



SE FL Coral Reef Ecosystem Conservation Area Water Quality Monitoring Program

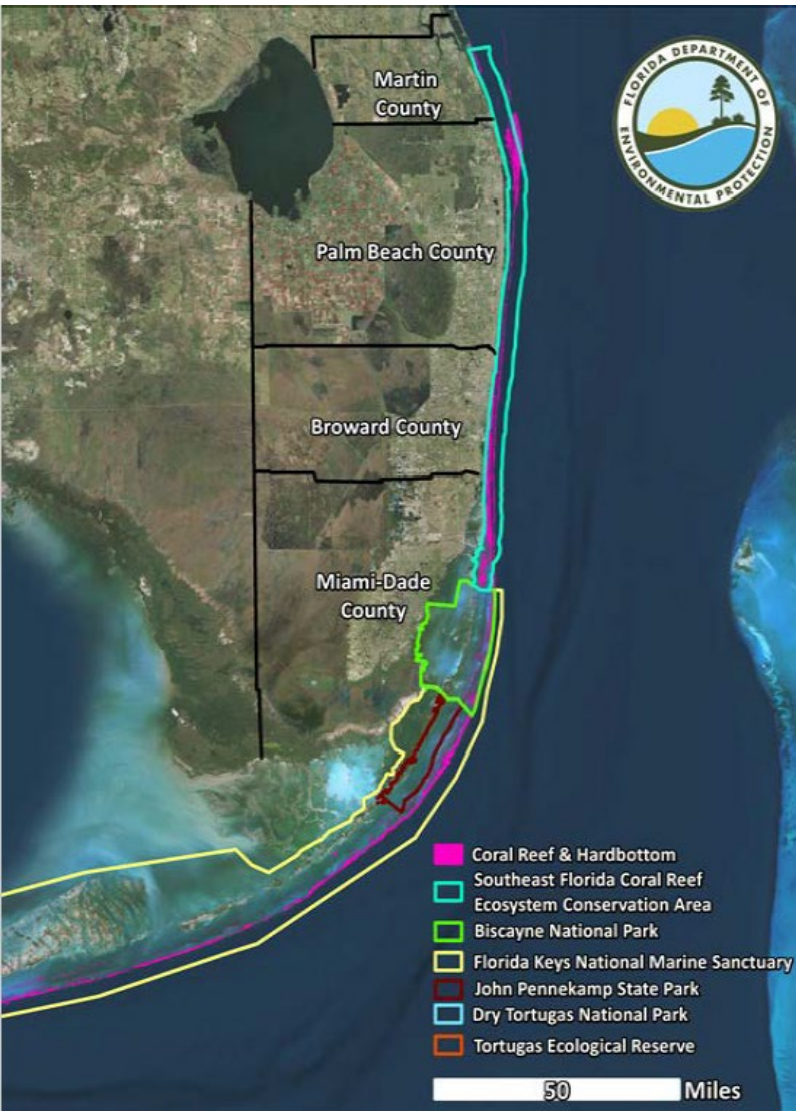
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Slides adapted from: Dave Whitall, Coastal Ecologist, NOAA



SE FL Coral Reef Ecosystem Conservation Area (ECA)

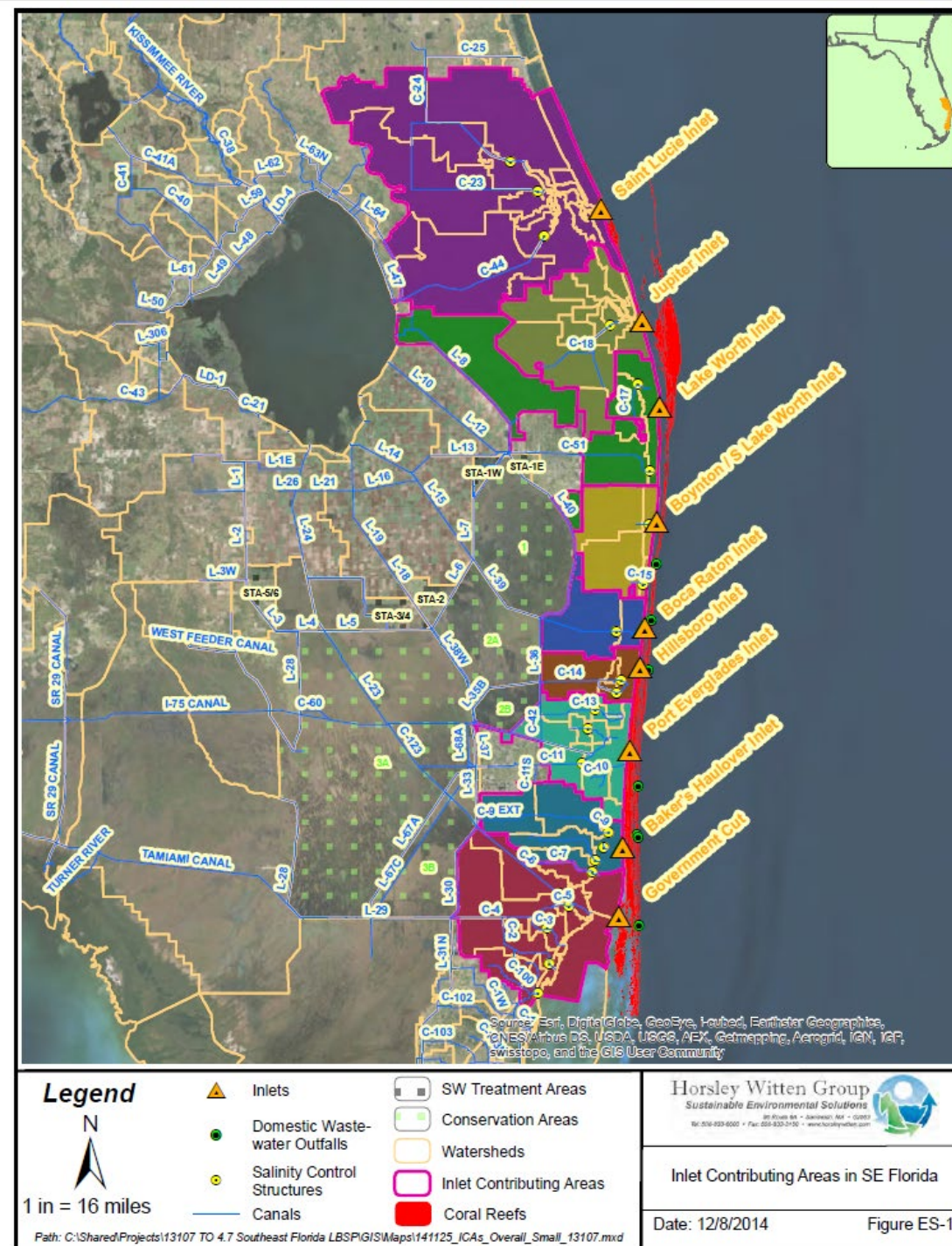


- Designated by Florida Legislature
- July 2018
- Marine managed area
- Formerly SEFCRI or SE FL Region
- Waters off Martin, Palm Beach, Broward, and Miami-Dade counties, from the St. Lucie Inlet to the northern boundary of Biscayne National Park



Inlet Contributing Areas (ICA)

- Delineated in 2015
- Sub-watersheds in SE FL
- 9 in ECA
- 2 priority ICAs
 - Boynton Beach ICA
 - Government Cut ICA





Water Quality and Coral Reefs

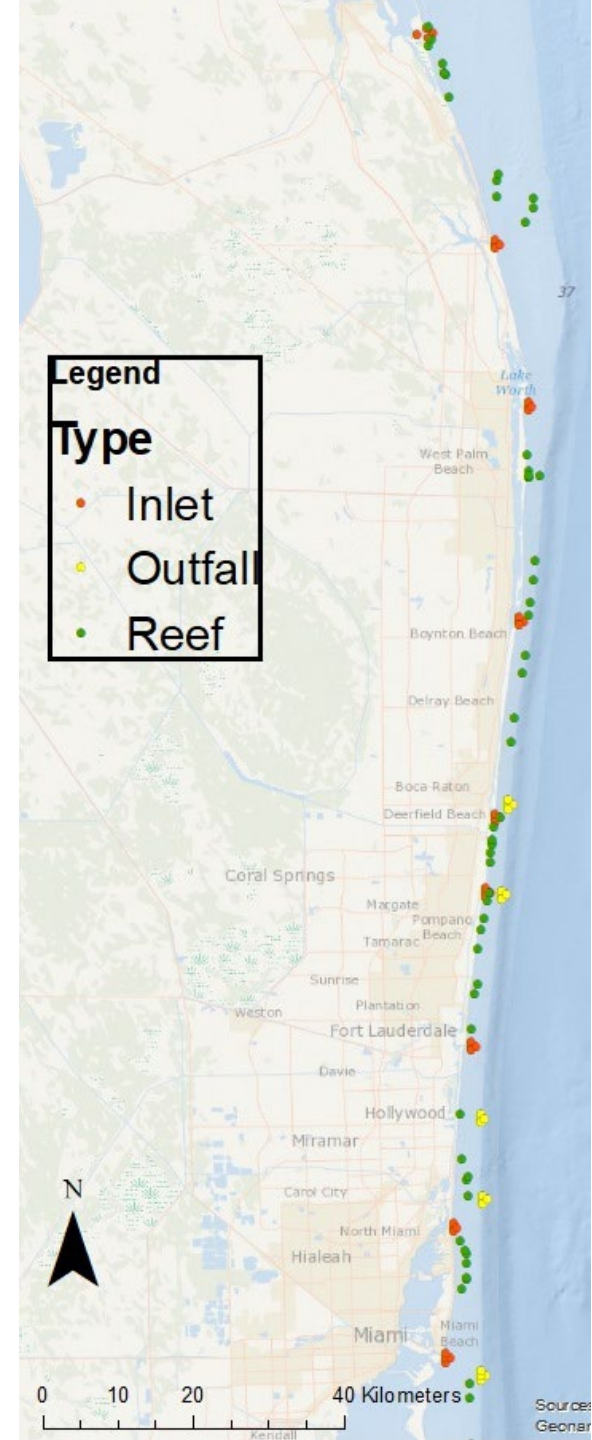
- Both point and non-point land-based sources of pollution (LBSP)
- Increased nutrients (N + P) can cause algae overgrowth on corals
- Increased sediment (turbidity) can cause smothering of corals
- Can also lead to increased incidences of coral bleaching and disease





Water Quality Monitoring Project

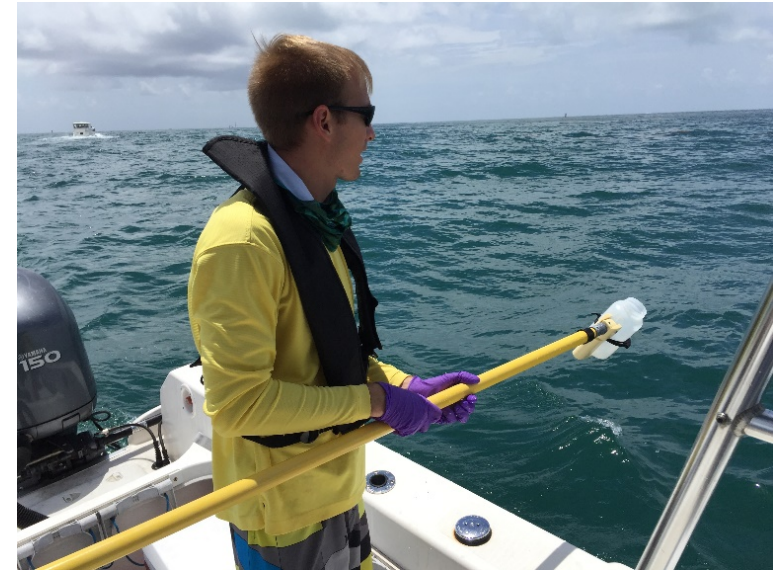
- 2015
 - Local experts/stakeholders to identify data gaps in water quality issues
- 2016
 - Sampling began in 2 ICAs
- 2017
 - Sampling to expand to all 9 ICA's
- 2016-2018
 - Data analysis featured in this presentation
- 2018-present
 - Sampling continues





Water Sampling

- 3 site types
 - Inlets, ocean outfalls, and coral reefs
- Monthly monitoring
- 115 samples across 9 ICAs each month
- Analytes
 - Nitrate/Nitrite
 - Ammonium
 - Urea
 - Total Nitrogen
 - TKN
 - Orthophosphate
 - Total Phosphorus
 - Silicate
 - TSS
 - Turbidity
 - Salinity



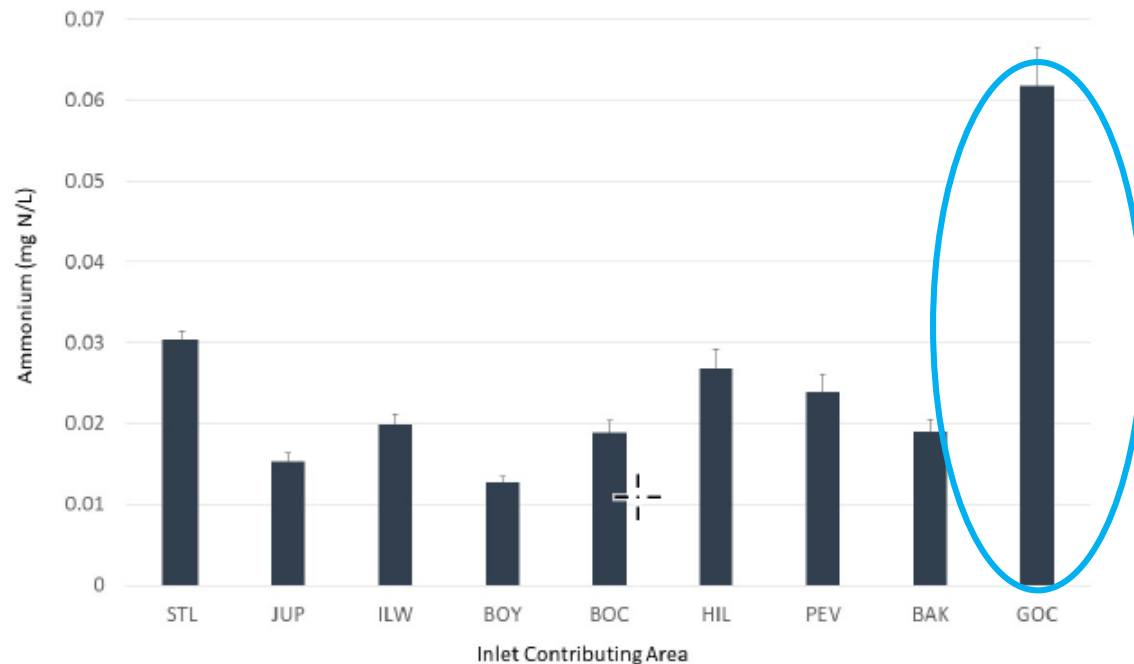


What do these data tell us?

1. We can see difference between the ICA's

- Silica highest in the north
- Ammonium highest in the south
- Attributable to land use (manageable)

Mean Ammonium by ICA



Land Use

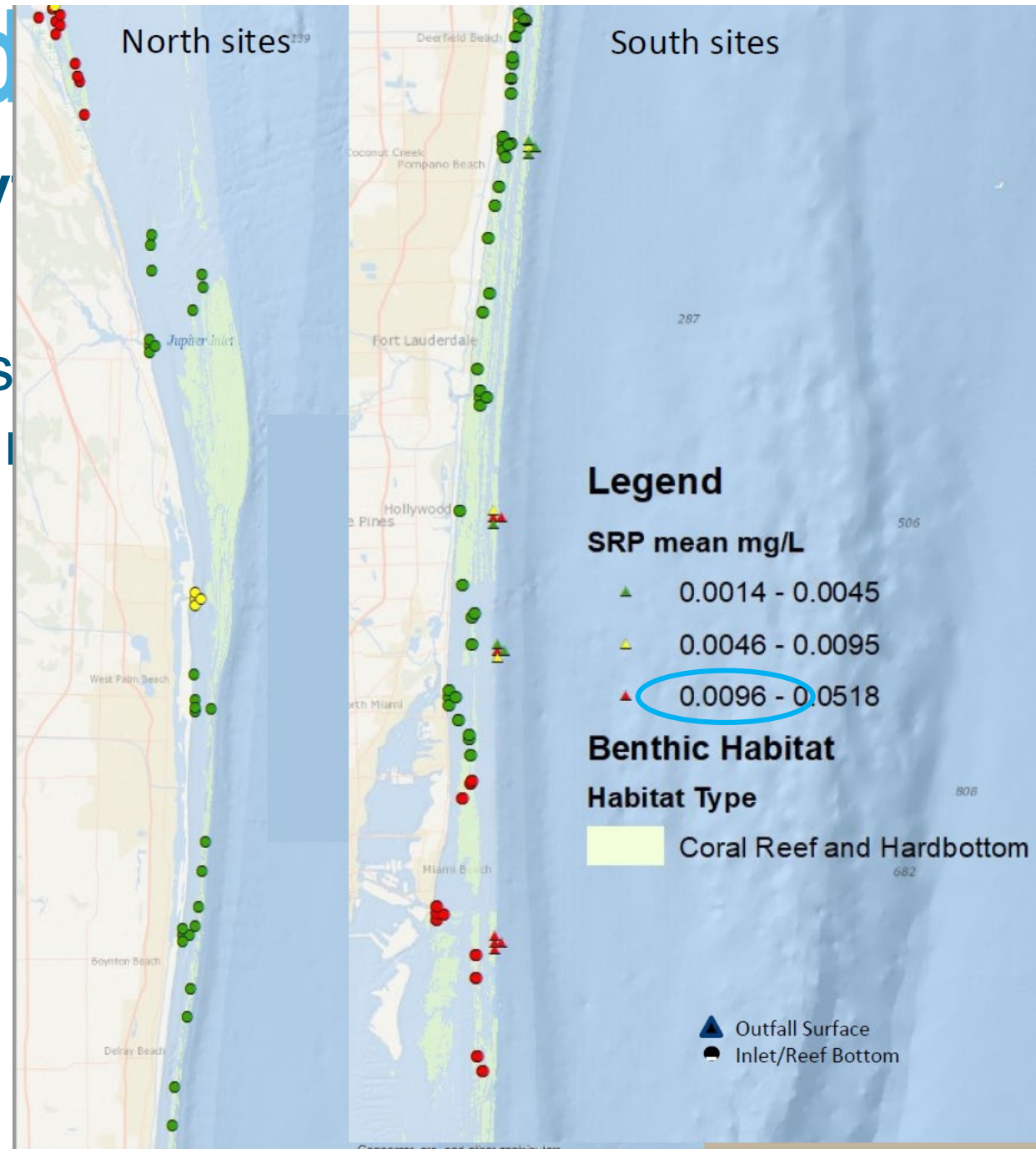
ICA	Urban %	Ag %
St. Lucie	20	50
Jupiter	25	10
Lake Worth	45	9
Boynton	75	11
Boca Raton	75	6
Hillsboro	89	0
Port Everglades	86	1
Baker's Haulover	77	1
Government Cut	60	1



What do these d

2. We can see where analy potentially harm corals

- Compared our data to thresholds
Lapointe, 1997 (not regulatory th
- DIN threshold = 0.014 mg/L
- SRP threshold = 0.0095 mg/L



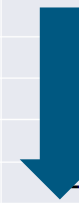
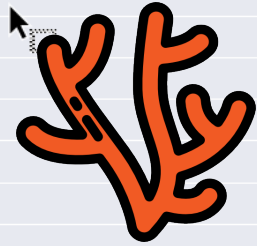


What do these data tell us?

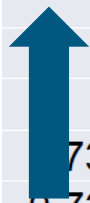
3. Comparison to benthic monitoring programs can shed light on reef health

- Statistical correlation - Negative
- Statistical correlation - Positive

Water Quality	Benthic Habitat	rho value
NO3_max	Encrusting_gorgonian	-0.7855
NH4_max	Encrusting_gorgonian	-0.7701
NO2_max	Palythoa	-0.746
Si_n	Millepora	0.73646
PO4	Halimeda	0.73578
NO2	Palythoa	0.73336
PO4	Cliona	0.73336
TSS	Other	-0.73336
TSS_mean	Other	-0.73336
Si_mean	Millepora	-0.73336
PO4_mean	Stephanocoenia_intersepta	-0.72761
TN_mean	Turf_Algae	-0.7113
NH4_max	Millepora	-0.7
NO3_mean	Encrusting_gorgonian	-0.69601
Si_mean	Siderastrea_siderea	-0.68437



Water Quality	Benthic Habitat	rho value
NH4_max	Palythoa	0.8
TN_max	Halimeda	0.785496
PO4_n	Palythoa	0.75
PO4_n	Podophyta	0.75
PO4_n	Other	0.75
NH4_n	Palythoa	0.733359
Si_mean	Palythoa	0.733359
TN_max	Gorgonians	0.715025
TSS_max	Encrusting_gorgonian	0.705952
TSS_mean	Encrusting_gorgonian	0.705952
NO3_max	Turf_Algae	0.694567





Potential uses of these data

- Compare with Stony Coral Tissue Loss Disease data to look for correlations
- Develop ECA/coral specific water quality regulatory thresholds (e.g., how much of each analyte is allowed while maintaining coral health?)
- Detect changes after management actions are implemented (e.g., how does water quality changes after outfalls are shut down in 2025?)





Next Steps

- Field sampling will continue at all 9 inlets
- Periodic data analysis and report writing (currently 2016-2018)
- Adapt project as needed to answer management questions
 - Reduced detection limits
 - Add relevant analytes (e.g., sucralose, chlorophyll-A, personal care product compounds)
- Use data to target LBSP reduction from largest sources in ECA
 - Partner with counties/municipalities to identify priority areas and potential projects



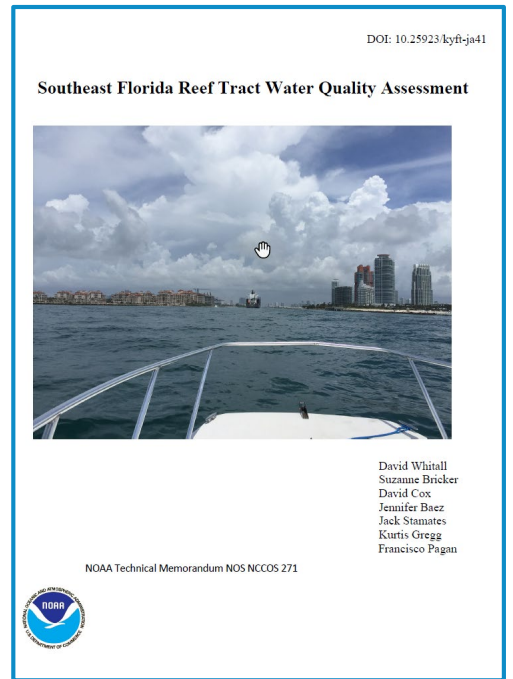
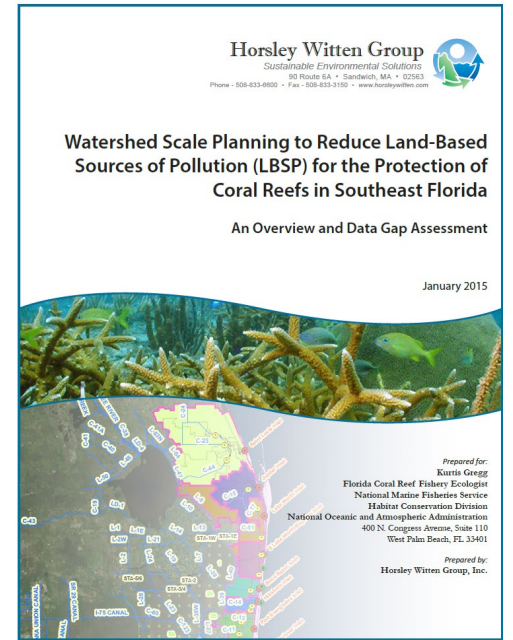
Products

Inlet Contributing Area Report:

- Watershed Scale Planning to Reduce LBSP for the Protection of Coral Reefs in SE FL
- <https://horsleywitten.com/tropicpdf/SEFloridaLBSPReductionForReefs.pdf>

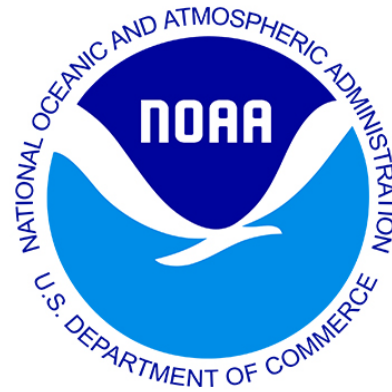
Water Quality Analysis Report:

- NOAA Technical Memorandum (NCCOS Tech Memo #271)
- <https://repository.library.noaa.gov/view/noaa/22999>





Thanks to Our Partners!





Any Questions?



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Thank you!

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