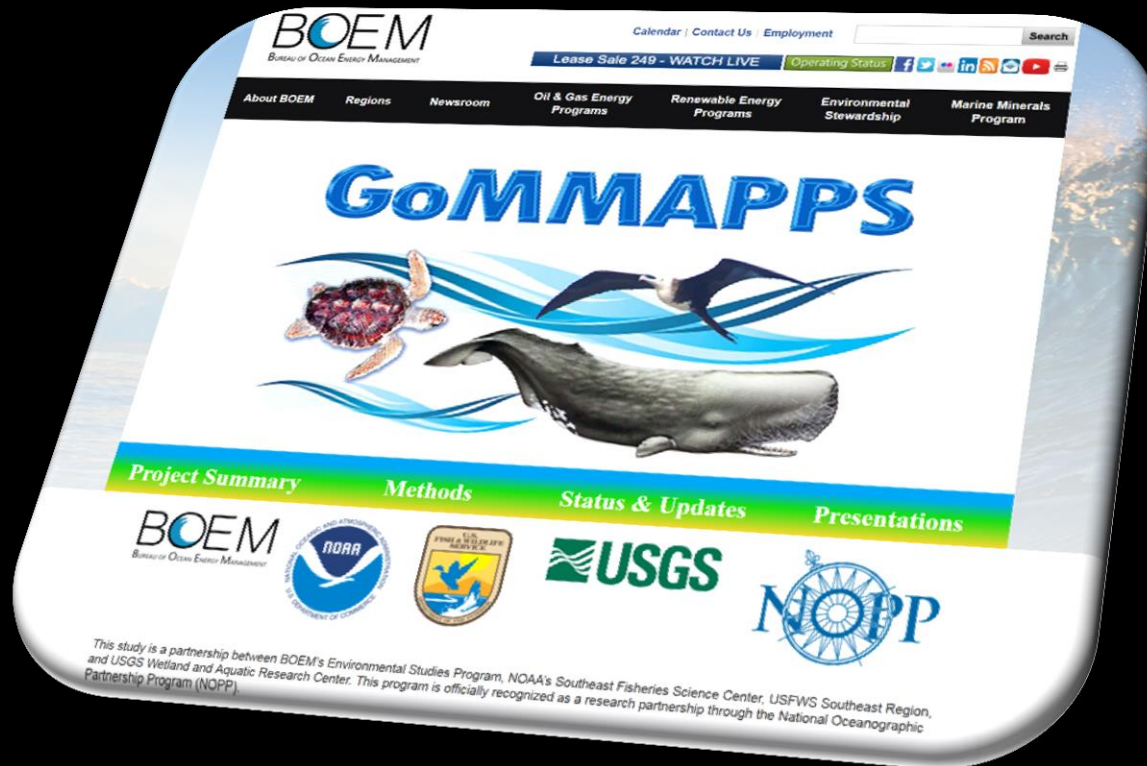




February 5-8, 2018 Hyatt Regency Hotel, New Orleans



*2018 Gulf of Mexico Oil Spill & Ecosystem Science Conference
New Orleans, LA; 5 Feb 2018
Jeff Gleason & Randy Wilson
U.S. Fish & Wildlife Service*

Seabird Surveys:

Goal: Collect broad-scale information on the distribution and abundance of seabirds in the Gulf of Mexico to inform seasonally- and spatially-explicit density estimates

Null Model: The distribution, abundance and diversity of seabirds is not influenced by:

(1) Presence (e.g., density) and status (e.g., active) of offshore platforms

(2) Proximal fisheries activities (e.g., trawling vessels)

(3) Proximal micro-habitat or forage indicators (e.g., Sargassum, menhaden)

(4) Oceanographic features (e.g., depth, loop current, eddies, salinity, SST, etc.)

(5) Broad-scale weather conditions (e.g., fronts)

Seabird Surveys:

Goal: Collect broad-scale information on the distribution and abundance of seabirds in the Gulf of Mexico to inform seasonally- and spatially-explicit density estimates

Methods:

✓ **Vessel-based Surveys**



✓ **Aerial Surveys**



Seabird Surveys: Vessel



Vessel Survey Team:

- Jeff Gleason (Program Lead) USFWS-Migratory Birds, Southeast Region
- Pat Jodice USGS South Carolina Cooperative Wildlife Research Unit / Clemson University + Graduate Student or Post-Doc
- Chris Haney Terra Mar Applied Sciences
- Yvan Satge South Carolina Cooperative Wildlife Research Unit



Photo: J. Christopher Haney

Seabird Surveys: NOAA Vessels of Opportunity



2017-2018 Surveys

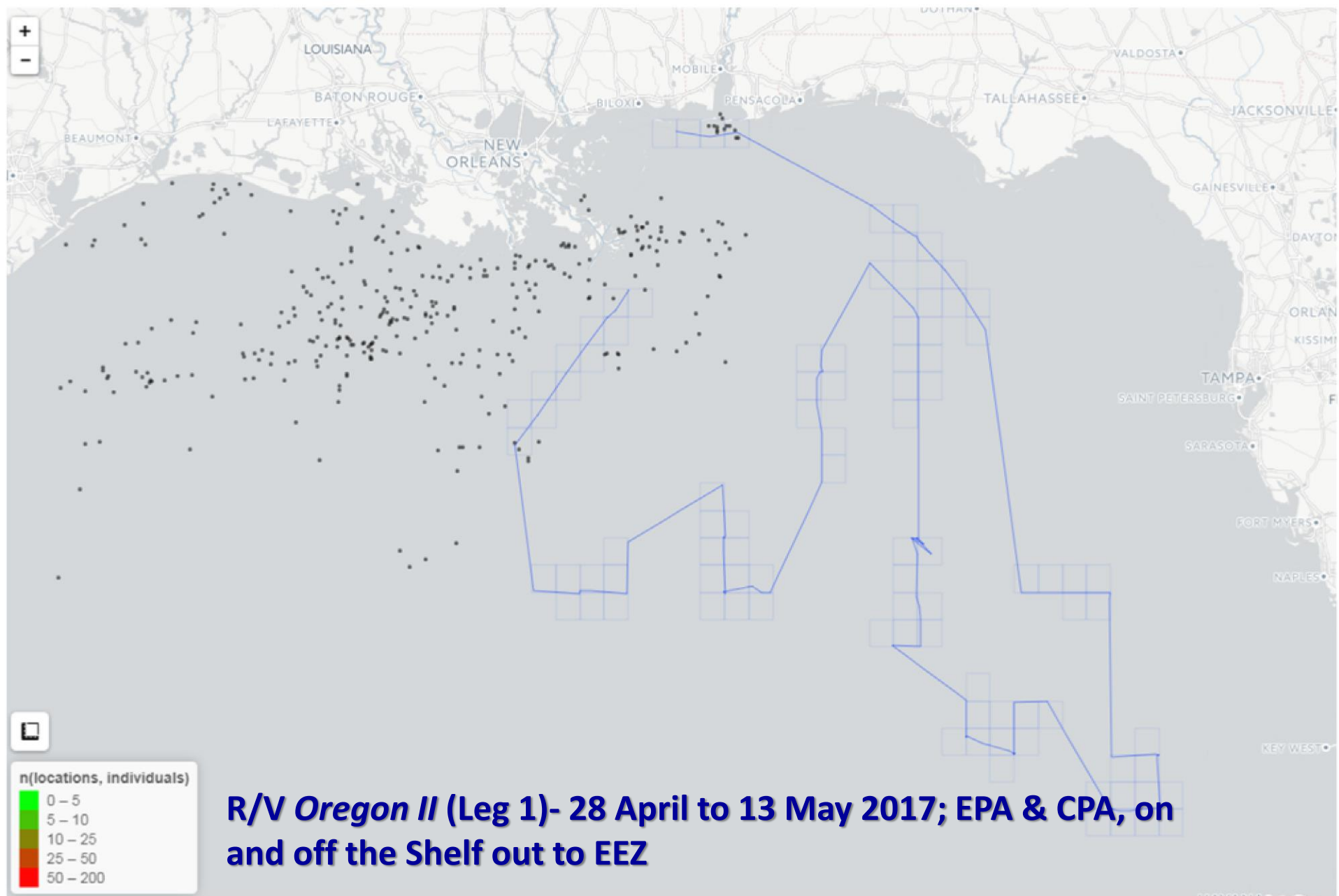
- ✓ R/V *Oregon II*- 28 April to 13 May (Spr. Plankton)
- ✓ R/V *Oregon II*- 14 to 30 May (Spr. Plankton)
- ✓ R/V *Pisces*- 1 to 17 June
- ✓ R/V *Gordon Gunter* MMC Leg 1- (no seabird observers)
- ✓ R/V *Gordon Gunter* Leg 2- 21 July to 5 Aug (MMC)
- ✓ R/V *Gordon Gunter* Leg 3- 9 to 25 Aug (MMC)
- ✓ R/V *Gordon Gunter*- 17-30 Sept (Fall Plankton)

----- ~90 DAS in 2017

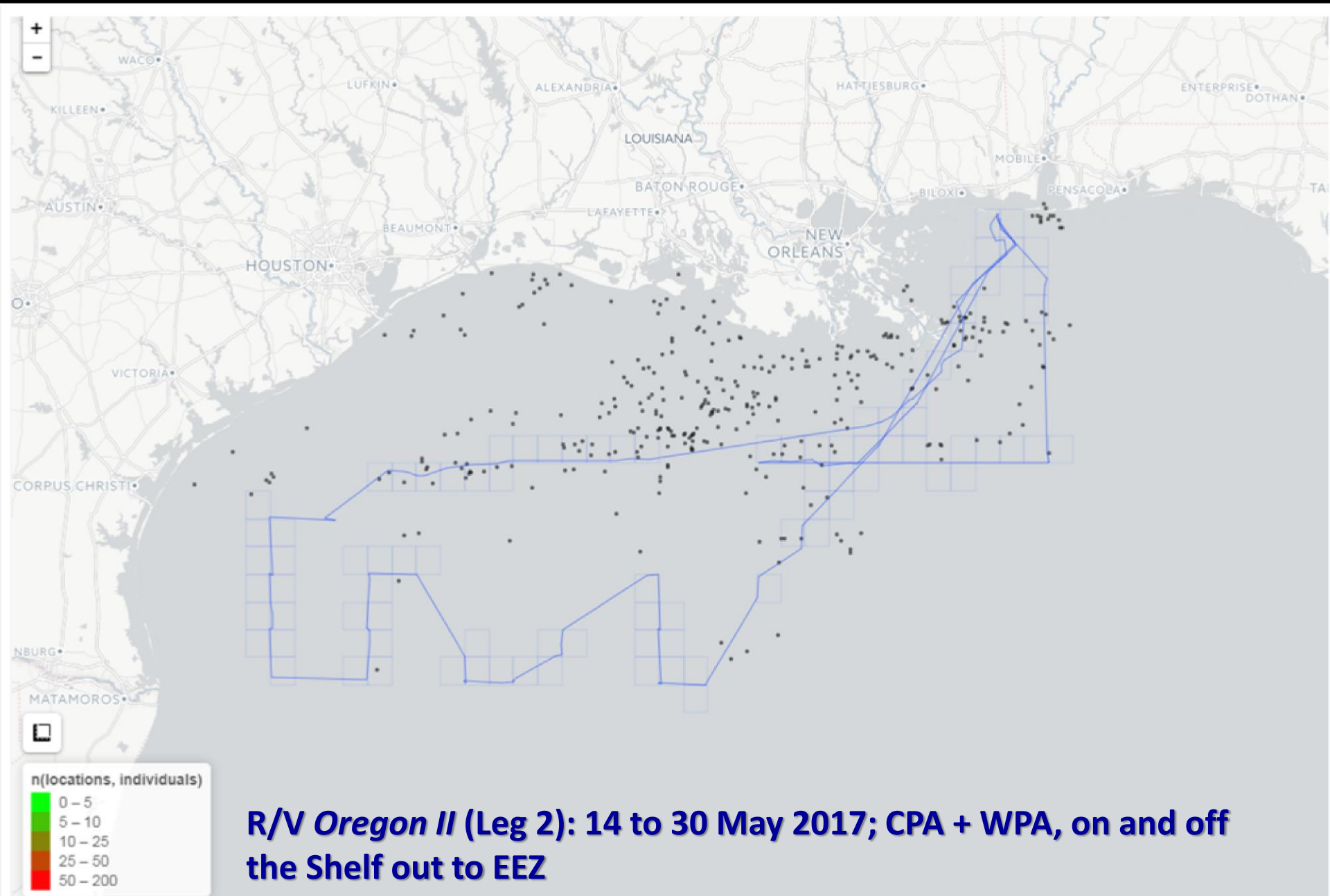
- ✓ R/V *Gordon Gunter* Leg 1- 8 to 22 Jan (MMC)
- ✓ R/V *Gordon Gunter* Leg 2- 25 Jan to 8 Feb (MMC) *In Progress*
- R/V *Gordon Gunter* Leg 3- 12 to 26 Feb (MMC)
- R/V *Gordon Gunter* Leg 4- 1 to 15 March¹ (MMC)

¹ Some days may be added to Leg 4 in attempt to make-up for lost DAS Leg 1

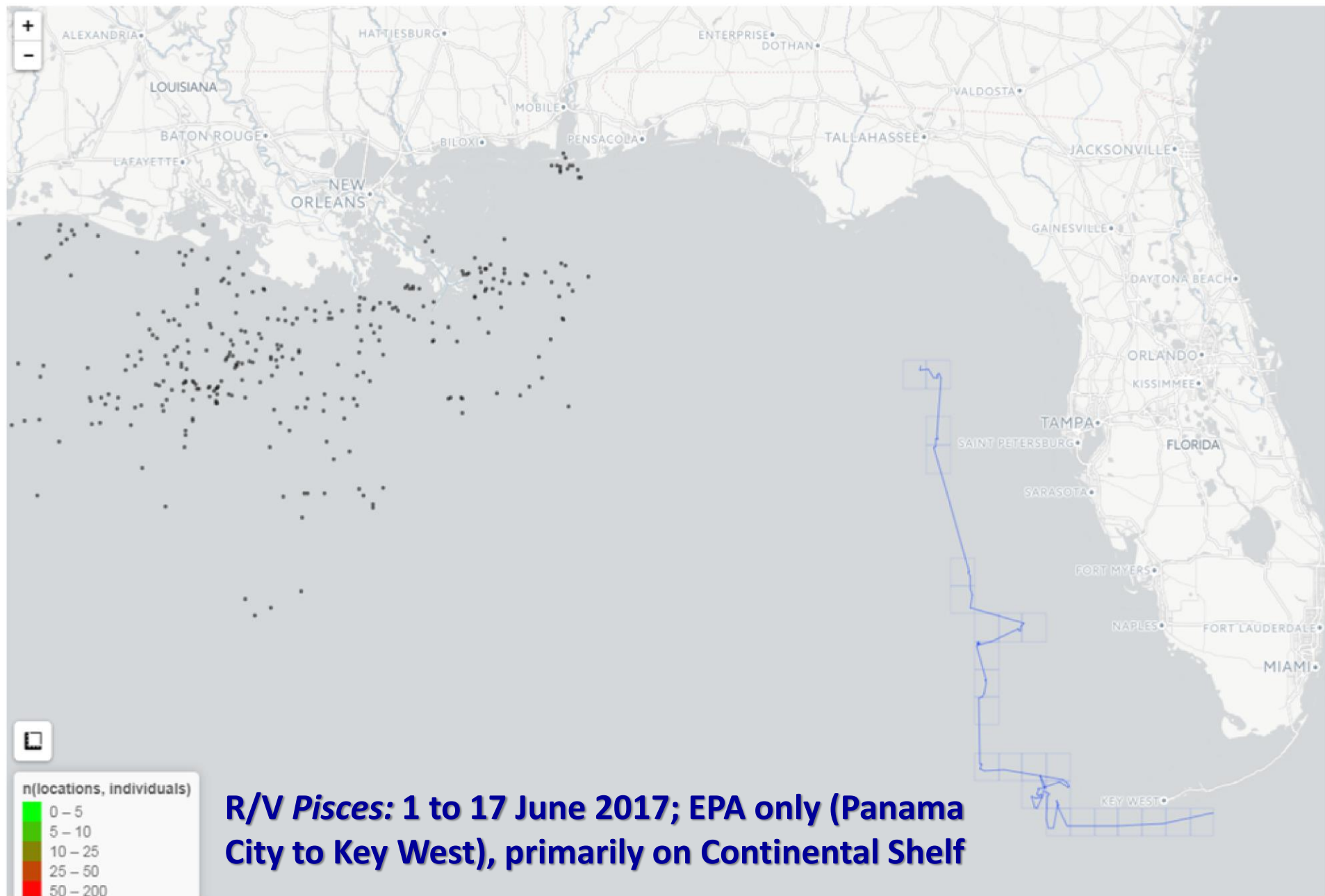
Seabird Surveys: NOAA Vessels of Opportunity (Spatial Coverage)



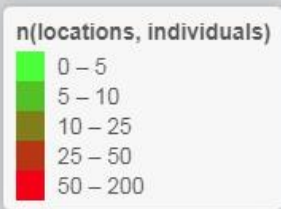
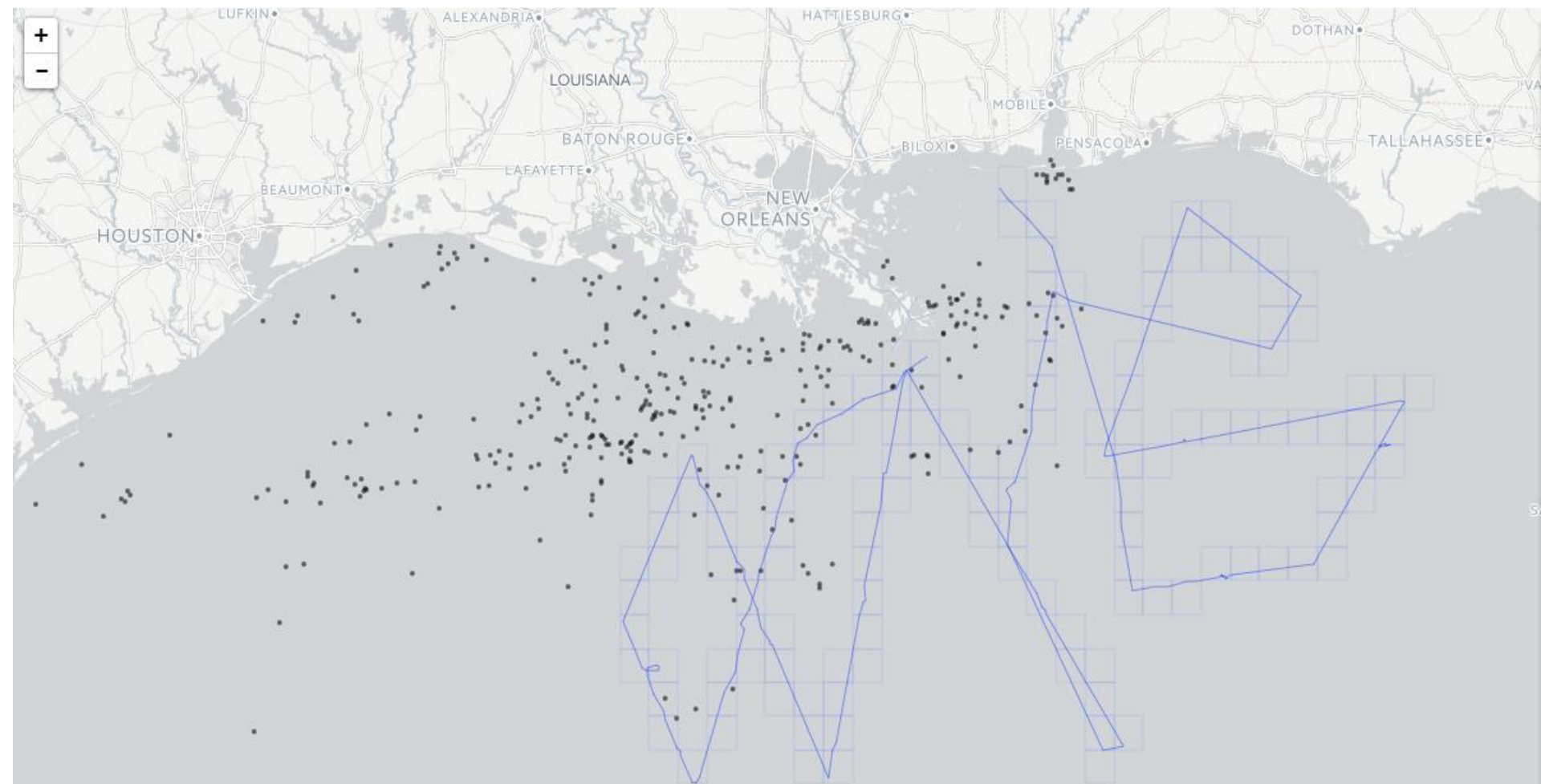
Seabird Surveys: NOAA Vessels of Opportunity (Spatial Coverage)



Seabird Surveys: NOAA Vessels of Opportunity (Spatial Coverage)

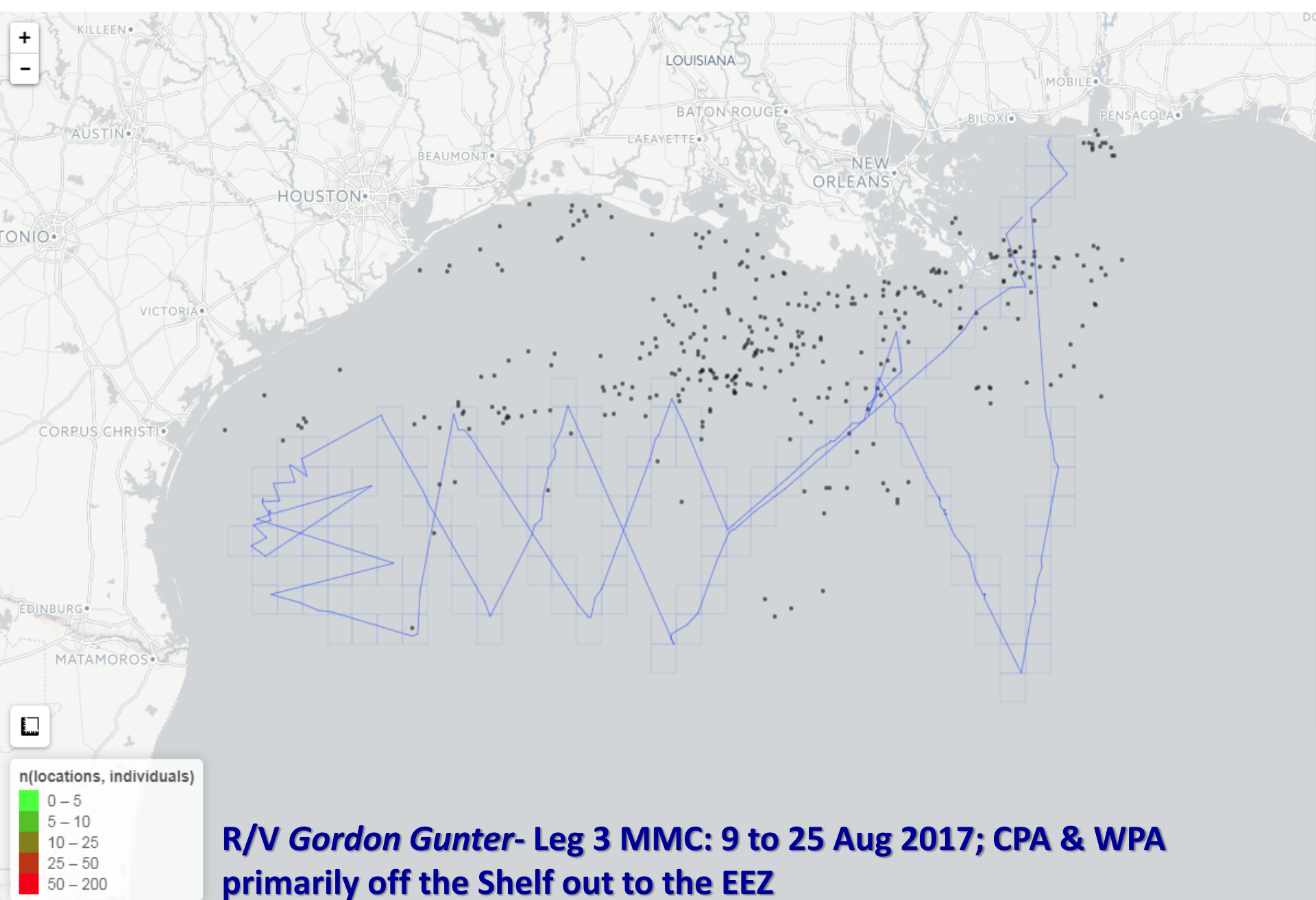


Seabird Surveys: NOAA Vessels of Opportunity (Spatial Coverage)

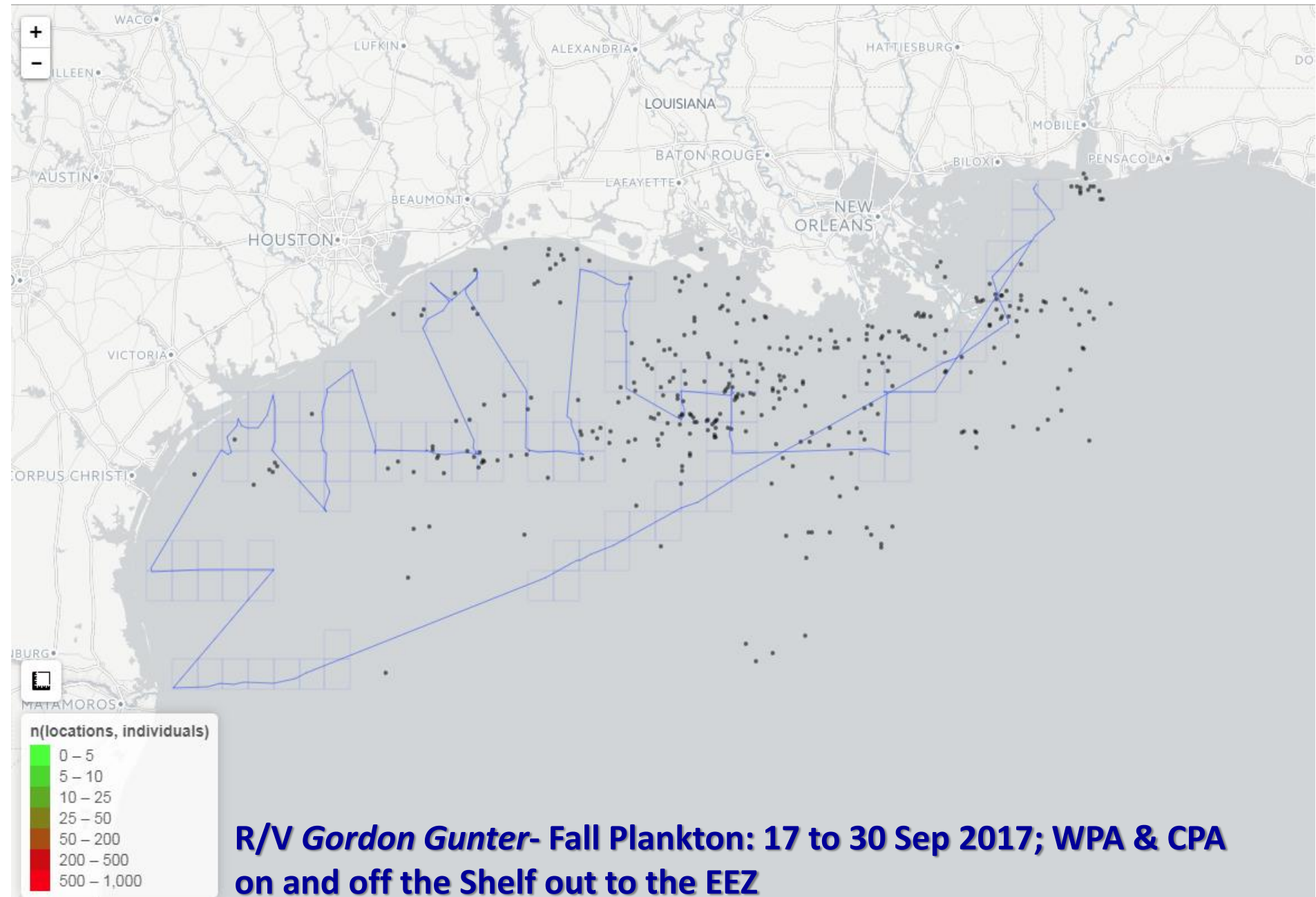


R/V Gordon Gunter- Leg 2 MMC: 21 July to 5 Aug 2017; CPA & EPA on and off the Shelf and out to the EEZ

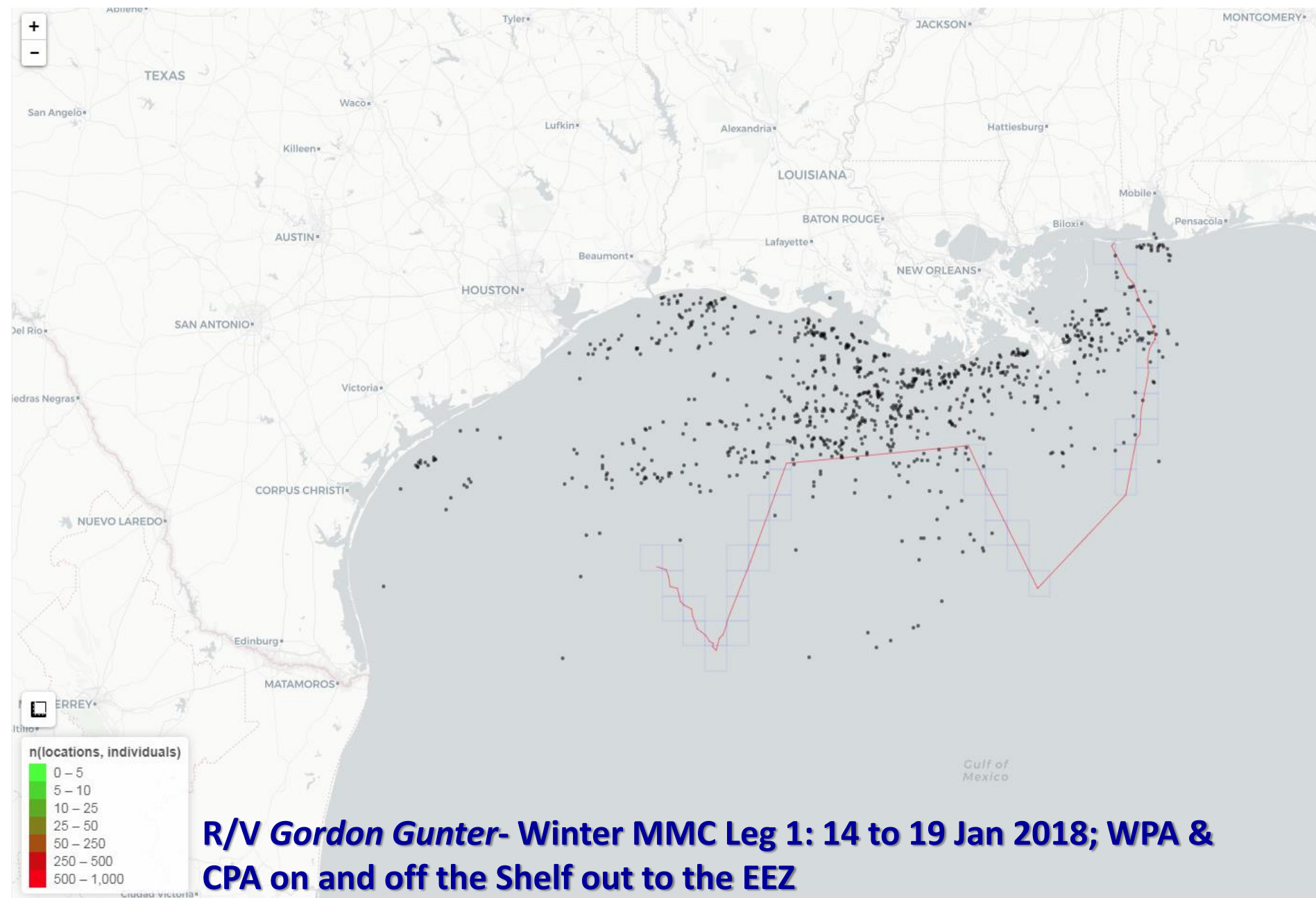
Seabird Surveys: NOAA Vessels of Opportunity (Spatial Coverage)



Seabird Surveys: NOAA Vessels of Opportunity (Spatial Coverage)



Seabird Surveys: NOAA Vessels of Opportunity (Spatial Coverage)



Seabird Surveys: NOAA VOOs- Preliminary “Results”

Vessel	Obsv. Days	Detections ¹	# Species ²
R/V <i>Oregon II</i>	12	>350	~17
R/V <i>Oregon II</i>	13	>1,100	~23
R/V <i>Pisces</i>	14	>600	~16
R/V <i>Gordon Gunter-2</i>	15	>1,300	~23
R/V <i>Gordon Gunter-3</i>	16	>2,800	~20
R/V <i>Gordon Gunter-FP</i>	13	>8,150	~19
R/V <i>Gordon Gunter-1</i>	5	>1,100	~15

- ✓ *Data are preliminary and represent raw uncorrected sightings*
- ✓ *Data collected to date have continued to far exceed expectations!!!*



Seabird Surveys: Lessons Learned & Future Efforts

Lessons Learned:

- ✓ Since 1017, we've strategically targeted VOOs that maximize time "On Transect", while still getting broad spatial & temporal coverage
- ✓ Two seabird observers per vessel/leg is required
- ✓ Govt shutdowns- no control; has potential to result in lost OBS time (vessel & aerial)- lost 2-3d during Leg 1 MMC

Future efforts:

2018: 2 Marine Mammal Cruises (Winter & early Fall) + 1-2 spring plankton cruises + 1-2 fall plankton cruises. **2018 Projection ~150-180 DAS**

2019: 1 Marine Mammal Cruise (Summer) + 1 or 2 spring plankton cruises + 1 or 2 fall plankton cruises. **2019 Projection ~94-128 DAS**



Seabird Surveys:

Goal: Collect broad-scale information on the distribution and abundance of seabirds in the Gulf of Mexico to inform seasonally- and spatially-explicit density estimates

Methods:

✓ **Vessel-based Surveys**



✓ **Aerial Surveys**



Seabird Surveys: Aerial



Aerial Survey Team:

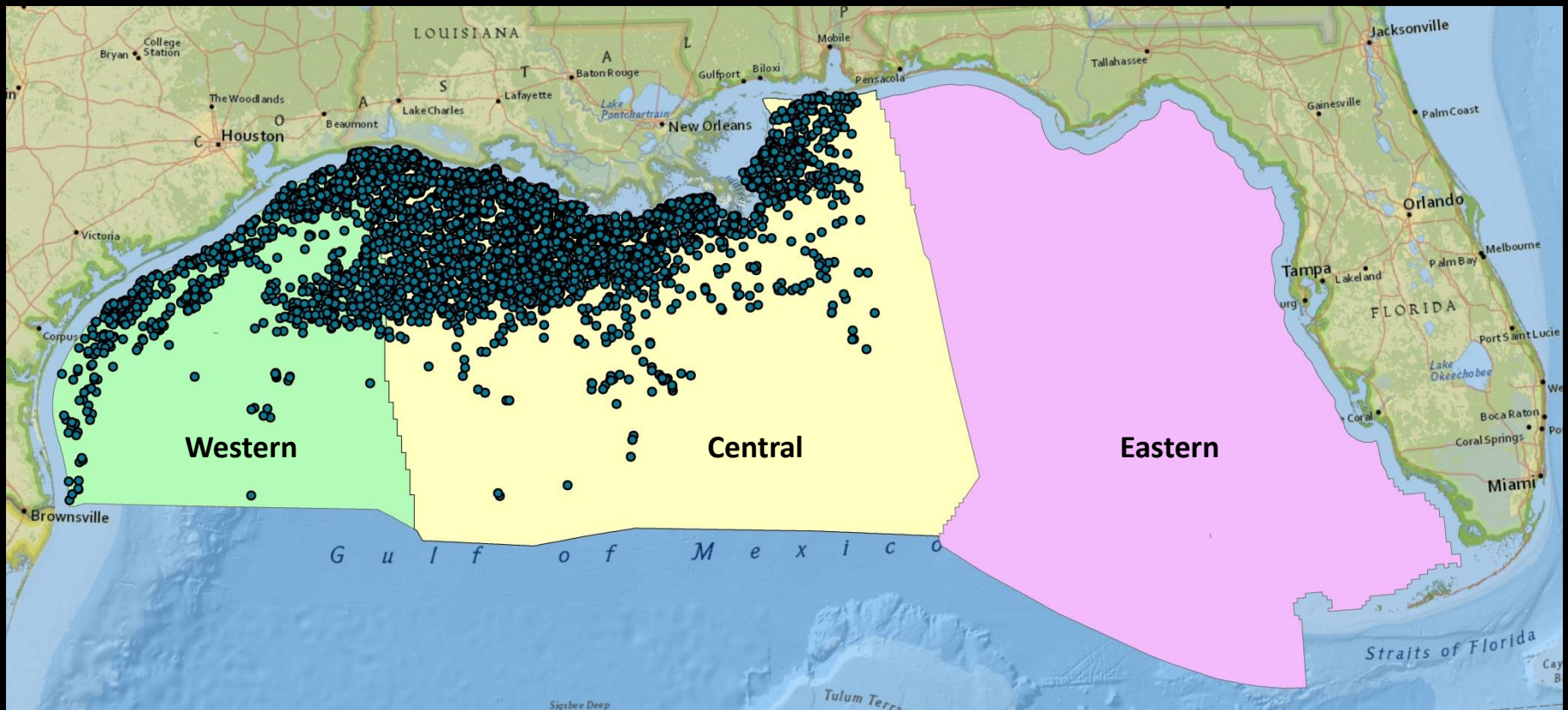
- **Randy Wilson (Program Lead)** *USFWS-Migratory Birds, Southeast Region*
- **Jim Lyons (Survey Design/Data Management)** *USGS Patuxent Wildlife Research Center*
- **+ Allison Sussman** *Post-Doc/Contractor– data management*
- **Emily Silverman (Survey Design/Data Management)** *USFWS-Population & Habitat Assessment*
- **Elise Zipkin (Data Analysis & Modeling)** *Michigan State University*
- **Plus Graduate Student – data analysis & modeling**
- **Ryan Theel (Spatial Analyst)** *USFWS-Ecological Services, Southeast Region*
- **Mark Koneff (Pilot-Biologist)** *USFWS-Migratory Bird Surveys*
- **Jim Wortham (Pilot-Biologist)** *USFWS-Migratory Bird Surveys*
- **Steve Earsom (Pilot-Biologist)** *USFWS-Migratory Bird Surveys*



Seabird Surveys: Aerial



Objective: Conduct low-level (200 ft), aerial surveys in the nearshore environment (<50NM) from Brownsville, TX to the Florida Keys.



Seabird Surveys: Aerial

2017 Field Season (Summer Pilot Season)

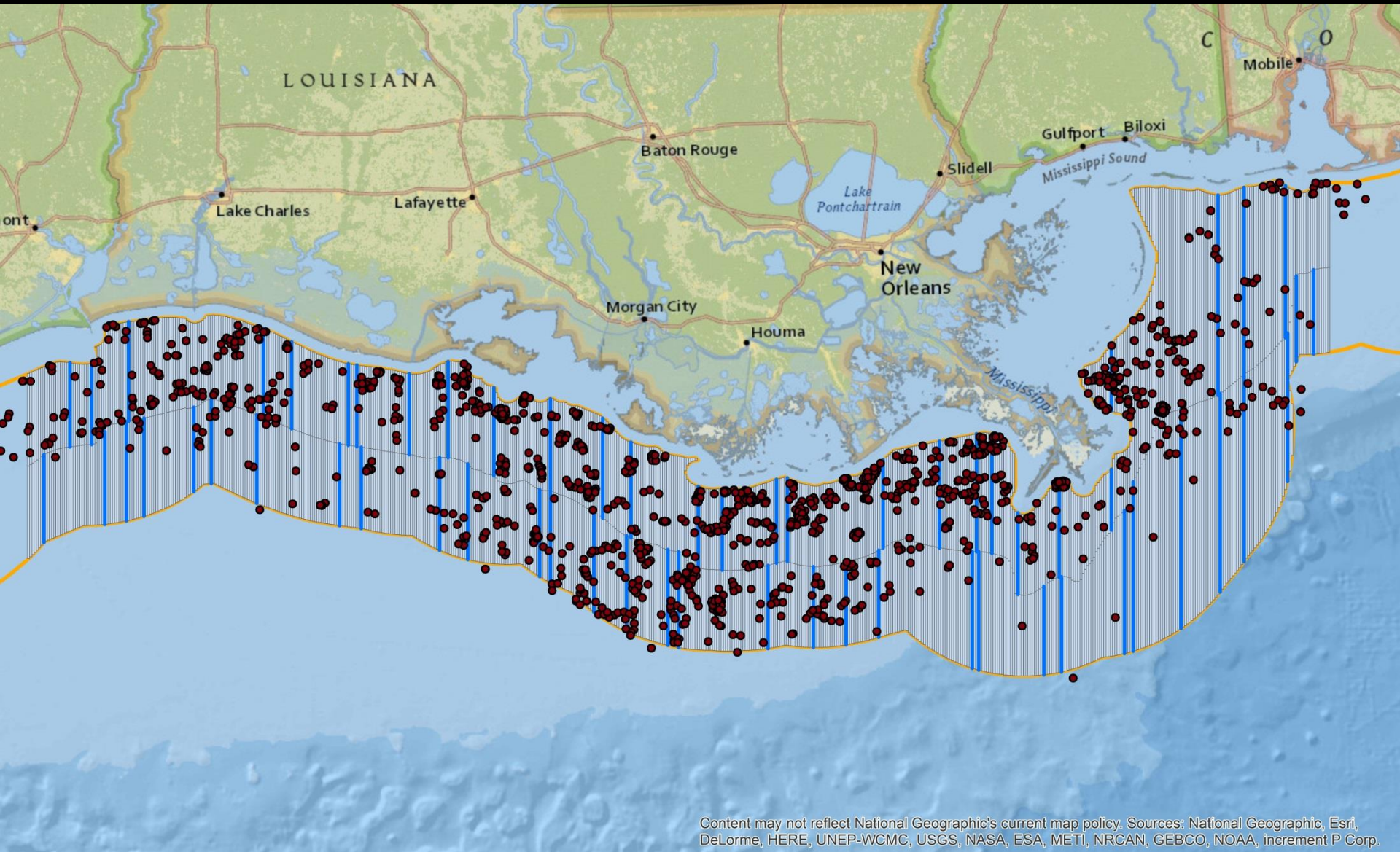
- ✓ Tested two survey designs off the Louisiana Coast (10nm to 50 nm offshore)
 - Standard Transects
 - Transect within Hexagon Plot

- ✓ Tested double observer protocols
 - Pilot did not count
 - Utilized 3 observers (right front, right rear, & left rear)



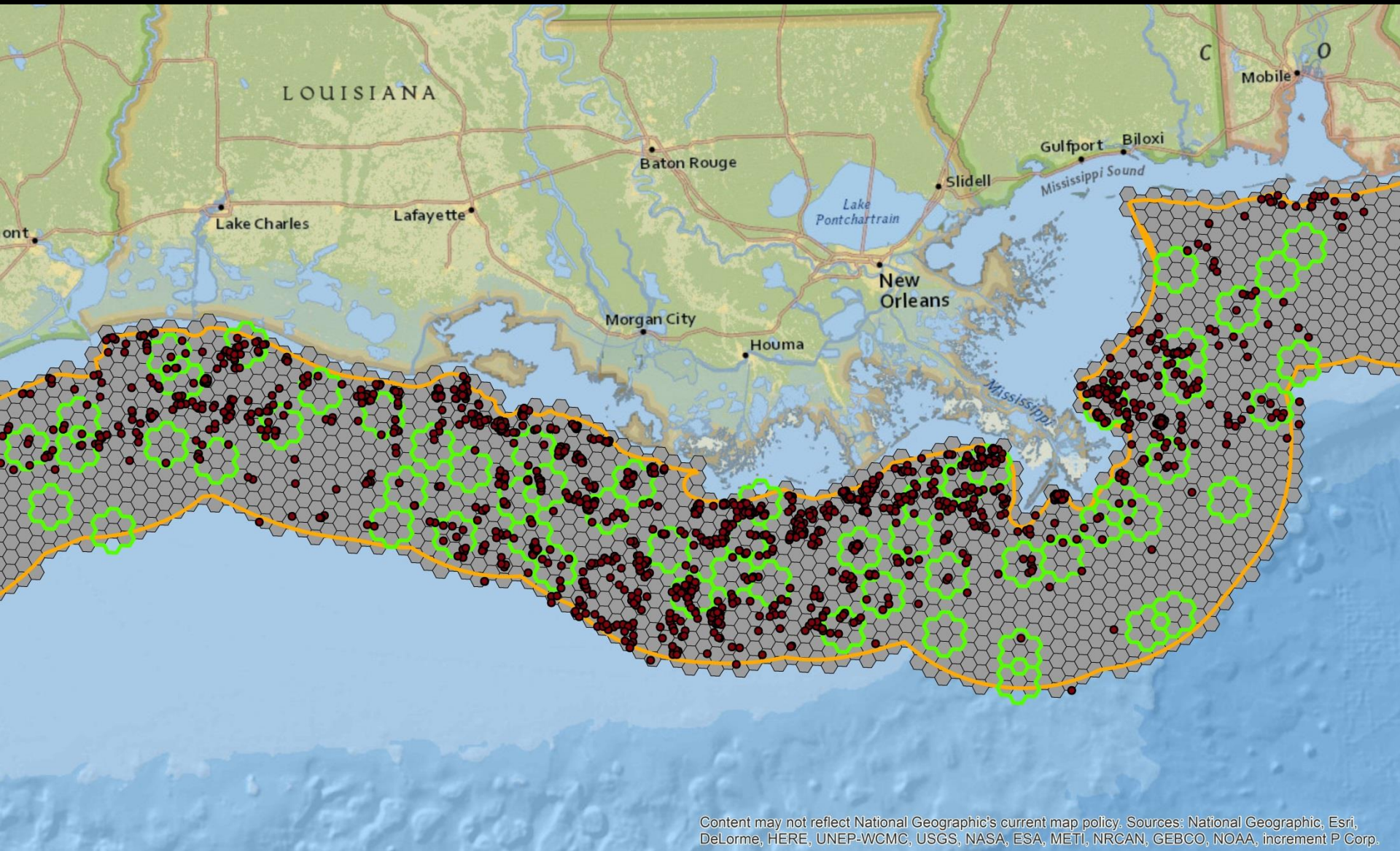
Selected Transects (n=60)

Selection via Generalized Random Tessellation Stratified (GRTS)



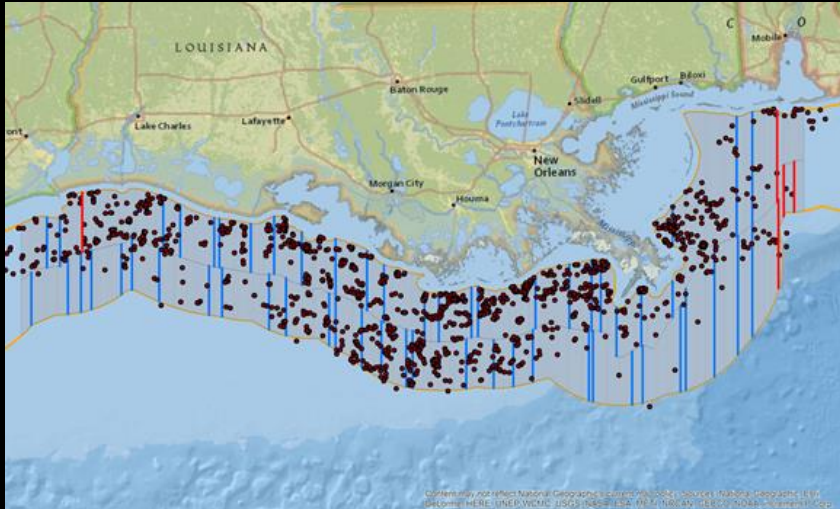
Selected Hexagon “snowflakes” (n=60)

Selection via Generalized Random Tessellation Stratified (GRTS)

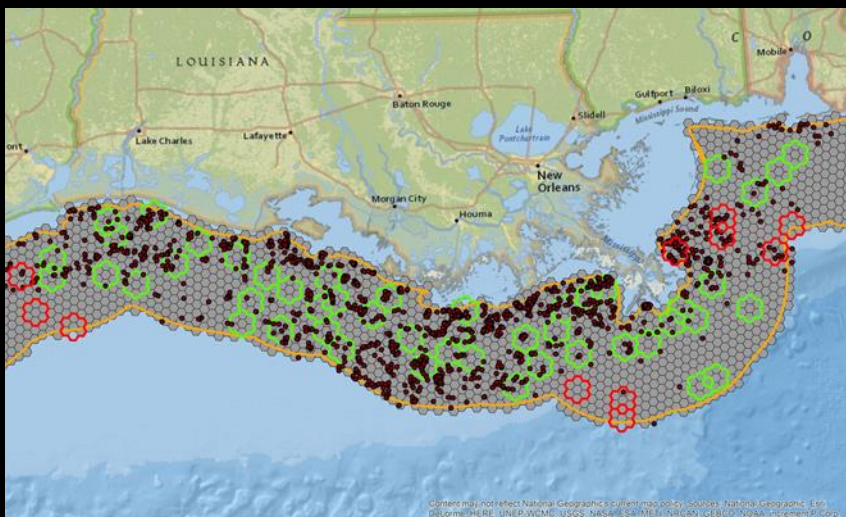


2017 Summer Study Design Surveys In Review....

Completed 55 of 60 Transects



Completed 49 of 60 Transects



Lessons Learned

Logistical:

- Fuel limitations on MS Delta
- Weather can disrupt the best laid plans
- Transects tend to be a bit more (fuel) efficient

Operational:

- Both designs are feasible
- Hexagons require more of the pilots attention
- Pilots felt they could be an observer on transects but not hexagons
- Interactions with other air traffic was minimal
- Platforms did present obstacle as presumed

Biological:

- Overall bird numbers were low
- No apparent differences in survey design
- Need to expand survey closer to shore

Going forward with aerial surveys...



Analysis of summer 2017 data to inform:

- ✓ Survey Design (transects vs hexagons)
- ✓ Sampling Intensity (power analysis)
- ✓ Number of Observers (detection probabilities)

Future aerial surveys...



February 2018

July 2018

February 2019

July 2019

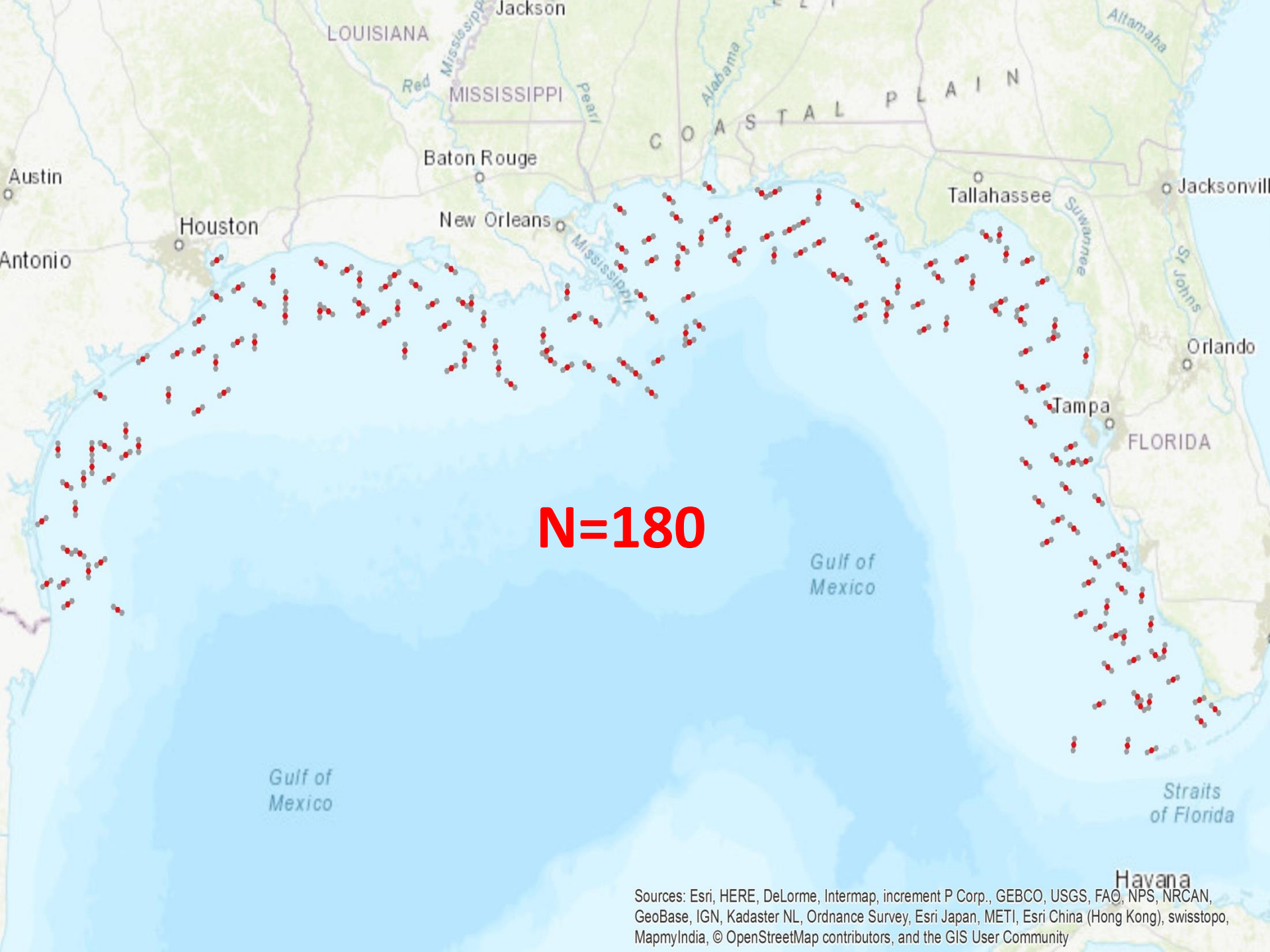
February 2020

Seabird Surveys: Aerial

2018 Winter Aerial Surveys

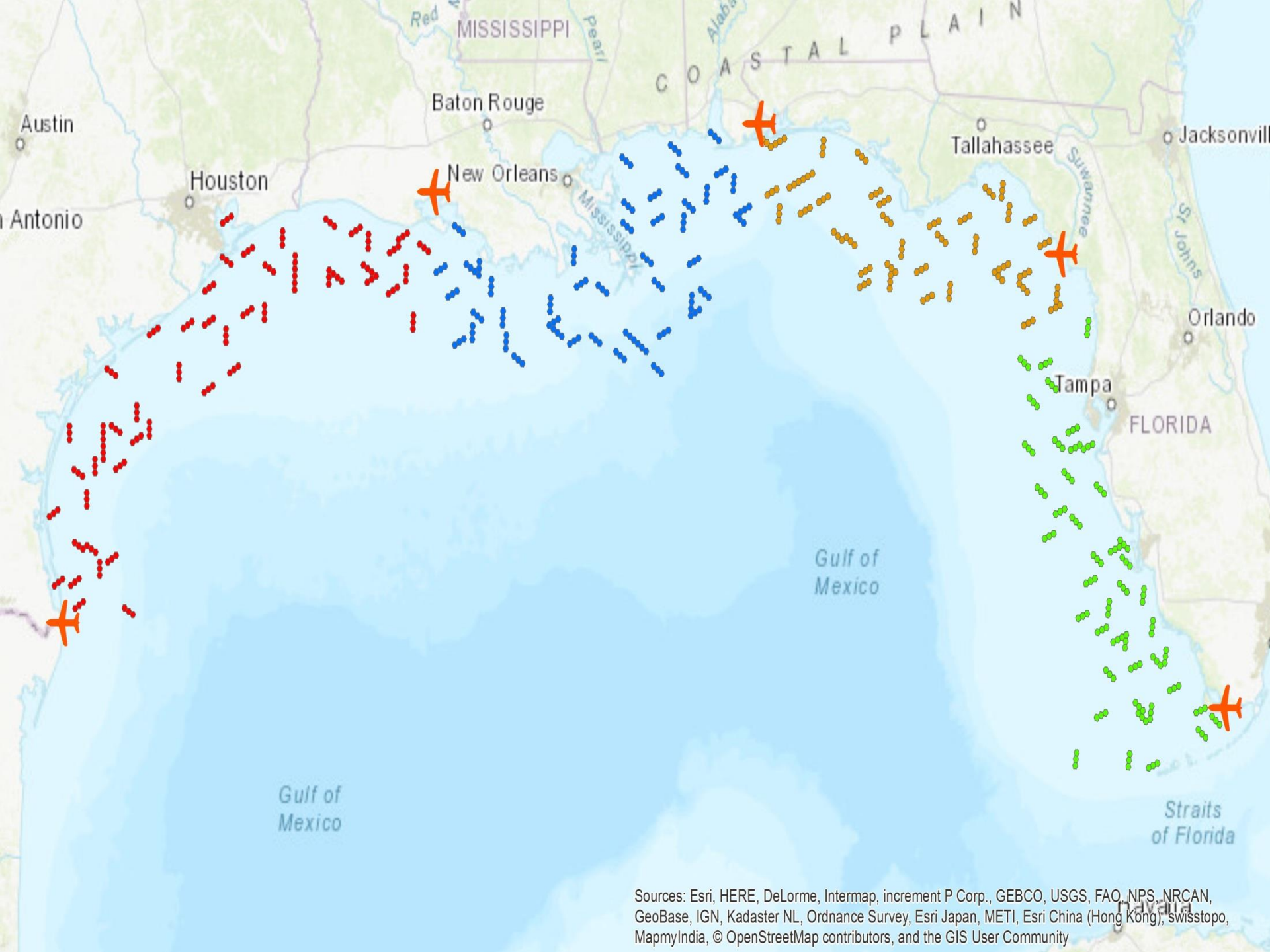


- ✓ Using info. learned from the July 2017 surveys, it was determined that Hexagon-based survey design yielded more detections than transects
- ✓ Moving forward, we will utilize the EPA Hexagons as our base sample unit, but instead of “flying a circle” from centroid to centroid (summer of 2017), we will fly 3 transects (200m width either side of aircraft), 1-mile apart through each of the selected Hexagon Groups
- ✓ Because an individual Hexagon is only 3.6nm across, we selected two adjacent Hexagons to also be included in the sample using a panel-design; hence a survey will cover 3 Hexagons resulting in circa 30NM of transects surveyed per Hexagon Group
- ✓ Additionally, the direction of each survey will be randomized based on the orientation of the selected, adjacent Hexagon (i.e., survey can be flown on a NW-SE orientation; N-S orientation; or NE-SW orientation)



N=180

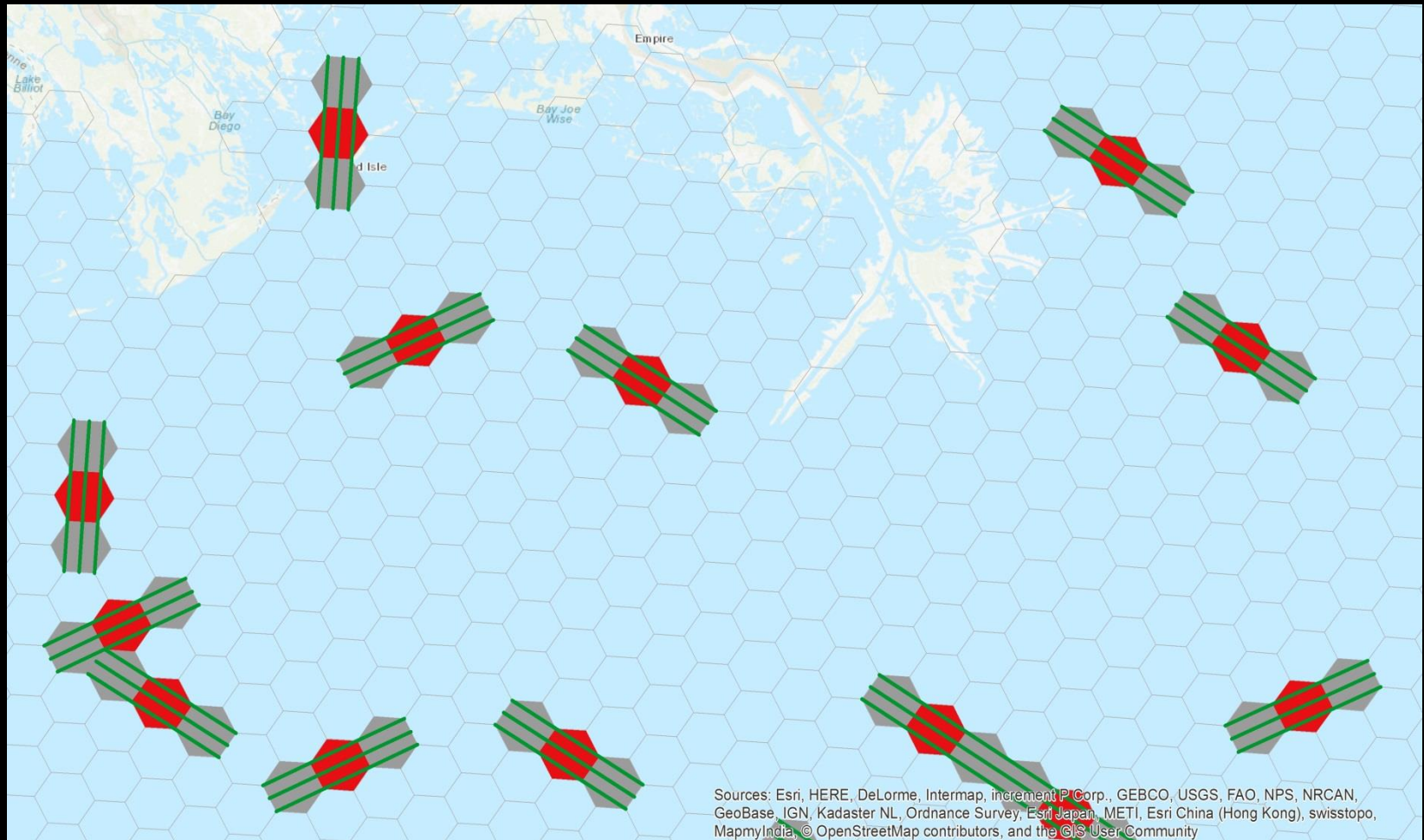
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

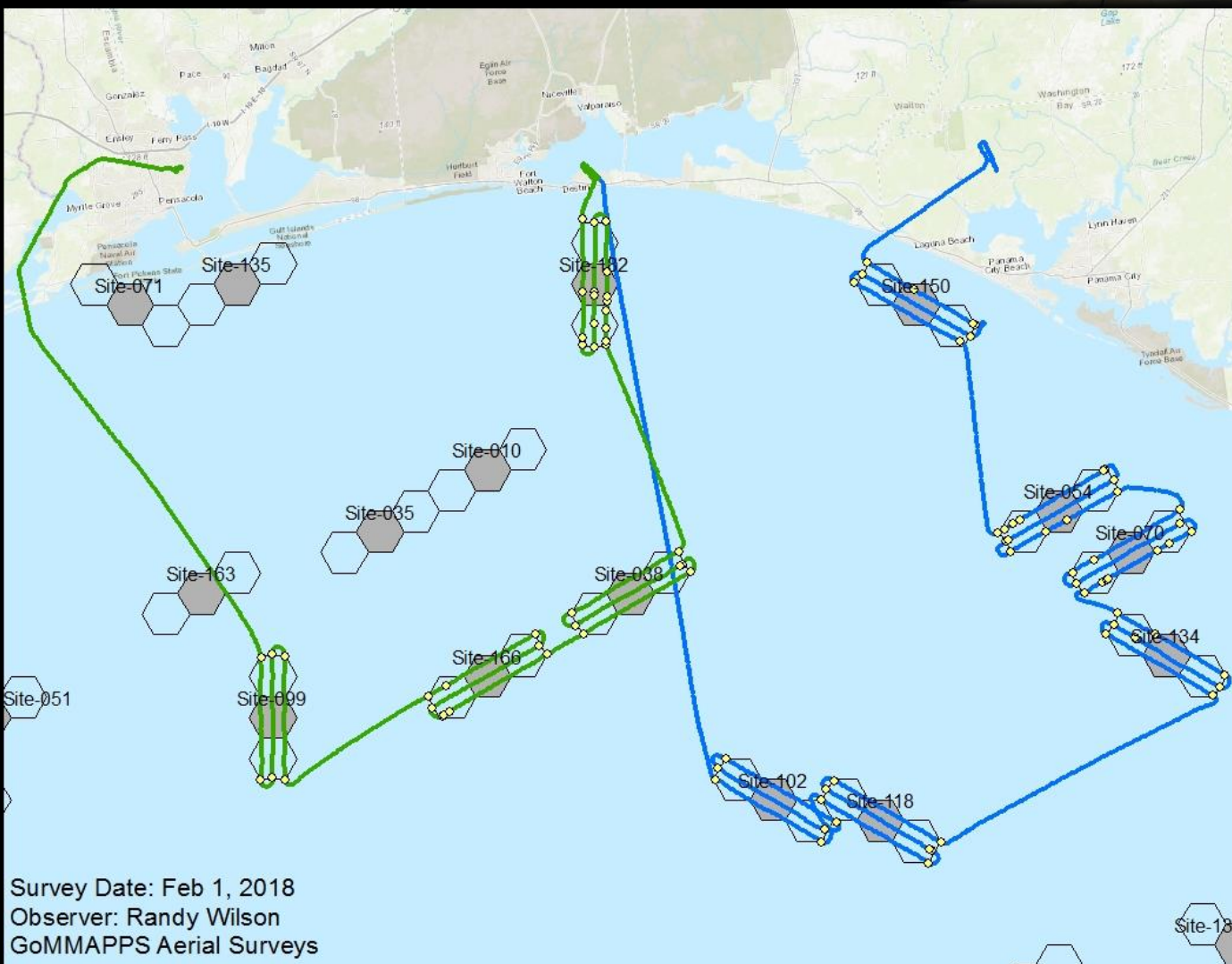
Seabird Surveys: Aerial

2018 Winter Aerial Surveys



Seabird Surveys: Aerial

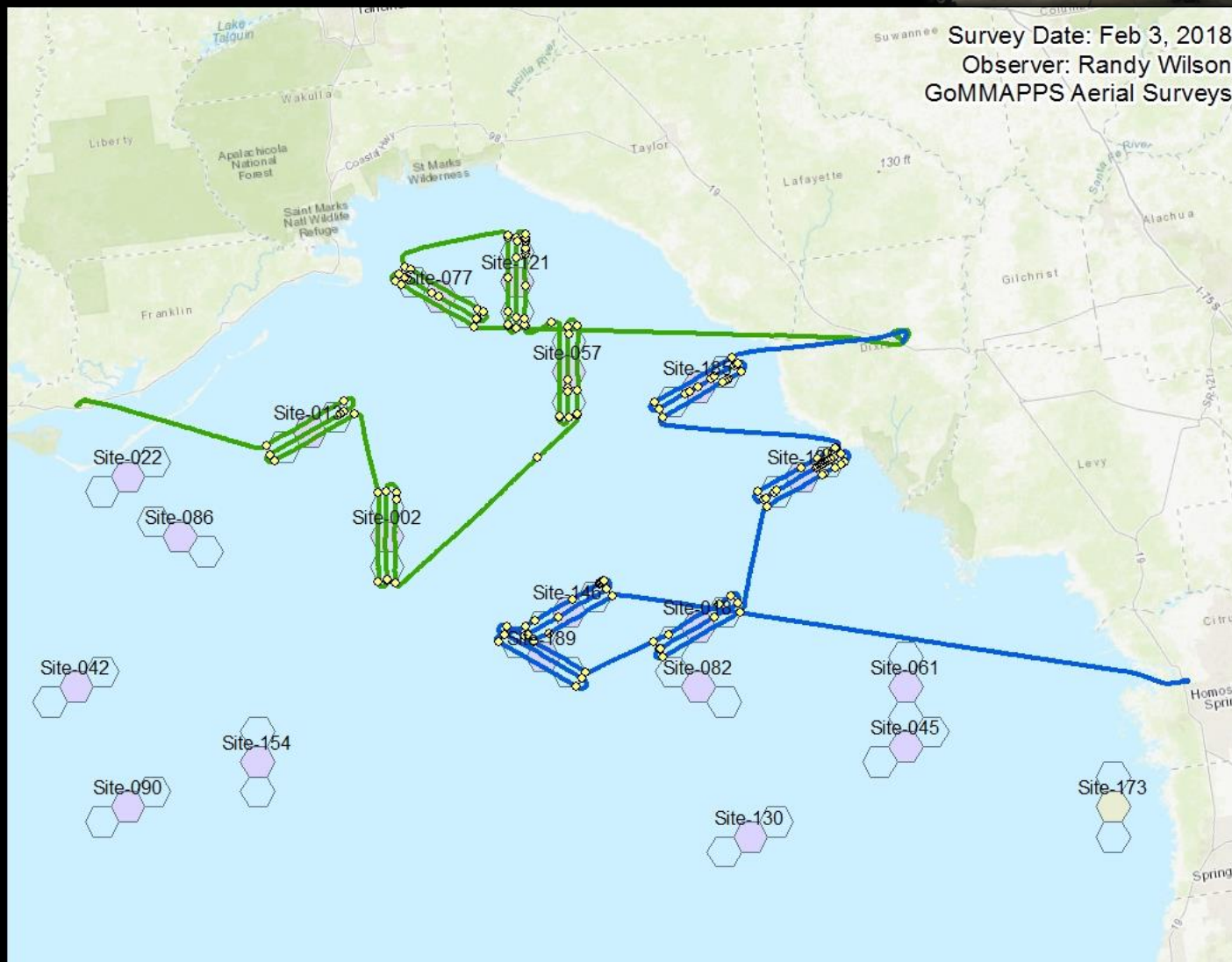
2018 Winter Aerial Surveys



Survey Date: Feb 1, 2018
Observer: Randy Wilson
GoMMAPPS Aerial Surveys

Seabird Surveys: Aerial

2018 Winter Aerial Surveys



Seabird Surveys: Wrap-up

Goal: Collect broad-scale information on the distribution and abundance of seabirds in the Gulf of Mexico to inform seasonally- and spatially-explicit density estimates

Methods:

✓ **Vessel-based Surveys**

✓ **Aerial Surveys**



Acknowledgements:

<https://www.boem.gov/GOMMAPPS/>

- ✓ All the PIs, Co-PIs, pilot-biologist, and others on the GoMMAPPS Seabird Team. Without everyone's expertise and commitment, this effort would not be possible
- ✓ USFWS staff for their leadership and support. Specifically, the Branch of Population Surveys provided Kodiak amphibious aircraft and pilot-biologists; National Wildlife Refuge System provided qualified observers; Ecological Services provided GIS support; and the Migratory Bird Program for providing administrative support
- ✓ NOAA staff, vessel crews, and particularly the Chief Scientists and IT Support on each of the respective vessels/legs for their assistance. Without their support and assistance the seabird vessel monitoring efforts would not have been possible or as successful
- ✓ This study was funded by the U.S. Department of the Interior, Bureau of Ocean Energy Management through Intra-Agency Agreement M17PG00011 with the U.S. Department of Interior, U.S. Fish and Wildlife Service