aerial survey data (SEFSC and NEFSC)
- Primary GoMMAPPS objective is to produce and disseminate operational mapping products

Summer aerial survey: 29 June – 17 Aug., 2017

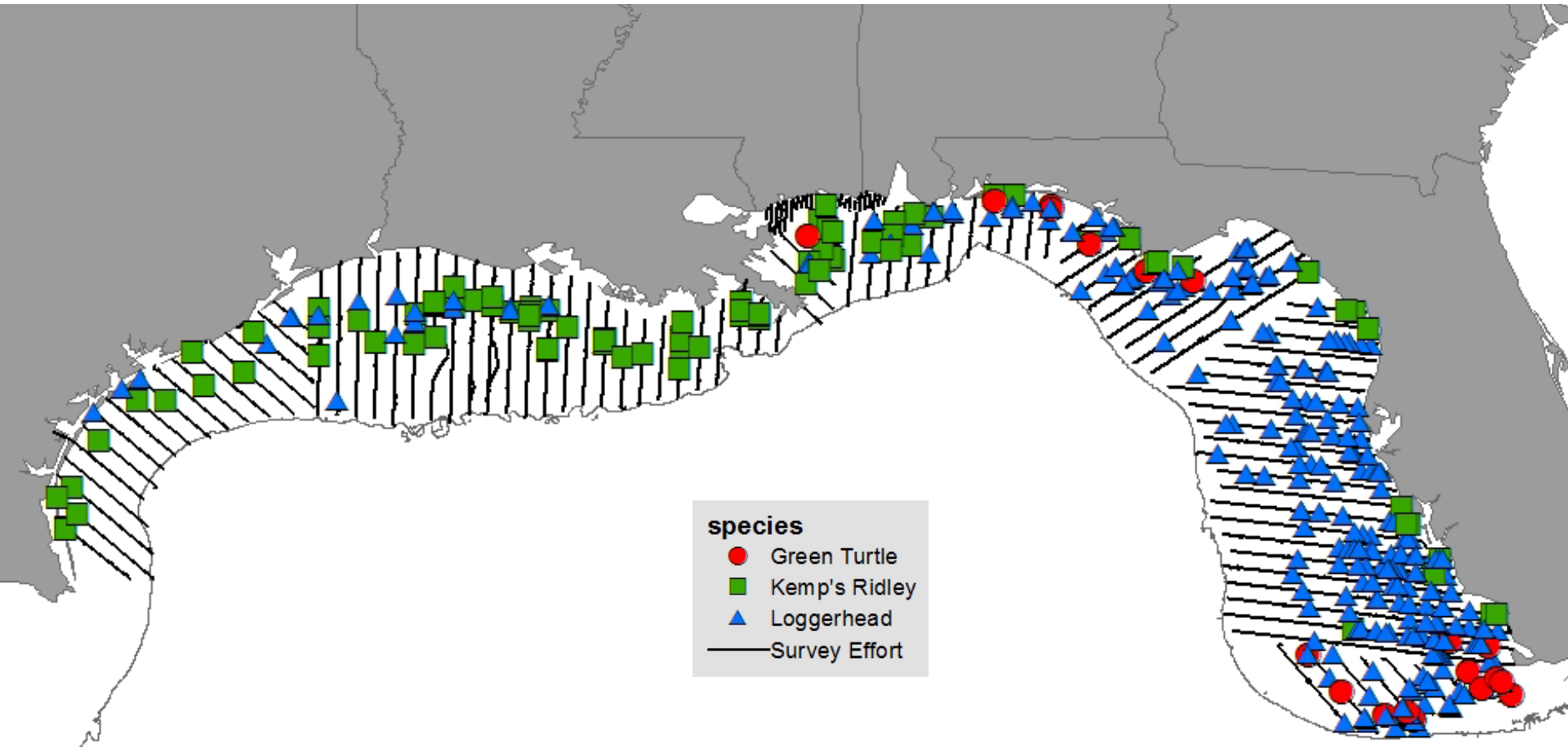
293 marine mammal sightings, primarily bottlenose dolphins followed by Atlantic spotted dolphins.



Summer aerial survey: 29 June – 17 Aug., 2017

929 sea turtle sightings

primarily Loggerhead followed by Kemp's Ridley



Summer aerial survey: 29 June – 17 Aug., 2017

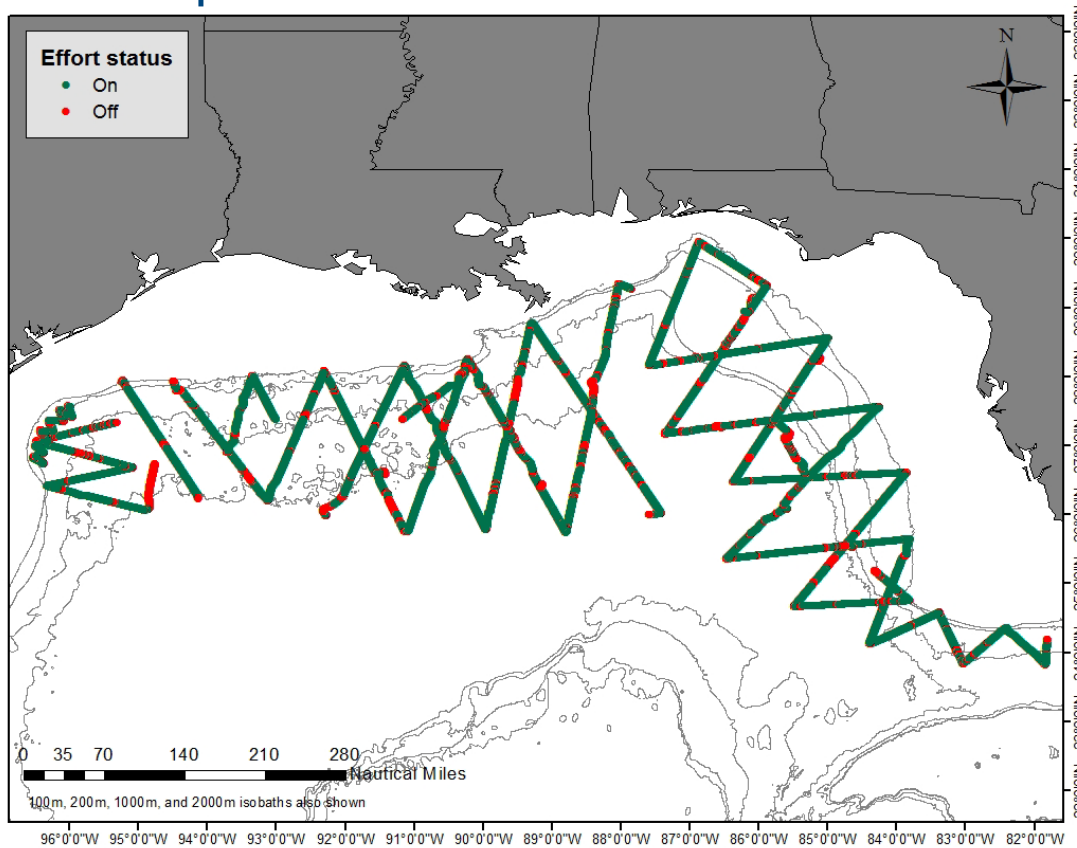
929 sea turtle sightings

38 Leatherback sightings, 50% unidentified hardshell



Summer vessel survey: 2 July – 25 Aug., 2017

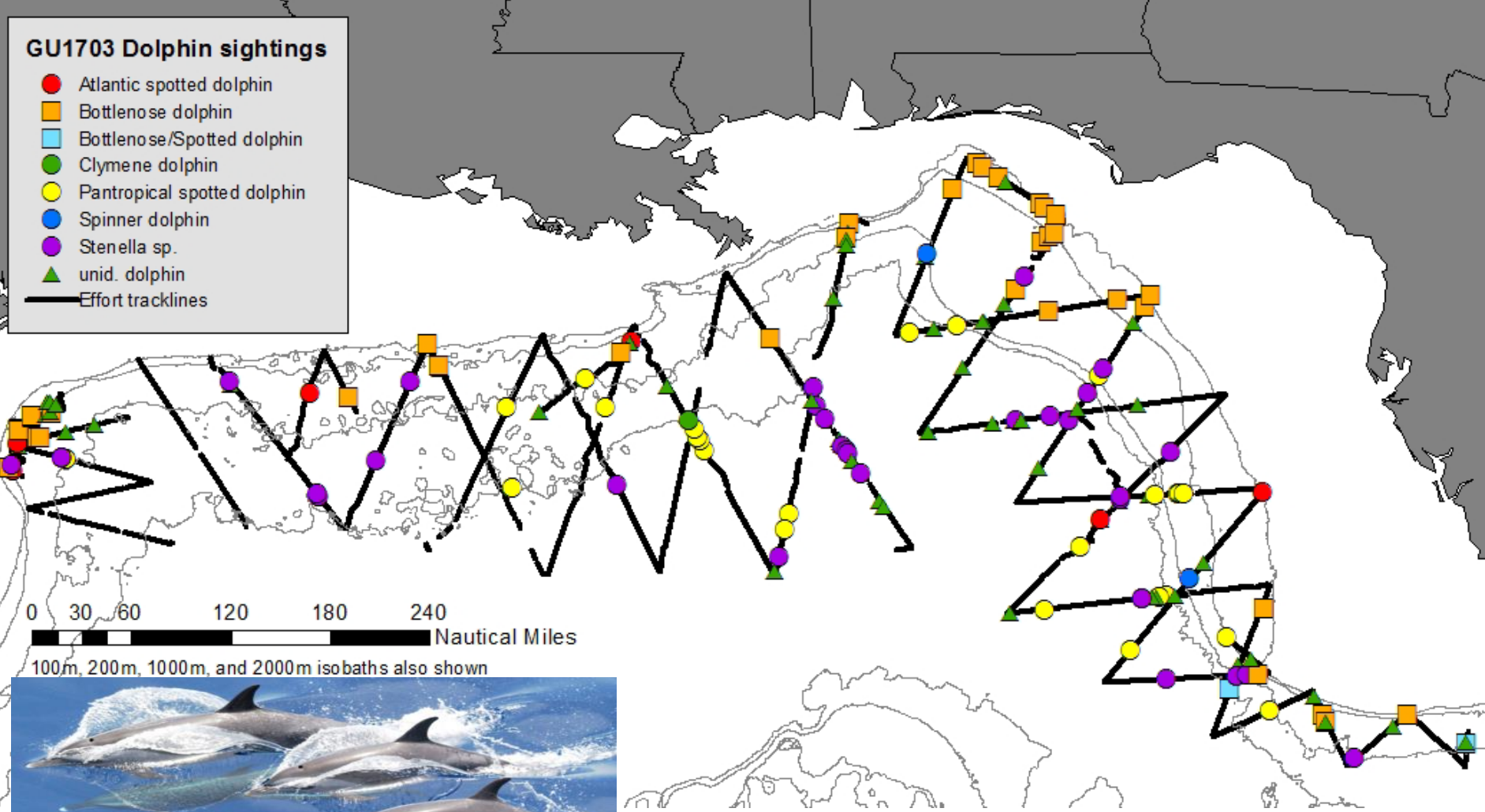
- 338 marine mammal sightings
- 545 marine mammal acoustic detections
- 136 plankton tows



Sightings:

- 338 group sightings
- 69 sperm whale
- 3 Bryde's whale
- 1 killer whale
- Remaining sightings comprised of at least 12 other species

Summer vessel survey: dolphin sightings



Summer vessel survey: small whale sightings

GU1703 Small whale sightings

- Killer whale
- False killer whale
- Melon-headed whale
- Melon-headed whale+Pygmy/Dwarf sperm whale
- Melon-headed/Pygmy killer whale
- Pilot whales
- Pygmy killer whale
- Risso's dolphin
- Effort tracklines

0 30 60 120 180 240 Nautical Miles

100m, 200m, 1000m, and 2000m isobaths also shown

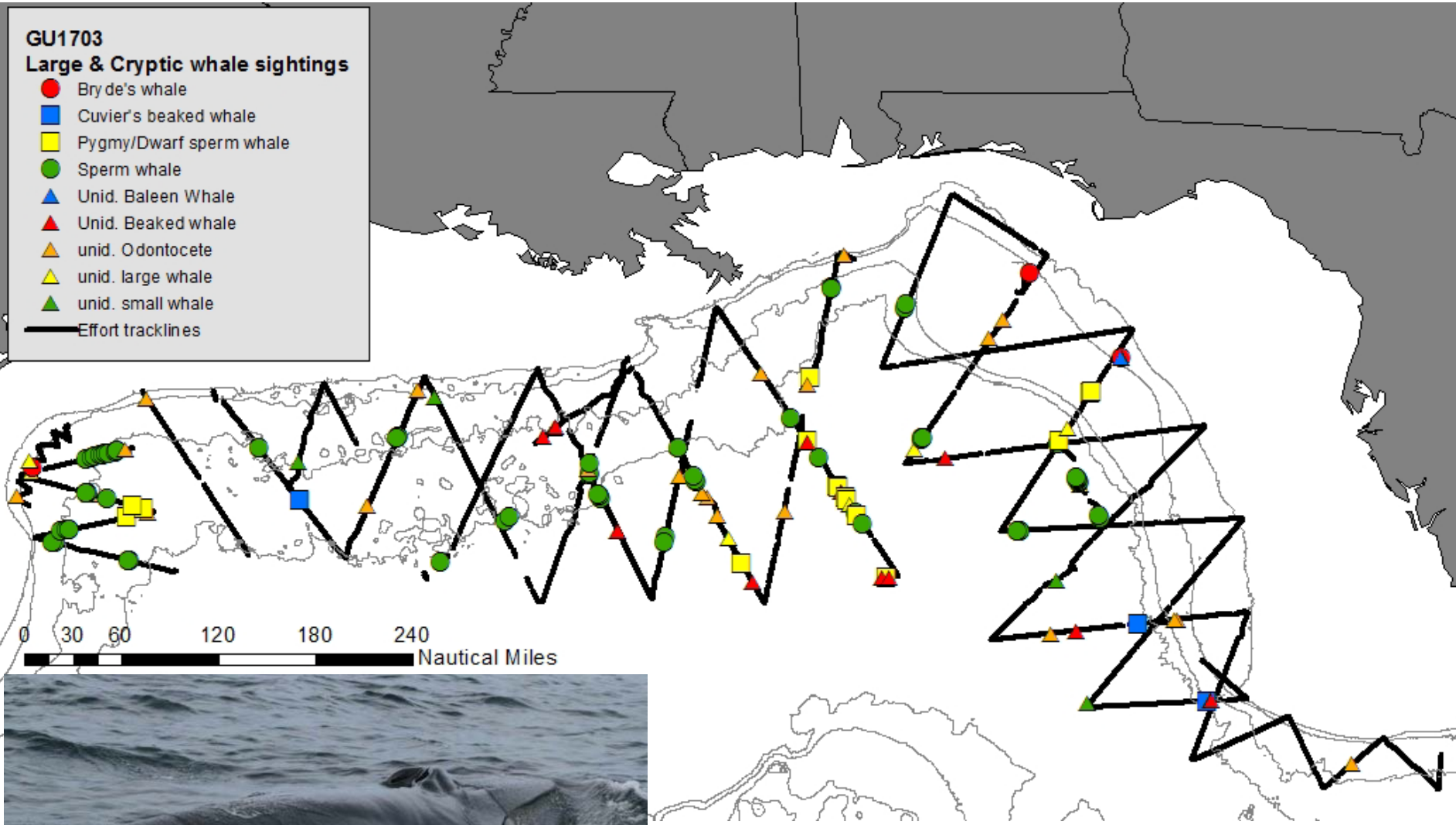


Killer whales
SEFSC- MMPA Permit No. 14450-4

Summer vessel survey: Large and cryptic whale sightings

GU1703 Large & Cryptic whale sightings

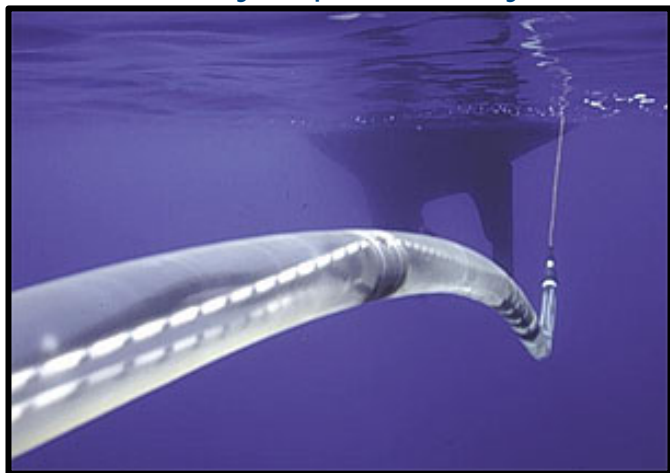
- Bryde's whale
- Cuvier's beaked whale
- Pygmy/Dwarf sperm whale
- Sperm whale
- ▲ Unid. Baleen Whale
- ▲ Unid. Beaked whale
- ▲ unid. Odontocete
- ▲ unid. large whale
- ▲ unid. small whale
- Effort tracklines



Bryde's whale, SEFSC- MMPA Permit No. 14450-4

Summer vessel survey: preliminary acoustic data

Towed Hydrophone Array

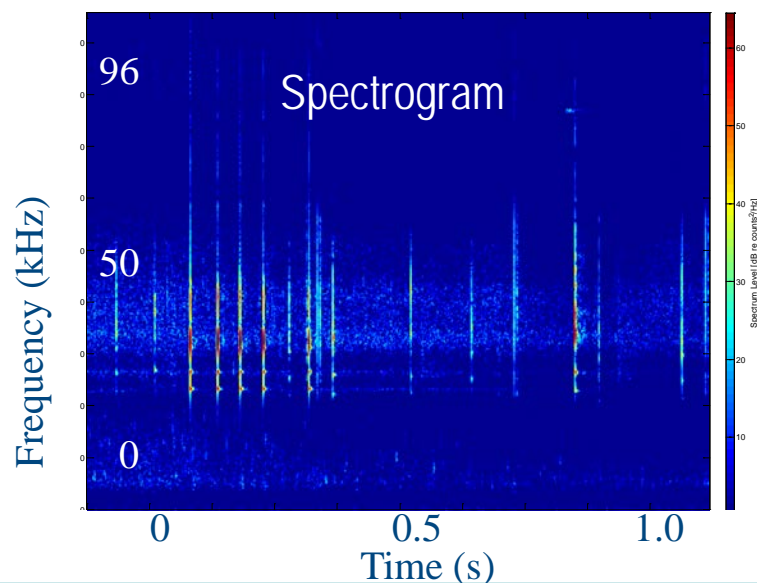


Array towed during daylight hours

- 545 acoustic detections
 - 28+ beaked whale groups
 - 131 sperm whale groups

33 sonobuoys deployed

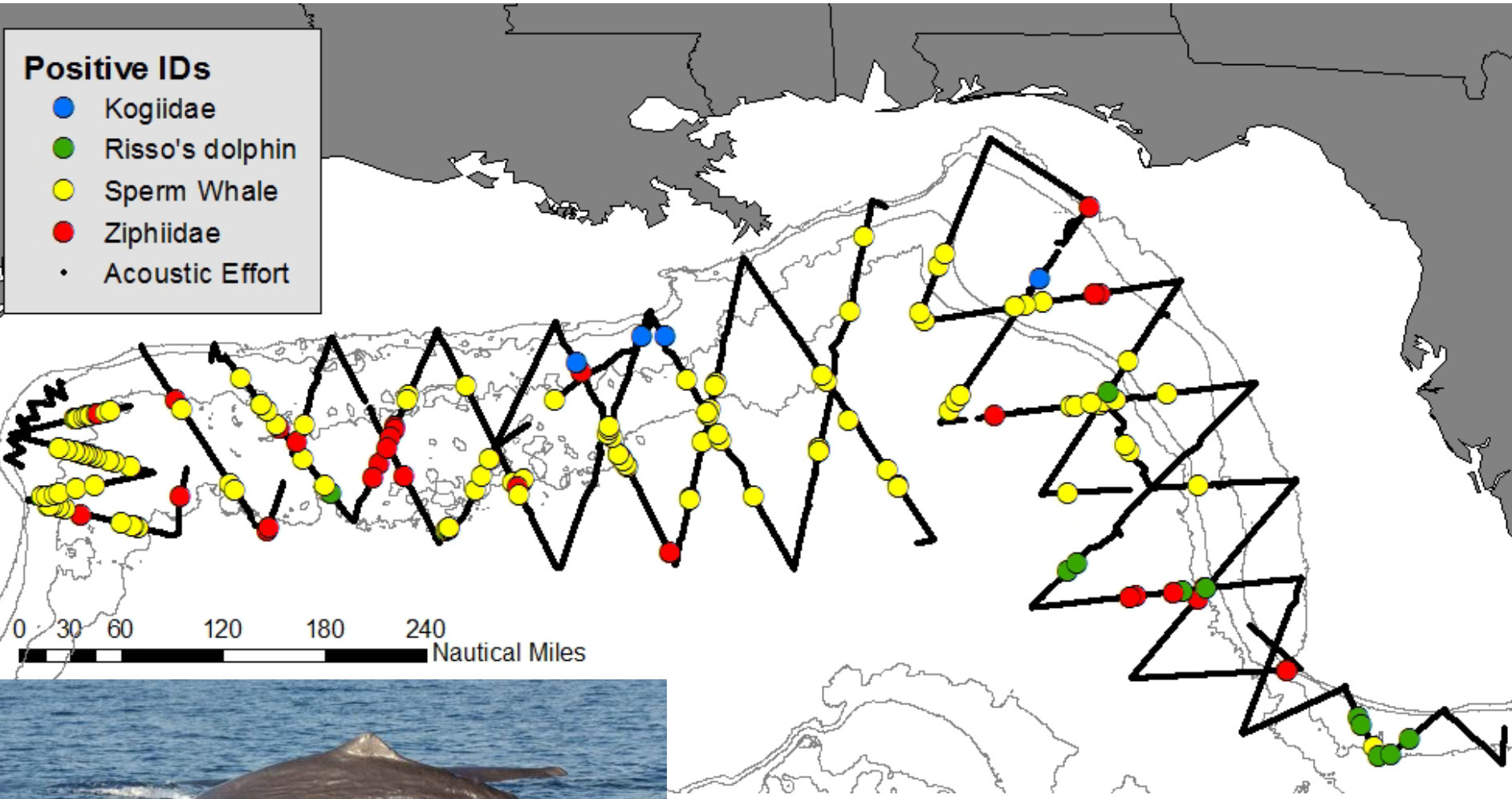
- 28 at track intersections with 250 m isobaths
- 5 opportunistically, including during Bryde's whale sightings



Summer vessel survey: positive acoustic IDs

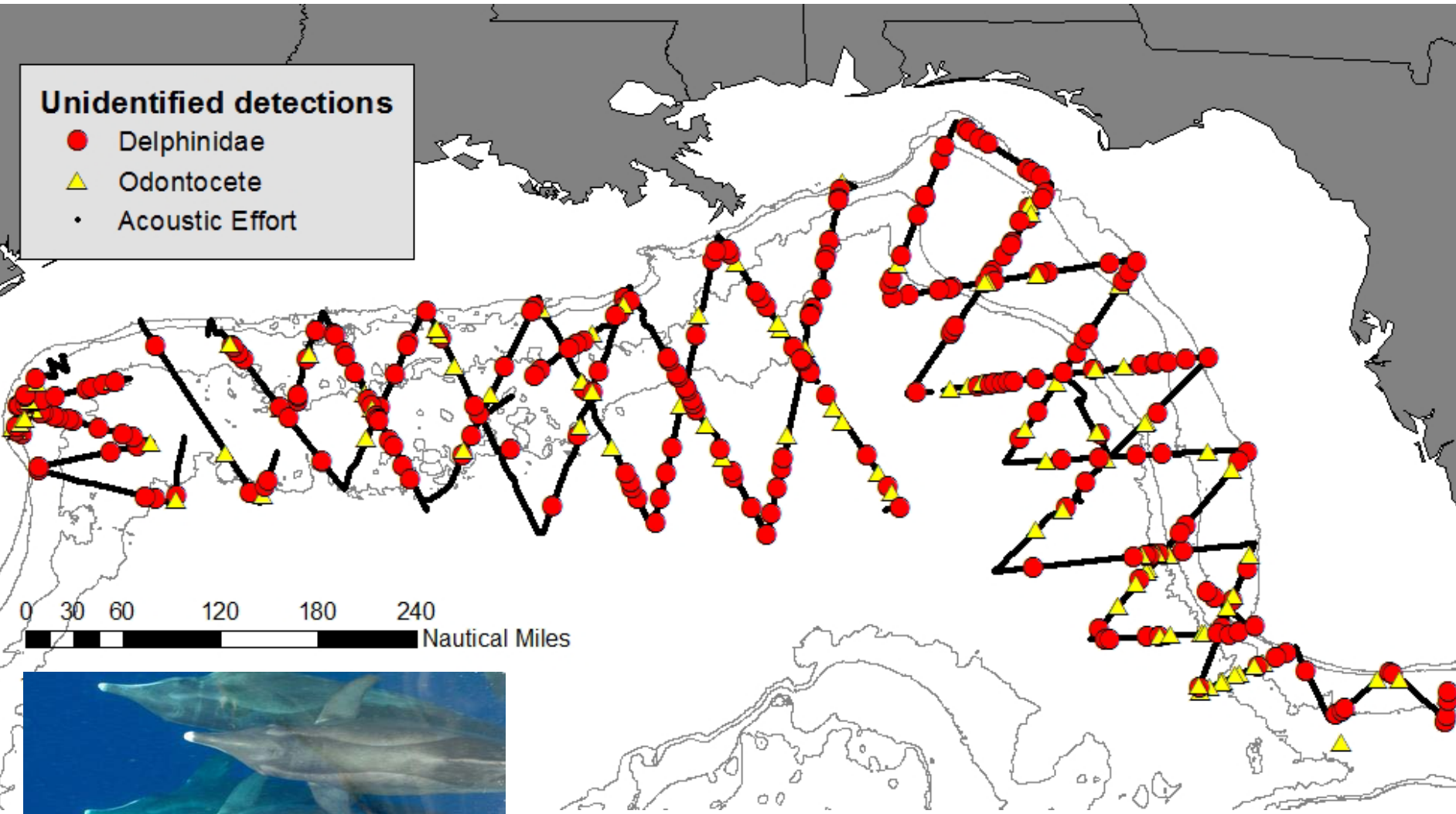
Positive IDs

- Kogiidae
- Risso's dolphin
- Sperm Whale
- Ziphiidae
- Acoustic Effort



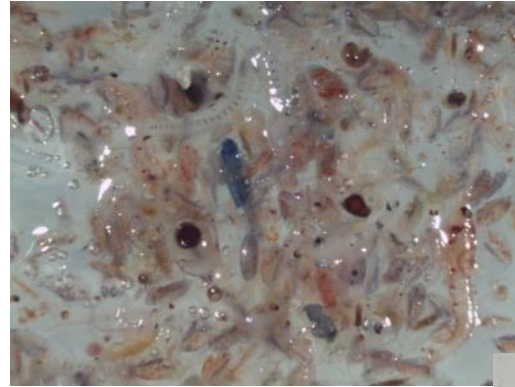
Sperm Whales
SEFSC- MMPA Permit No. 779-1633

Summer vessel survey: unidentified acoustic detections

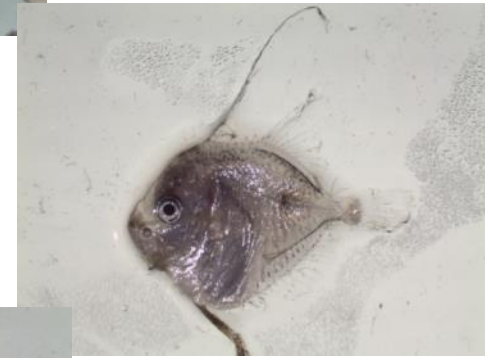


Summer vessel survey: plankton & environmental data

- Completed 92 plankton stations
- 136 Bongo tows
- Bongo samples preliminarily sorted ~ 2500 larval fish preserved from taxa of interest including tuna, billfish, snapper, grouper, and lionfish
- 133 CTD casts
- 225 XBT casts



Average plankton sample



Lookdown (*Selene* sp.)



Cephalopod - paralarva or larval squid

Summary

- Winter 2018 surveys are ongoing
- Maintaining coordination with the sea turtle and seabird groups
- QA/QC of the summer survey data is ongoing
- Beginning analyses including integration of habitat data and historical sightings data

Sperm Whale
SEFSC- MMPA Permit No. 779-1633



Spinner dolphin
SEFSC- MMPA Permit No. 779-1633



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Questions?

