

A Decade of Rapid Coral Community Change on the Florida Reef Tract

Insights from the National Coral Reef Monitoring Program

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¹CSS Inc. under contract to NOAA National Ocean Service, National Center for Coastal Ocean Science

²NOAA National Ocean Service, National Center for Coastal Ocean Science

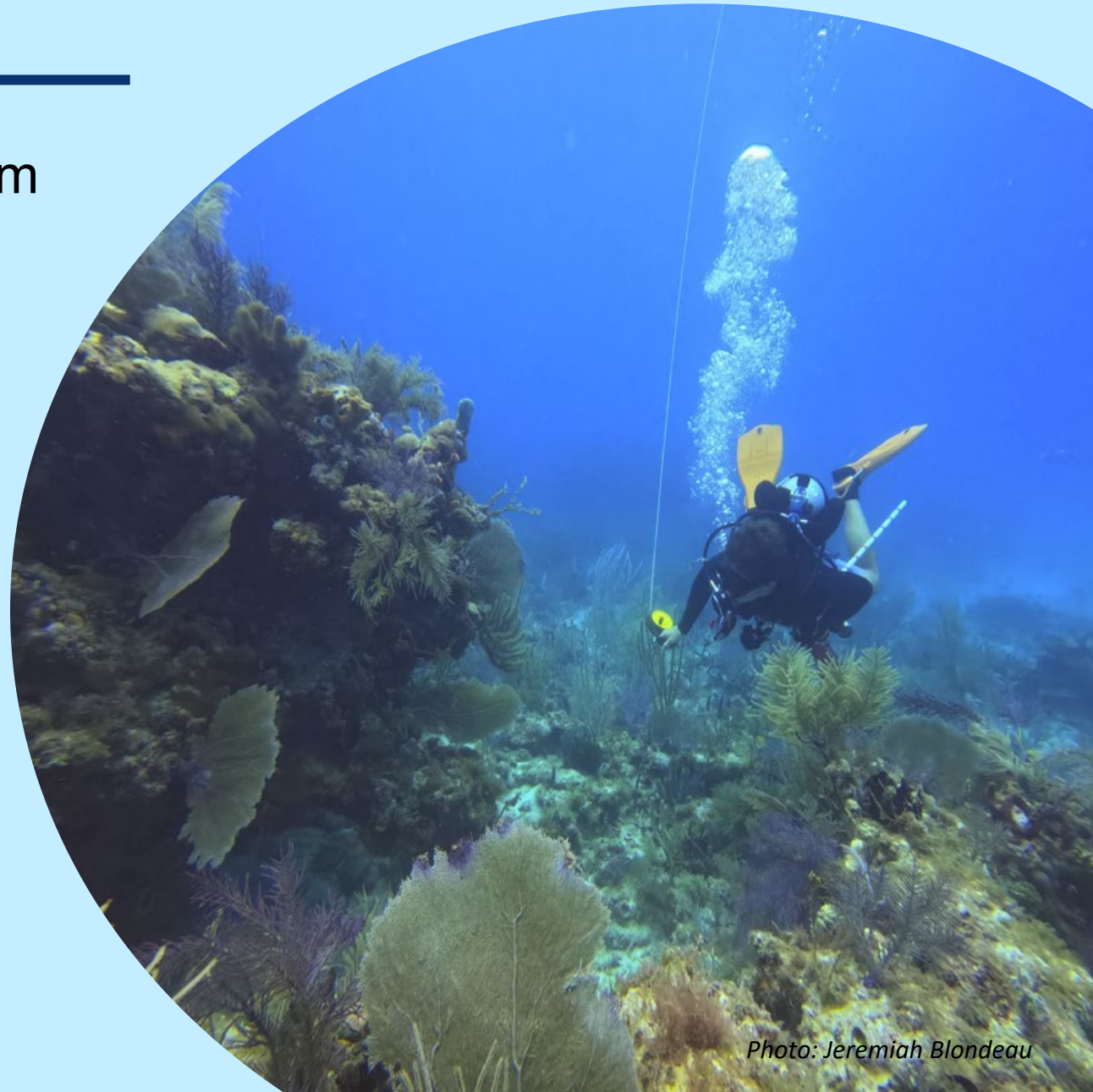


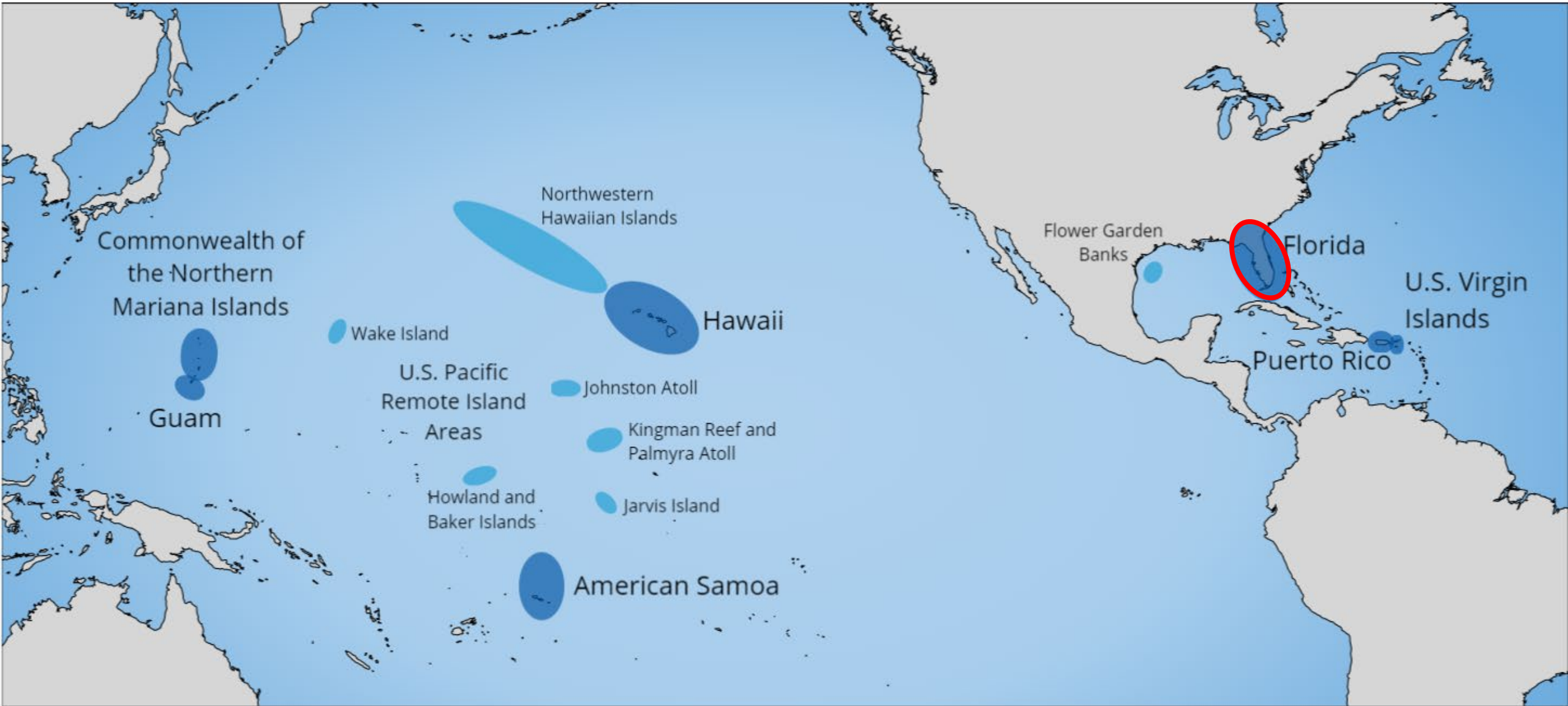
photo credit:
Hunter Noren

NOAA's NCRMP

- National Coral Reef Monitoring Program
- Standardize and improve methods
 - Build strong partnerships
- Provide comprehensive data
 - Inform local and national decision-making
- Assess trends in reef ecosystems

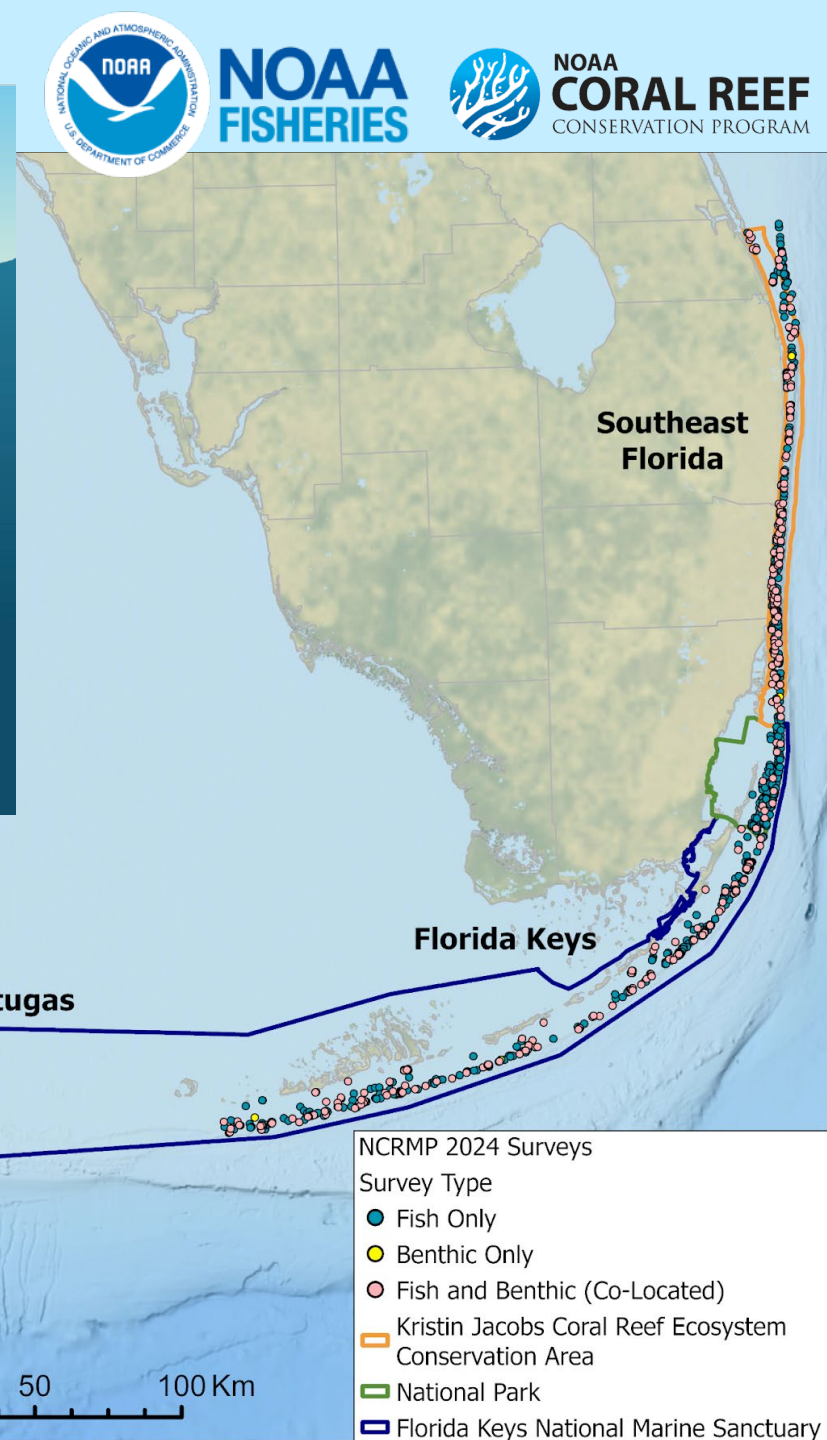
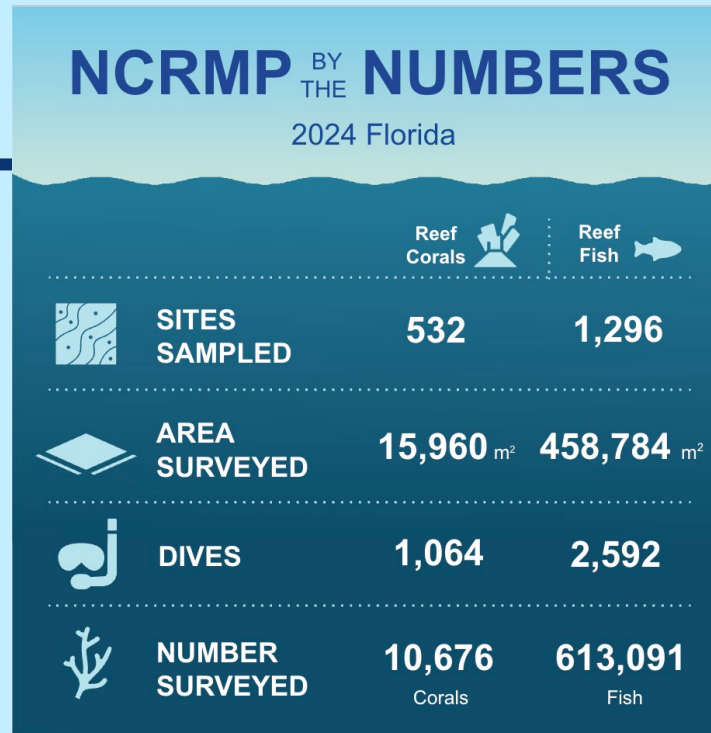
Objective: Conduct sustained observations of biological (fish and benthic), environmental, and socioeconomic indicators in U.S. states and territories





NCRMP Florida

- Three regions
 - Southeast Florida
 - Florida Keys
 - Dry Tortugas
- 2014-2024
 - 2,267 samples since 2014
- Collaboration with FL FWC Disturbance Response Monitoring (DRM)
 - NCRMP biannual sampling
 - DRM yearly sampling
- Recent sampling with Mission: Iconic Reefs
 - Evaluate restoration



NCRMP Benthic Methods



Benthic Community Assessment

- LPI, rugosity, invert count, ESA-listed species
- NCRMP specific

Coral Demographics

- Coral species, size, and condition

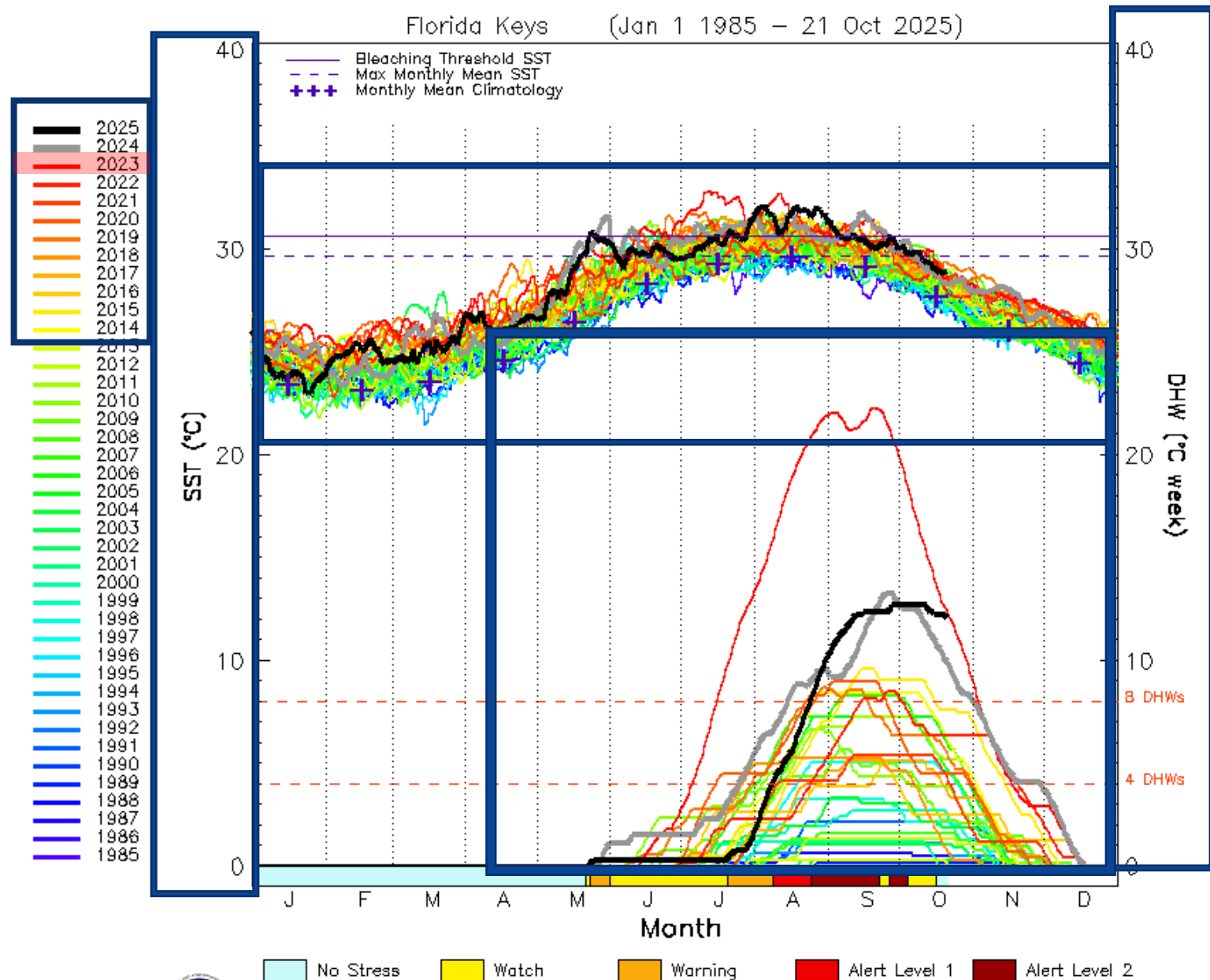


photo: Rosmin Ennis

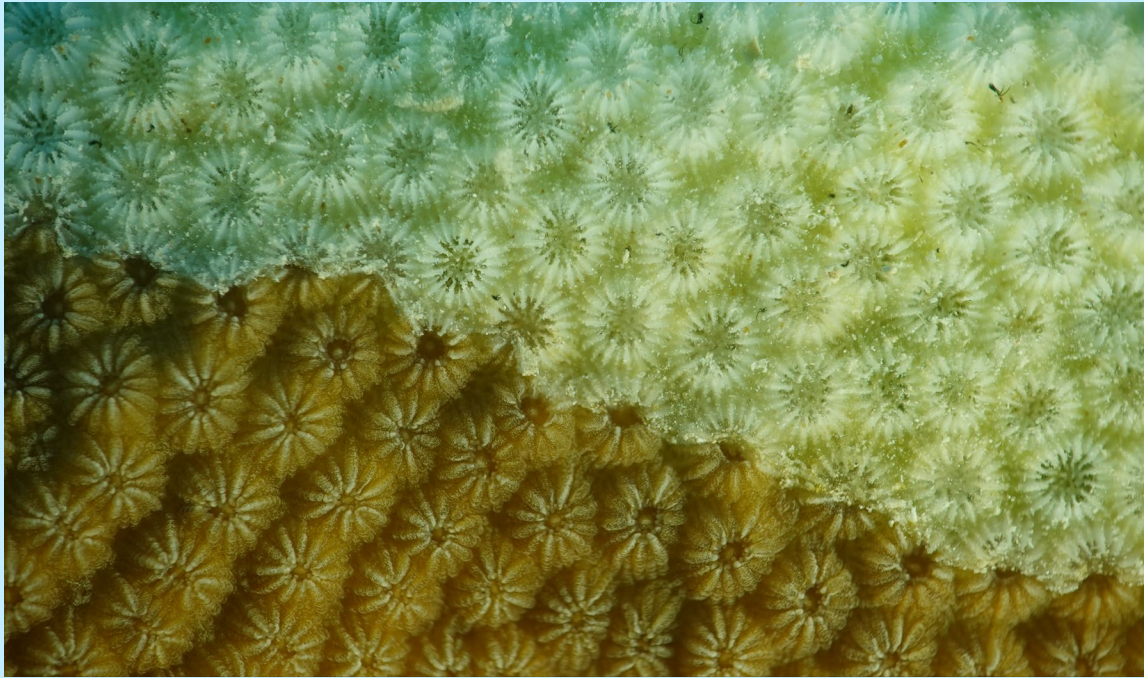
8 DHWs = coral mortality

4 DHWs = significant bleaching

Mass bleaching events in 2014, 2015, and 2023



Stony Coral Tissue Loss Disease



- Decimated reefs across the Florida Reef Tract and the Caribbean
- Likely the most lethal coral disease recorded to date (*Gintert et al., 2019; Walton et al., 2018*)

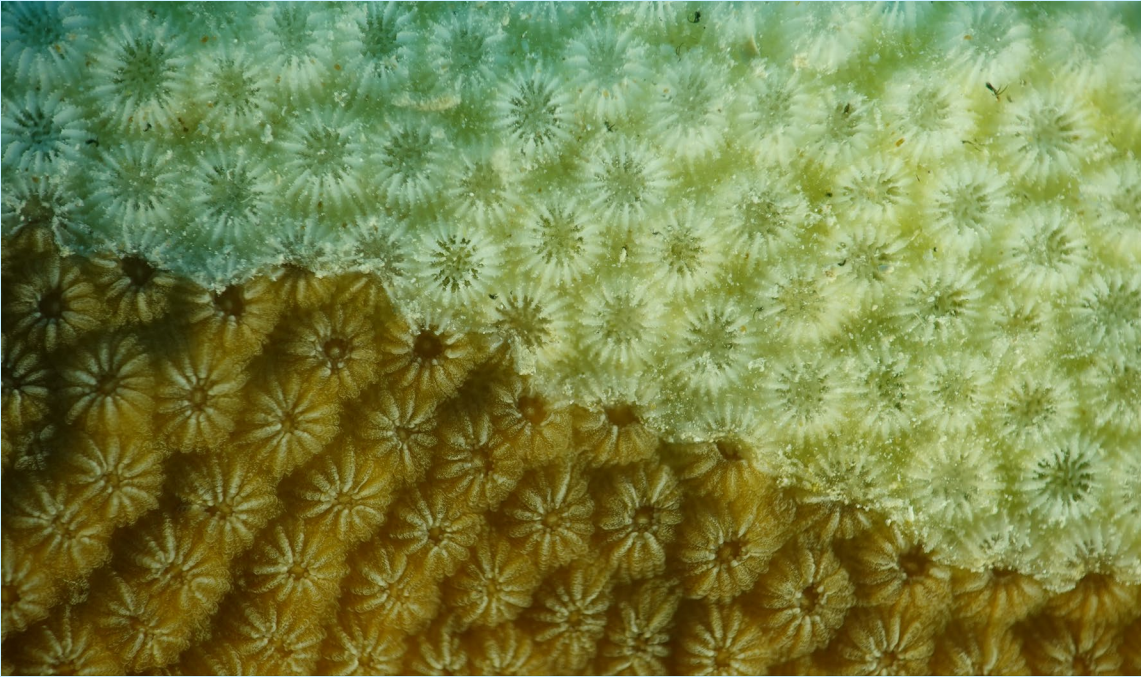
virulence

generalist nature

persistence

transmissibility

Stony Coral Tissue Loss Disease



SCTLD emergence in
Southeast Florida

SCTLD reported in
Florida Keys

SCTLD reported in
Dry Tortugas

2014

2016

2021

2024

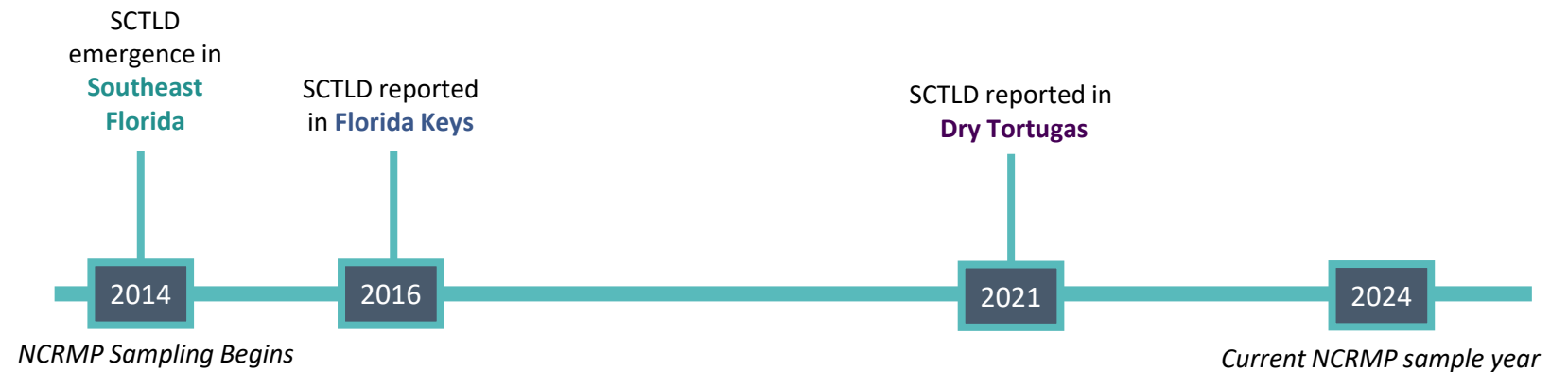
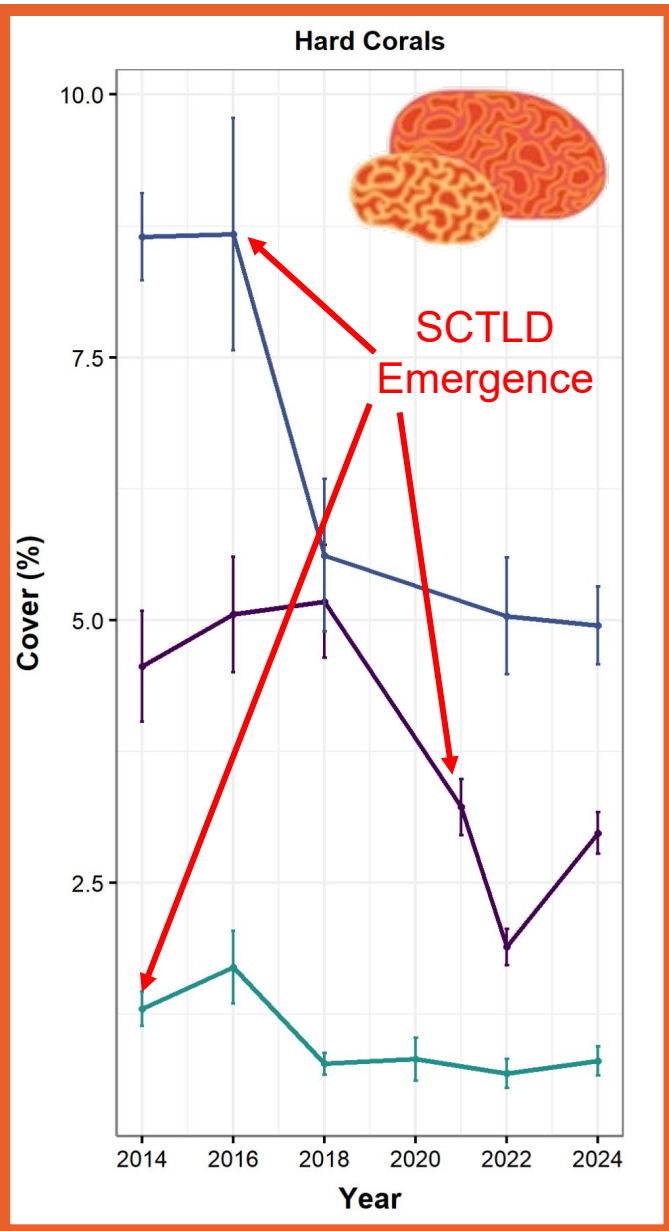
NCRMP Sampling Begins

Current NCRMP sample year

Results

Coral Cover

- Coral declined most in **Florida Keys**
- **Southeast Florida** was low to begin with, steady since 2018
- Drops correspond with SCTLD



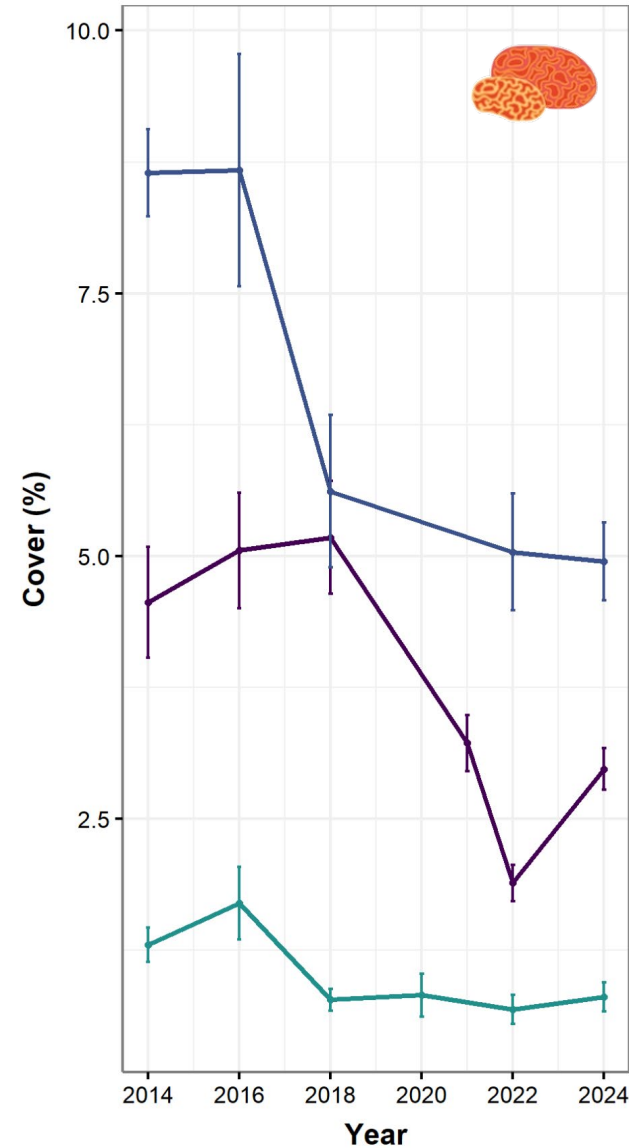
 **Southeast Florida**  **Florida Keys**  **Dry Tortugas**

Results

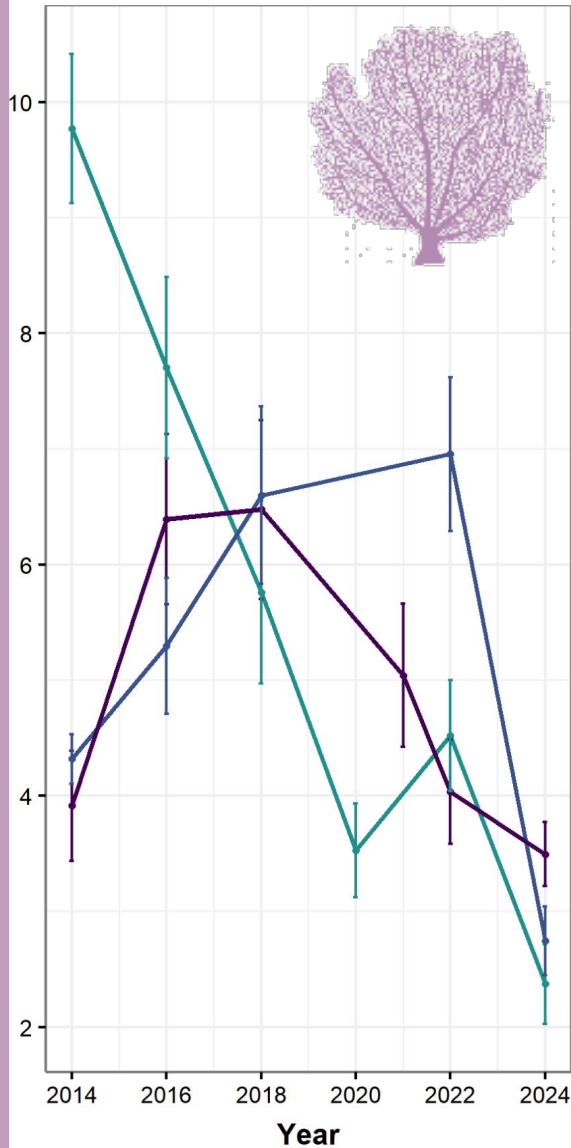
Gorgonian Cover

- Strong declines for Southeast Florida
- Messy signal for Florida Keys and Dry Tortugas but very low numbers in 2024

Hard Corals



Soft Corals



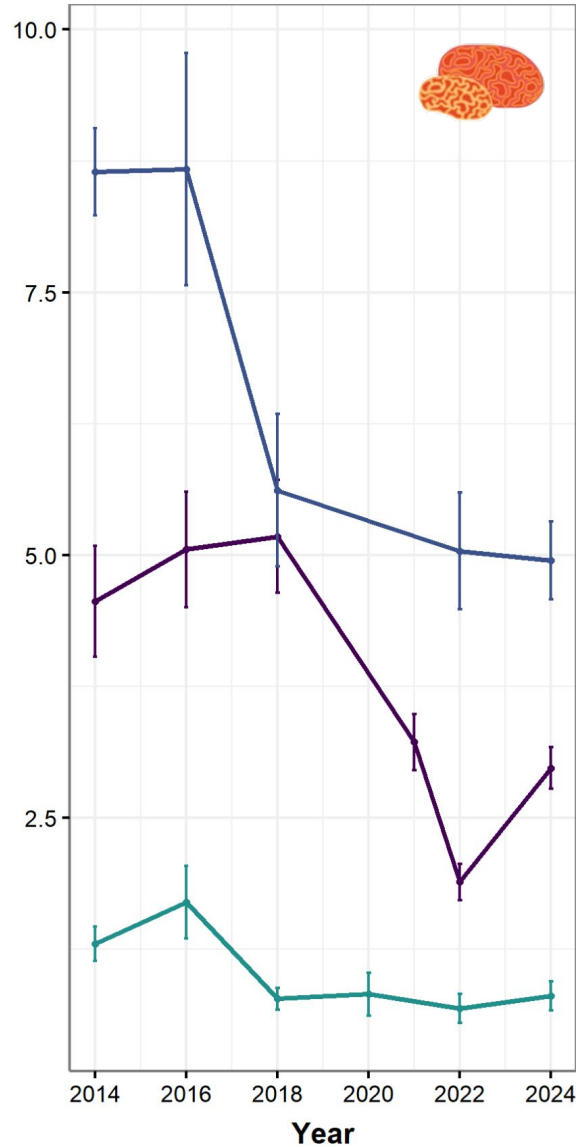
 Southeast Florida
  Florida Keys
  Dry Tortugas

Results

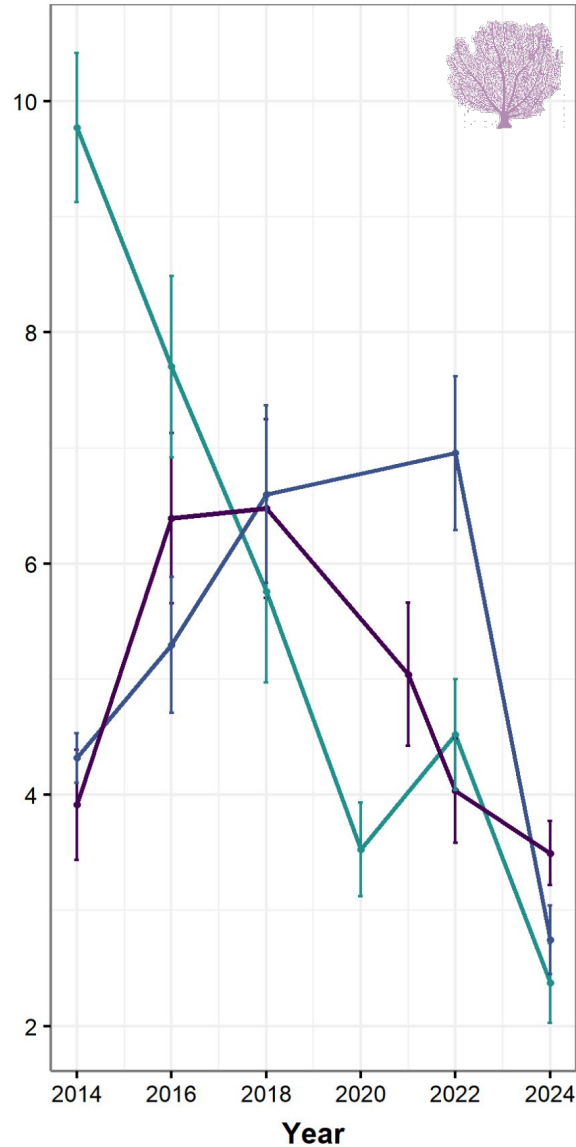
Sponge Cover

- Strong Southeast Florida declines
- Relatively stable for Dry Tortugas and Florida Keys

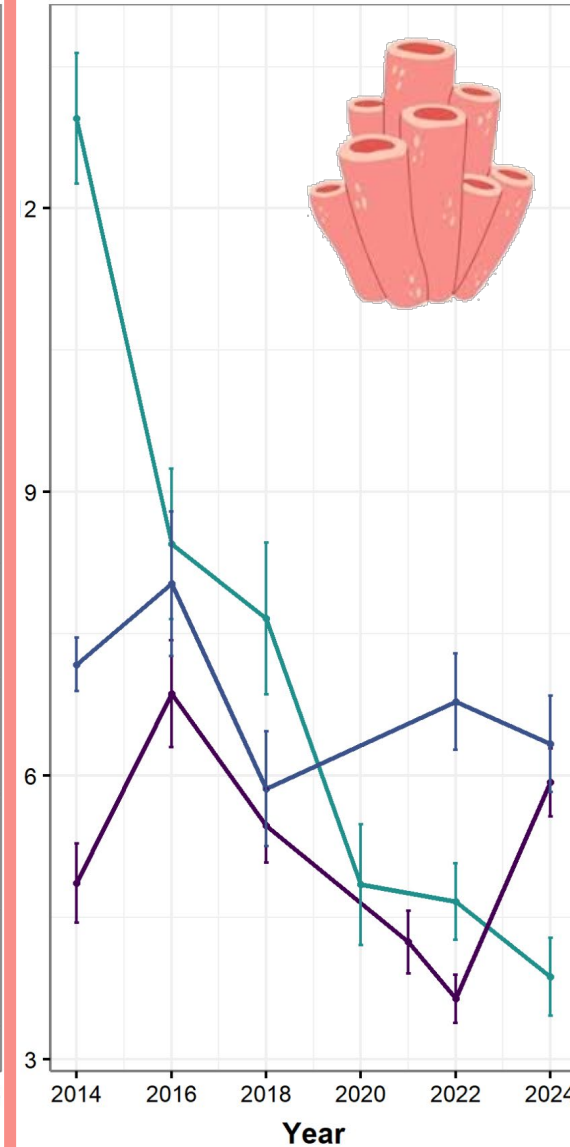
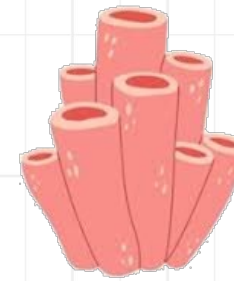
Hard Corals



Soft Corals



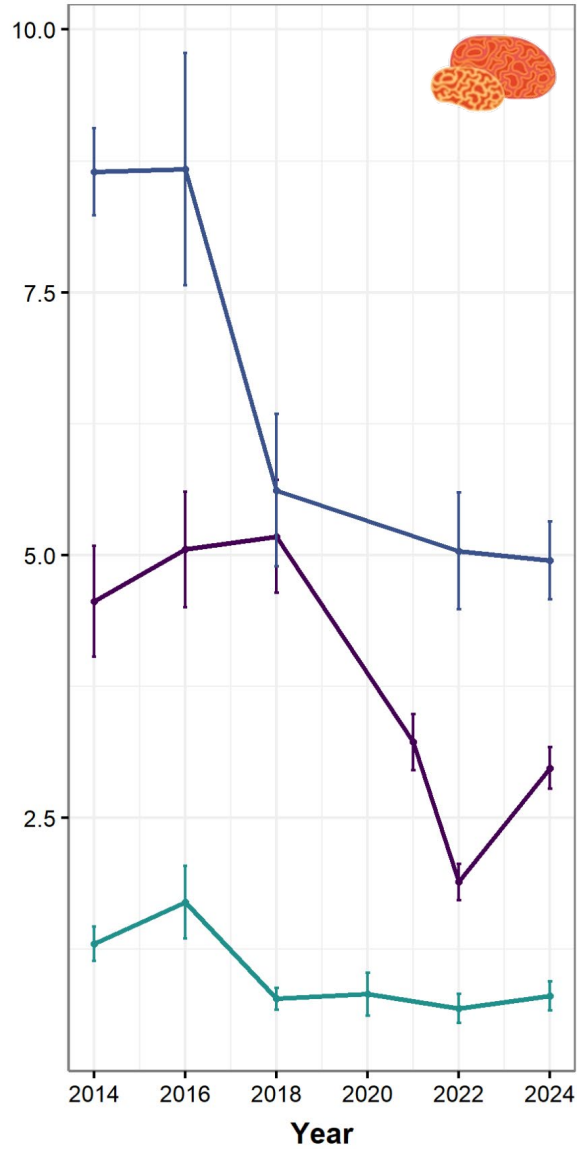
Sponges



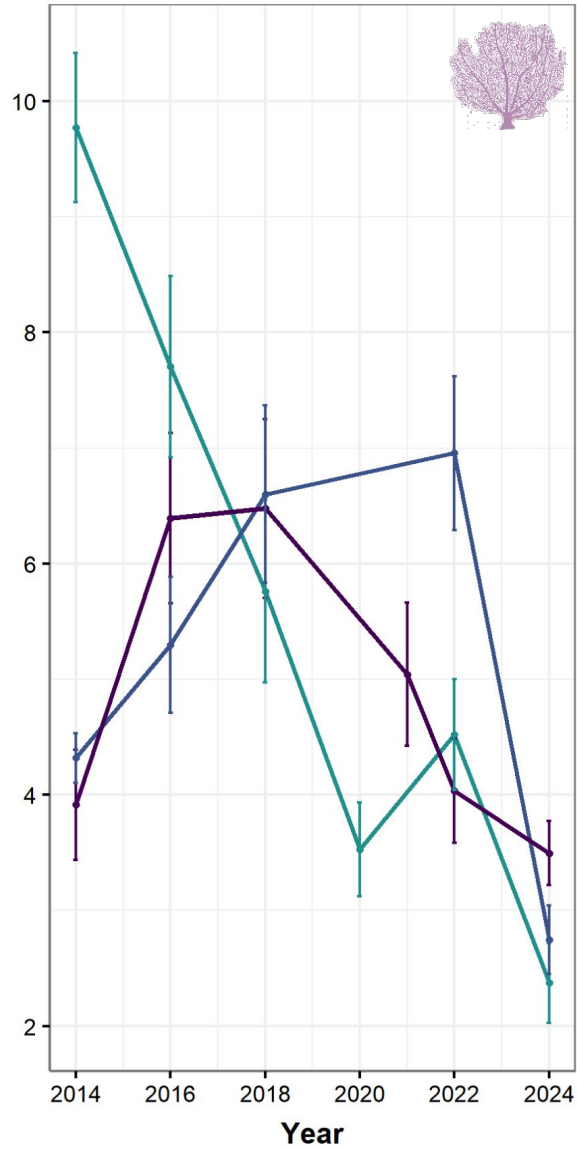
Southeast Florida
 Florida Keys
 Dry Tortugas

Results

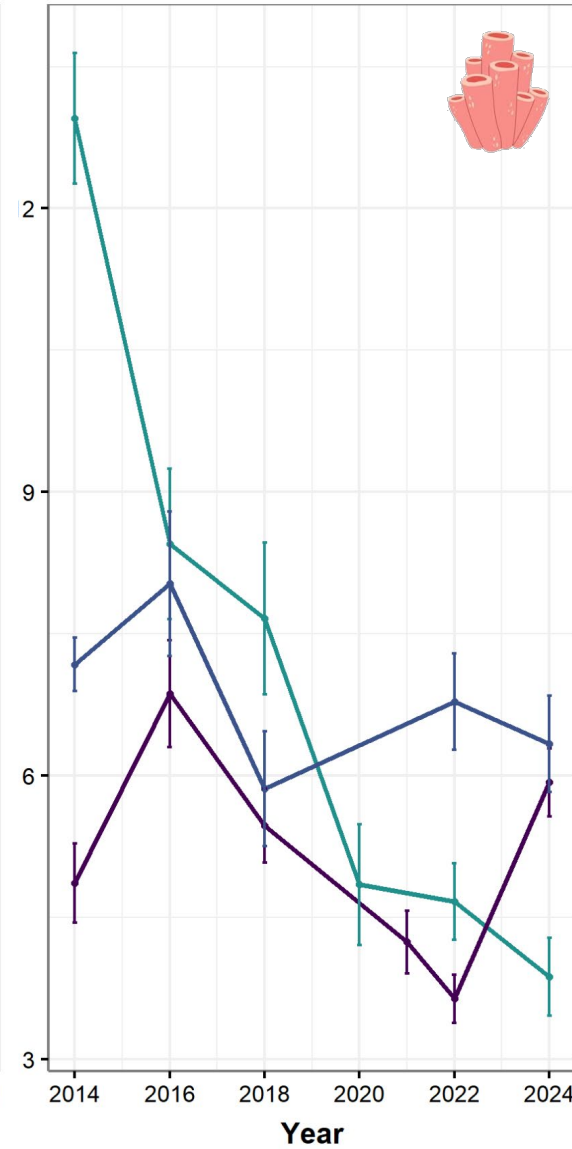
Hard Corals



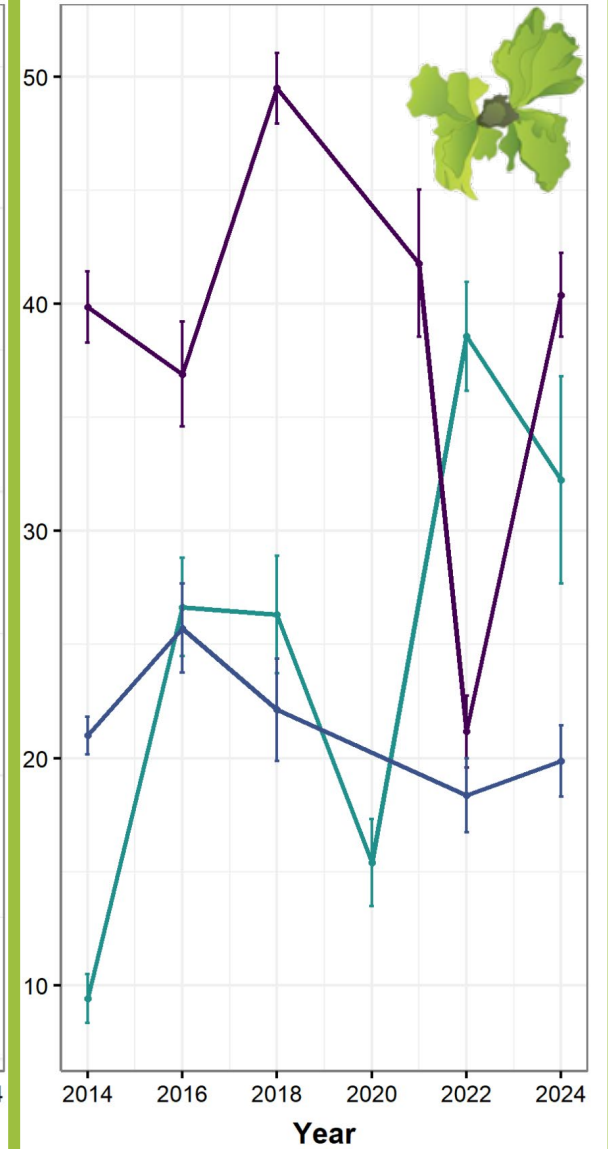
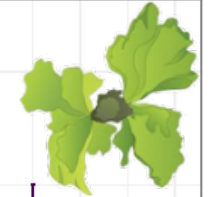
Soft Corals



Sponges



Macroalgae

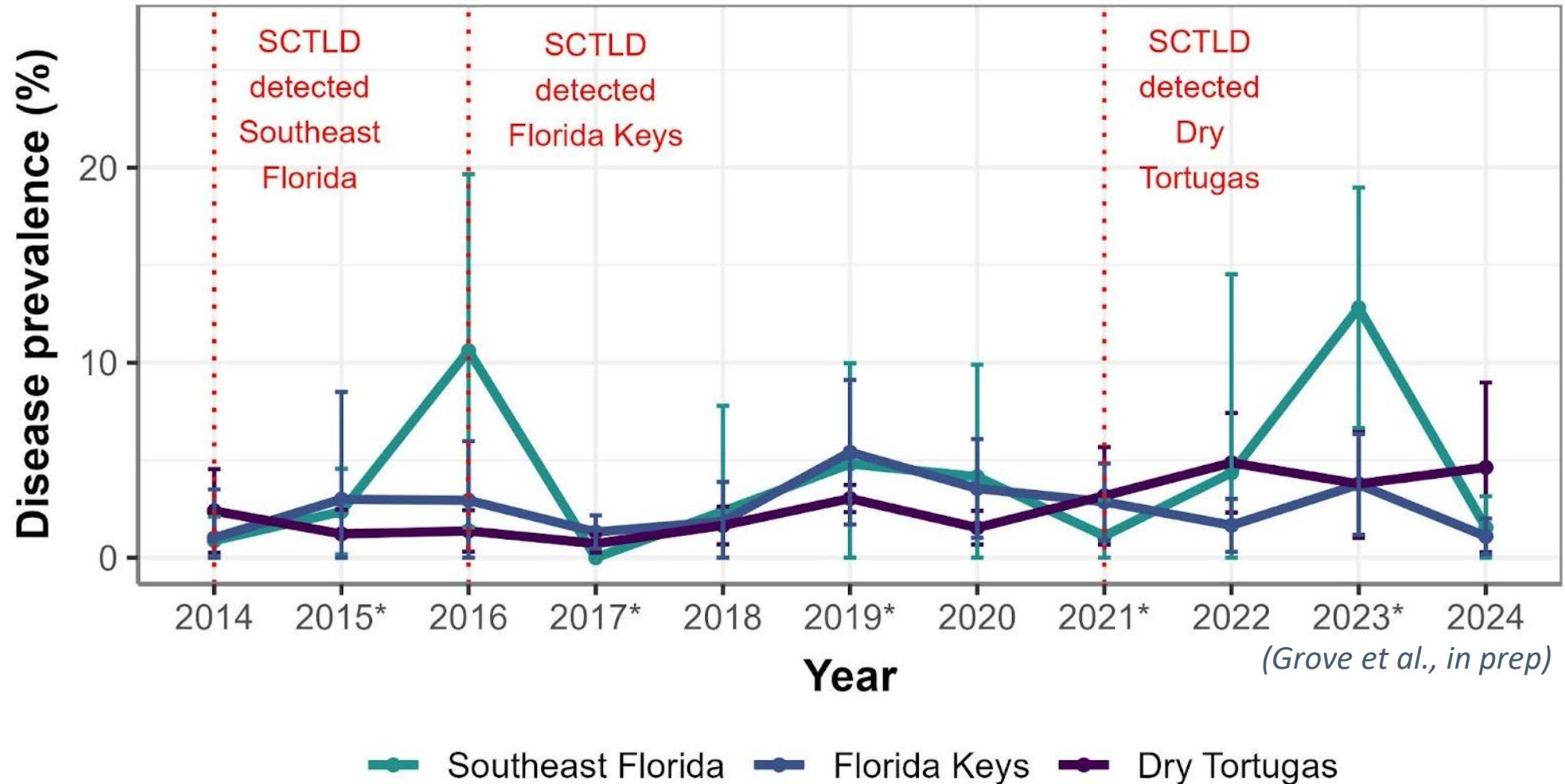


 Southeast Florida  Florida Keys  Dry Tortugas

Disease Prevalence

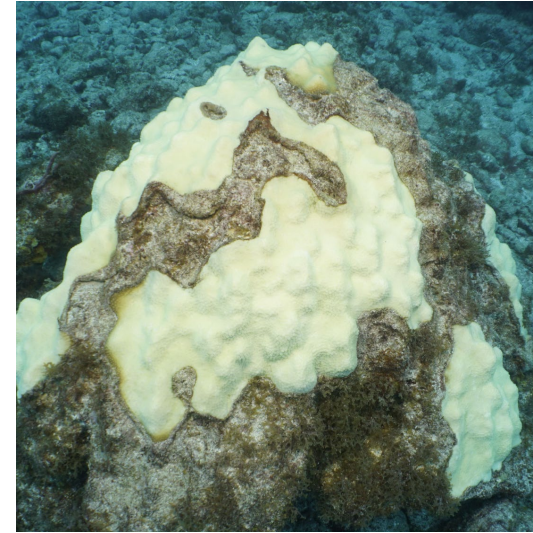
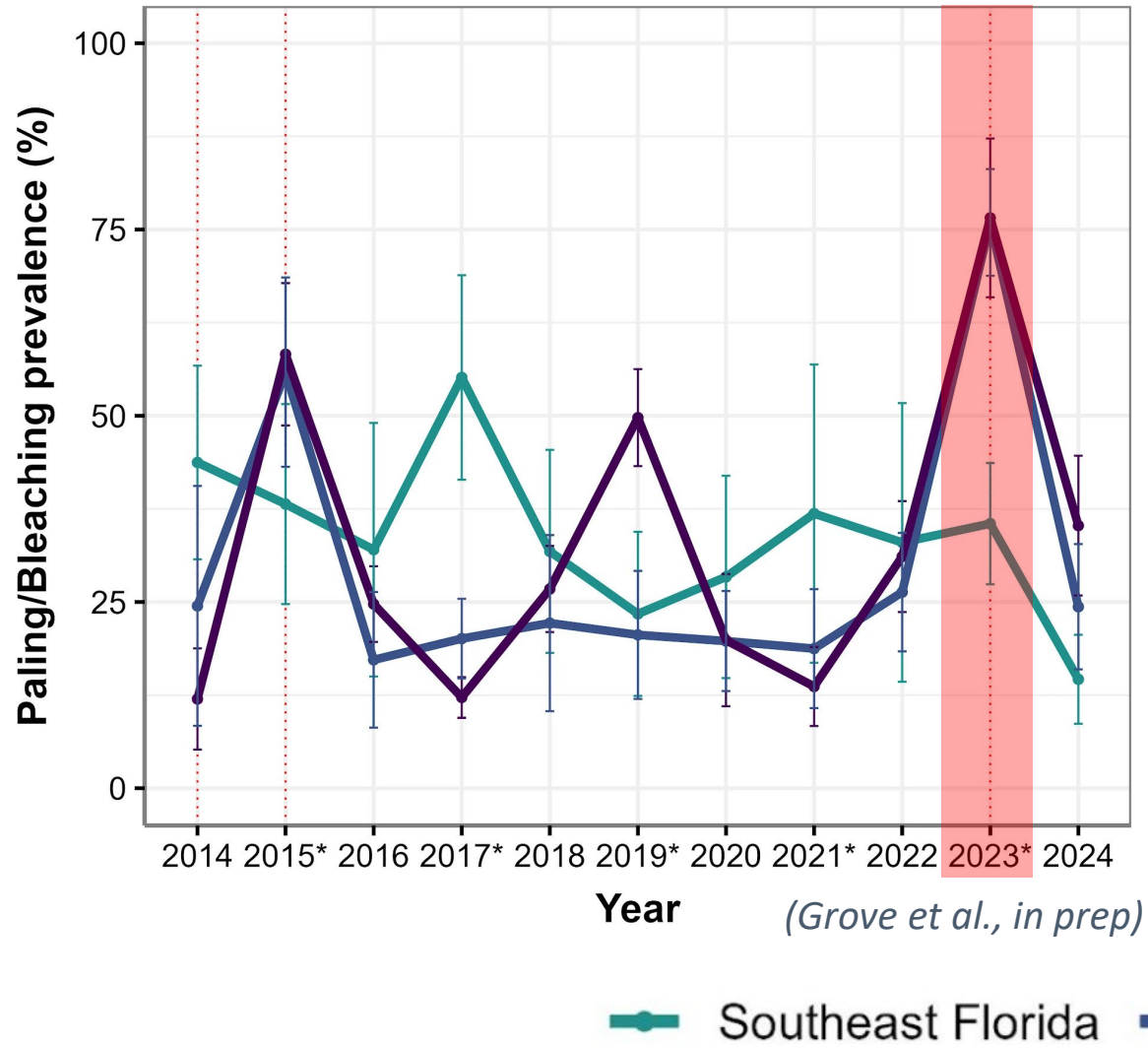
Florida

**indicates DRM only survey year*



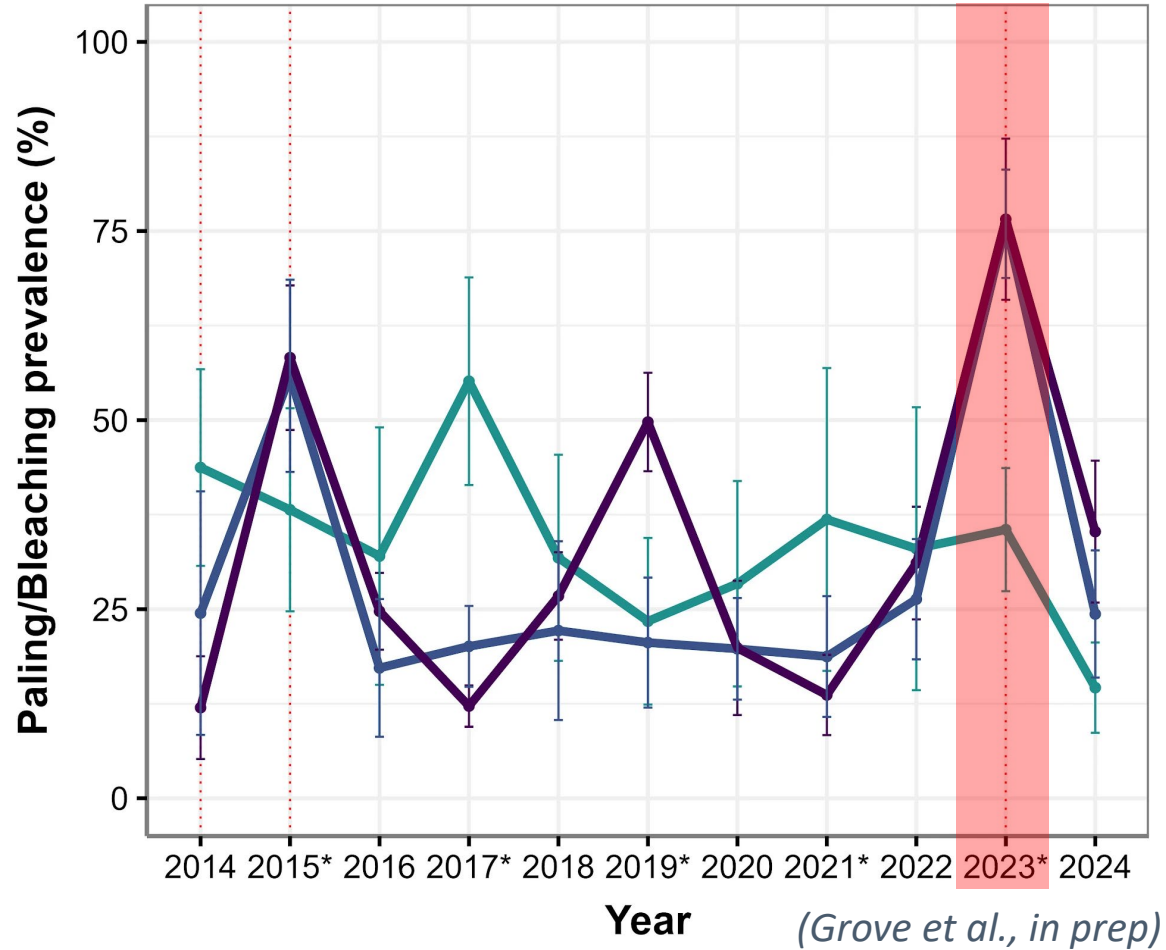
Bleaching Prevalence

**indicates DRM only survey year*



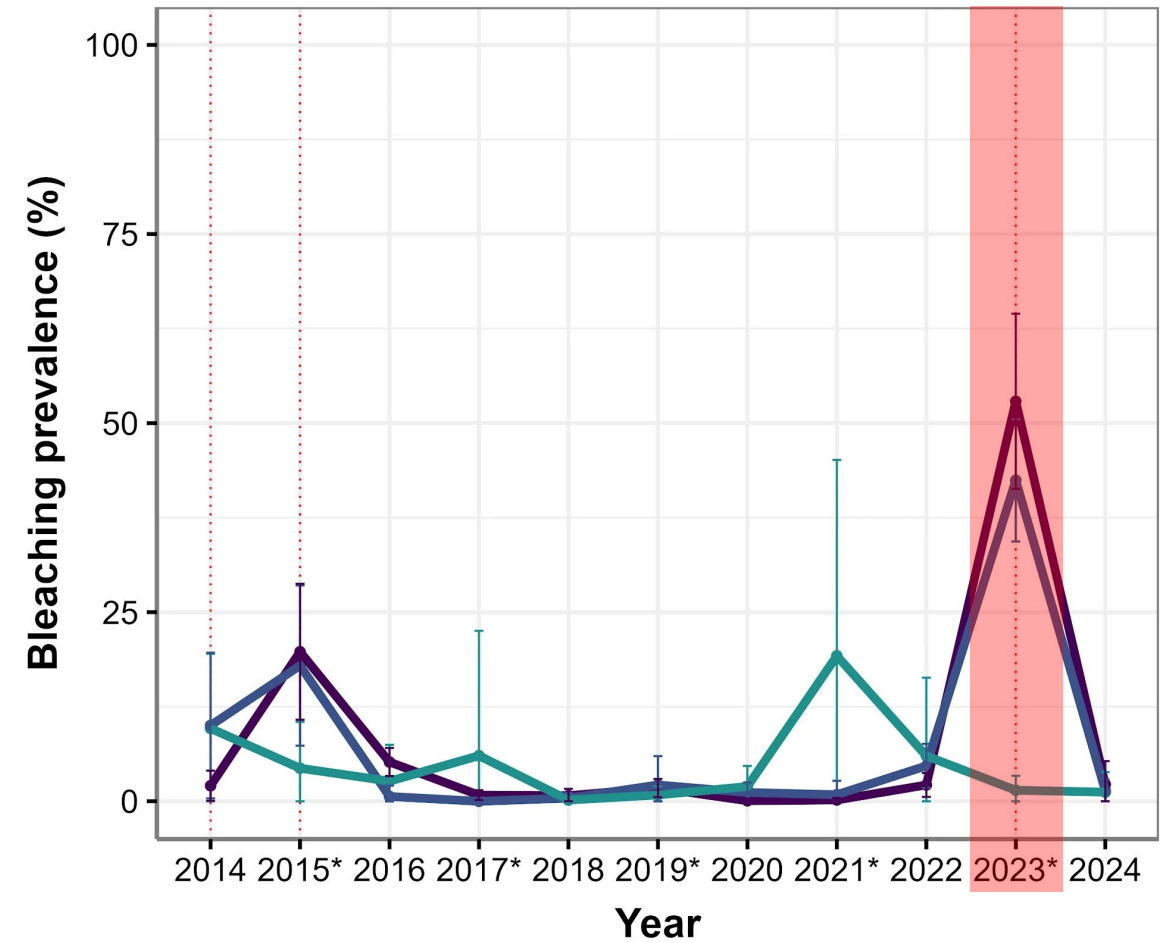
Bleaching Prevalence

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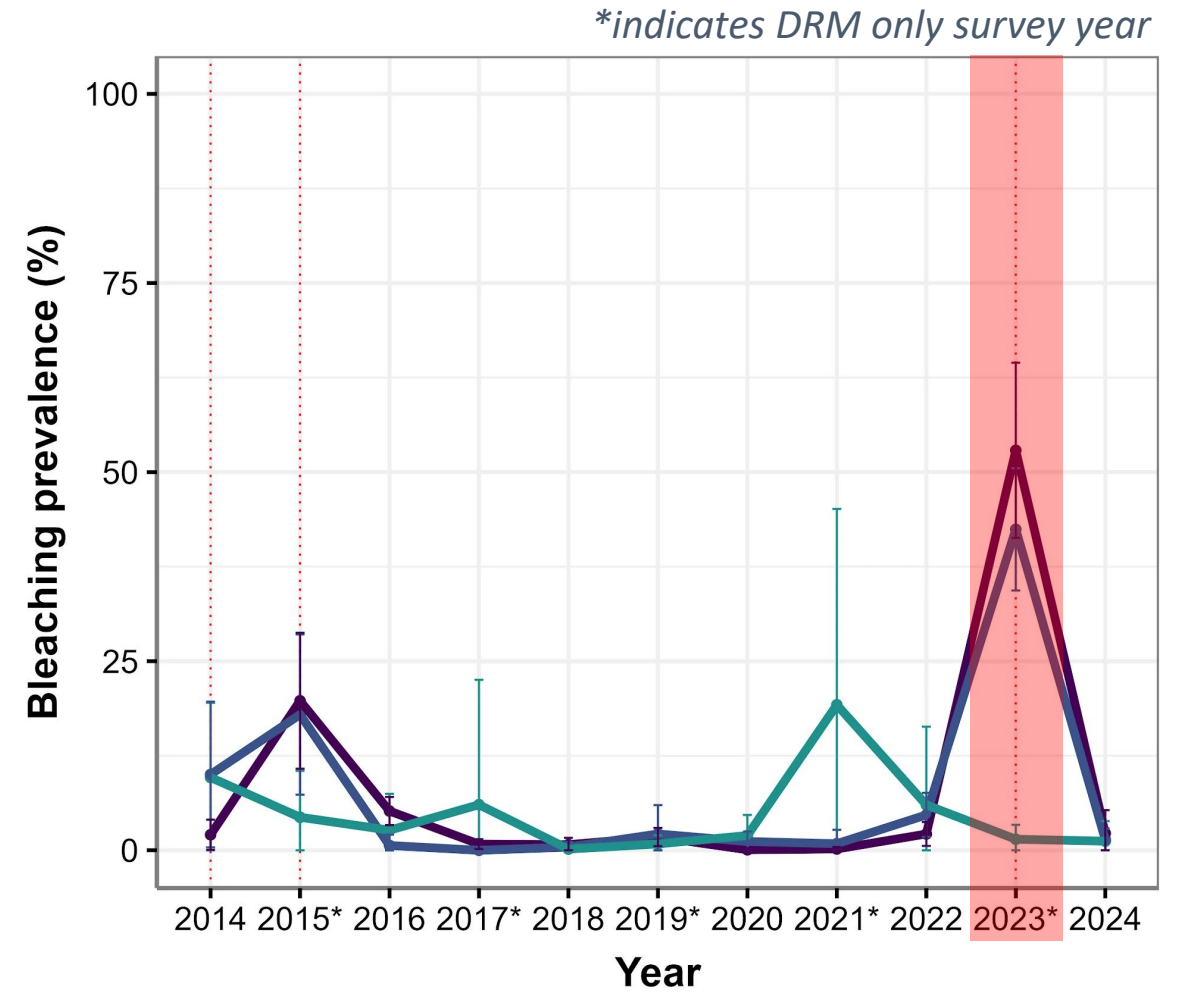
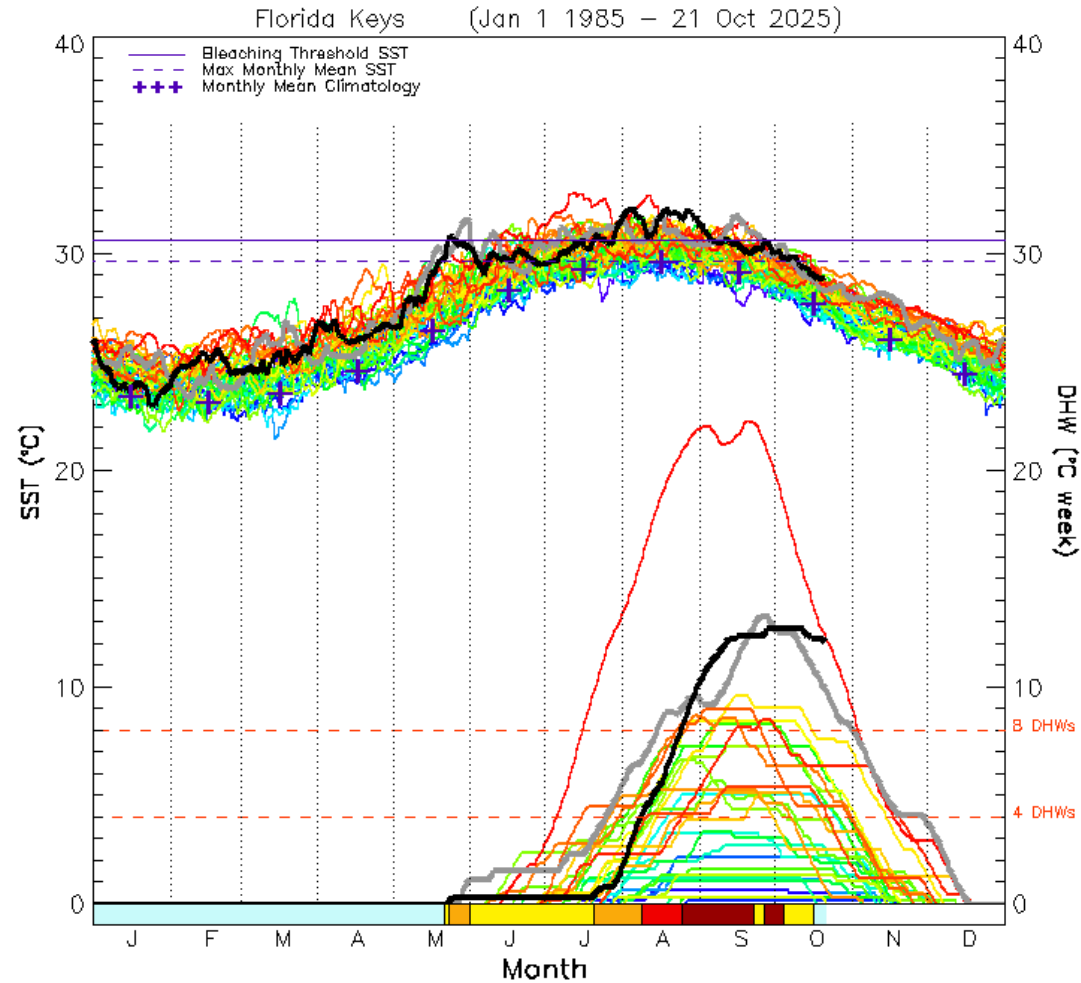


—●— Southeast Florida —●— Florida Keys —●— Dry Tortugas

*indicates DRM only survey year



Bleaching Prevalence

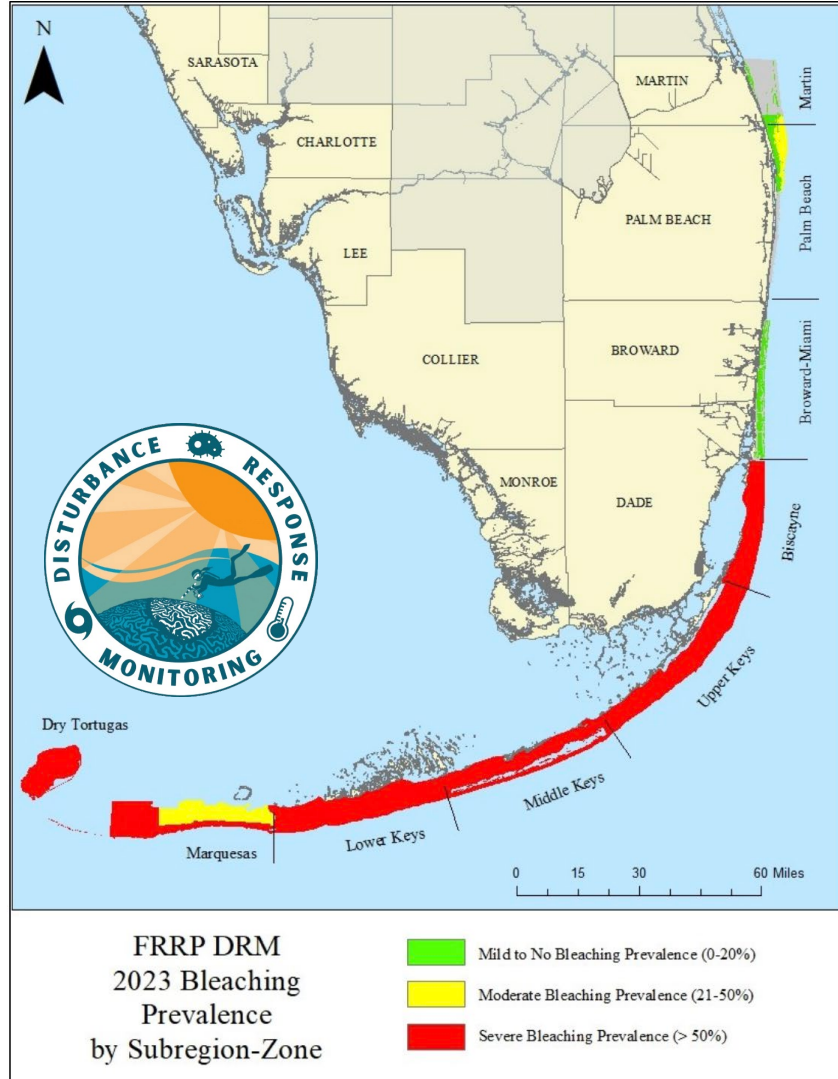


No Stress Watch Warning Alert Level 1 Alert Level 2

(NOAA Coral Reef Watch, 2025)

— Southeast Florida — Florida Keys — Dry Tortugas

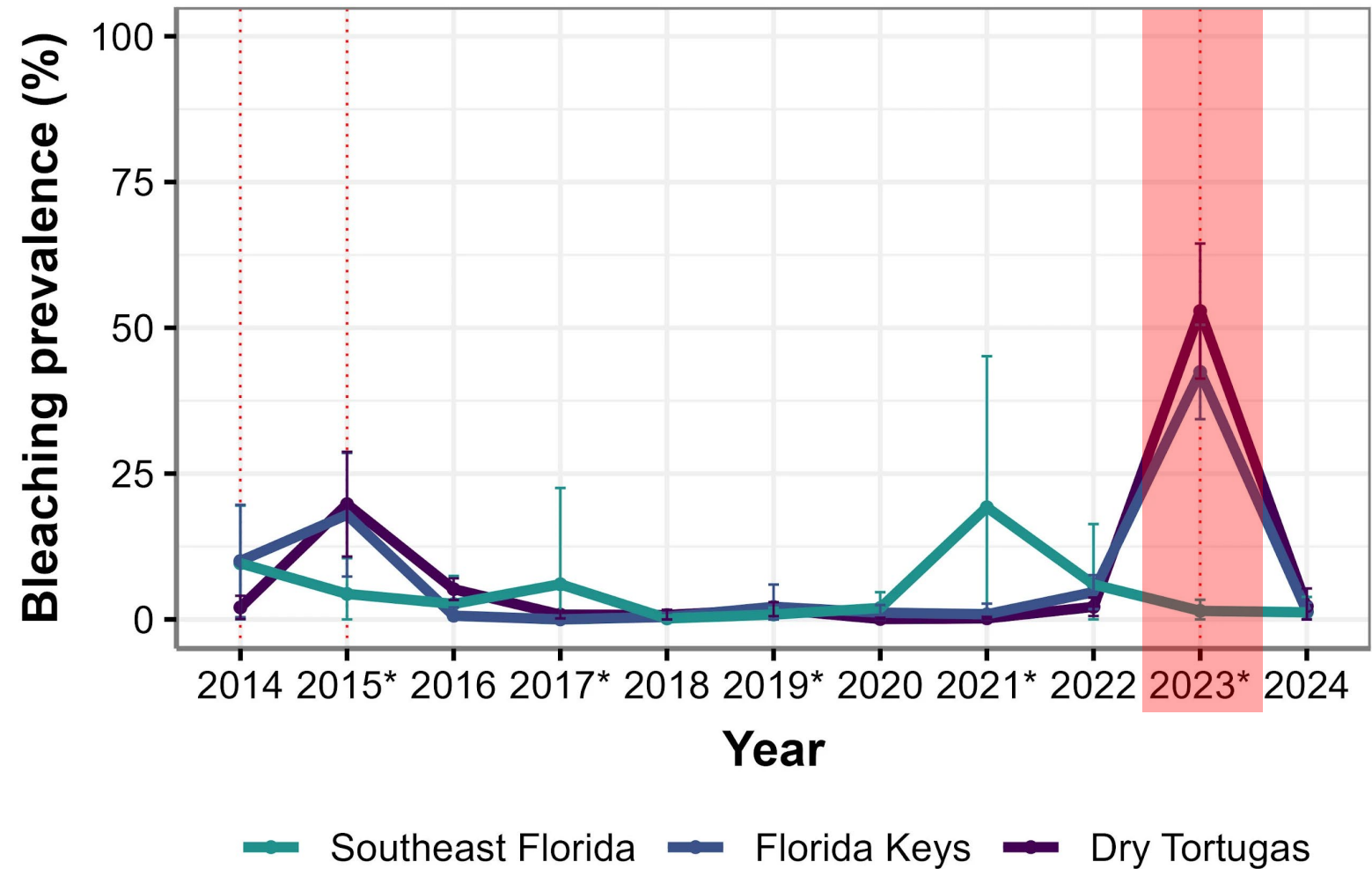
Bleaching Prevalence



(Stein & Ruzicka, 2023)

Florida

**indicates DRM only survey year*



Results

Consistently Bleached Species



Siderastrea spp.

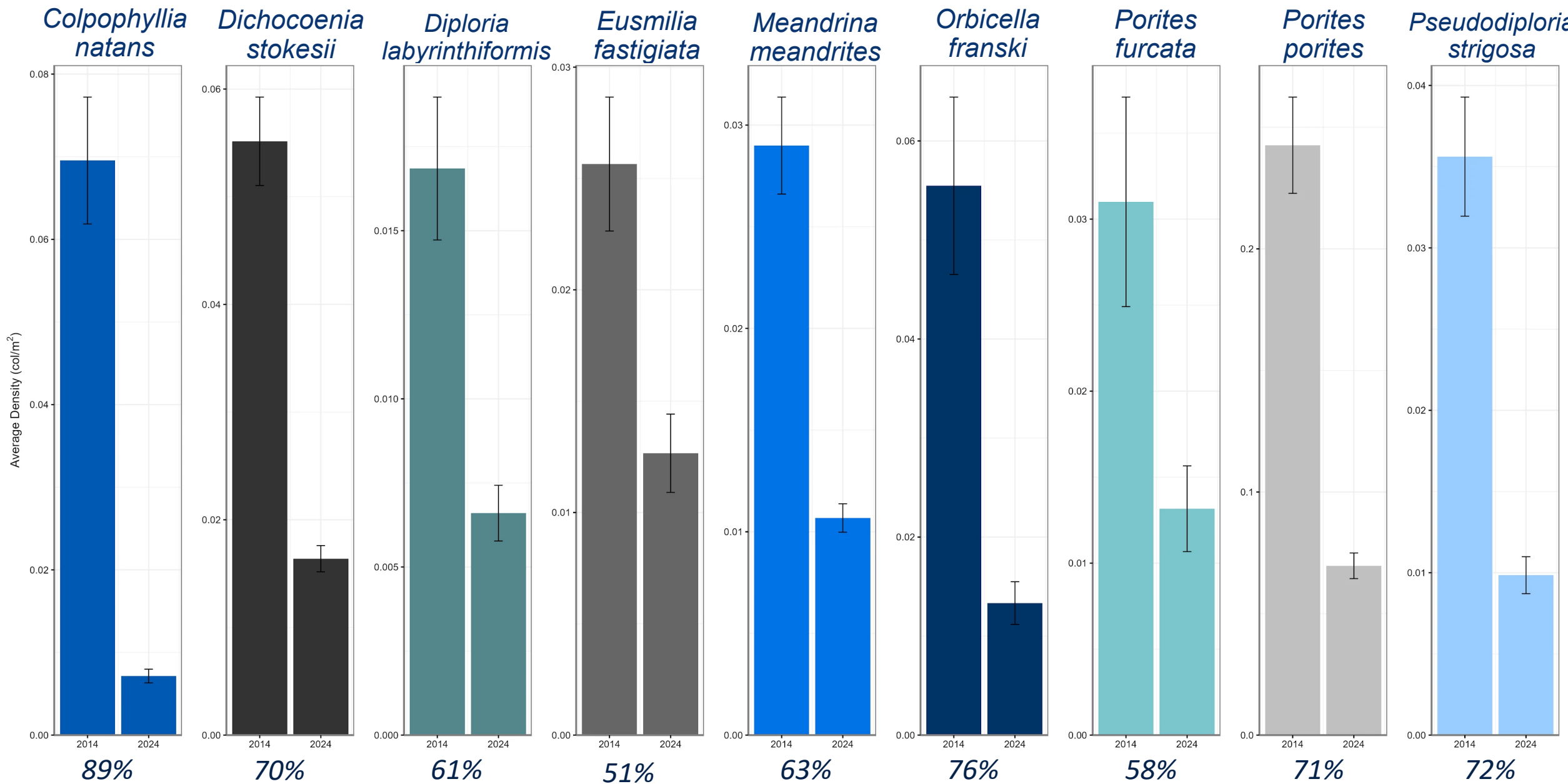


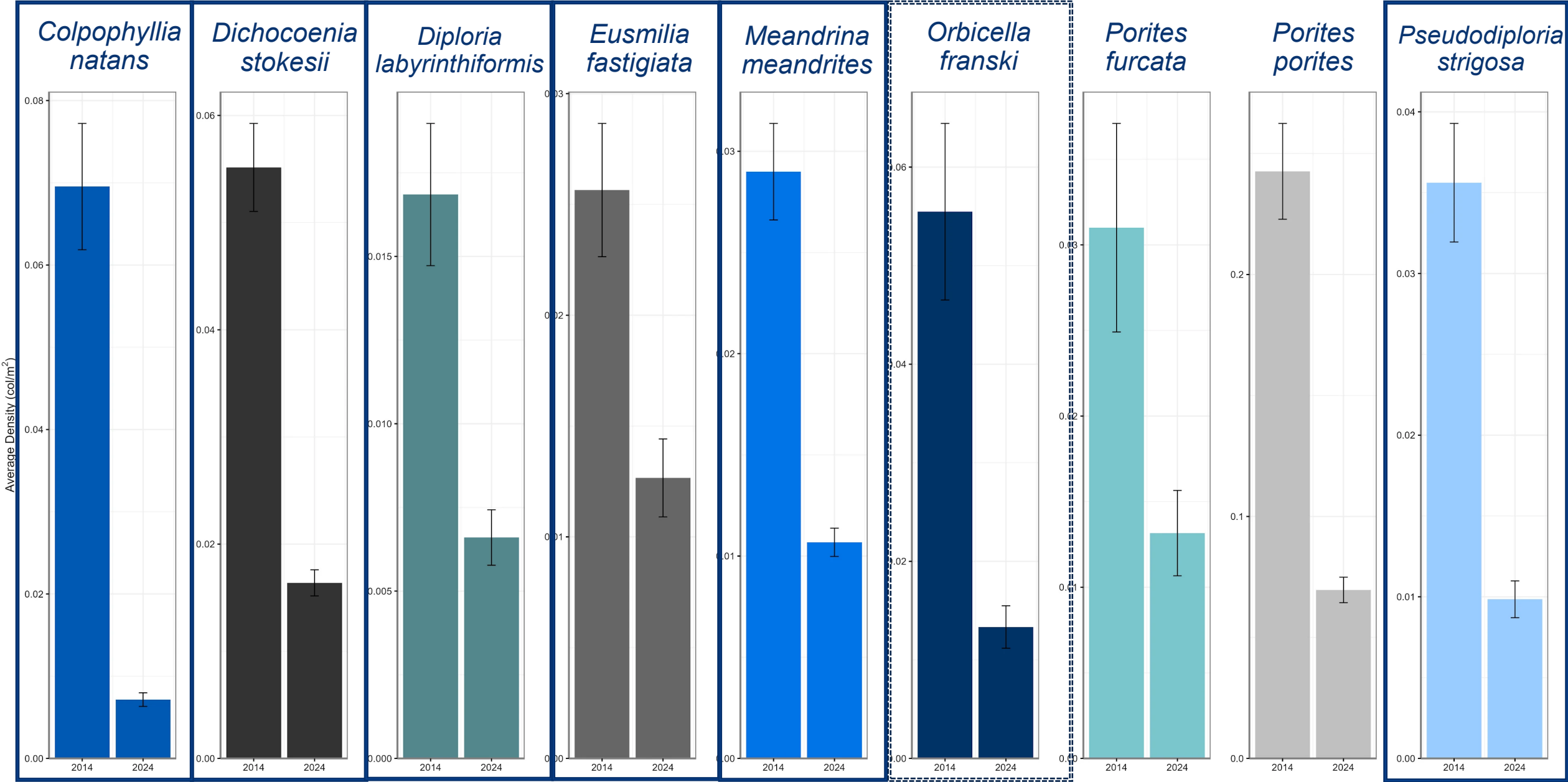
Photo credit: Lindsay Dade

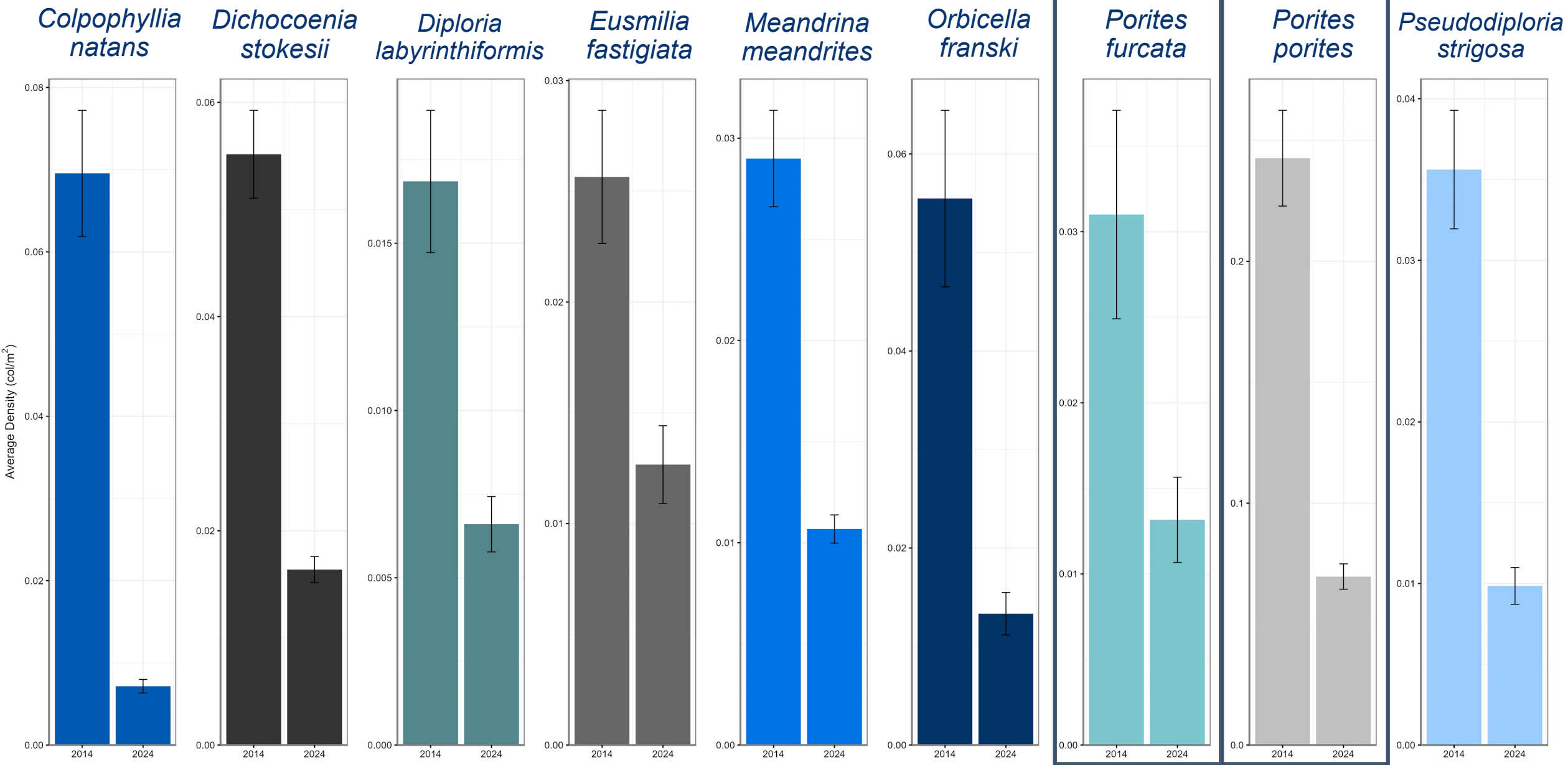
Agaricia spp.

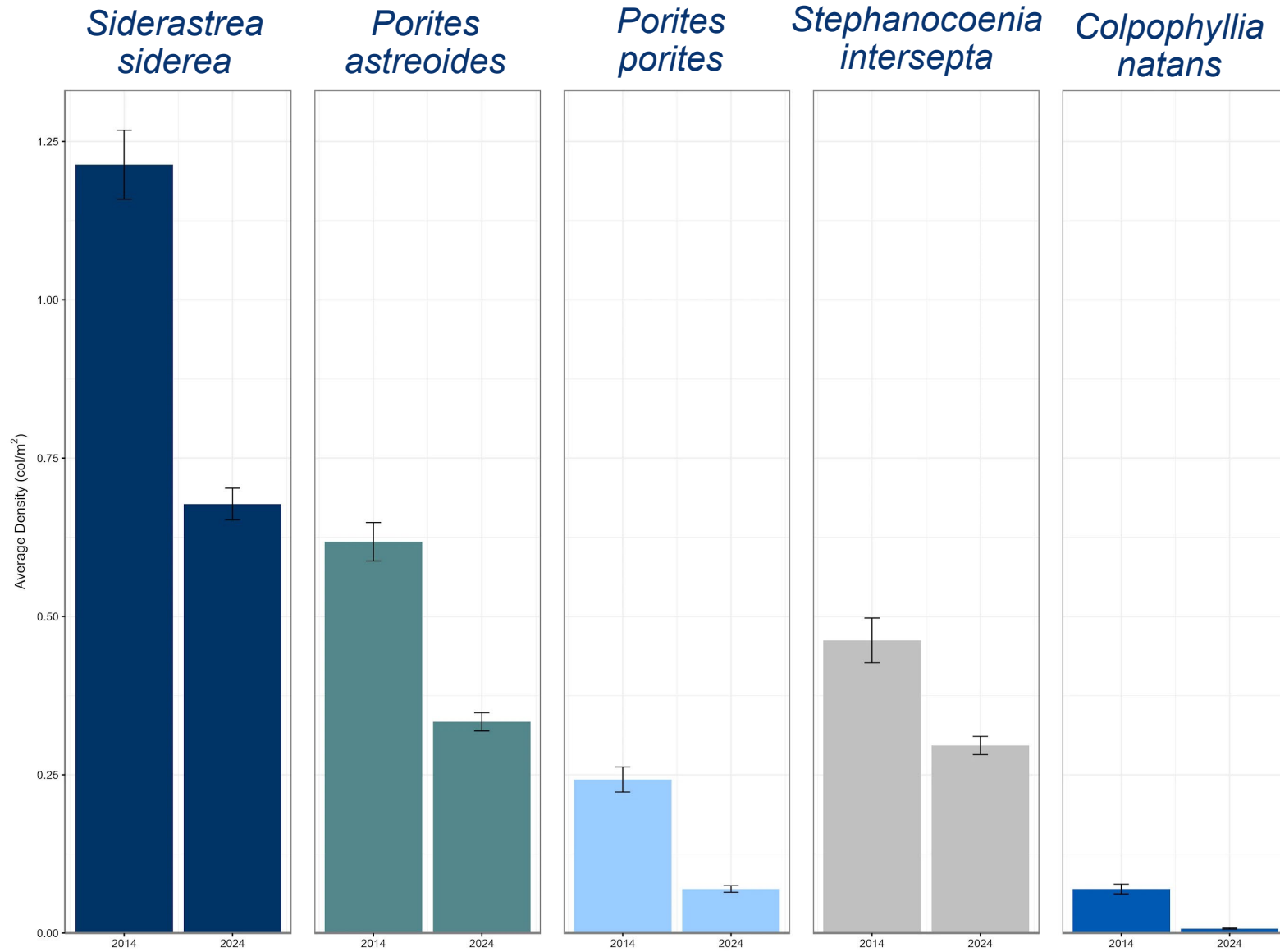


Porites spp.









Absolute Coral Density

- Most are sensitive to bleaching
- Greater absolute loss → greater coral coverage loss

KEY POINTS

↓ CORAL COVER

Across all regions, but
Florida Keys hit worst

↑ BLEACHING

Lots of paling across years
regardless of heat stress
2023 major bleaching

↓ CORAL DENSITY

Indications that SCTLD
drove species declines

SYNERGISTIC IMPACTS

Dual stressors reducing
coral diversity
and density



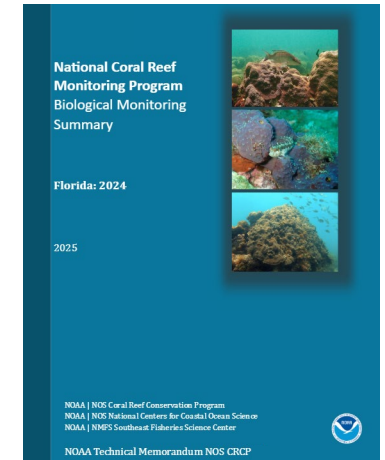
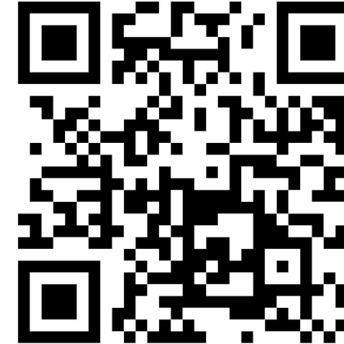
Thanks to these Partners

Questions?

Nicole Krampitz

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Scan for Florida
2022 Tech Memo



(2024 Tech Memo in prep.)

Data Resources:

https://github.com/MSE-NCCOS-NOAA/NCRMP_benthics

<https://ncrmp-visualization-tool-noaa.hub.arcgis.com/>



References

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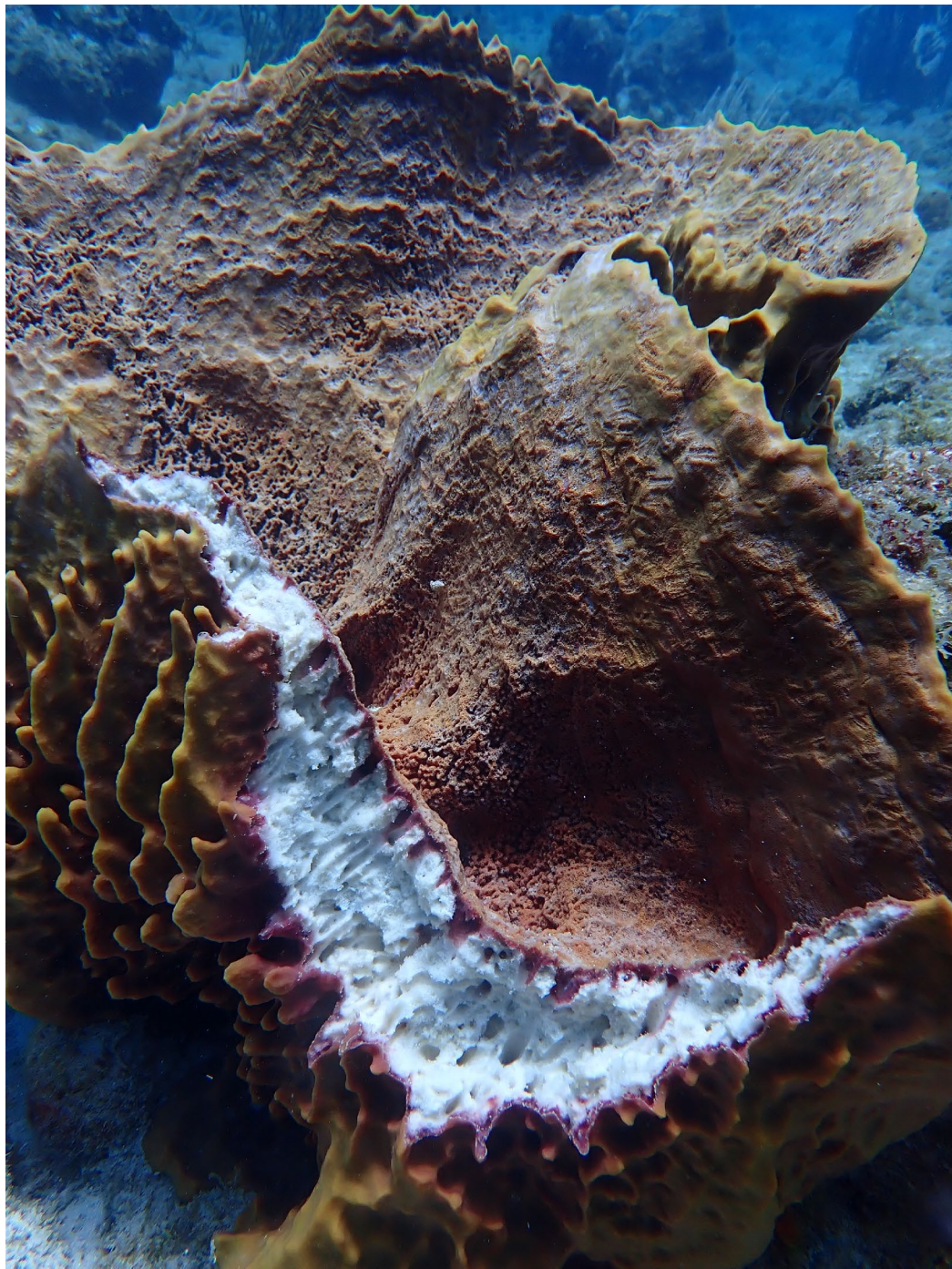
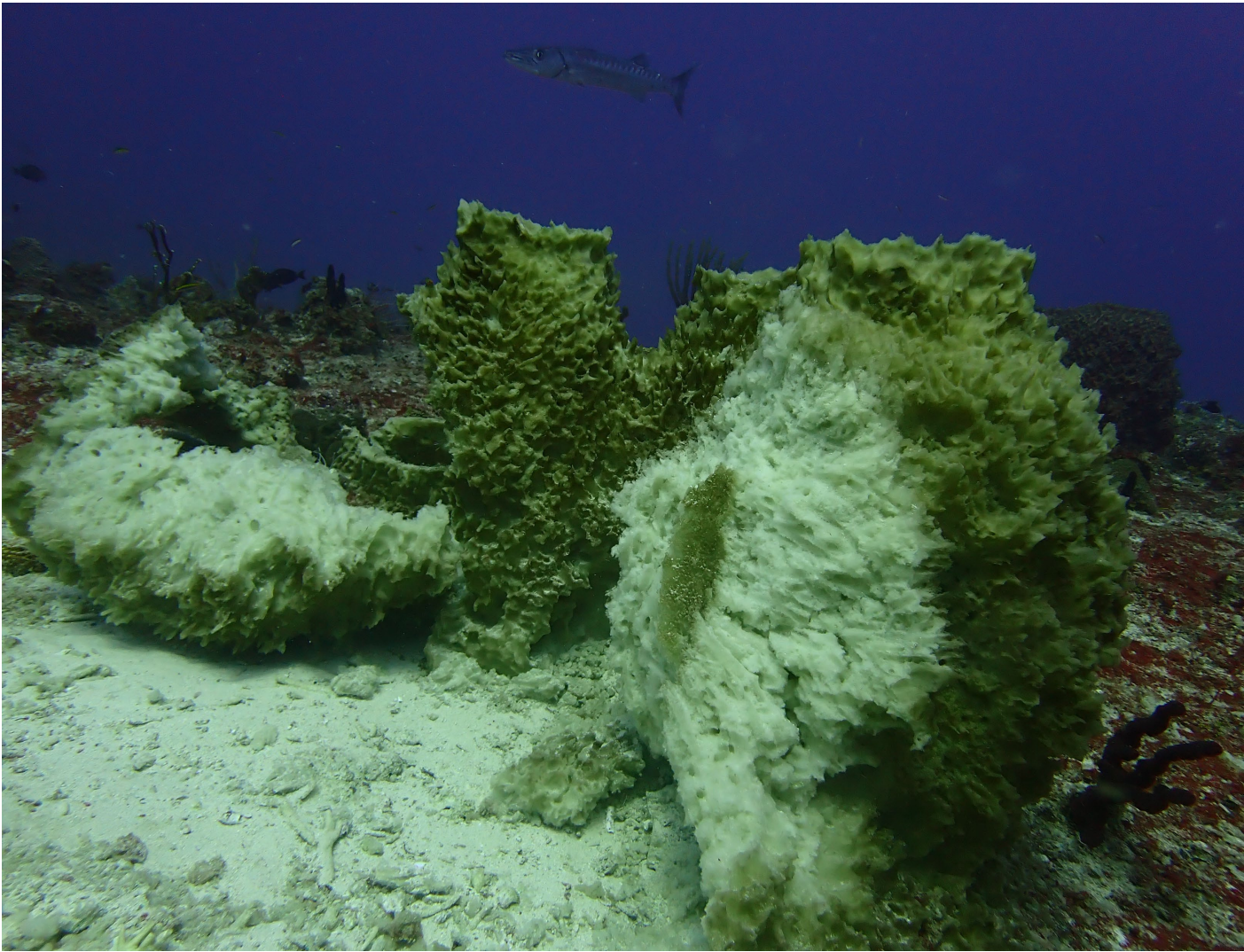
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Results

Overall Coral Density

