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Florida Manatee Movements and Habitat Use in the Northern Gulf of Mexico

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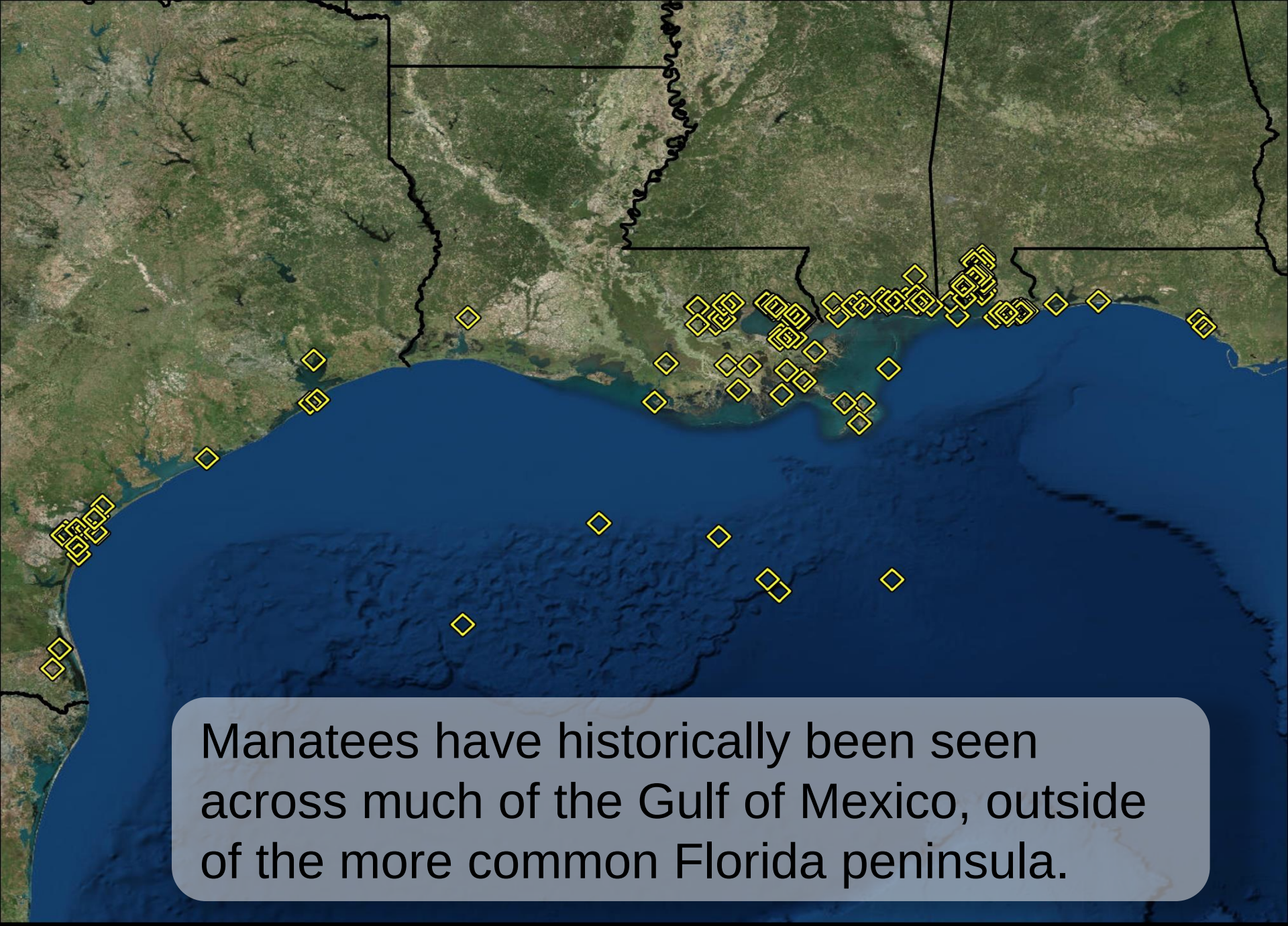
USGS Sirenia Project research in the Northern Gulf of Mexico

Manatee Tracking	• Analyze existing spatial manatee data • Capture and tag additional manatees in Crystal River and the northern Gulf
Habitat Assessment	• Collect existing habitat base layers • Describe manatee use habitat based on manatee locations and observations.
Health /Genetics	• Examine manatees for health status. • Collect and process genetic samples from Crystal River migrants and manatees captured in northern Gulf.
Photo-Identification / Population monitoring	• Photo-identification of manatees that overwinter at Crystal River and Wakulla. • Matching of animals photographed in the NGOM


Manatees have historically been seen across much of the Gulf of Mexico, outside of the more common Florida peninsula.

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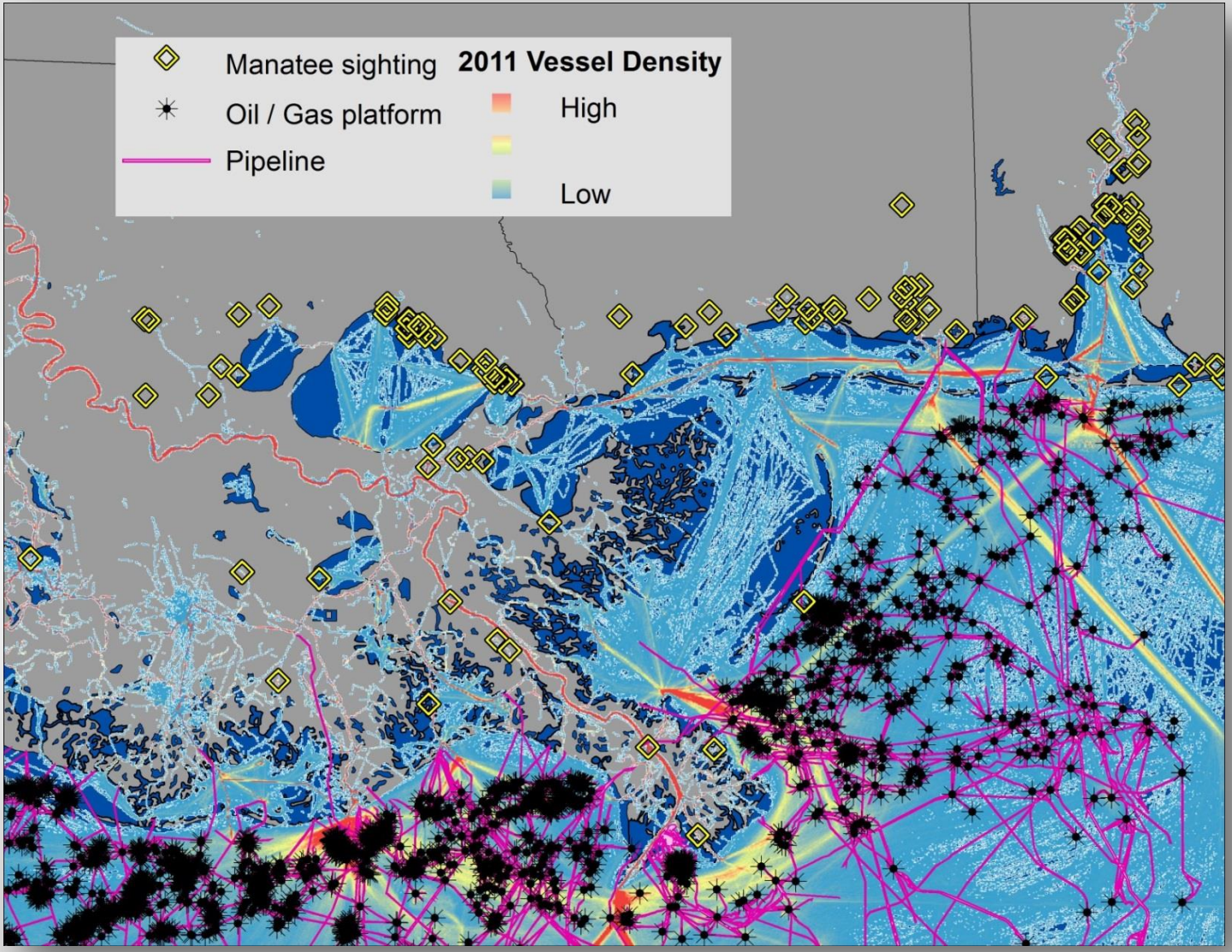
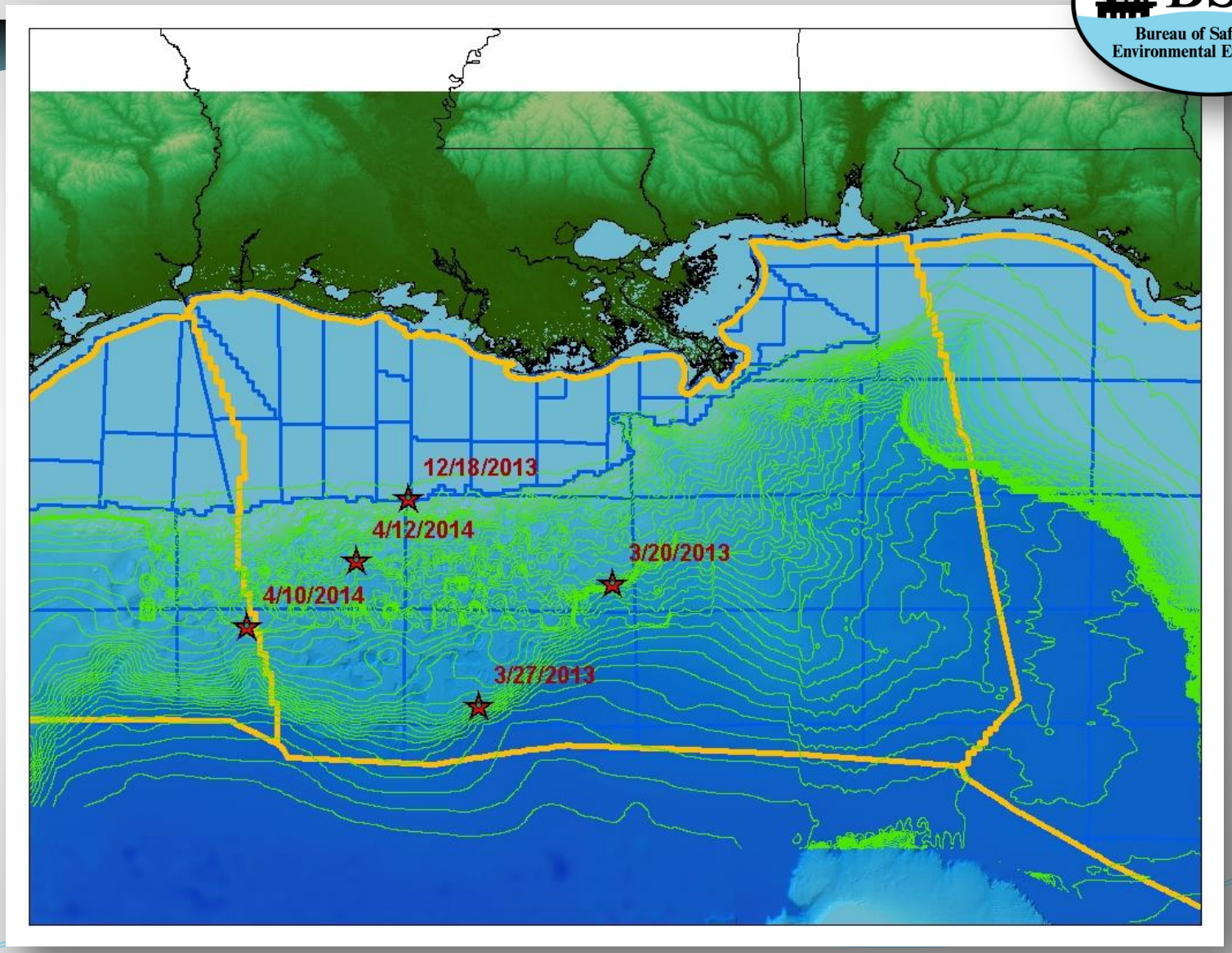
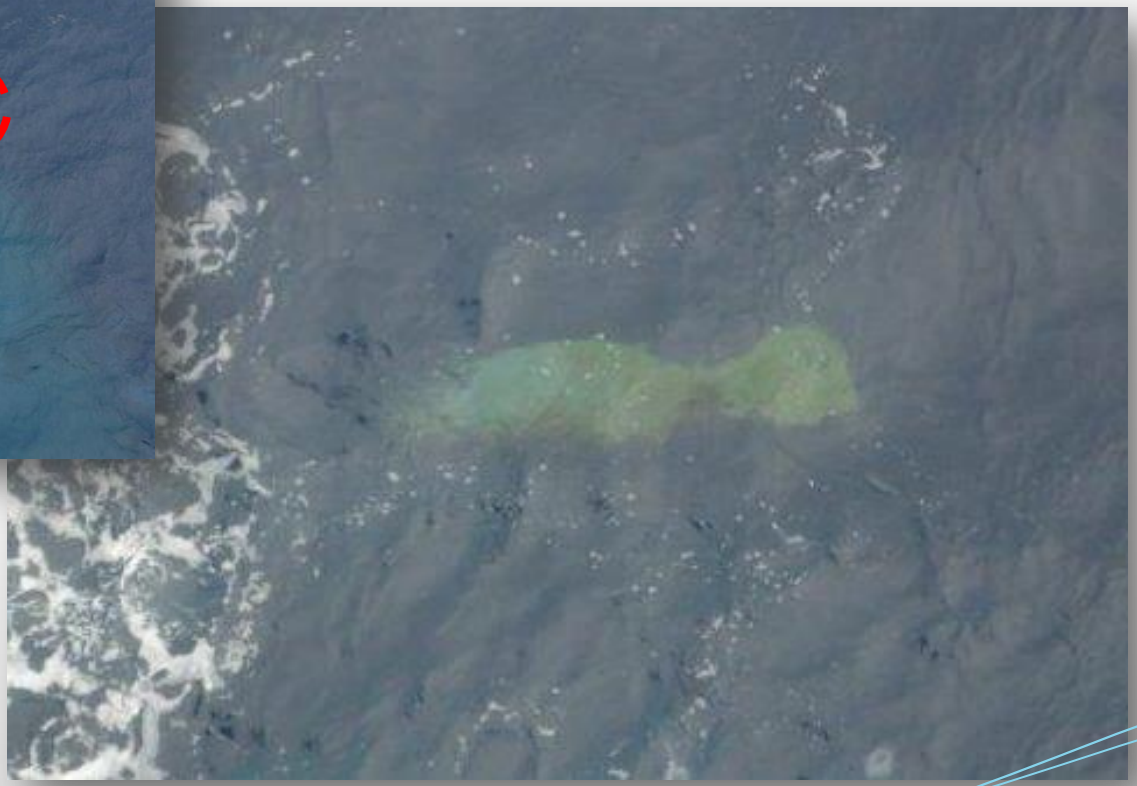
Including sighting reports from areas used extensively by the energy industry



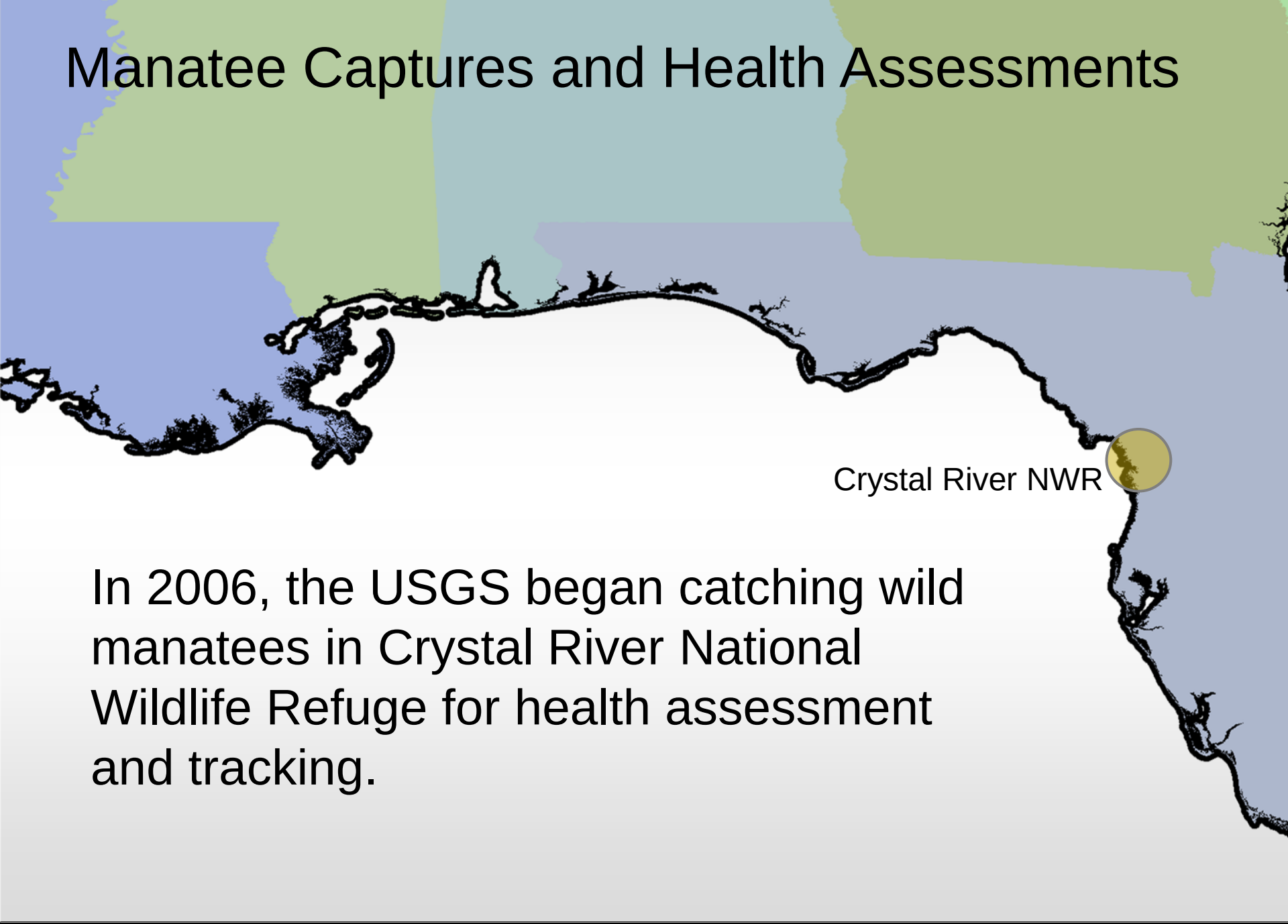
Including offshore oil platforms





BSEE
Bureau of Safety and Environmental Enforcement

Manatee Captures and Health Assessments



In 2006, the USGS began catching wild manatees in Crystal River National Wildlife Refuge for health assessment and tracking.

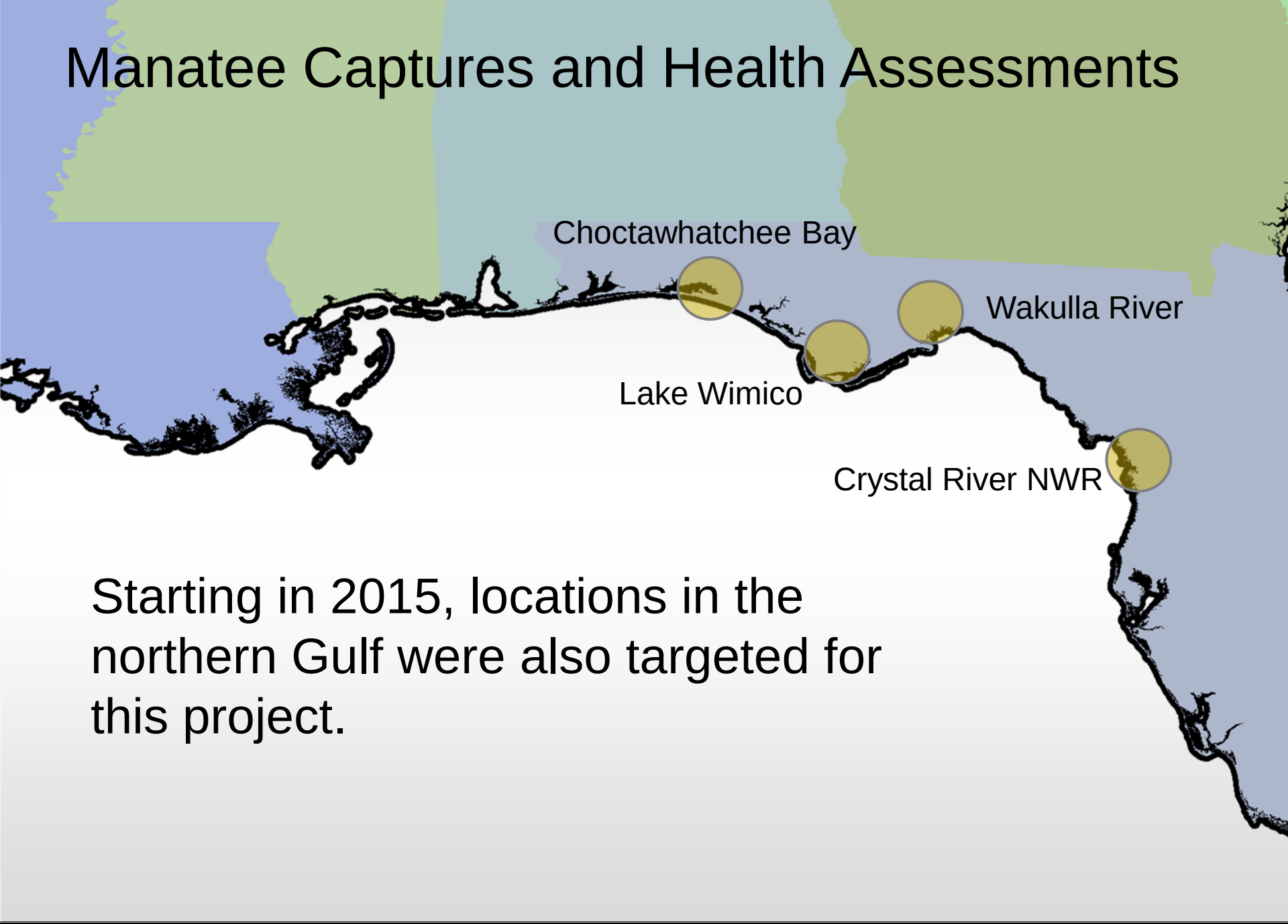
Manatee Captures and Health Assessments

With Florida Fish and Wildlife Conservation Commission, UF, and others

Photographic Documentation of a Manatee

Manatees are identified by their unique scar patterns, caused mostly by watercraft collisions. We targeted individuals that were known from locations in the northern GOM for assessment and tagging.

Manatee Captures and Health Assessments



Starting in 2015, locations in the northern Gulf were also targeted for this project.

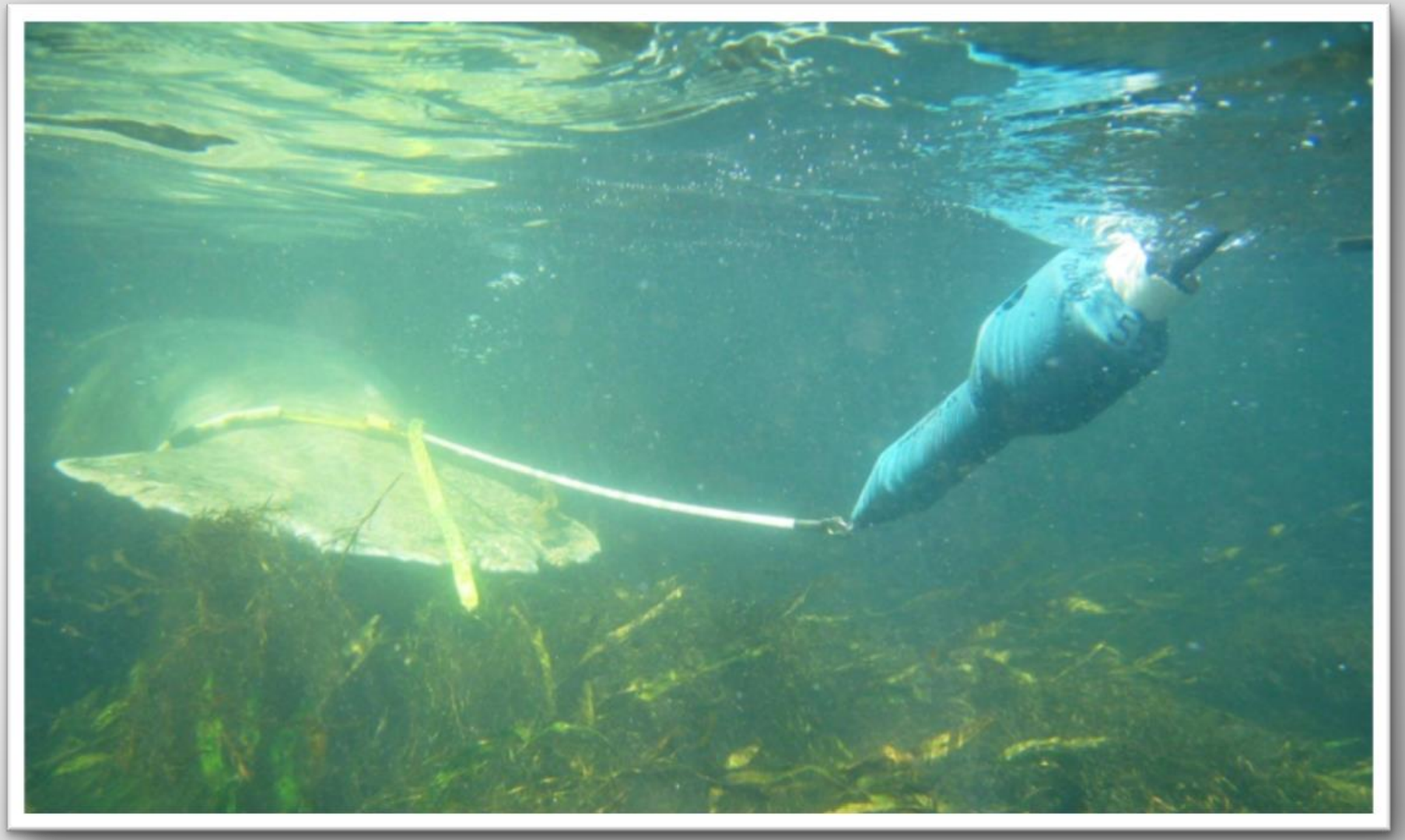
Manatee Captures and Health Assessments

Manatee Captures and Health Assessments

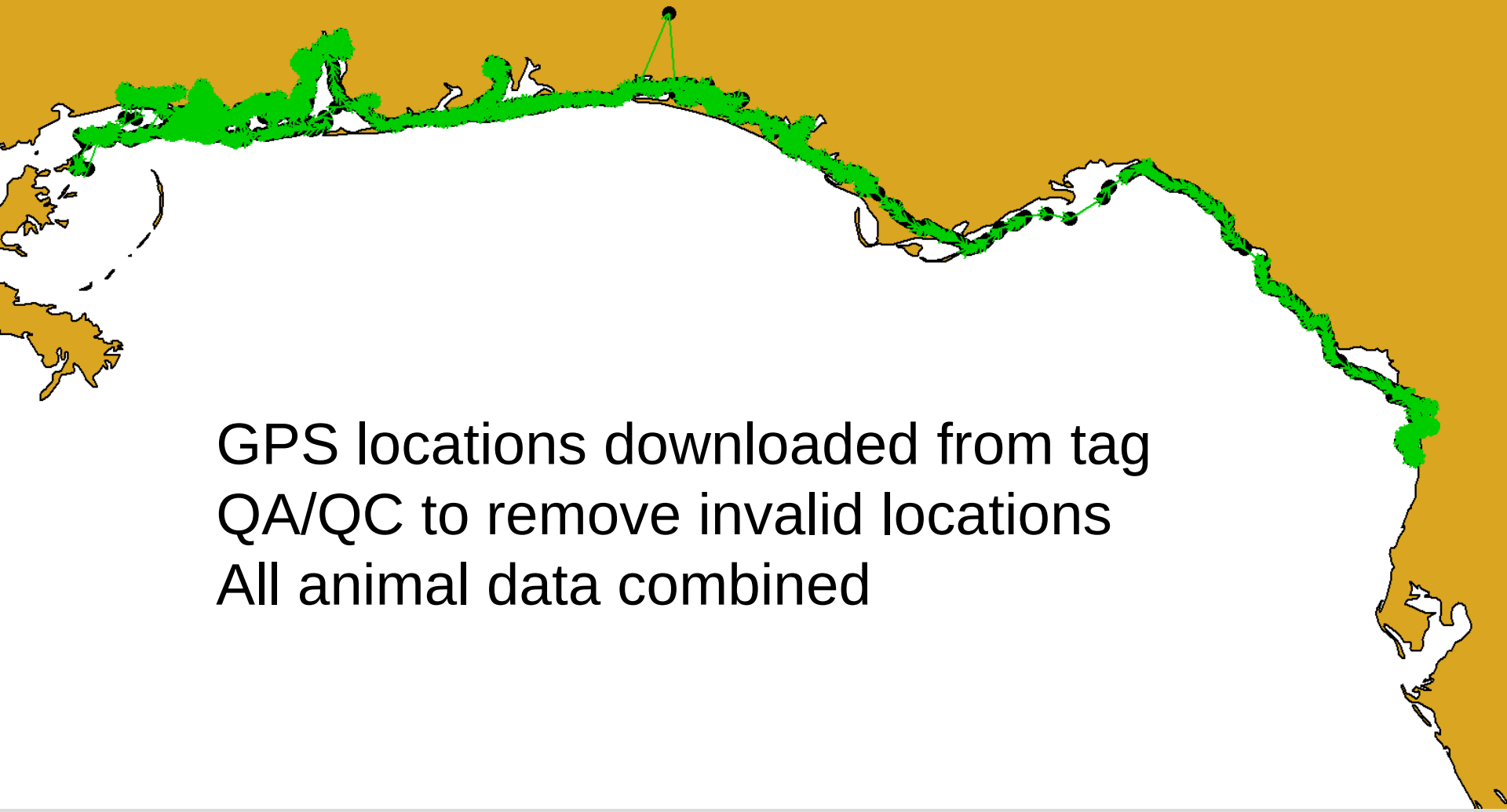
Manatees were processed and samples collected. All were within generally healthy ranges for the monitored parameters and stressors.

Radio Tagging: during capture or free-tagging

Radio Tagging: during capture or free-tagging



GPS location every 15 min.



GPS locations downloaded from tag
QA/QC to remove invalid locations
All animal data combined

Manatee tracking effort in NGOM GPS data

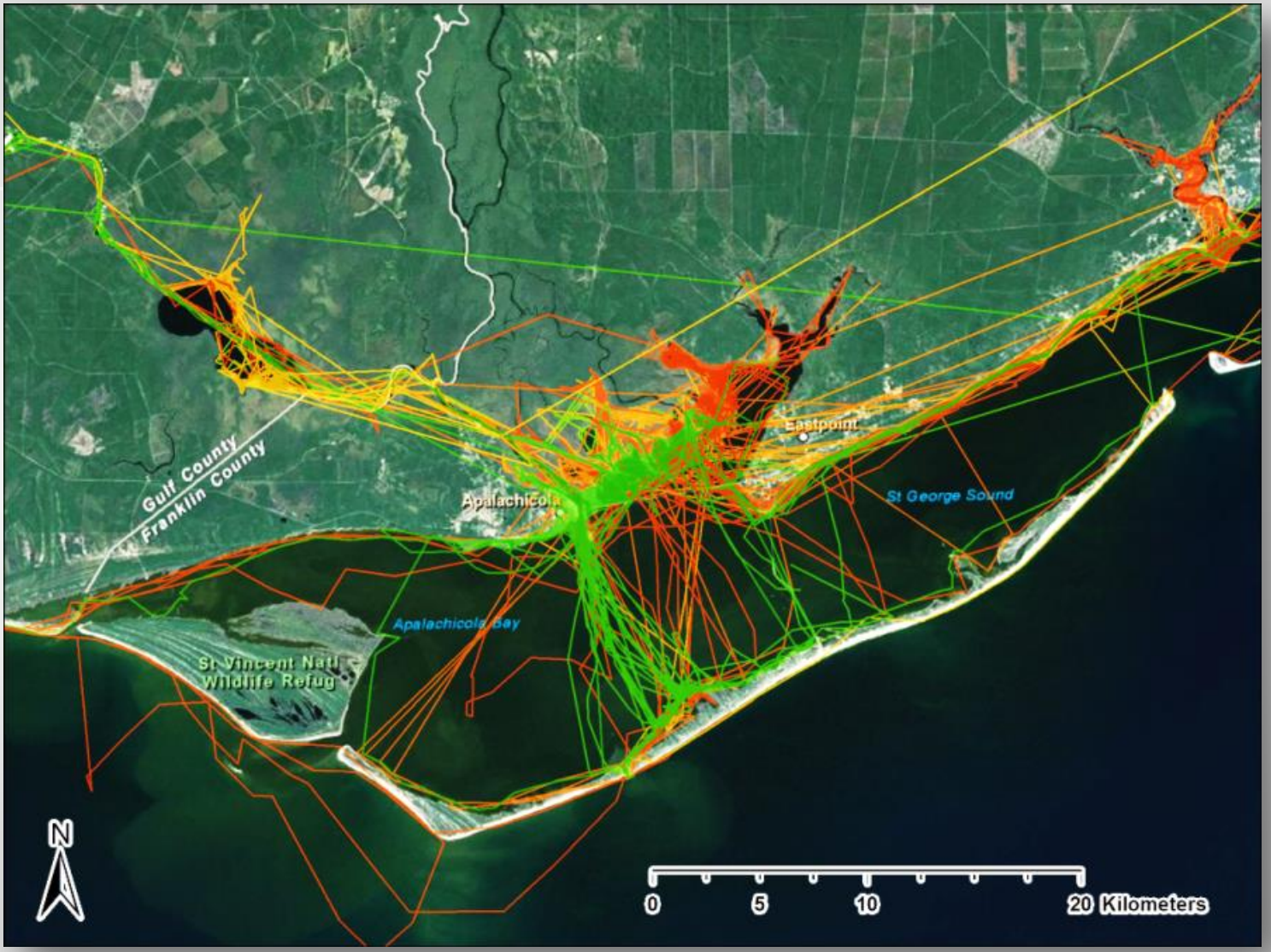
Dates	Manatees Tracked	Tracking bouts	“manatee years” tracked
2006-2013	20	69	19.9
2013-2017	24	87	22.5
2006-2017	**43**	**181**	**42.4**

2006-2013: tagged manatees were those that opportunistically travelled north, including Wakulla Spring

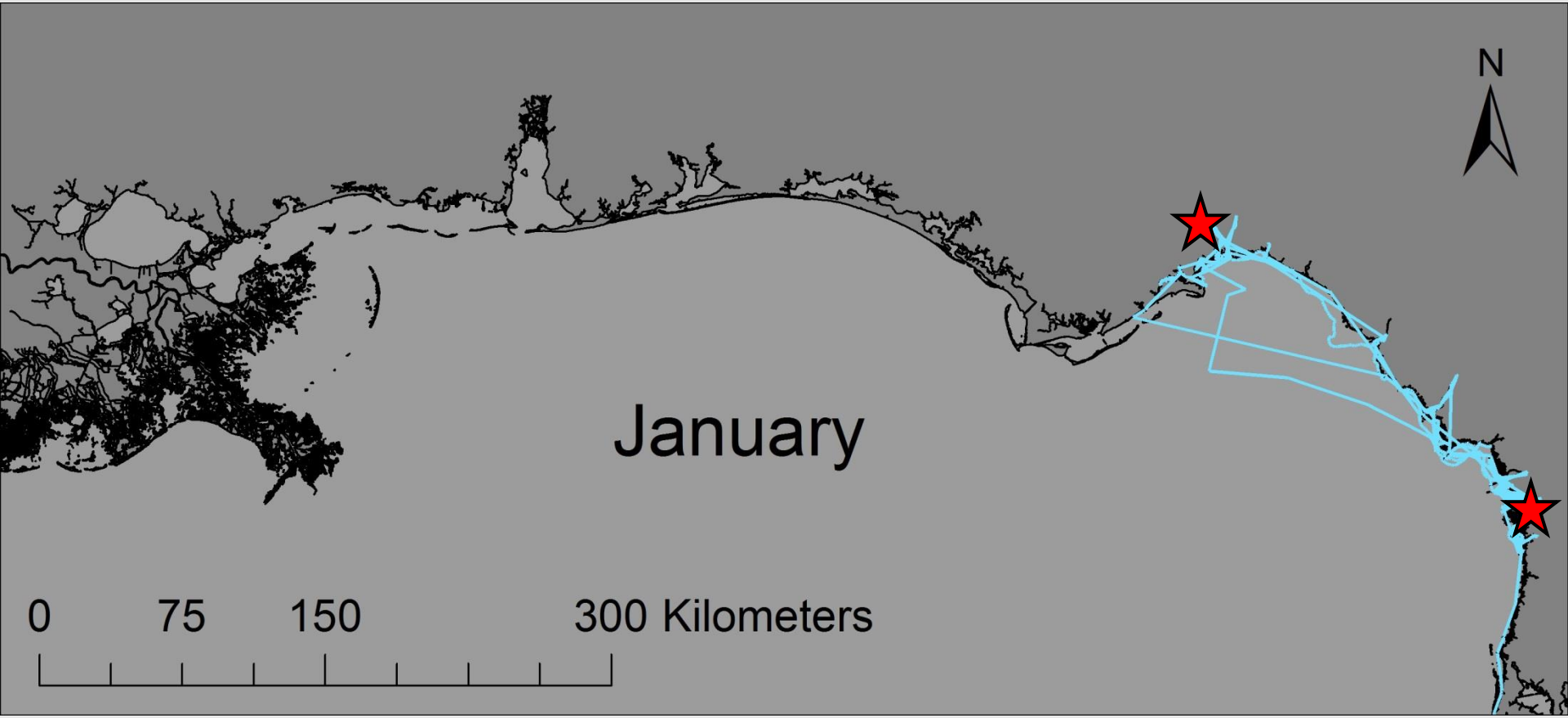
2013-2017: Individuals known to travel to NGOM targeted

Total number of data points ~700,000

Making sense of manatee movements

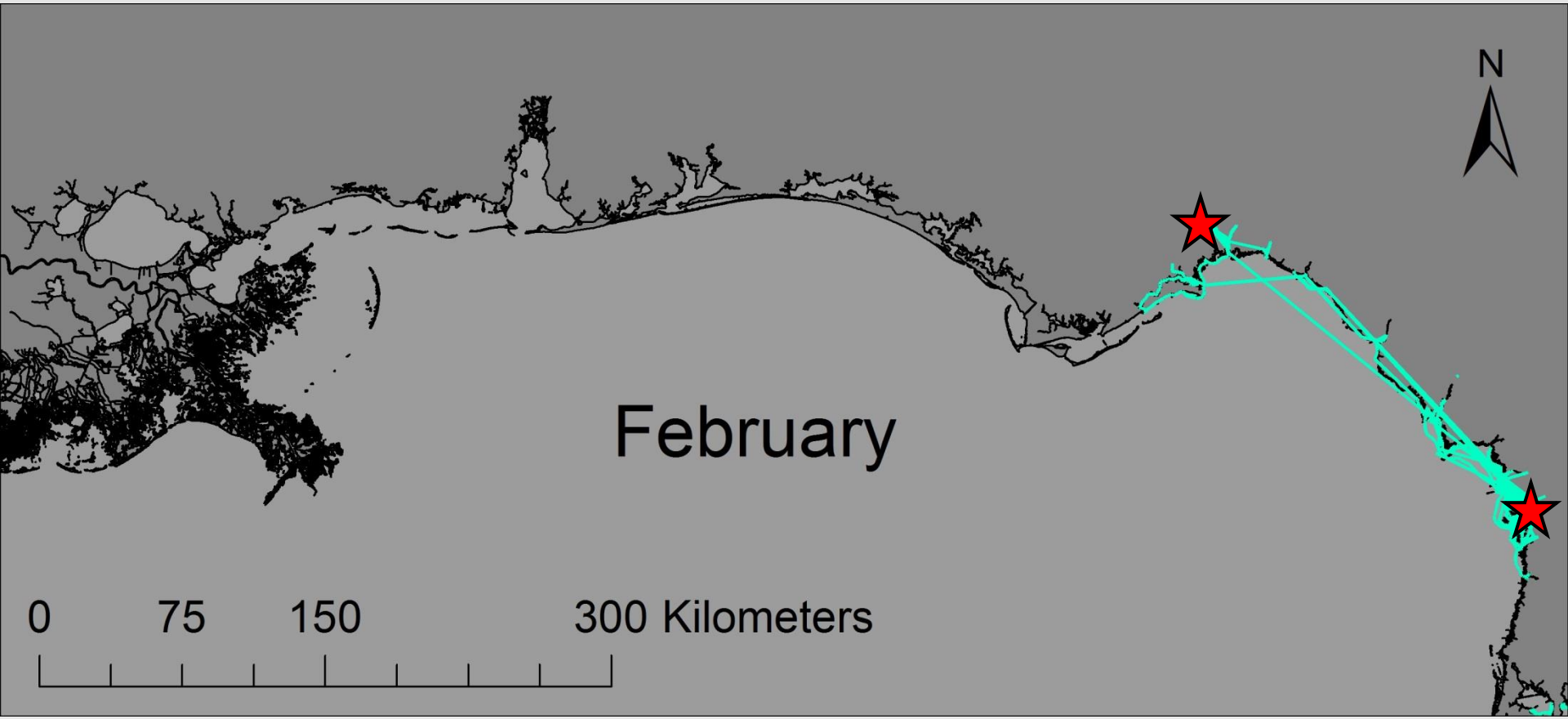


Seasonal movement patterns

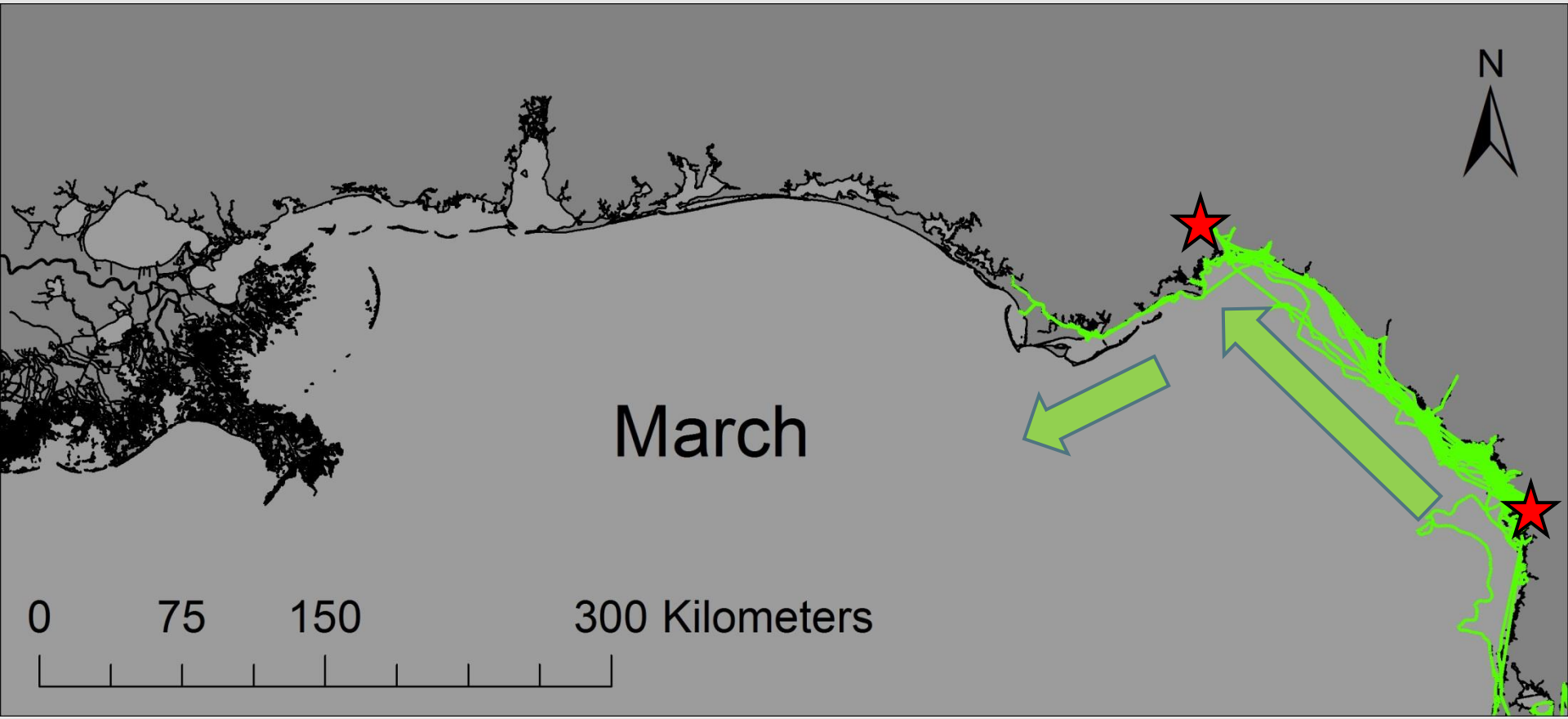


Manatees in winter remain close to warm water refuges. In the northwest these include Crystal River and Wakulla Spring

Seasonal movement patterns

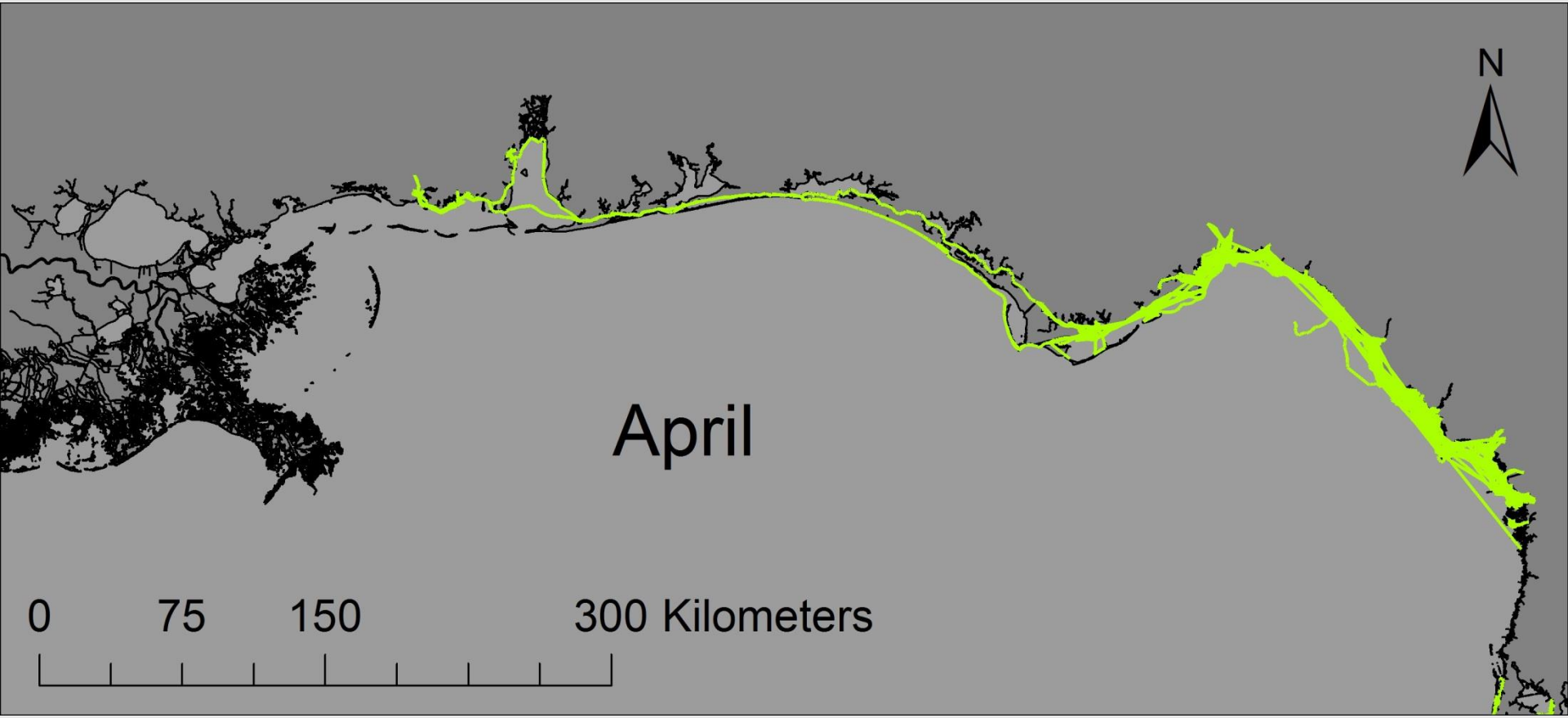


Seasonal movement patterns

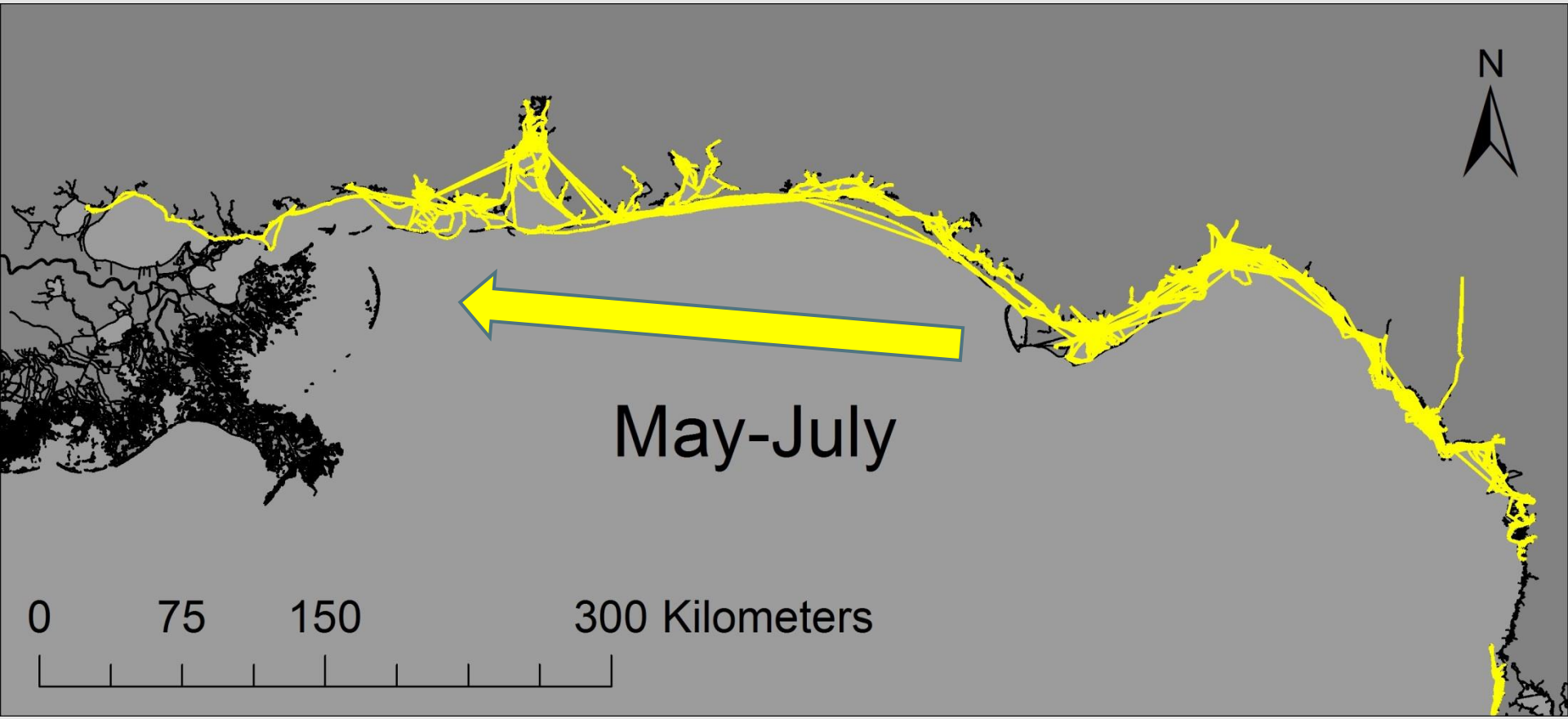


In early springtime some manatees begin to move away from winter refuges at Crystal River and Wakulla Spring

Seasonal movement patterns

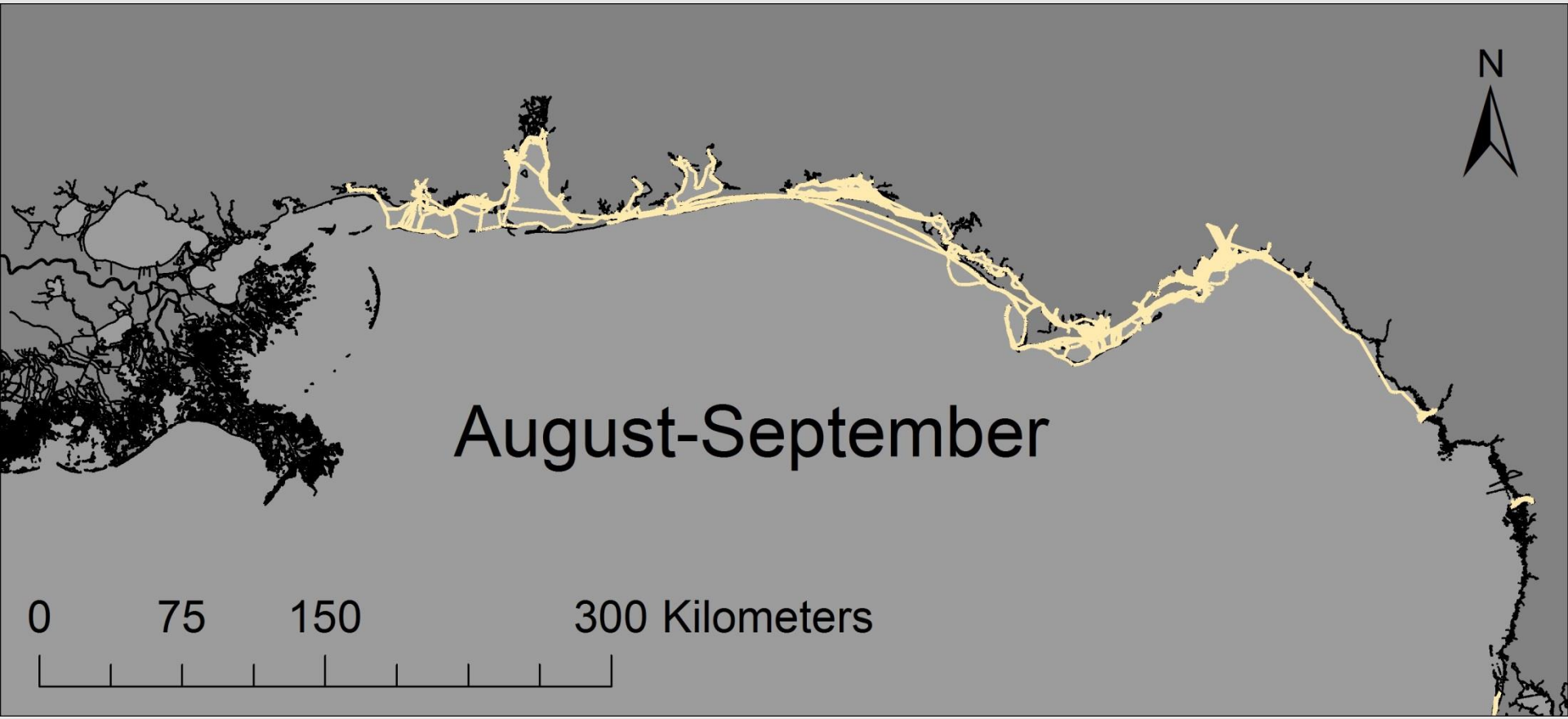


Seasonal movement patterns

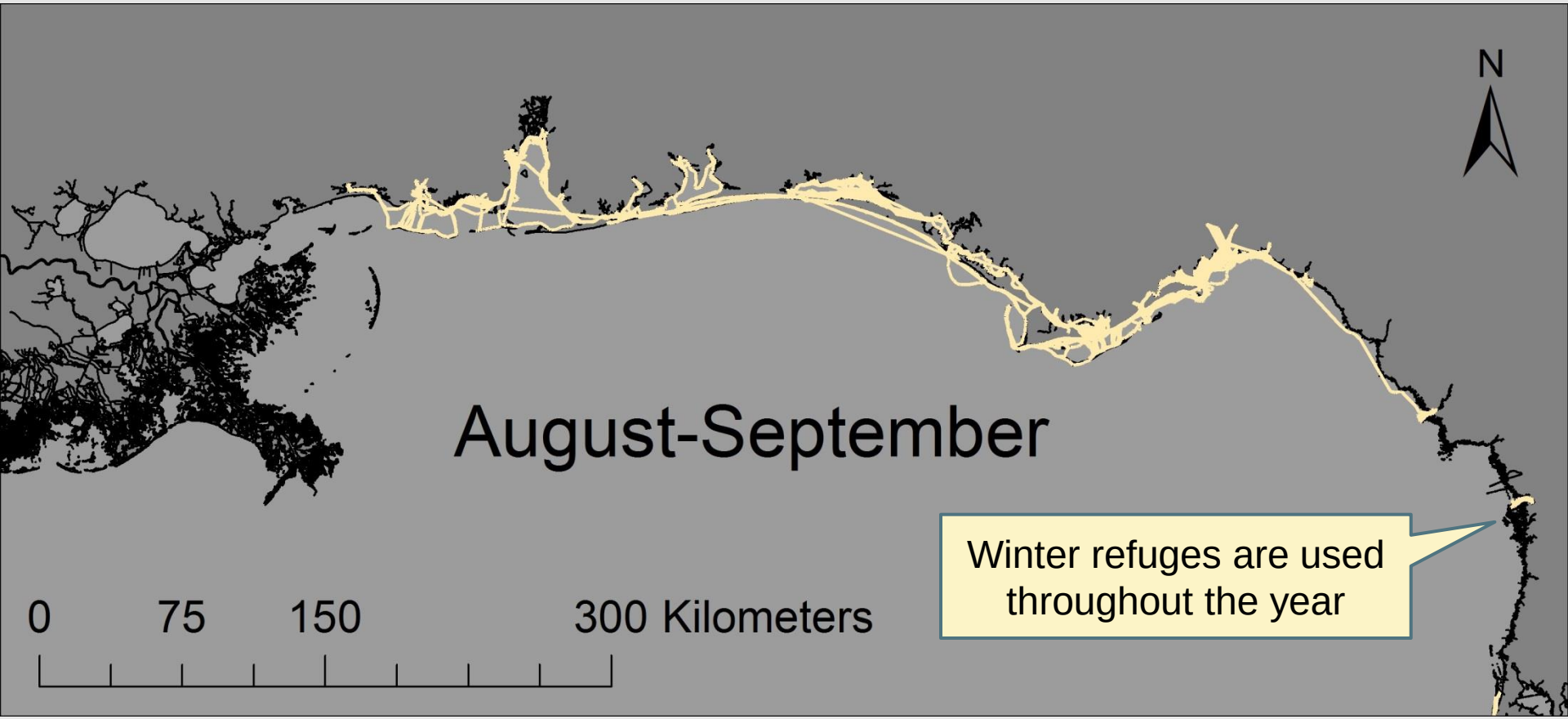


As the weather and waters warm, some manatees continue to travel west, exploiting habitat throughout the northeastern Gulf.

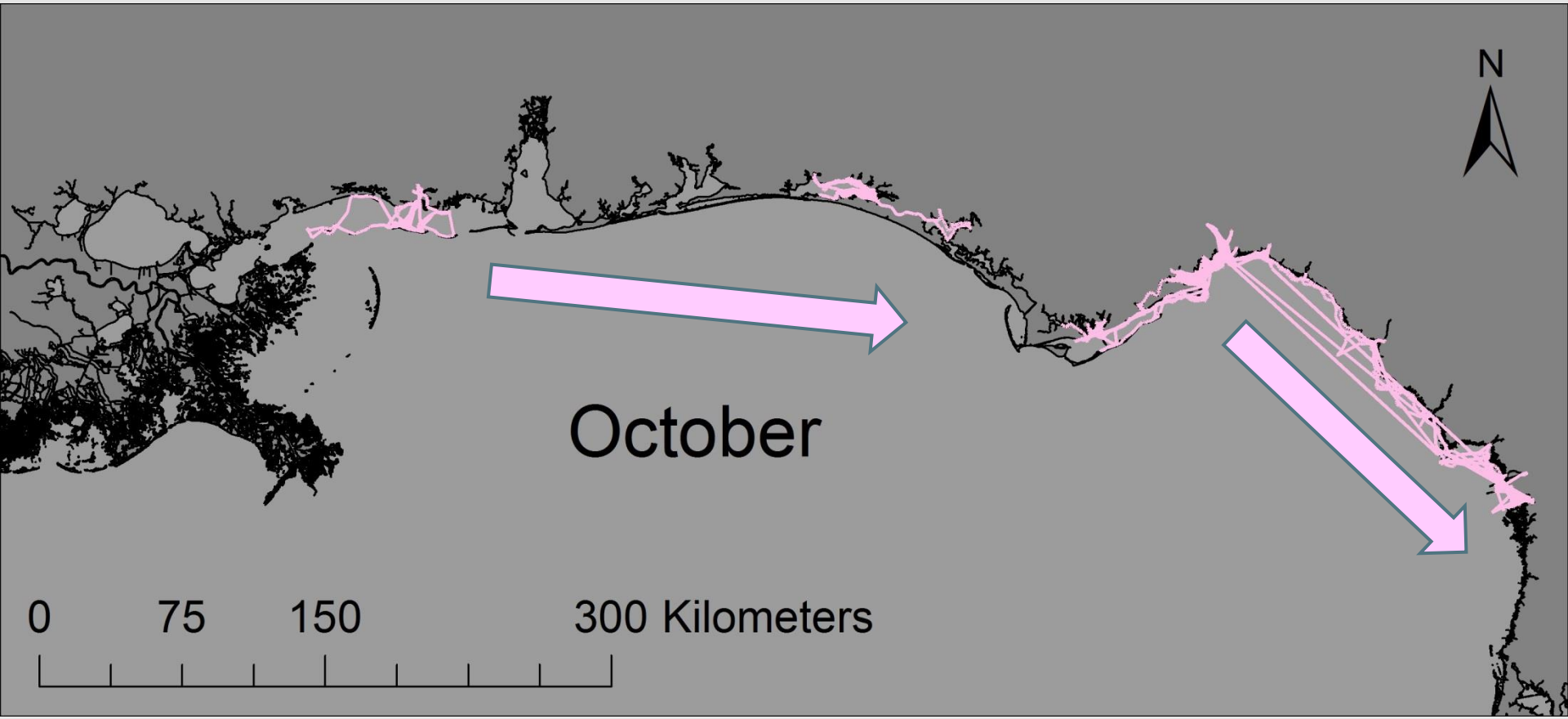
Seasonal movement patterns



Seasonal movement patterns

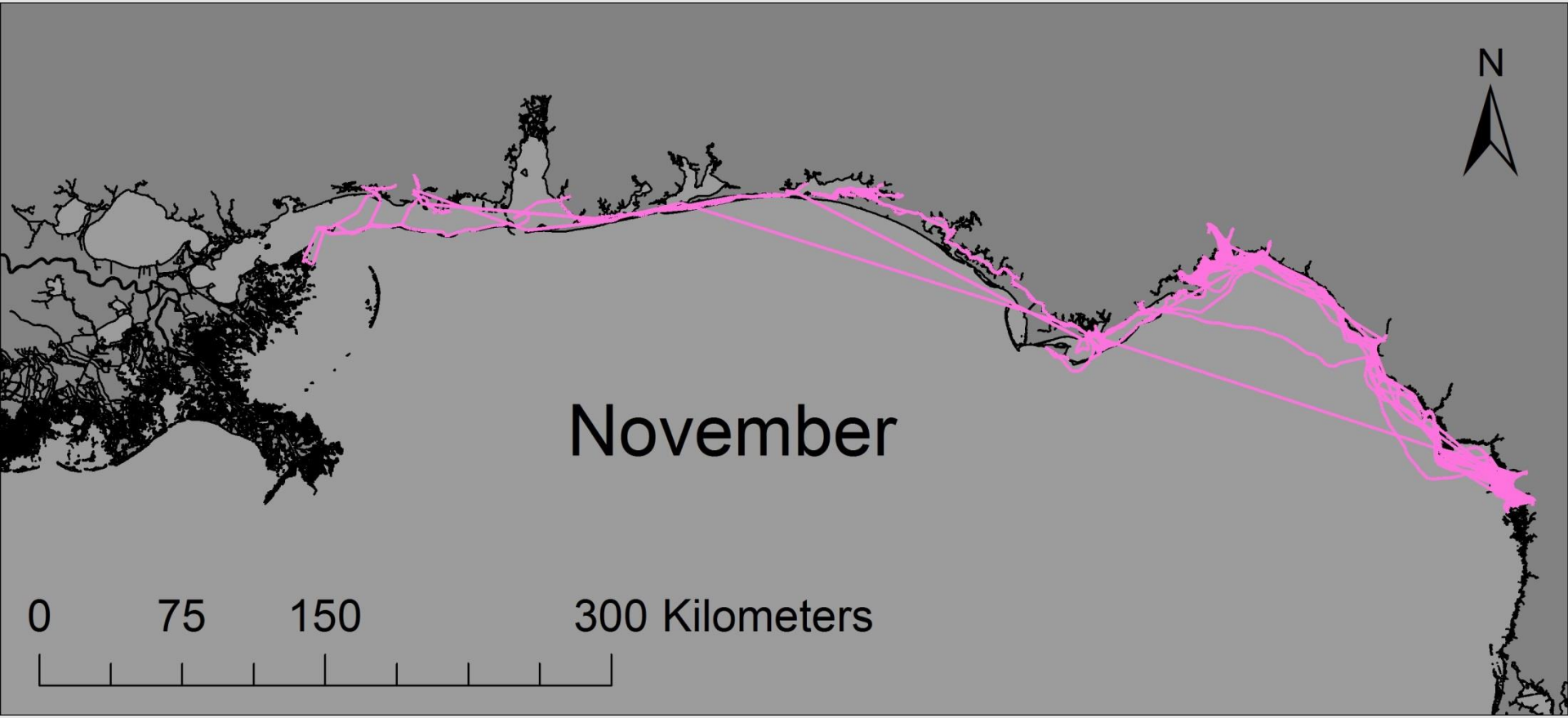


Seasonal movement patterns

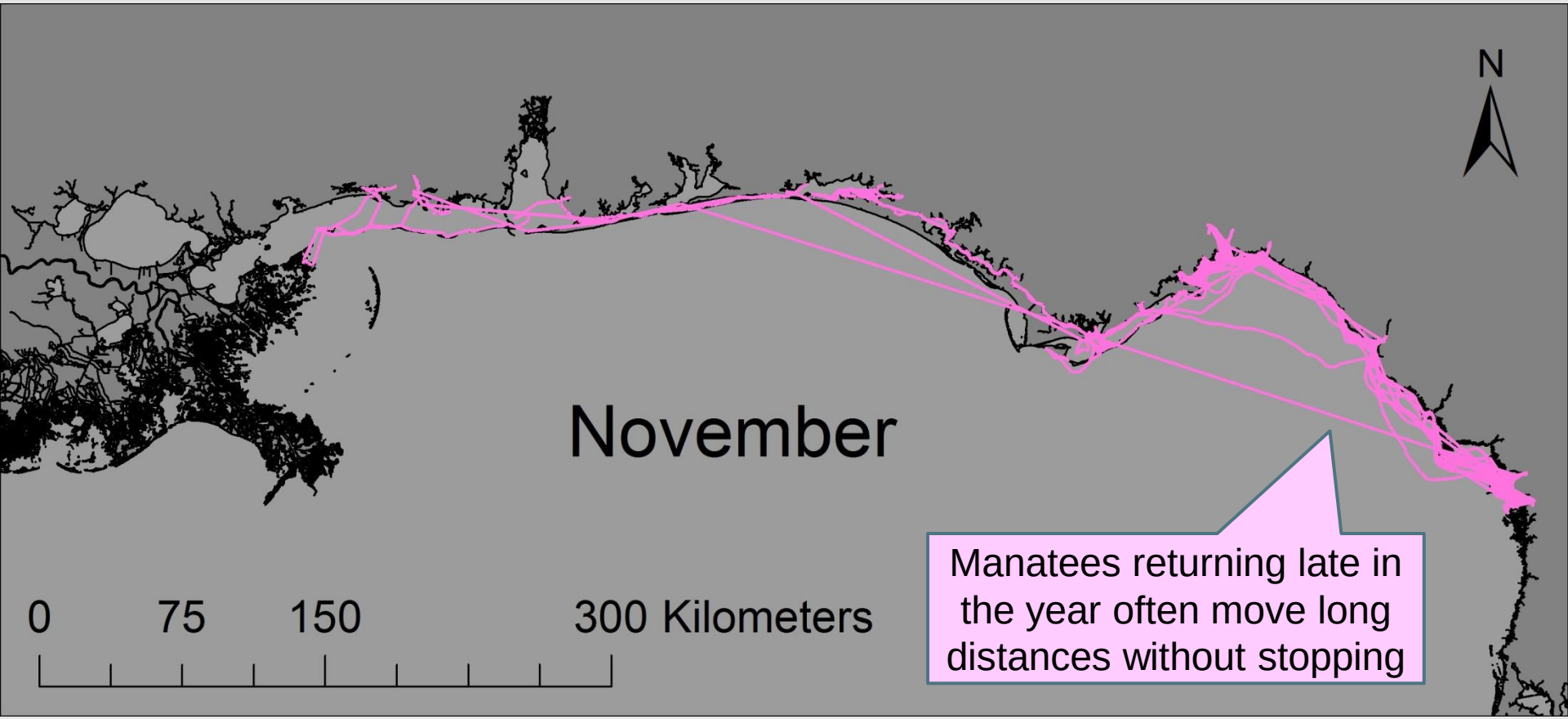


Those manatees begin their return from summer habitat to their winter refuges in the fall

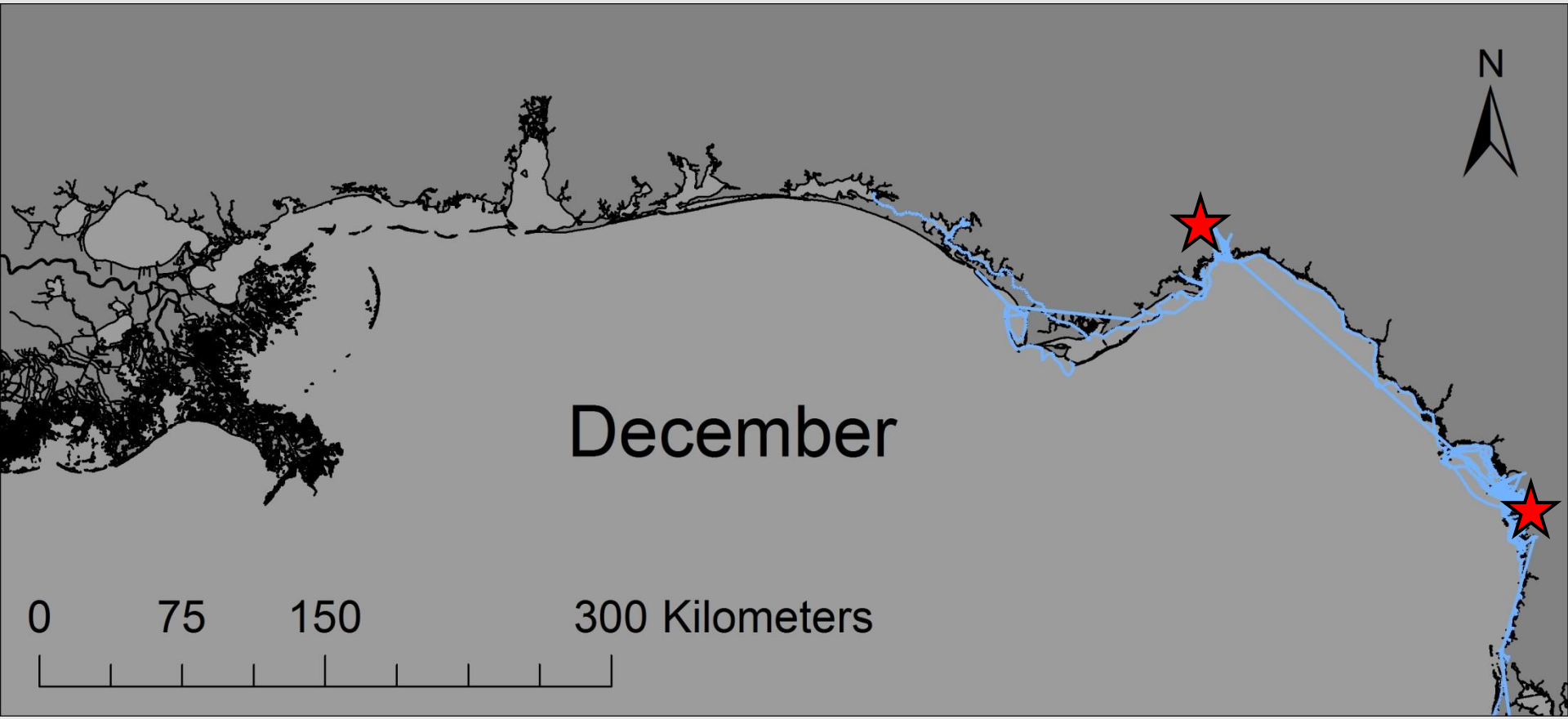
Seasonal movement patterns



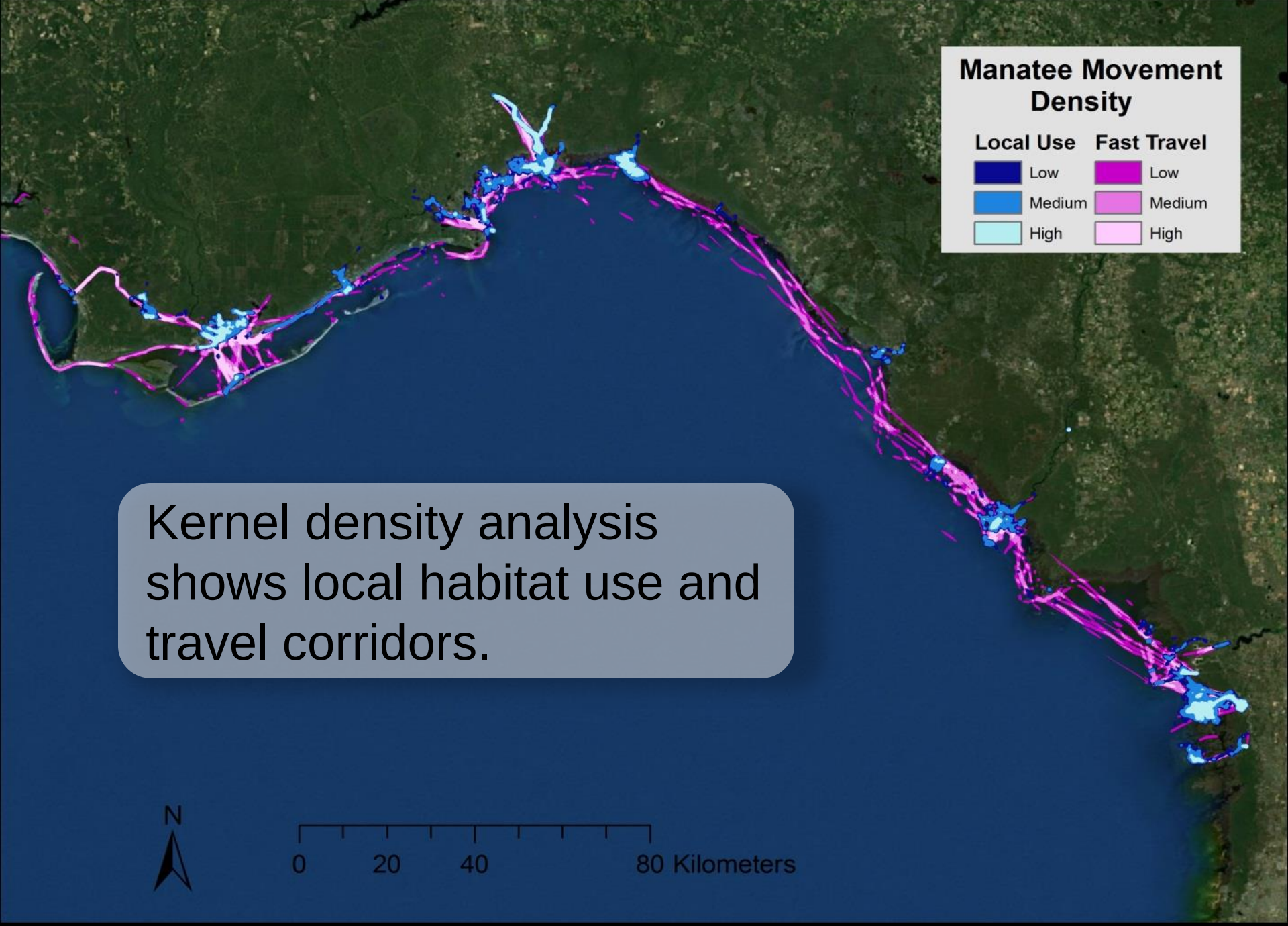
Seasonal movement patterns



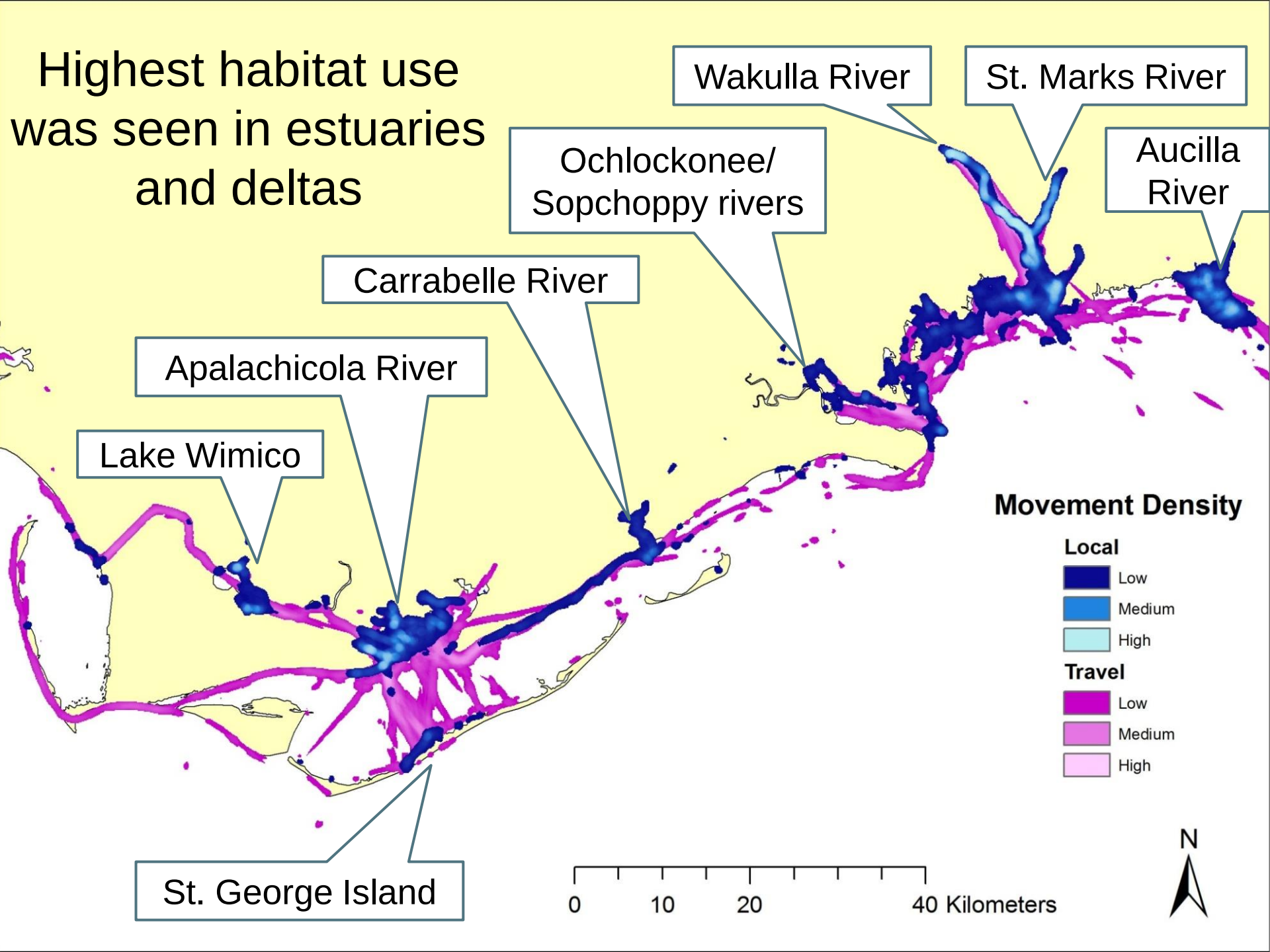
Seasonal movement patterns

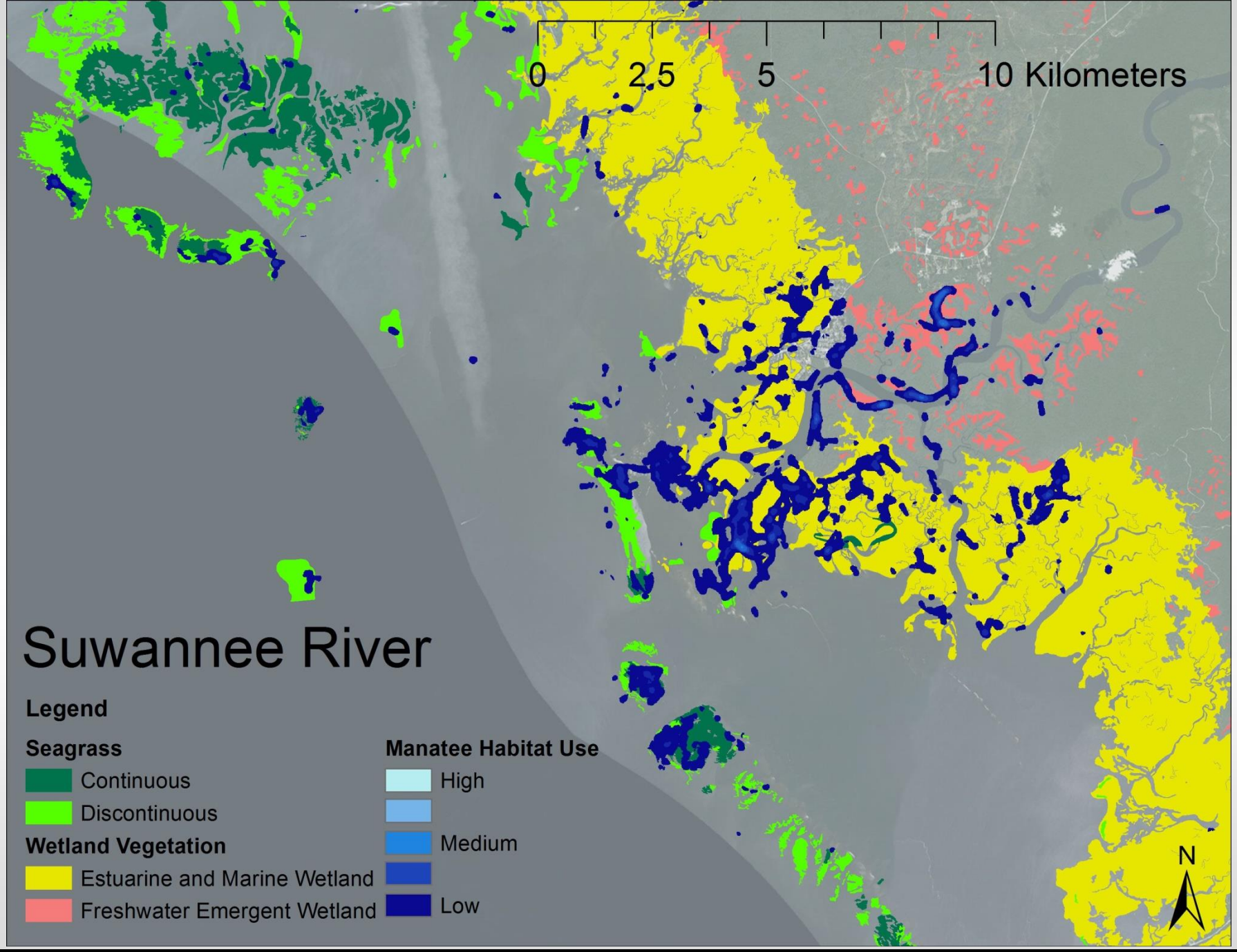


By December, most manatees have returned again close to their winter refuges

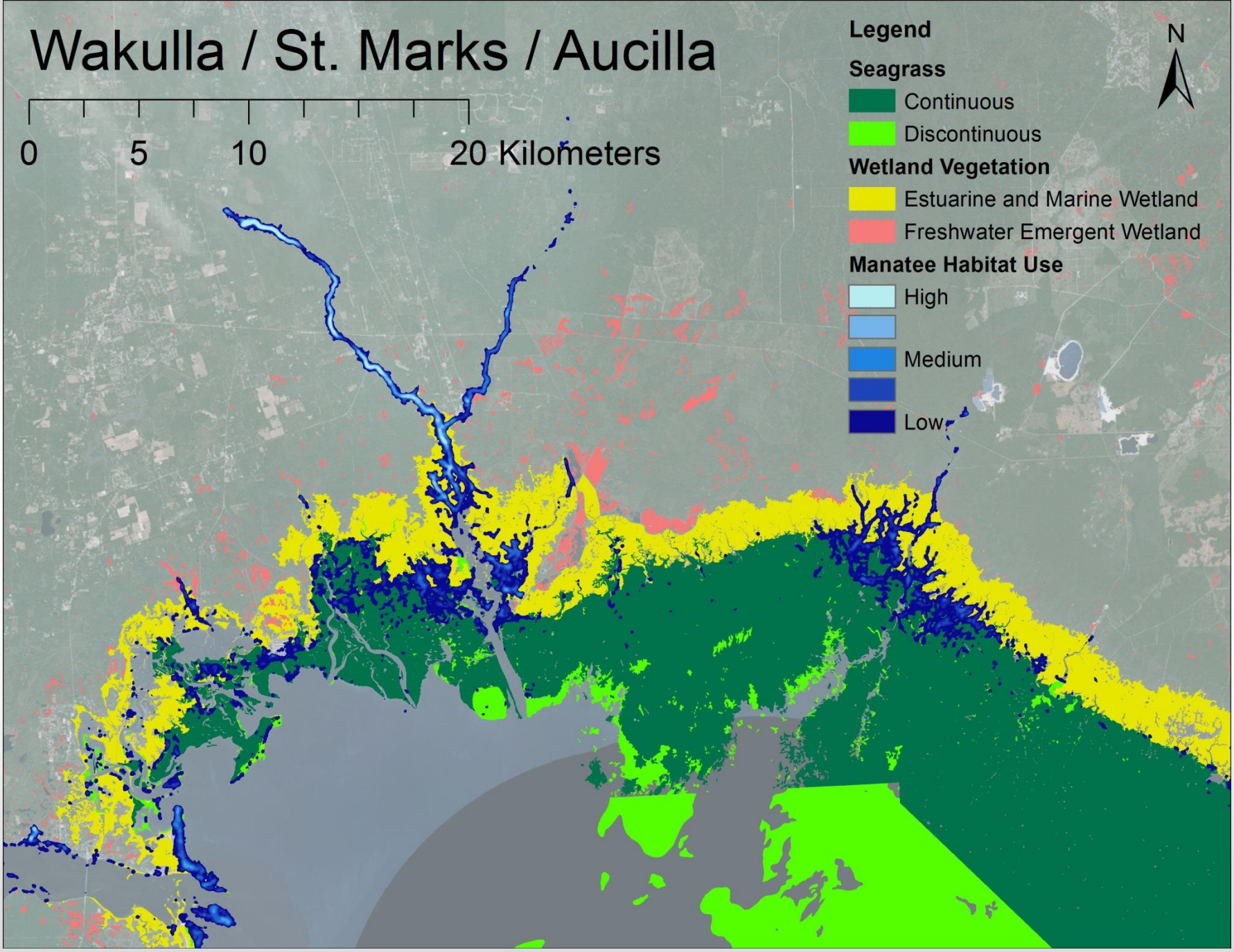

Manatee Movement Density
Local Use
Low
Medium
High
Fast Travel
Low
Medium
High
Kernel density analysis shows local habitat use and travel corridors.
N
0
20
40
80 Kilometers

USGS

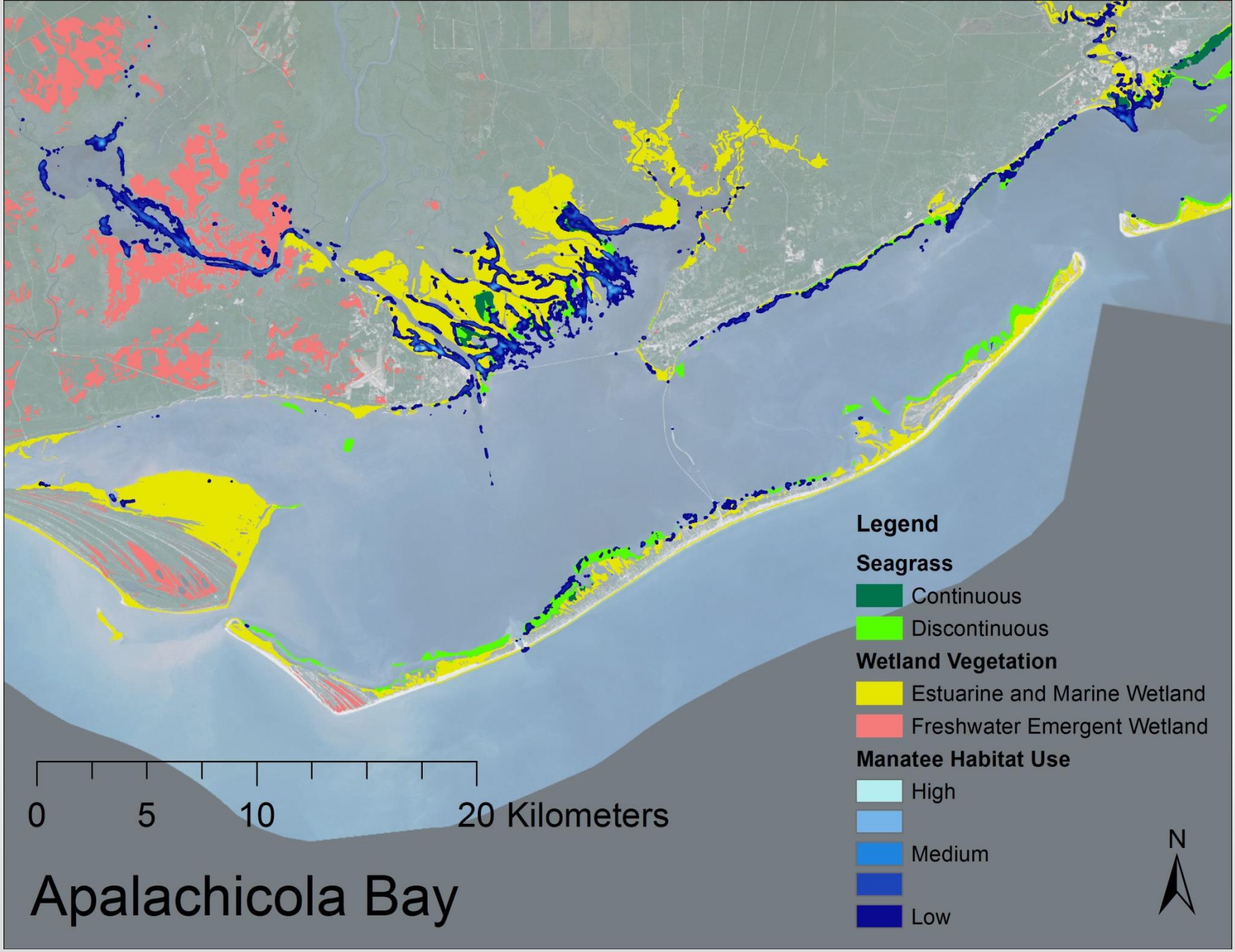

Highest habitat use was seen in estuaries and deltas
Wakulla River
St. Marks River
Aucilla River
Ochlockonee/ Sopchoppy rivers
Carrabelle River
Apalachicola River
Lake Wimico
St. George Island
Movement Density
Local
Low
Medium
High
Travel
Low
Medium
High
0
10
20
40 Kilometers
N

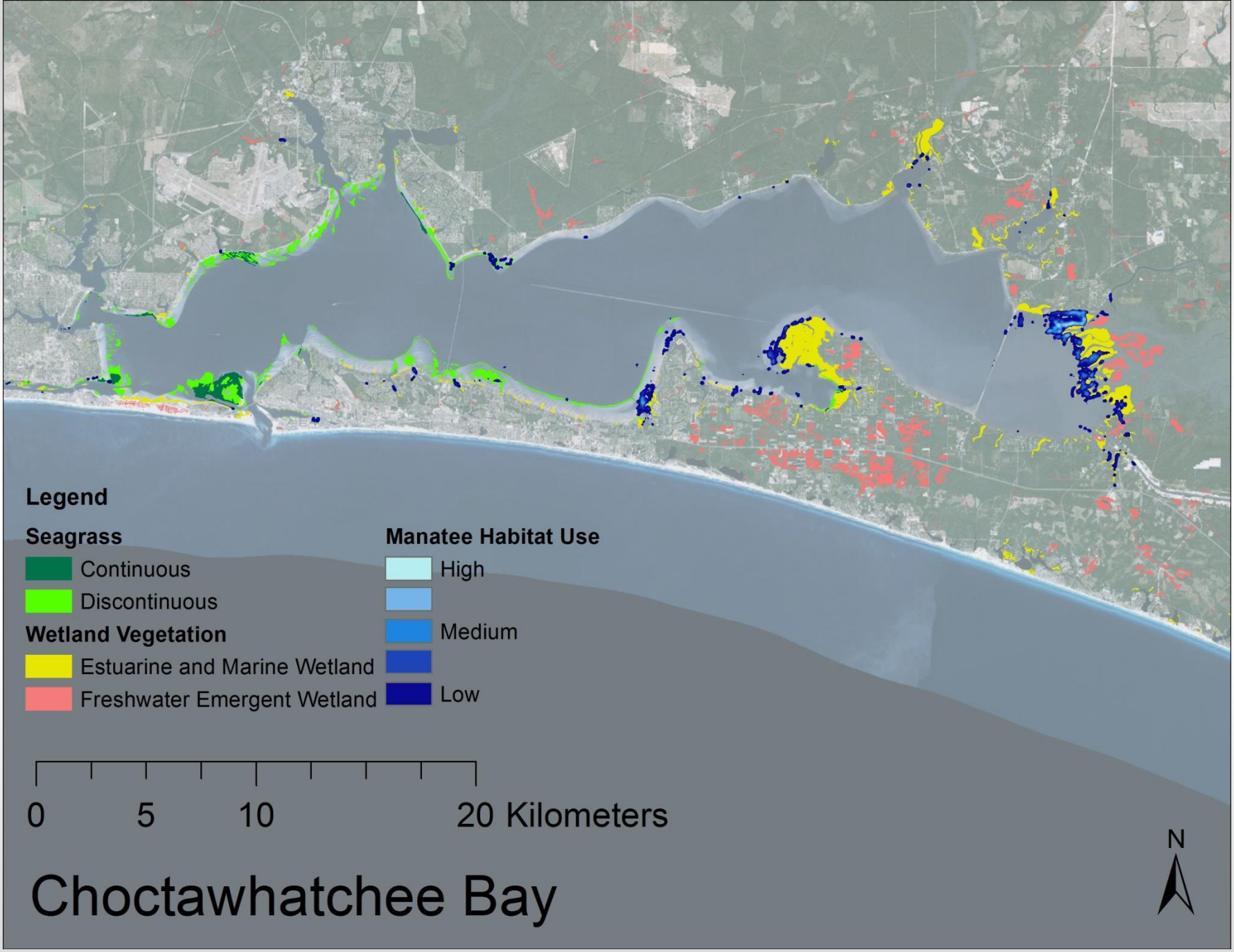

0
2.5
5
10 Kilometers
Suwannee River
Legend
Seagrass
Continuous
Discontinuous
Wetland Vegetation
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Manatee Habitat Use
High
Medium
Low
N

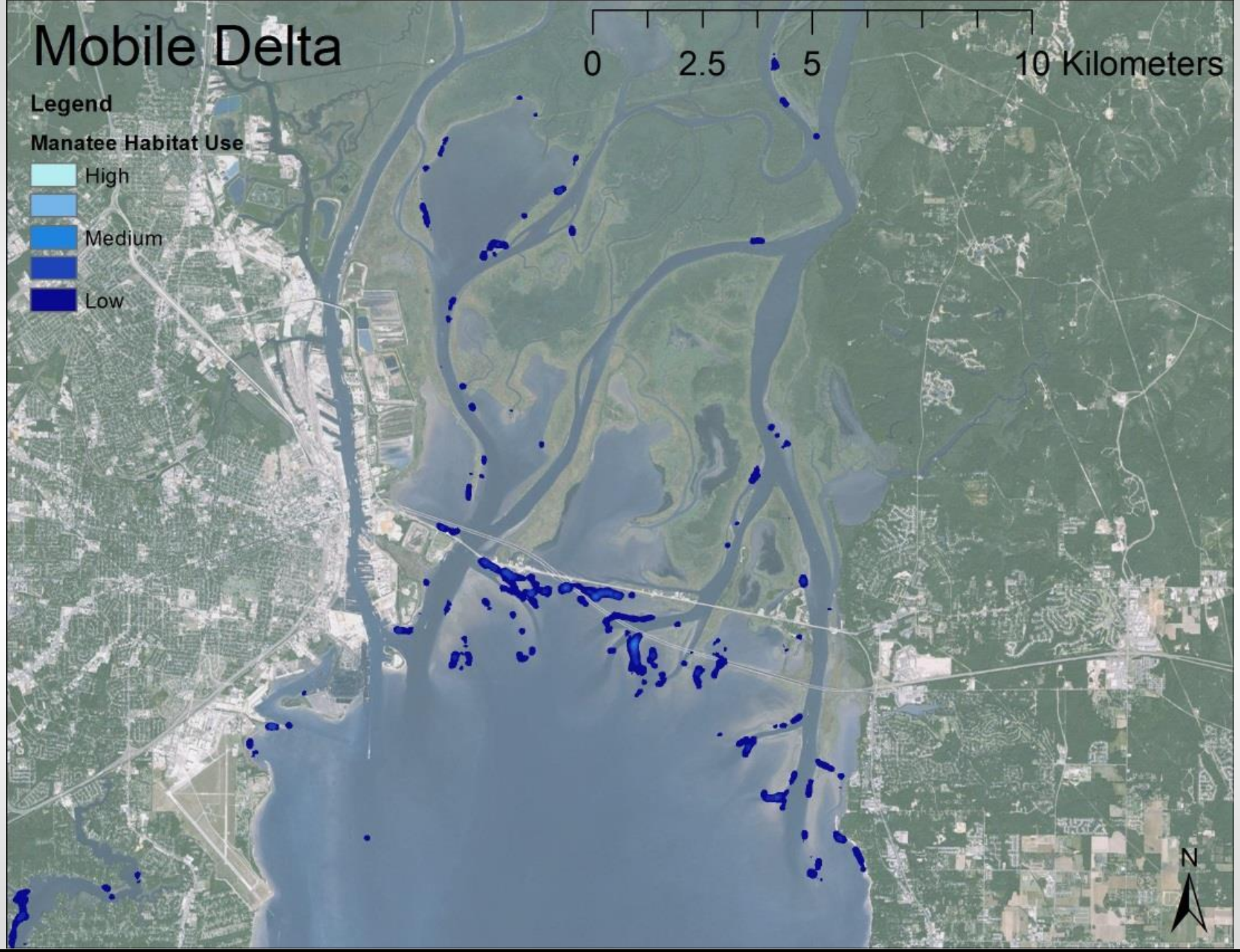
USGS


Wakulla / St. Marks / Aucilla
0
5
10
20 Kilometers
Legend
Seagrass
Continuous
Discontinuous
Wetland Vegetation
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Manatee Habitat Use
High
Medium
Low
N

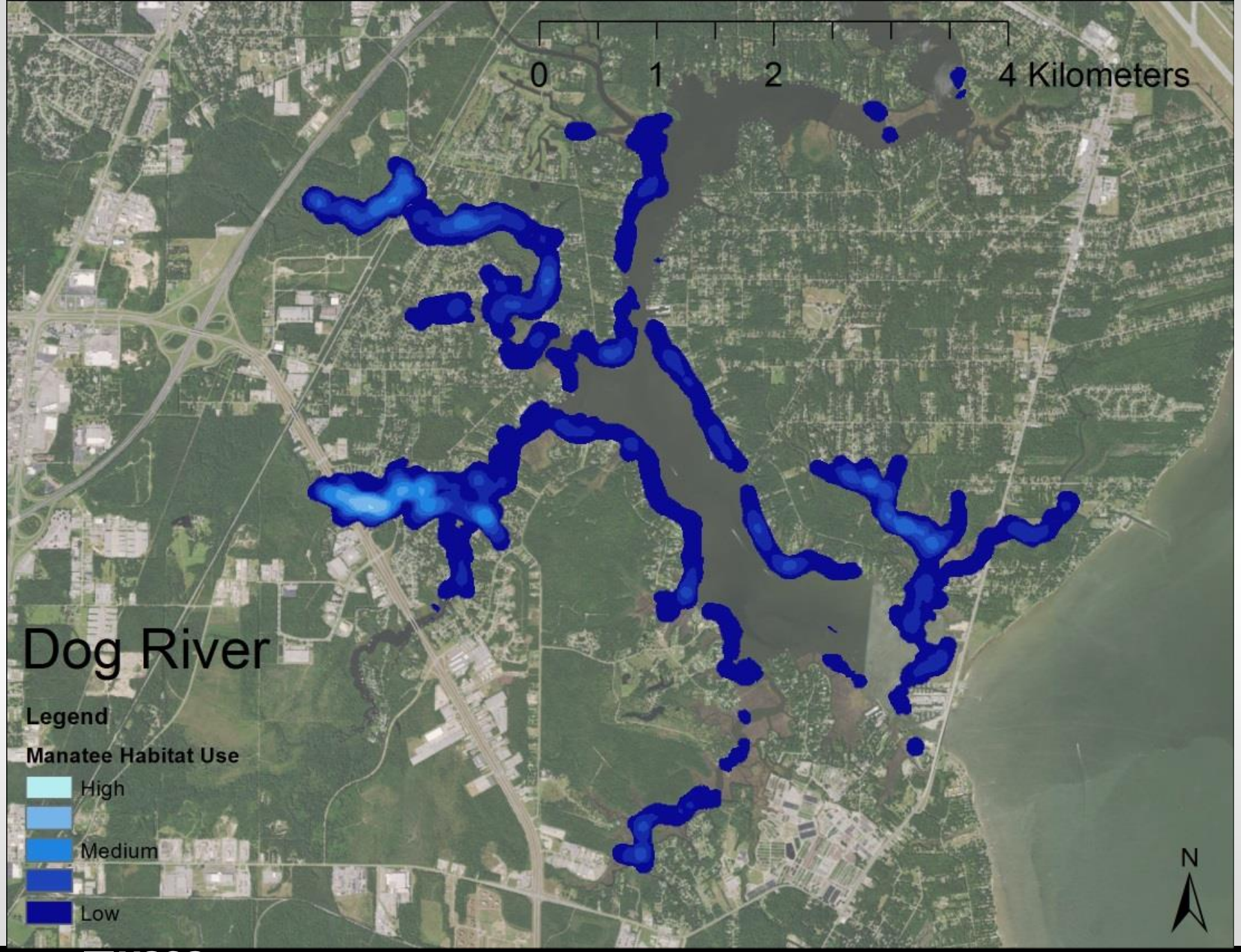
USGS


Legend
Seagrass
Continuous
Discontinuous
Wetland Vegetation
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Manatee Habitat Use
High
Medium
Low
N
0
5
10
20 Kilometers
Apalachicola Bay


Legend
Seagrass
Continuous
Discontinuous
Wetland Vegetation
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Manatee Habitat Use
High
Medium
Low
0
5
10
20 Kilometers
N
Choctawhatchee Bay


Mobile Delta
0
2.5
5
10 Kilometers
Legend
Manatee Habitat Use
High
Medium
Low
N

USGS


0
1
2
4 Kilometers
Dog River
Legend
Manatee Habitat Use
High
Medium
Low
N

USGS

Seagrass/SAV studies

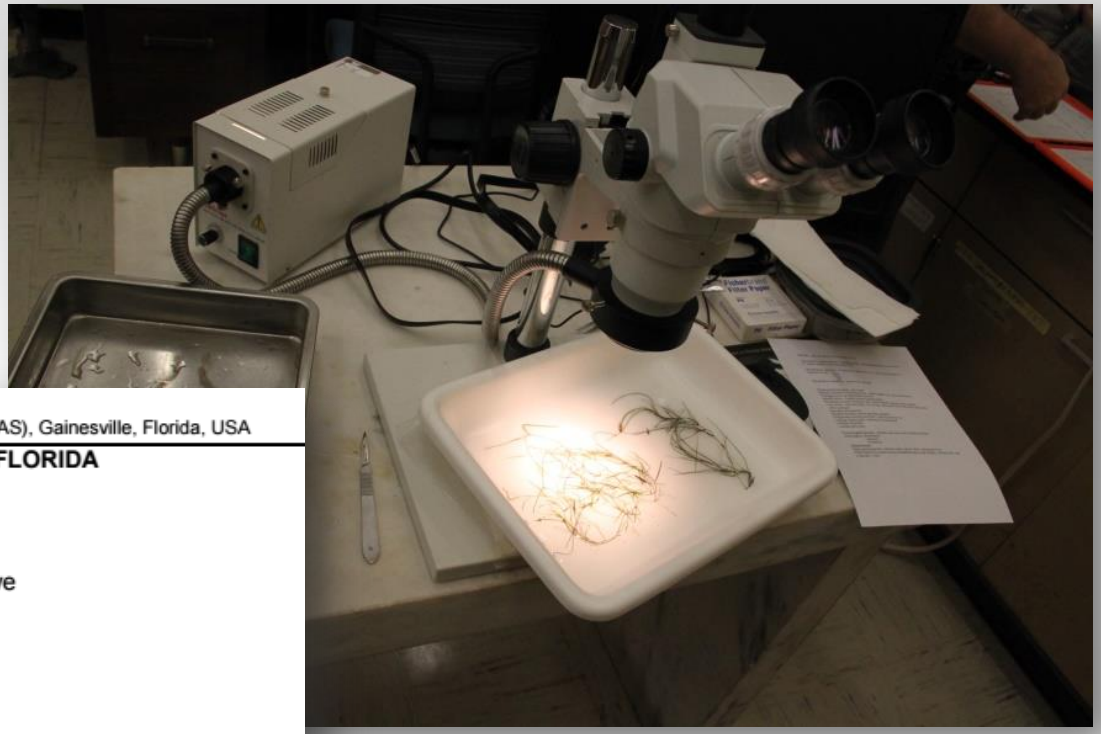
- Characterization of SAV in foraging areas
- Assessment of manatee feeding strategies
- Species composition
- Abundance

Seagrass/SAV studies


2017 Mar 29 14:35:32 Suwannee
2017 Jul 24 17:50:55 Escambia Bay
Seagrass/SAV studies
2017 Mar 29 14:46:49 Suwannee
2017 Jul 24 18:27:40 Escambia Bay

USGS

Seagrass/SAV studies



University of Florida Herbarium (FLAS), Gainesville, Florida, USA

PLANTS OF FLORIDA

Ruppiaceae

Ruppia maritima L.
det. C. C. Jacono, 31 July 2017

BALDWIN COUNTY: Mobile Delta. Secchi= 70cm Vegetative

Lat. 30.67858 N. Long. -88.00000 W. Datum: WGS84.

coll. Susan Butler # s.n. 27 July 2017
with J. Reid, D. Slone

USGS Northern Gulf of Mexico Manattee Habitat Research
Common name: Wigeongrass

University of Florida Herbarium (FLAS), Gainesville, Florida, USA

PLANTS OF ALABAMA

Potamogetonaceae

Potamogeton pusillus L.
det. C. C. Jacono, 1 August 2017

BALDWIN COUNTY: Mobile Delta. Secchi= 48cm Vegetative

Lat. 30.63304 N. Long. -87.93576 W. Datum: WGS84.

coll. Susan Butler # s.n. 25 July 2017
with J. Reid, D. Slone

USGS Northern Gulf of Mexico Manattee Habitat Research

Leveraging information from this project

2015: Report to Crystal River National Wildlife Refuge – manatee movements and relative abundance in springs

2016: PhD dissertation chapter – manatee movements from Kings Bay to offshore seagrass over time

2017: Data to inform manatee presence in northwest FL for Environmental Sensitivity Index (ESI)

2017: Analysis of manatee use of springs in CRNWR to inform management plan.