

Advancing Coastal Habitat Data Integration to Better Facilitate Understanding and Management of Coastal Resources

38th National Conference on Beach Preservation Technology
Florida Shore & Beach Preservation Association
Embassy Suites by Hilton, Panama City Beach, February 5-7, 2025

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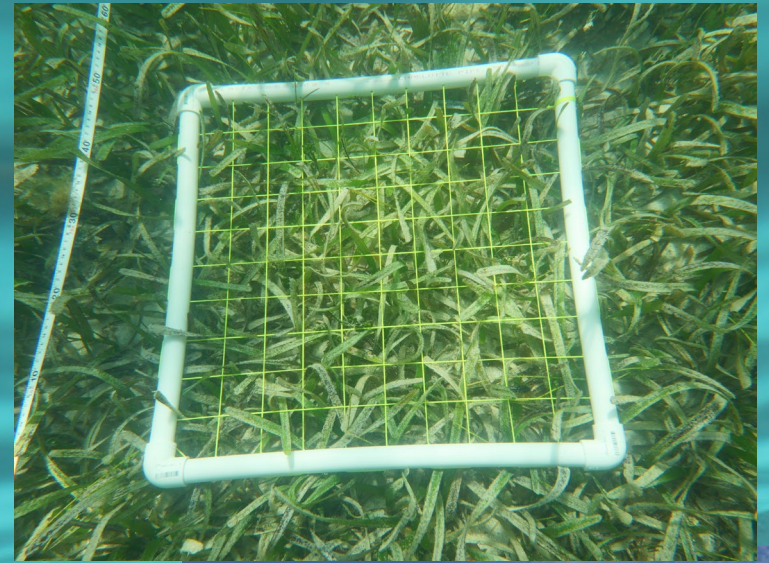
Factors Affecting Nearshore Coastal Submerged Habitats

- Substrate type—hard or soft
- Substrate depth
- Water depth—circulation and light penetration
- Water quality
- Species—types, distribution, condition
- Interaction of these factors leading to causation



Current Types of Data Collected

- Habitat monitoring—select sites and sample them on regular basis
- Large-scale regulatory monitoring—sample sites before and after activities
- Scientific studies of specific locations, habitats or species (not addressing these)



EXAMPLES OF HABITAT MONITORING

Florida Keys National Marine Sanctuary EPA-funded programs since 1996

FWC Coral Reefs (Coral Reef Evaluation & Monitoring Project or CREMP)

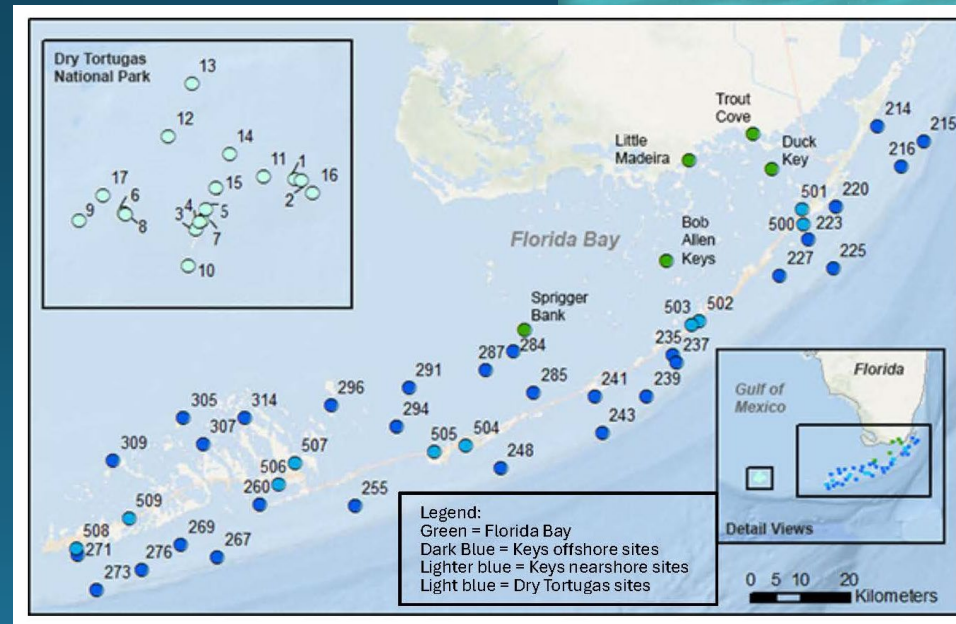
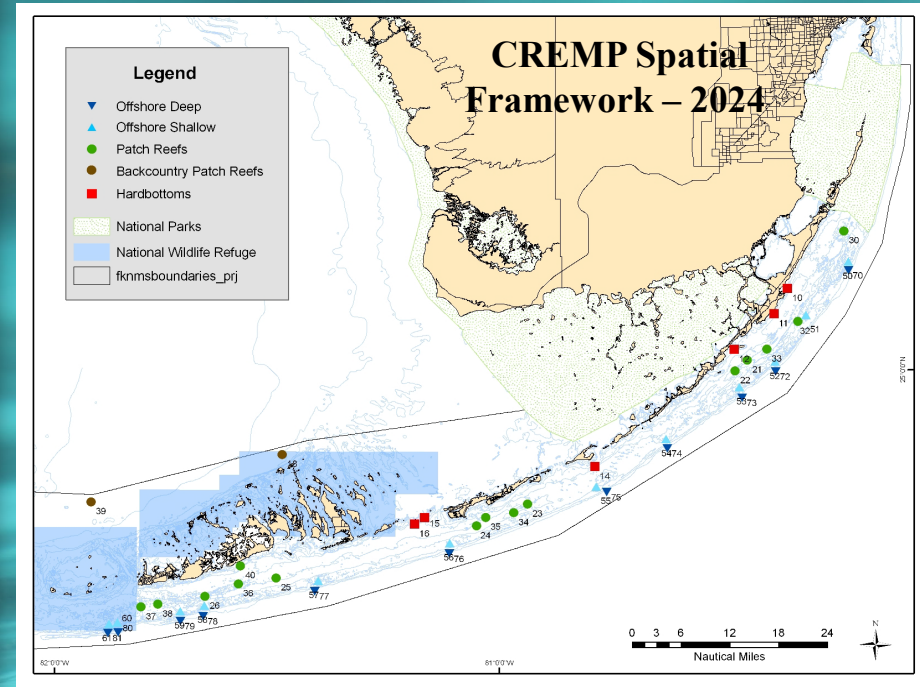
- 28 years
- 40 sites (of 340 sites throughout South Florida)
- 28 days in water in 2023
- Found significant trends, pretty much all down

FIU Seagrasses

- 27 years
- 40 sites coinciding with WQ sites
- 7 distinctive benthic community types
- Found significant up and down trends

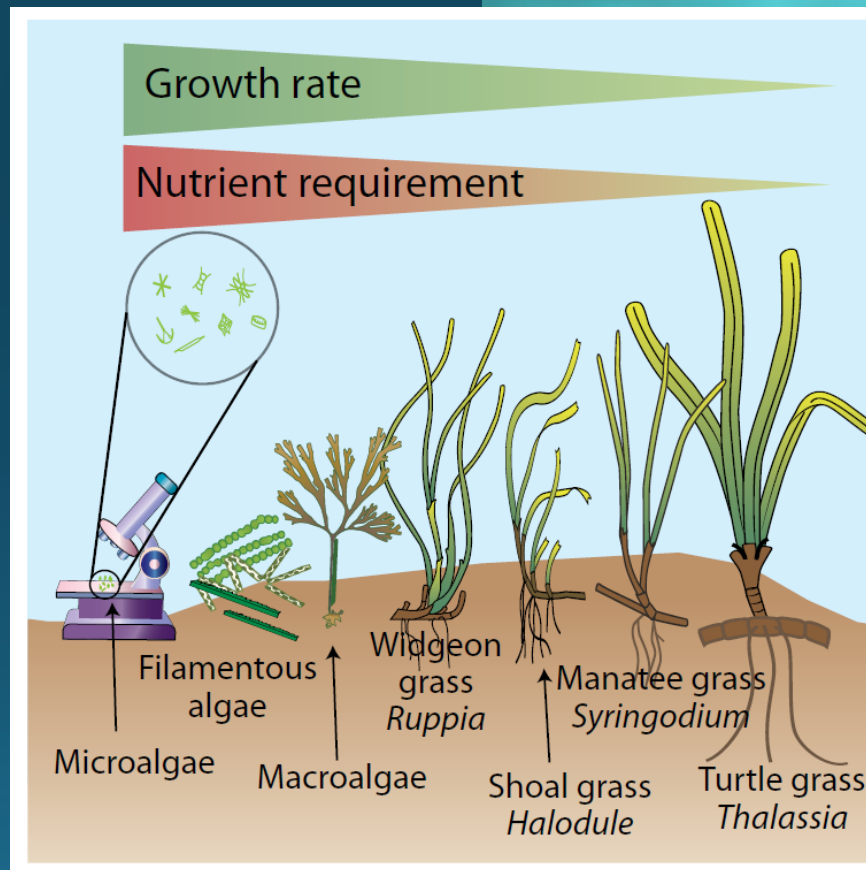
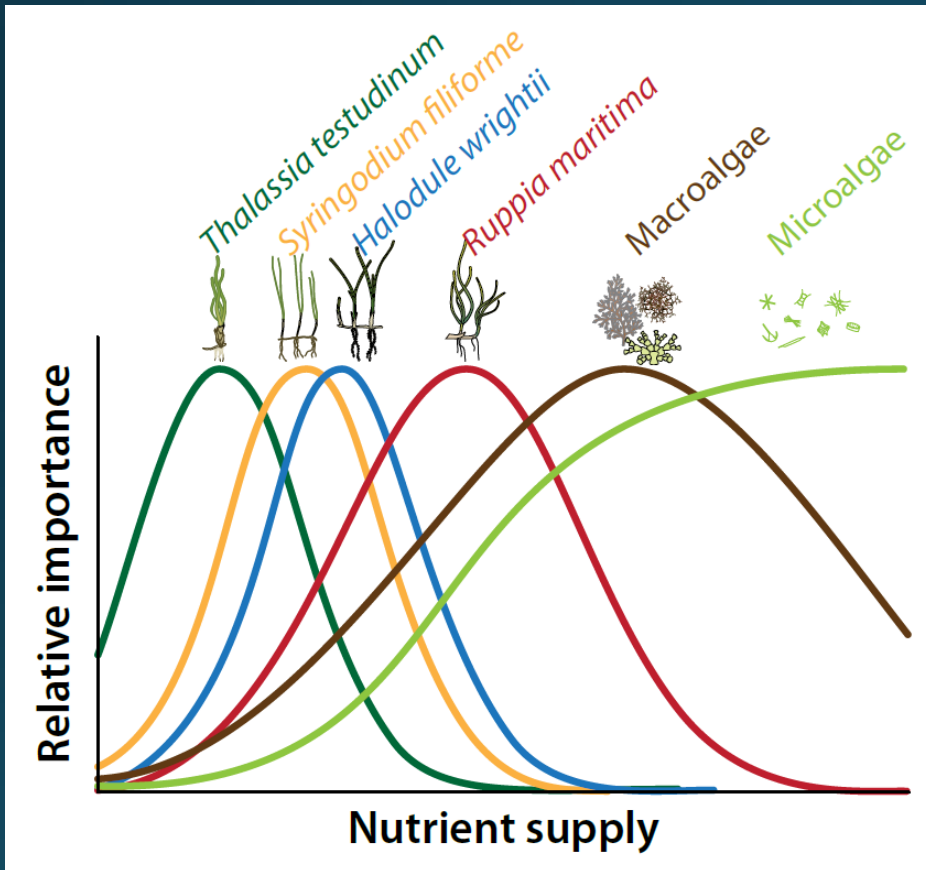
FIU Water Quality

- 29 years, quarterly
- 159 sites in 2000, 120 since 2012
- Found significant up and down trends



KEYS & FLORIDA BAY SEAGRASS MONITORING CAUSATION RESULTS

As nutrients in water column increase, predominant species shifts from seagrass to algae, leading to macroalgae



EXAMPLE OF HABITAT MONITORING

DEP SEACAR Statewide Database

- 70+ organizations—local, State, federal, NGOs
- Focused on protected marine areas including aquatic preserves, national estuary sites
- Goals:
 - Show statewide and site-specific **trends** over time
 - Allow **comparisons** between sites and across state
 - Illustrate **habitat change** over time driven by biotic and abiotic factors that define community structure
 - Allow **data/results to directly inform and/or be used** in local and state natural resource management decisions, submerged land planning and/or restoration
 - Allow for **site and/or regional specific environments** and conditions while being **comparable statewide**
- 229 databases (only protected areas data correlated)

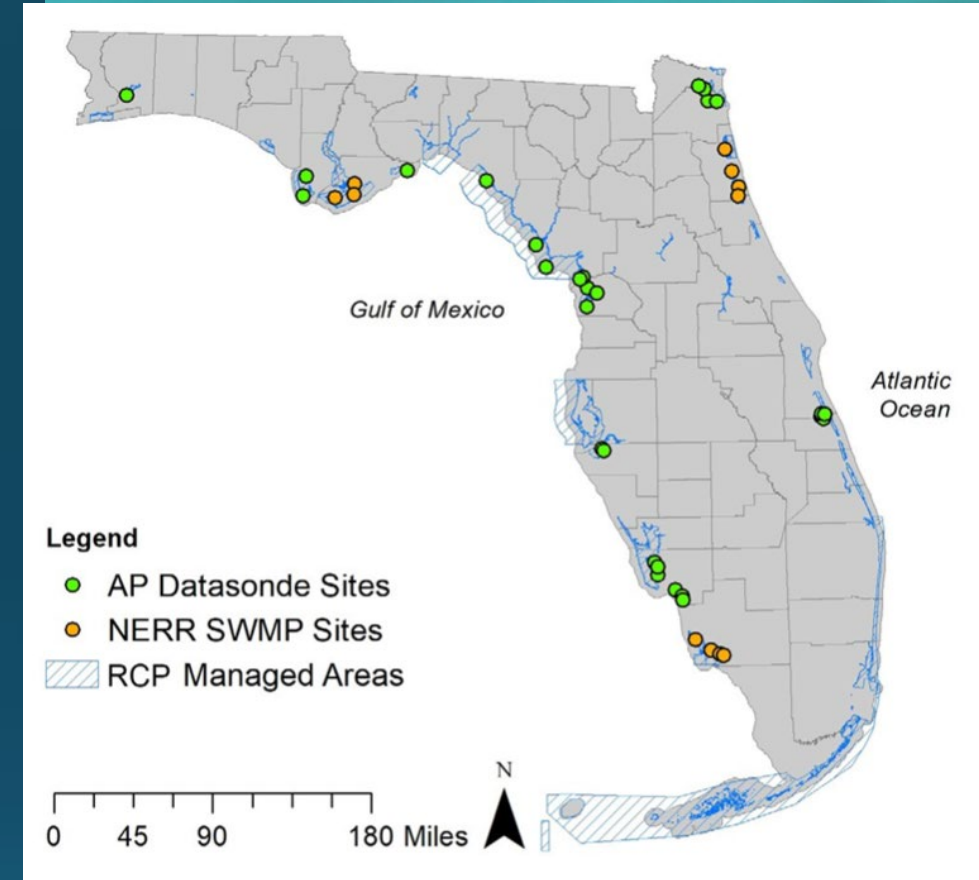


Figure 9, pg. 18, stations where continuous WQ monitoring was conducted. Source Florida Coastal Water Quality Assessment and Integration report updated 09-24.

EXAMPLES OF HABITAT MONITORING

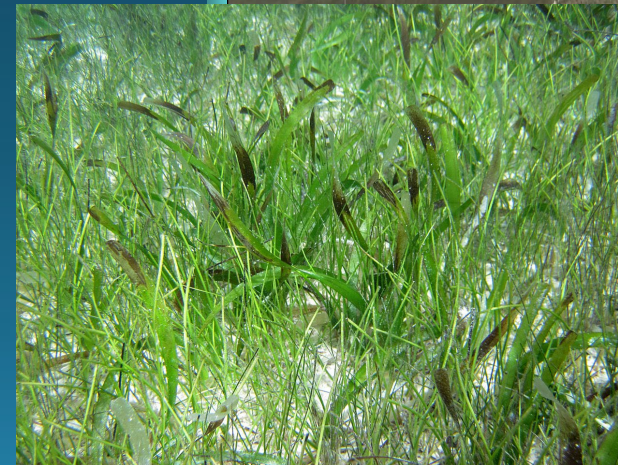
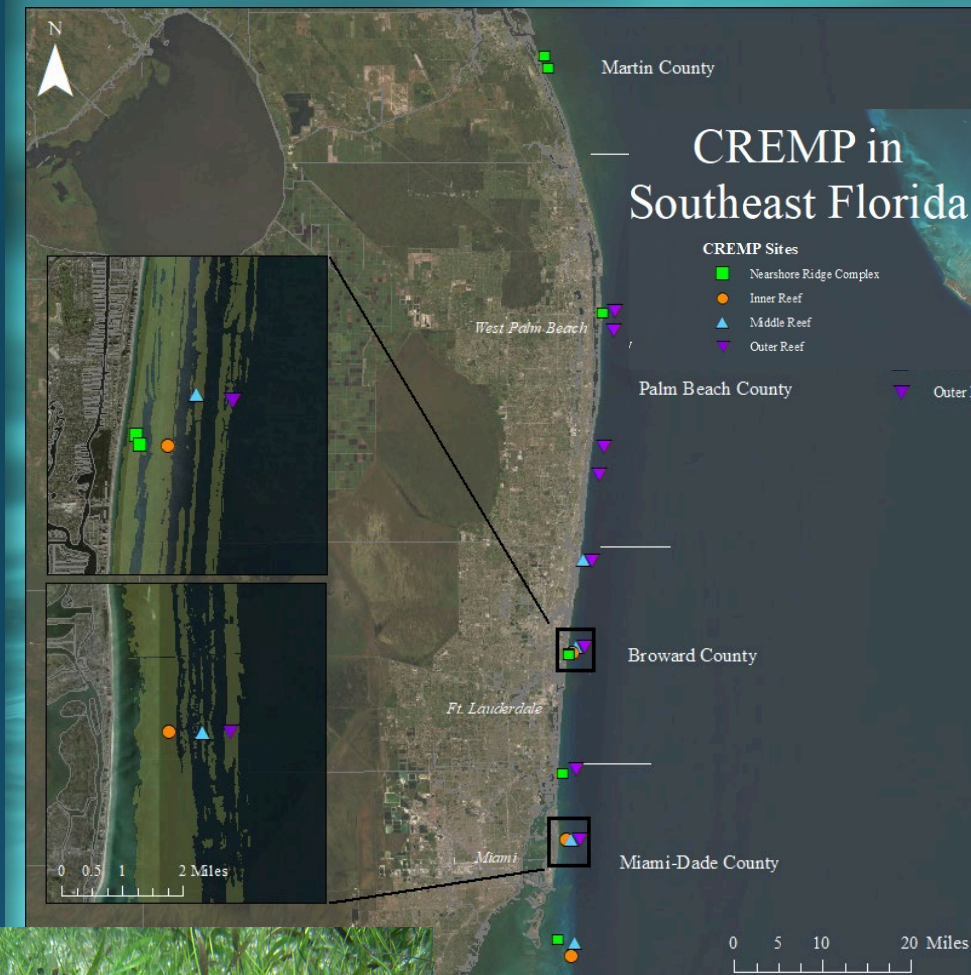
FWC Programs

CREMP in SE Florida (outside FL Keys)

- Started in 2003
- 10 sites at first then transitioned to 22 total
- Most data extracted from photos along transects
- Nova SE Univ field work, FWC data mgmt

SIMM (Seagrass Integrated Mapping and Monitoring)

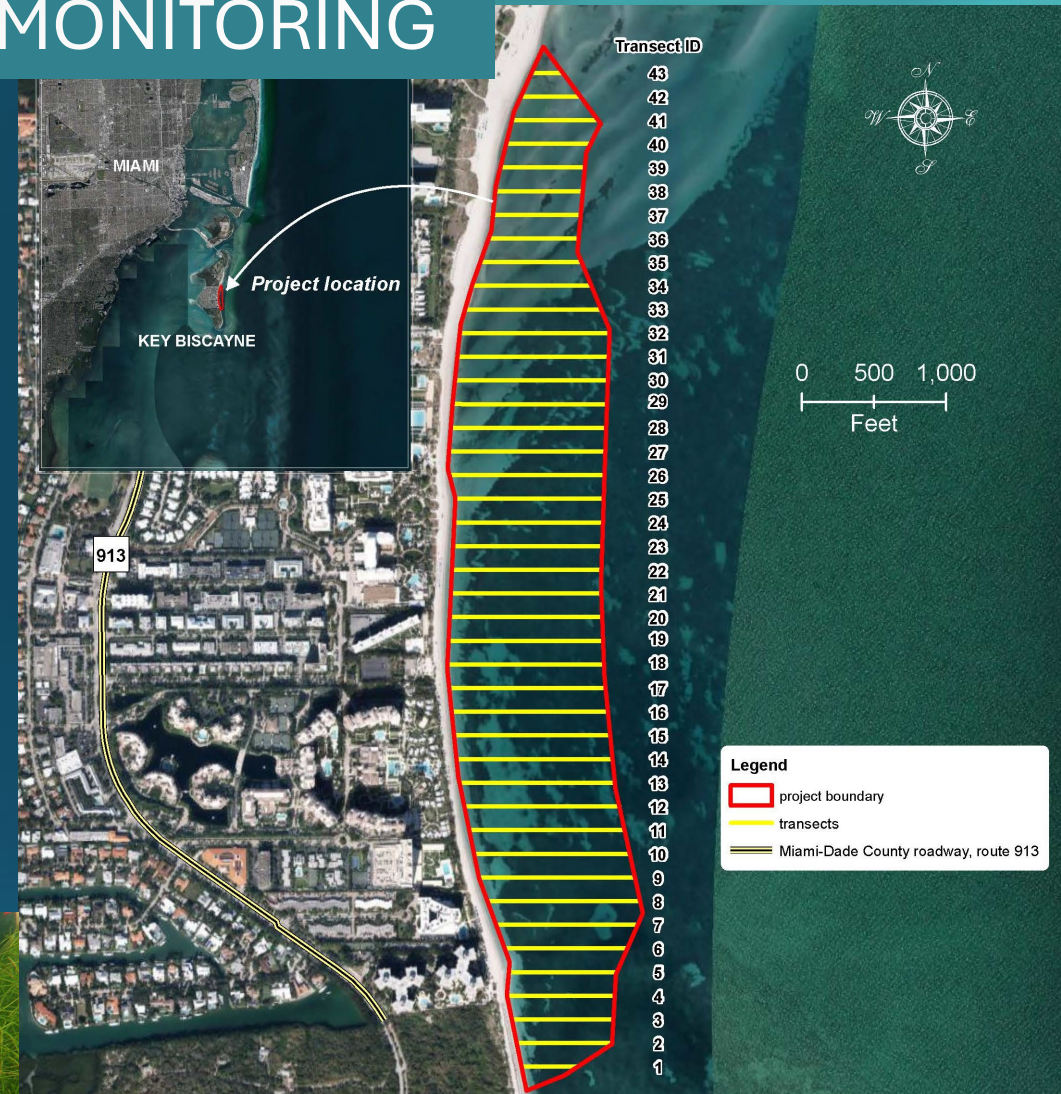
- Started in 2010
- GIS mapping now includes 54,471 records
- Different studies measure
 - Presence or absence of seagrass
 - Estimated density of seagrass shoots
 - Species composition of seagrass beds mostly with quadrats and Braun-Blanquet
 - Sampling either along transects or random
 - Sampling usually includes water temp and salinity



EXAMPLE OF LARGE-SCALE REGULATORY MONITORING

Key Biscayne USACE SAV Study

- Part of Miami-Dade CSRM Feasibility Study
- 145-acre project boundary
- 43 transects
- 1 m quadrats every 5 m
- 22 days with 2 dive teams
- Detailed SAV surveys and reports



EXAMPLE OF LARGE-SCALE REGULATORY MONITORING

Key Biscayne USACE SAV Study

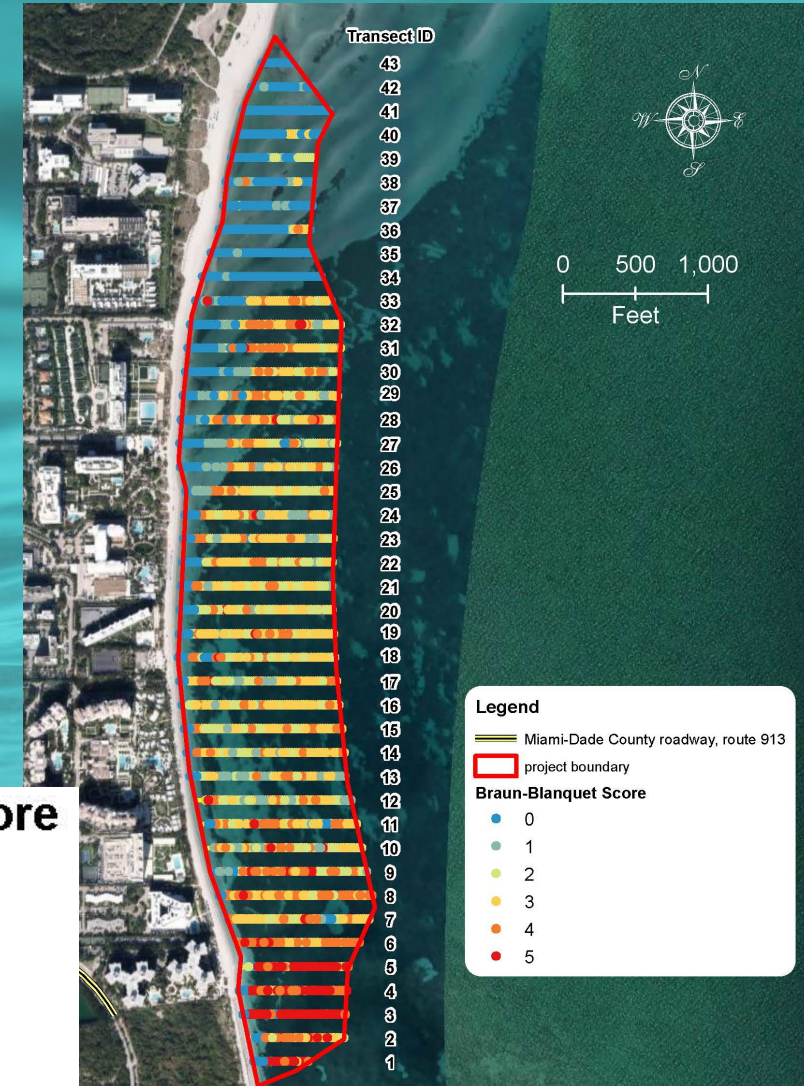
Data Collected (standard Corps protocol)

- Total seagrass density (Braun Blanquet)
- Percent cover by species
- Three density short shoot counts for each species in each Braun-Blanquet category
- Macroalgae density
- Seagrass health
- Substrate conditions
- Epiphytic coverage
- Marine fauna
- Other notable conditions/observations

Braun-Blanquet Score

- 0
- 1
- 2
- 3
- 4
- 5

Total seagrass coverage along transects



EXAMPLE OF LARGE-SCALE REGULATORY MONITORING

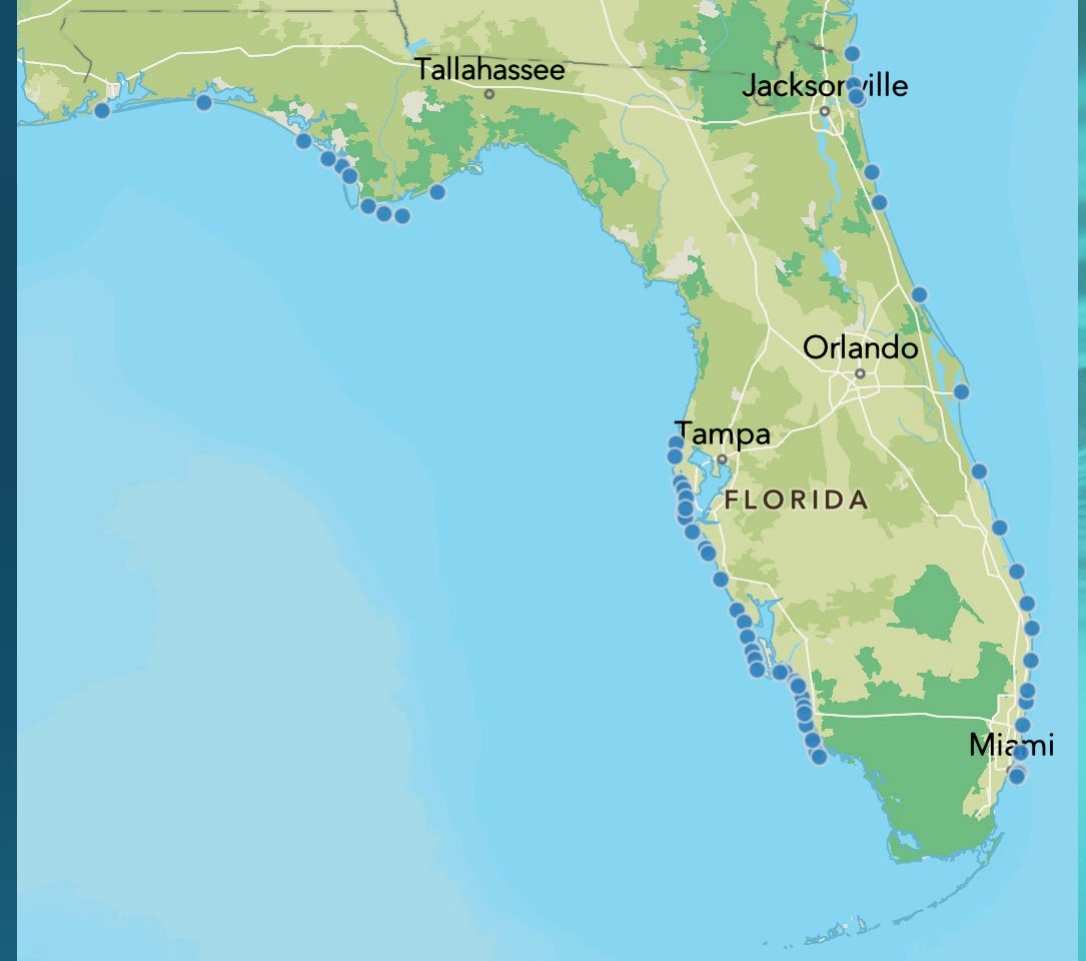
Key Biscayne USACE SAV Study

Frequency of Occurrence, Mean Seagrass Density and Mean Seagrass Abundance by Transect

Transect Number	Frequency of Occurrence	Density		Abundance	
		Mean (%)	Standard Deviation (%)	Mean (%)	Standard Deviation (%)
1	19/26	61.27	39.78	83.84	14.15
2	34/38	58.58	27.44	65.47	19.47
3	42/45	83.33	22.96	89.29	4.63
4	40/46	72.72	29.81	83.63	9.47
5	41/43	79.67	22.57	83.56	14.21
6	52/52	71.15	13.85	71.15	13.85
7	54/60	51.33	23.47	57.04	16.78
8	61/65	59.00	21.22	62.87	15.26
9	59/64	56.41	26.93	61.19	22.13
10	63/63	48.83	21.94	48.83	21.94
11	58/63	51.29	24.73	55.71	20.36
12	62/62	42.11	22.60	42.11	22.60
13	61/66	36.79	24.39	39.80	22.85
14	63/67	45.93	20.32	48.84	17.17
15	63/67	44.93	21.02	47.78	18.22
16	65/67	47.01	16.58	48.46	14.57
17	63/67	45.16	22.38	48.03	19.83
18	56/67	40.75	26.15	48.75	20.58
19	60/66	47.73	21.72	52.50	16.27
20	58/65	41.71	20.86	46.74	15.79
21	59/64	43.16	20.60	46.81	16.93
22	55/64	41.83	22.37	48.67	15.63

Transect Number	Frequency of Occurrence	Density		Abundance	
		Mean (%)	Standard Deviation (%)	Mean (%)	Standard Deviation (%)
23	58/64	45.20	23.01	49.88	18.65
24	56/63	42.81	23.89	48.16	19.52
25	60/63	43.49	21.58	45.67	19.71
26	51/66	32.77	27.10	42.41	23.19
27	51/67	34.30	26.11	45.06	20.13
28	54/66	43.86	29.00	53.61	22.34
29	55/66	40.82	27.64	48.98	22.63
30	47/65	34.06	29.46	47.11	24.08
31	47/65	41.09	29.46	56.83	17.14
32	49/64	39.75	30.62	51.92	24.20
33	42/58	38.34	29.43	52.95	20.28
34	2/51	0.12	0.71	3.00	2.83
35	1/43	0.23	1.52	10.00	0.00
36	8/39	9.41	21.33	45.88	23.64
37	5/38	1.37	5.28	10.40	11.84
38	14/37	13.08	24.30	34.57	28.91
39	14/35	10.23	16.20	25.57	16.23
40	7/38	8.18	18.20	44.43	12.80
41	1/37	0.03	0.16	1.00	0.00
42	3/26	0.27	1.00	2.33	2.31
43	0/14	0.00	0.00	0.00	0.00

RANGE OF LARGE-SCALE REGULATORY MONITORING



Left: Florida coastal areas that receive sand placement, 693 records, info updated 02-20-24. Right: Florida coastal inlets, 63 records, info updated 08-22-23. Source: DEP Geospatial Open Data.

Issues integrating large-scale regulatory monitoring data

QUESTION

Monitoring focused on required permitting parameters rather than scientific scope



ANSWER

Data collected is as or more detailed than habitat monitoring and should consider habitat change causation

QUESTION

Timeframes are based on project need rather than regular frequency



ANSWER

Shoreline nourishment occurs approx. every 7-9 years so could create own cycle

RANGE OF LARGE-SCALE REGULATORY MONITORING



Issues integrating large-scale regulatory monitoring data (cont.)

QUESTION

Data is not all available in permit applications



ANSWER

USACE requires all data along with report so it could be submitted with application

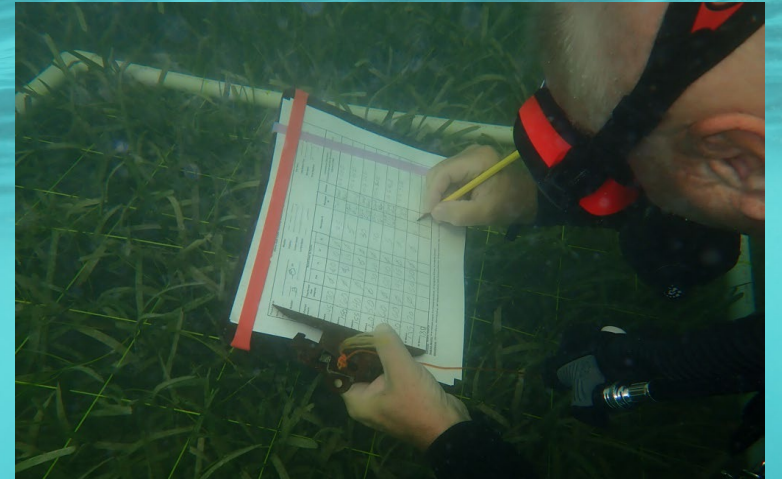
QUESTION

Acquiring and analyzing data would be very time consuming



ANSWER

This could be a task well-suited for AI



Comparison of habitat and large-scale monitoring goals

SEACAR Goals	Regulatory Monitoring Opportunities
Site-specific and Statewide trends and comparisons	Data comparison throughout most of Florida coastline
Habitat change driven by biotic and abiotic factors	Regulatory monitoring should consider these factors and include WQ and substrate data
Results should inform local and State submerged land management decisions	Long-term data comparison could greatly facilitate beach, inlet and port mgmt decisions
Site and regional specific environments and conditions comparable Statewide	Rigorous data from 770 large sites throughout most of coastline could make major additions

Large-Scale Regulatory Monitoring

- ✓ Rigorous and extensive data
- ✓ 740 sites along most of Florida coastline
- ✓ Meets goals of Florida habitat monitoring
- ✓ Could make significant contribution to understanding of Florida coastal processes
- ✓ Leverages extensive repeated public assessment efforts for more broad purpose

Incorporating these findings into Statewide databases is worth doing!

