Changes in seagrass species distribution and cover over time at the Chandeleur Islands, LA identified through spatially explicit annual monitoring

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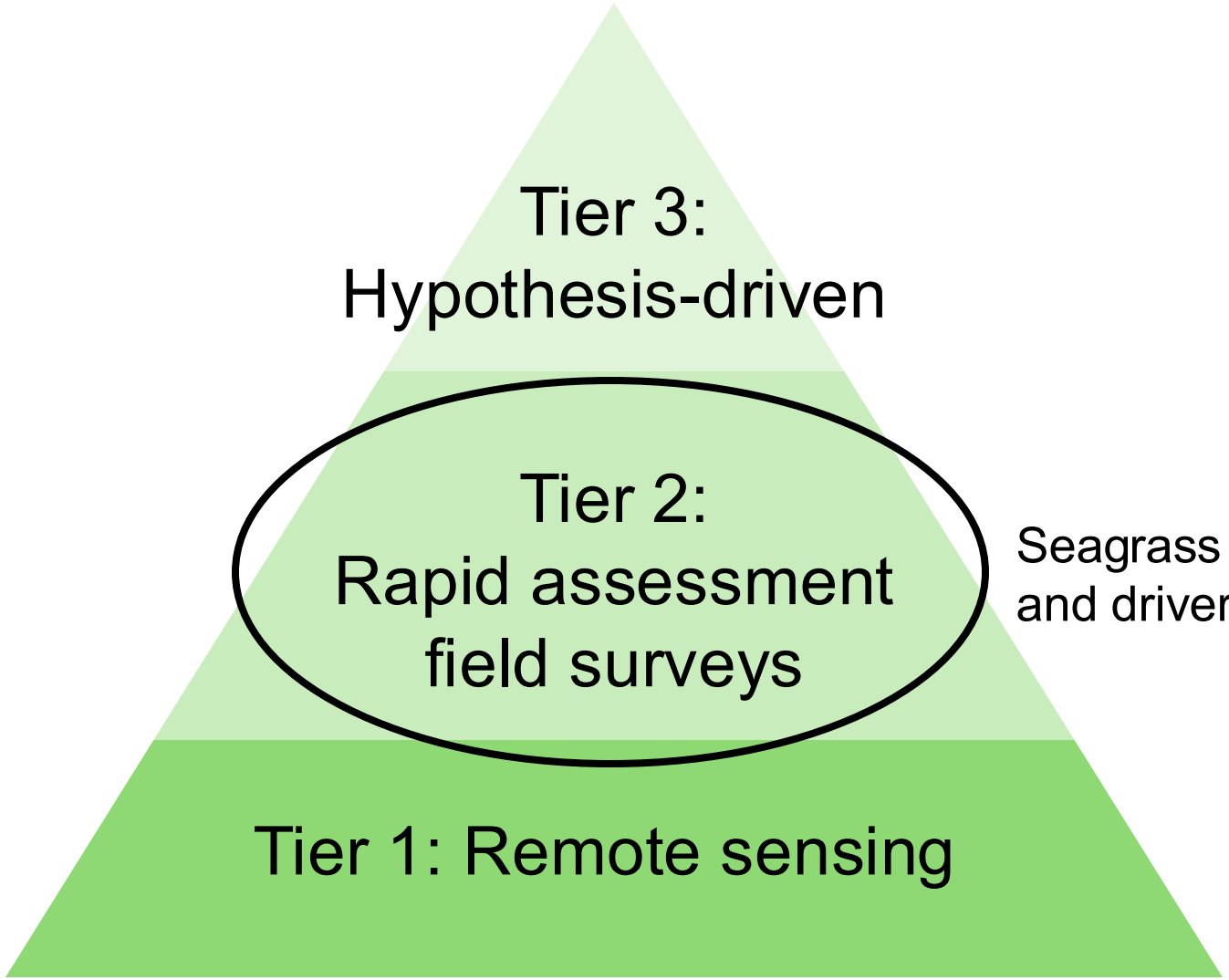
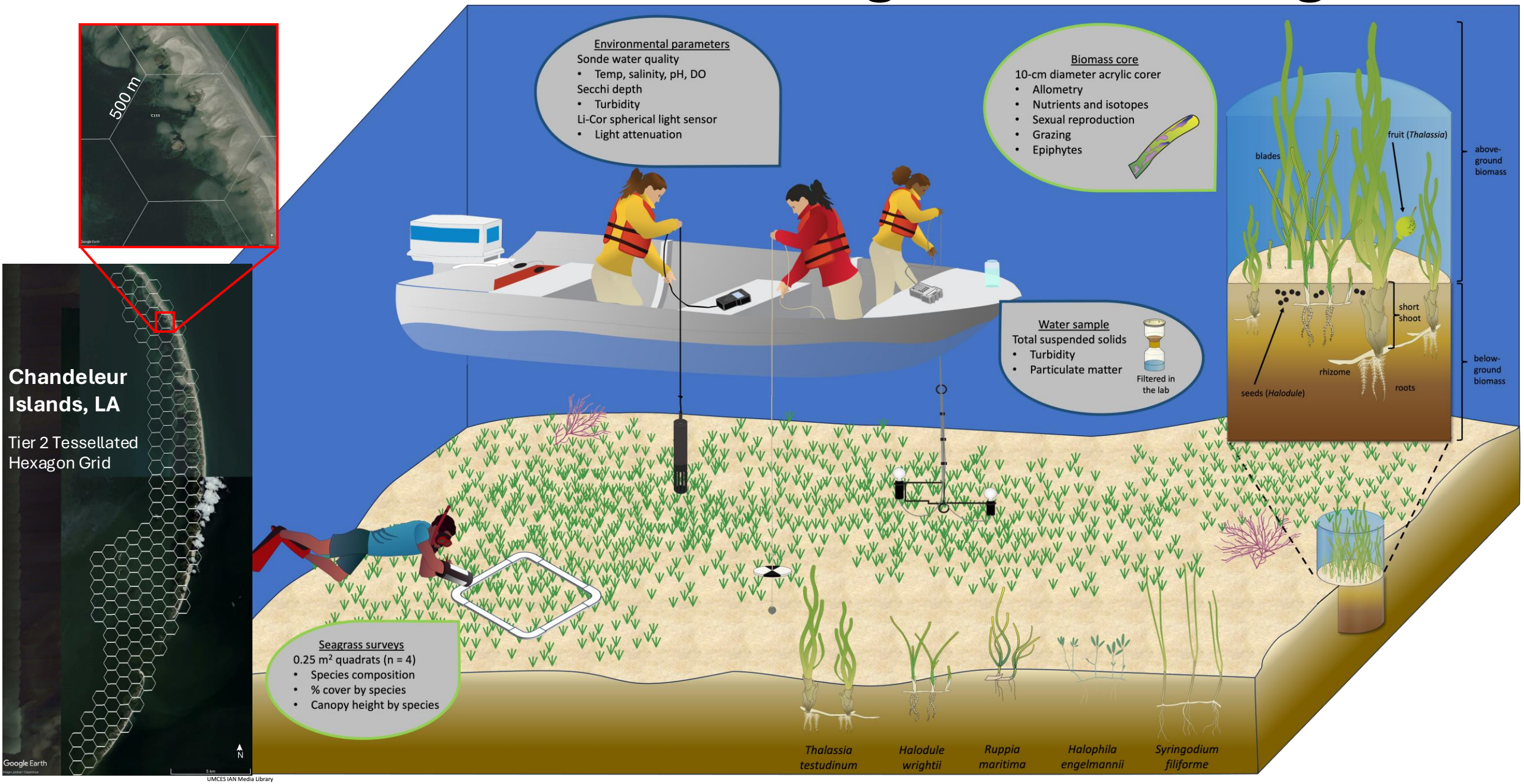
Tiered approach to habitat monitoring



Neckles et al. 2012

Tier 2 Seagrass Monitoring



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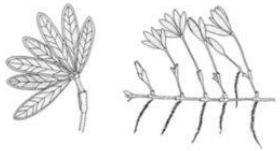
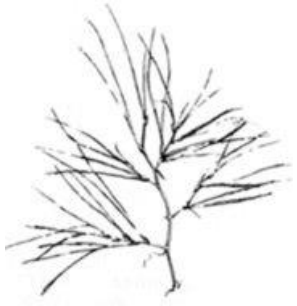
Seagrasses at the Chandeleur Islands

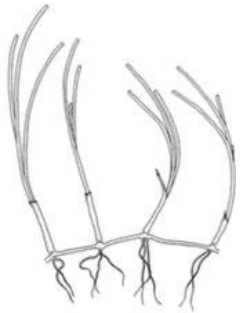
- Rely on Islands for protection
- 5 Gulf of Mexico seagrass species; only mixed beds over 1,000 km of coastline from TX to FL



Star grass
Halophila engelmannii



Widgeon grass
Ruppia maritima



Shoal grass
Halodule wrightii

Manatee grass
Syringodium filiforme

Turtlegrass
Thalassia testudinum

Early Colonizers → Climax Species

Phillips and Menez 1988, USFWS

FISCAL YEAR 2025 ANNUAL PLAN:
PROJECT HIGHLIGHTS

All Active Projects Off On

1 Long Point Bayou Marsh Creation
2 No Name Bayou Marsh Creation
3 Cameron Creole Maintenance Storm Damage Repairs Project
4 Southwest Coastal Louisiana
5 Freshwater Bayou Shoreline Protection
6 Henderson Lake Water Management Unit Spoil Bank Gapping
7 River Reintroduction into Maurepas Swamp
8 Morganza to the Gulf
9 West Shore Lake Pontchartrain Hurricane Protection
10 LaBranche Marsh Creation

VIEW ACTIVE PROJECTS TABLE
VIEW FY 2025 ANNUAL PLAN

CHANDELEUR ISLAND RESTORATION

FY 2025 STATUS	TYPE	FUNDING SOURCE(S)	ESTIMATED COST
ENGINEERING & DESIGN	BARRIER ISLAND MAINTAINENCE	NRDA	IN DEVELOPMENT

The Chandeleur Islands are a thin chain of unpopulated barrier islands located east of New Orleans in the Gulf of Mexico. The islands are a world-renowned recreational fishing spot and have historically served as an important storm surge barrier for some of southeast Louisianas most densely populated areas. The Chandeleur Islands are also part of Breton National Wildlife Refuge, the second oldest national wildlife refuge in the U.S., which supports an incredibly diverse group of wildlife and fish species. Over 300,000 migratory birds, including piping plovers, red knots, redhead ducks, and shorebirds, inhabit the islands in a typical year. The islands are notably the only nesting ground in the entire world for the Chandeleur gull.

However, the islands have lost nearly 90% of their landmass over the past 200 years due to intense weather events, including Hurricanes Georges (1998) and Katrina (2005). The islands were also heavily oiled during the *Deepwater Horizon* oil spill, impacting many birds, plants, and aquatic species that inhabited them.

CPRA is currently in the engineering and design phase to restore 13 miles of the Chandeleur Islands. Once complete, restoration will increase overall resiliency and sustainability of these landmasses long term. With full funding in place, the Chandeleur Islands Restoration project will provide significant protection to several coastal communities through a whole ecosystem restoration approach intended to preserve, rebuild, and improve marsh habitat with a special focus on birds, sea turtles, and sea grasses.

<u>Restoration Project Goals</u>

- Restore and Conserve Bird Nesting and Foraging Habitat
- Enhance Sea Turtle Hatchling Productivity and Restore and Conserve Nesting Beach Habitat
- Create, Restore, and Enhance Barrier and Coastal Islands and Headlands
- **Restore and Enhance Submerged Aquatic Vegetation**

ChIRPS

Chandeleur **I**slands **R**estoration **P**roject for **S**eagrass

Restoration Success Criteria

- Analysis of historic data and restoration success criteria
- Seagrass community sampling and deep learning imagery analysis
- Numerical modeling

+

Storm Impacts

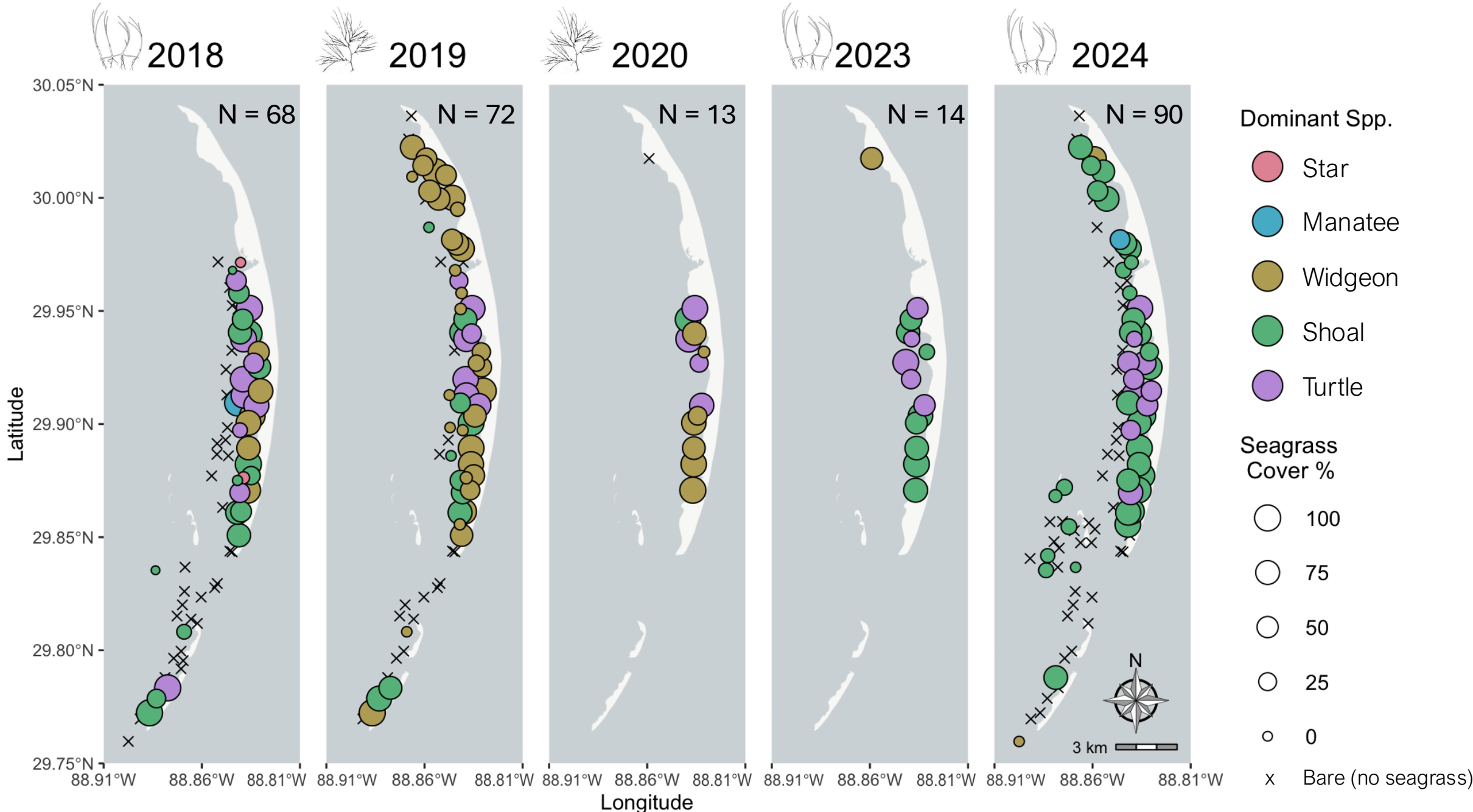
- Pre- and post-disturbance sampling
- Numerical modeling and deep learning imagery analysis

+

Population Structure/Resilience

- Describe the genetic variability, structure, and connectivity of seagrasses at the Chandeleur Islands
- Understand resilience capacity

Shoal (n=16)	Widgeon (n = 34)	Widgeon (n = 7)	Shoal (n = 8)	Shoal (n = 33)	Dominant Spp.



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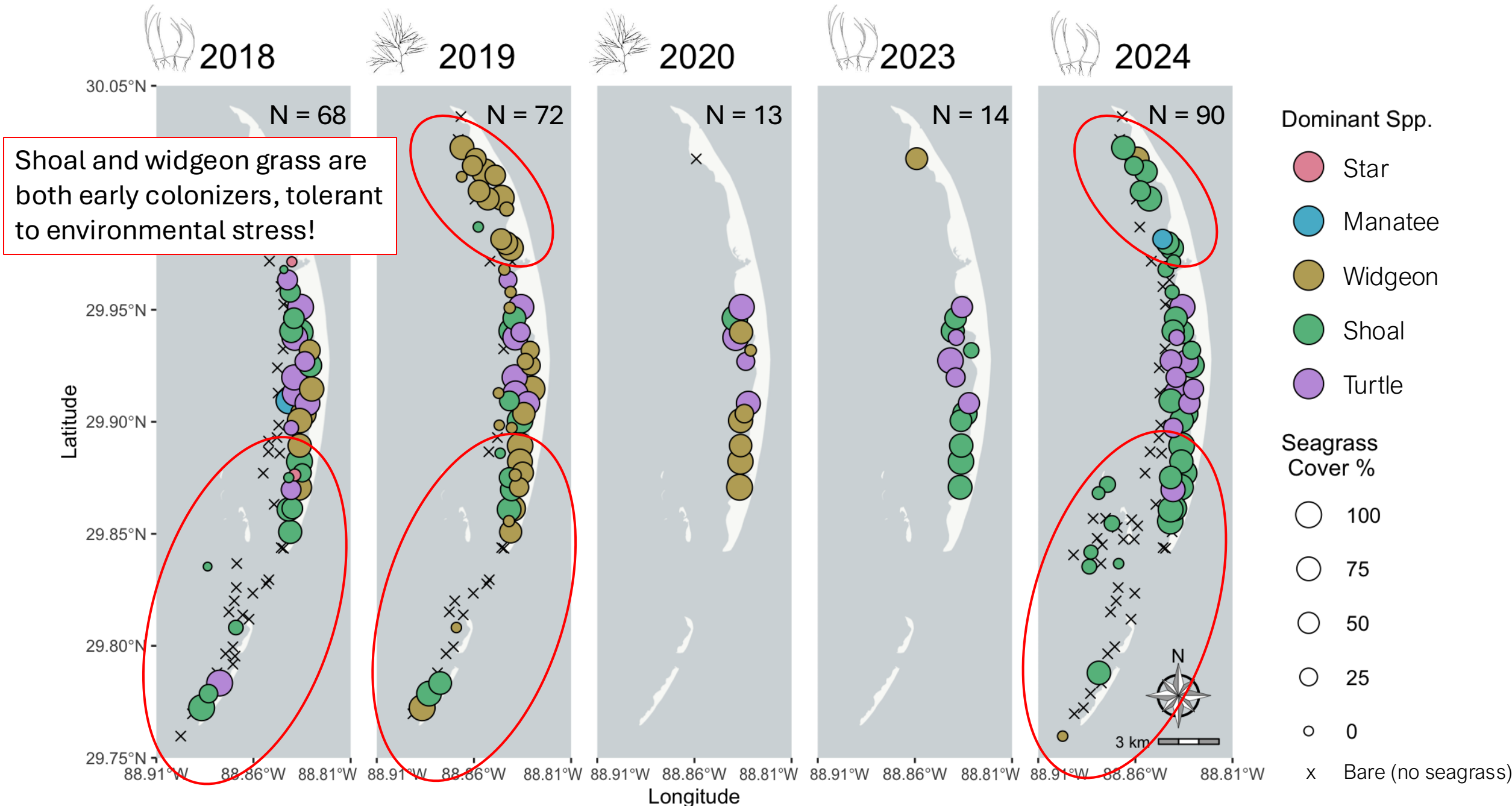

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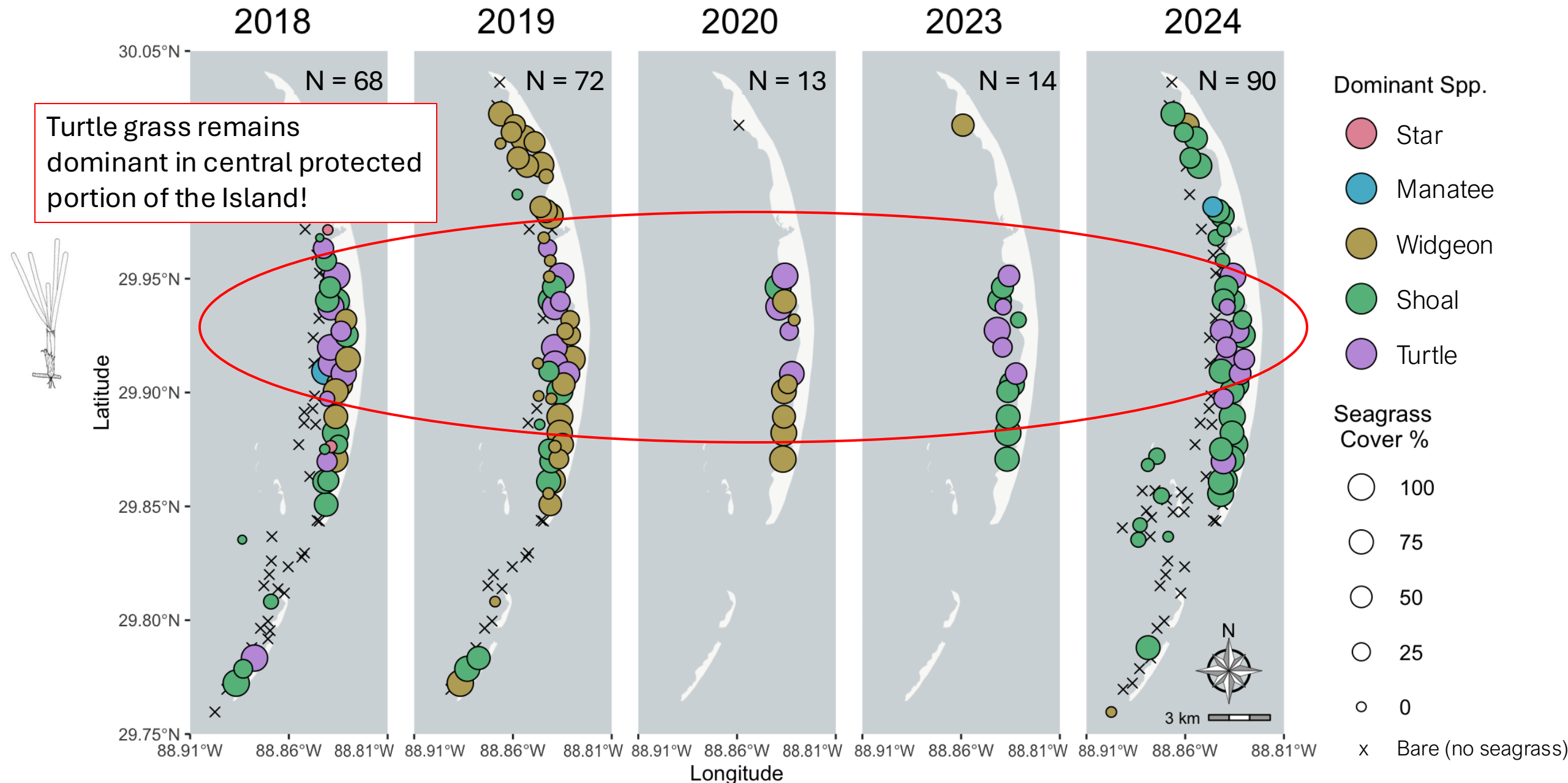

Turtle grass remains dominant in central protected portion of the Island!

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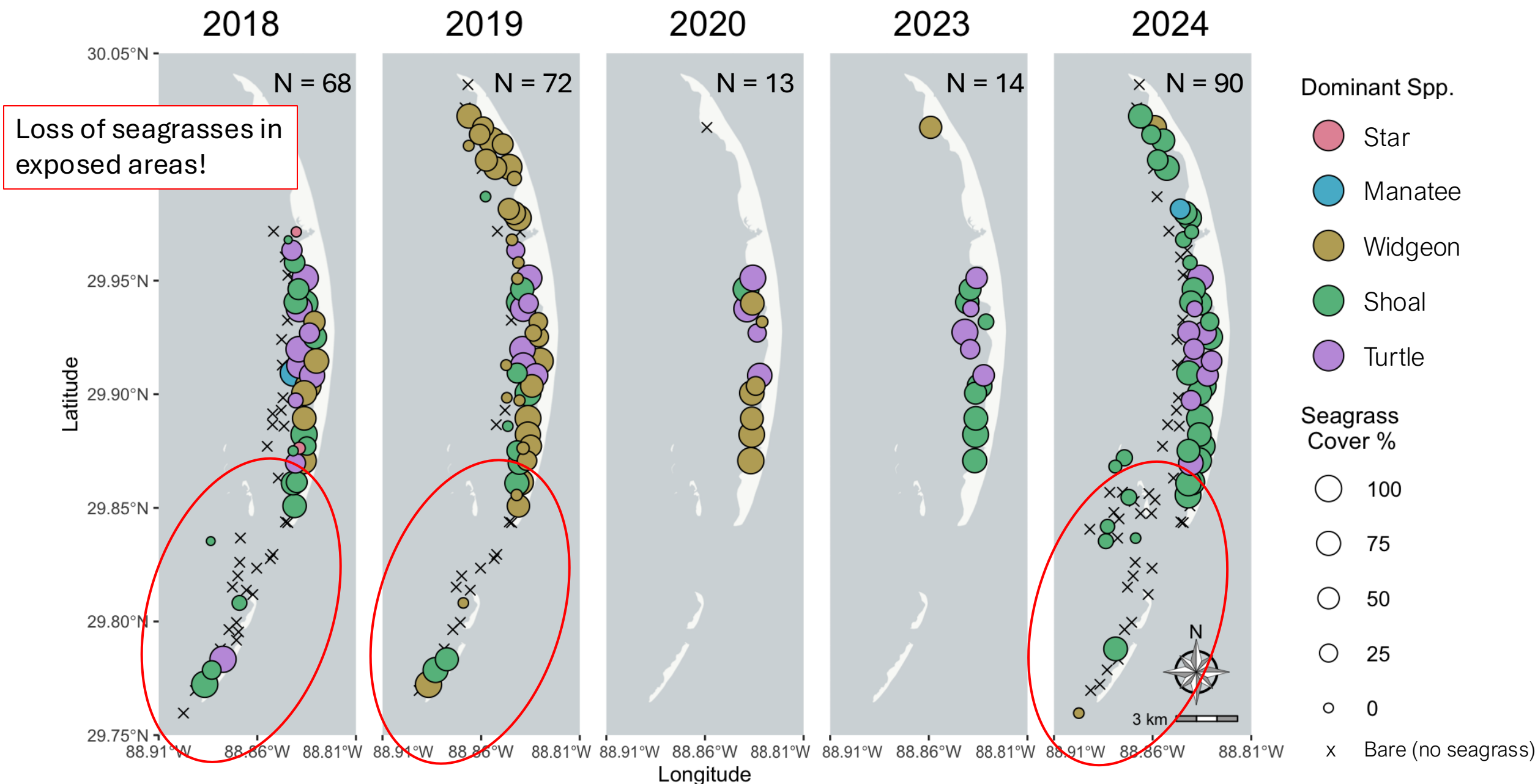


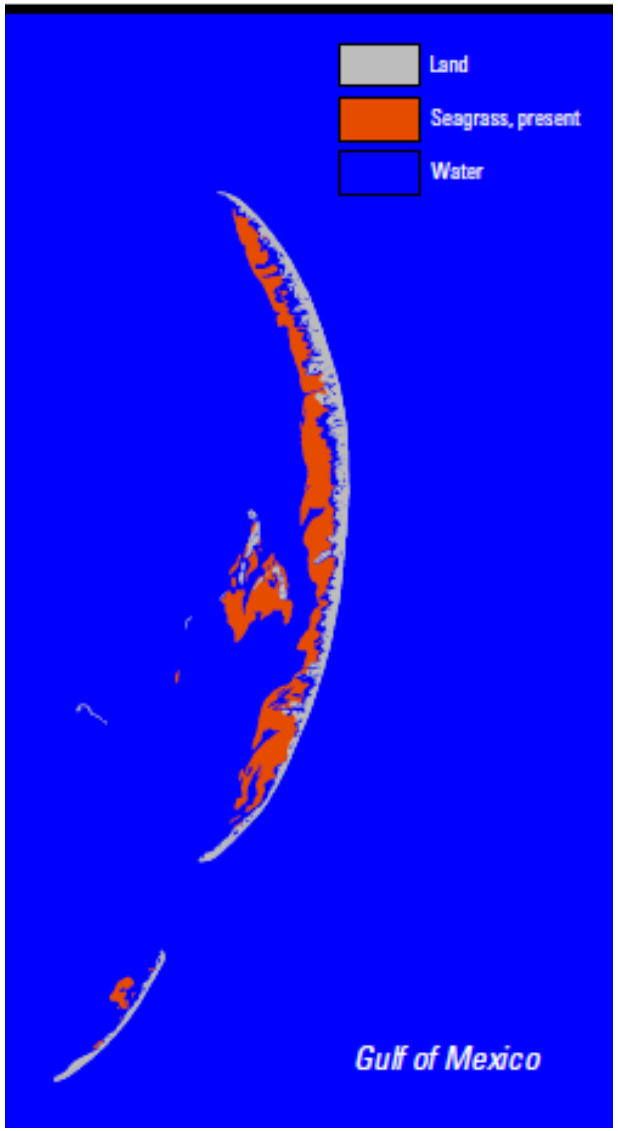
Landscape changes and storm over-wash buries seagrass

South of Katrina Cut

ChIRPS Tier 2 Monitoring Conclusions

- Most past efforts broadly focused on <u>extent of distribution</u>

1995



Porrier and Handley 2007

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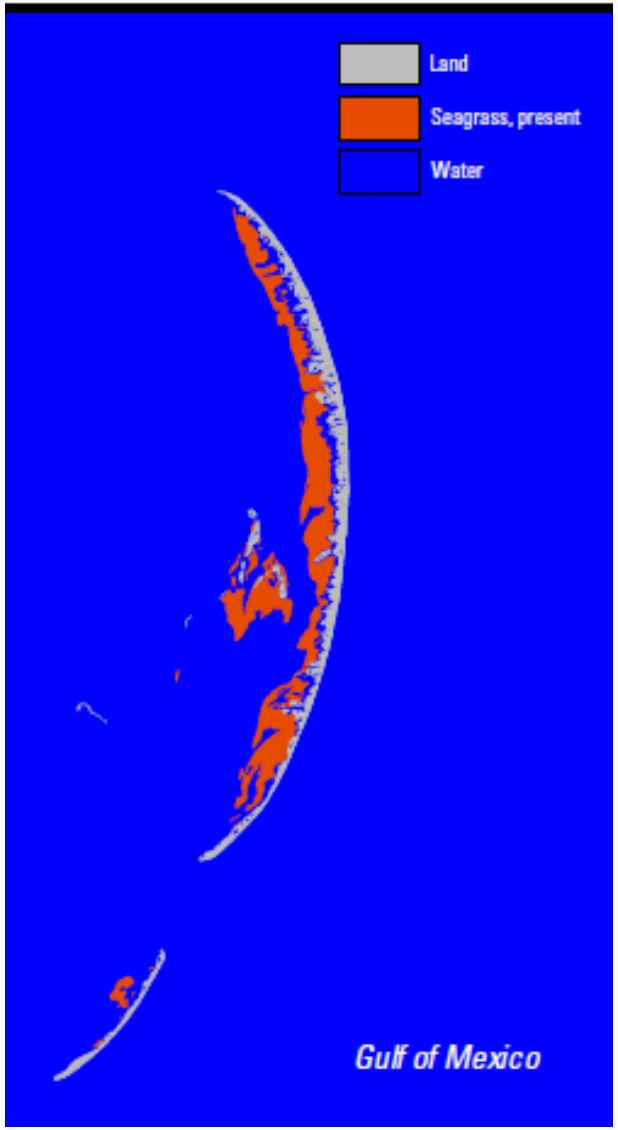

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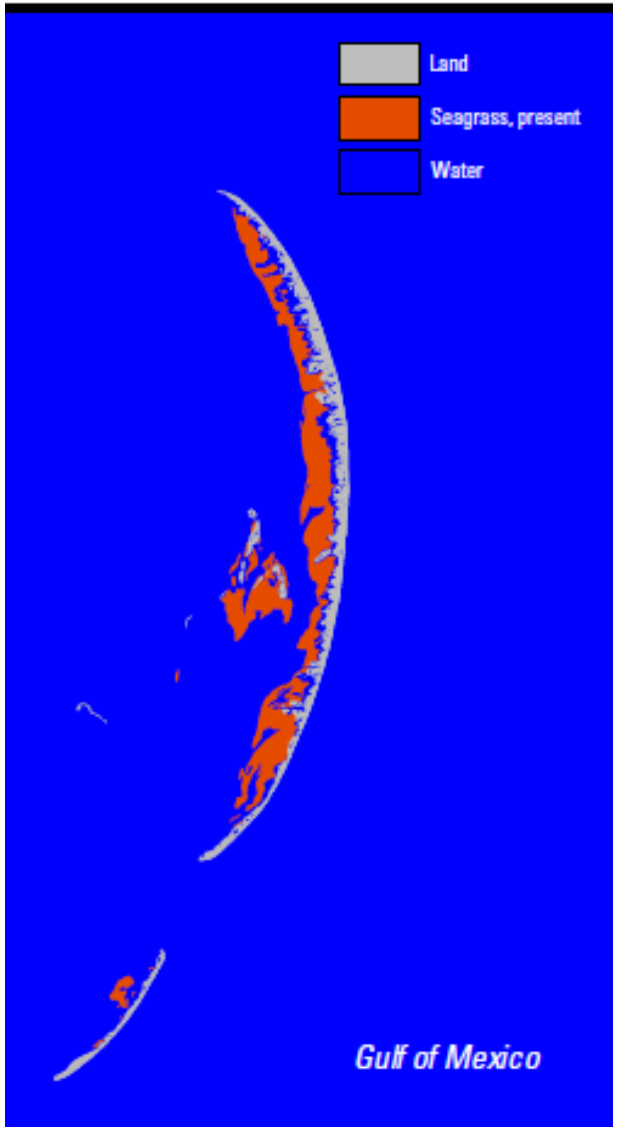

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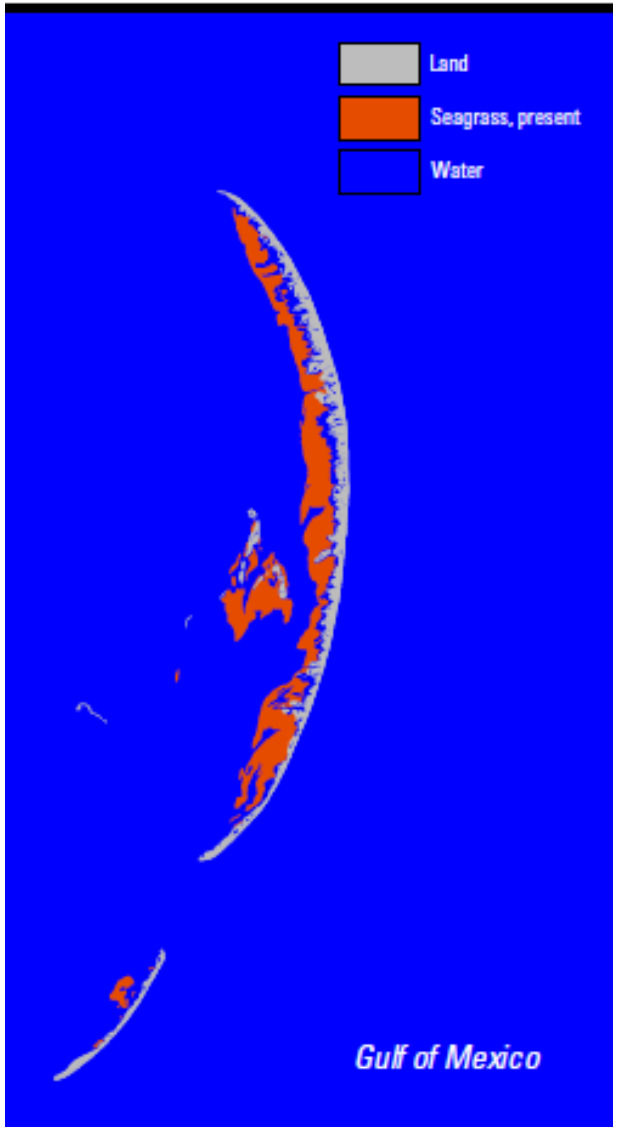

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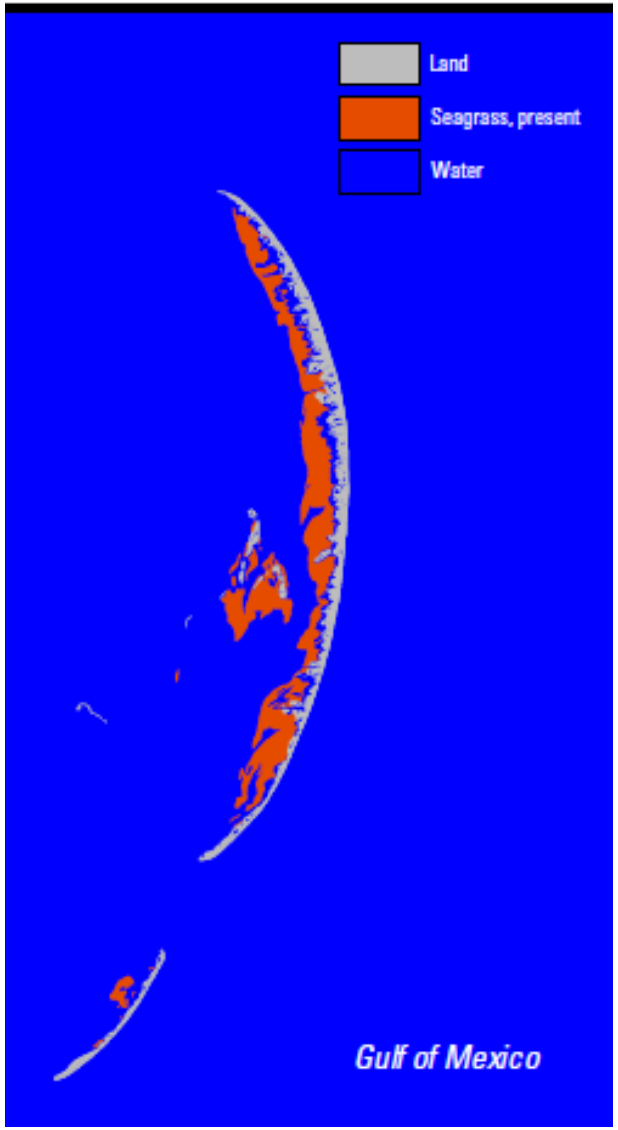
ChIRPS Tier 2 Monitoring Conclusions

- Most past efforts broadly focused on <u>extent of distribution</u>
  - Added stations capturing historical seagrass record
  - Species specific monitoring tells us more!
- Island and seagrass habitat management can be beneficial
- Stable island dynamics may promote stable seagrass dynamics
  - Changes in seagrass distribution varies by species and location

1995



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- Proven the need for long-term monitoring
- Shown loss of seagrasses in highly dynamic areas
- Informed deep machine learning and remote sensing models
- Aided Chandeleur Island Restoration Project design and implementation

Teamwork makes the dream work!

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THE UNIVERSITY OF SOUTHERN MISSISSIPPI

RESTORE SCIENCE PROGRAM

NOAA RESTORE Science Program Grant: NA23NOS4510304

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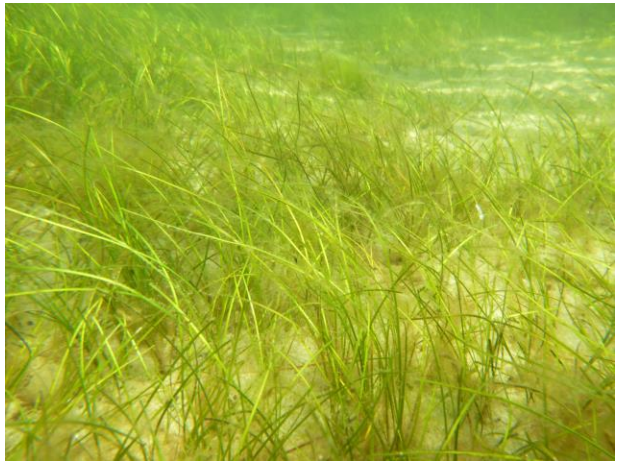

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