CERP RECOVER PROGRAM: 2019 SYSTEM STATUS REPORT KEY FINDINGS FROM THE SOUTHERN COASTAL SYSTEMS FOR WATER YEARS 2013-2017

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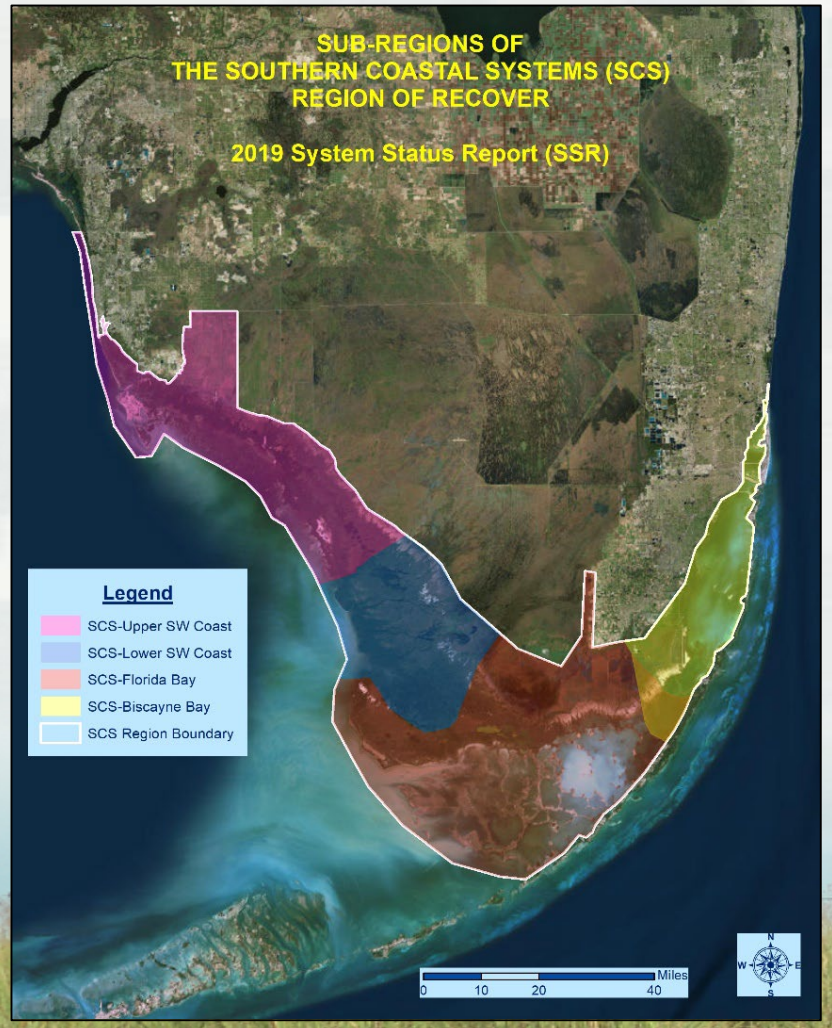
Introduction to the Southern Coastal Systems (SCS)

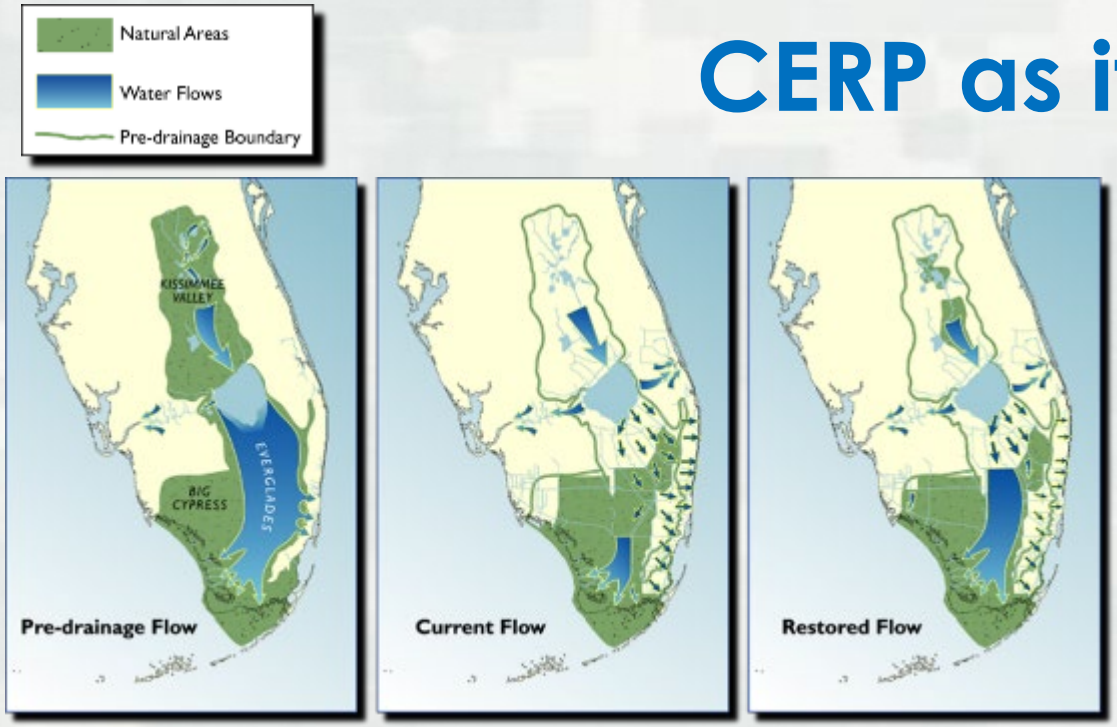


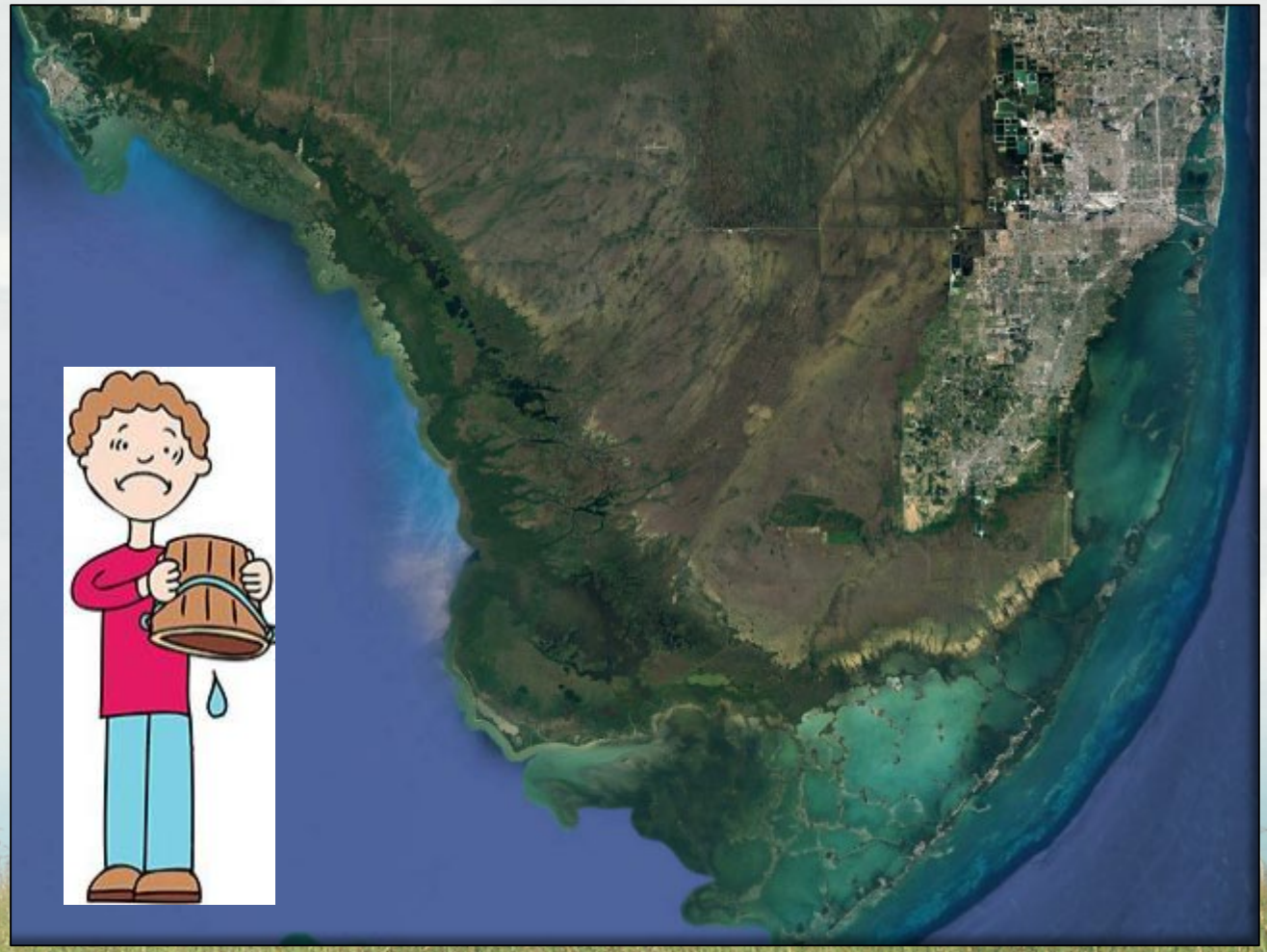
- SCS is one of the most ecologically and economically important regions in Florida.
- Contiguous network of coastal wetlands, estuaries, and bays wrapping around the southern end of Florida from Miami to Naples.
- Four sub-regions of SCS: Biscayne Bay, Florida Bay, Lower Southwest Coast, Upper Southwest Coast.

Introduction to the Southern Coastal Systems (SCS)

- Rich and diverse ecological resources including seagrass meadows, mangrove forests, coastal lakes, oyster reefs, and graminoid marshes
- These natural communities support:
  - various sponge species (benthic habitat)
  - Commercially important species populations (spiny lobster, stone crabs, juvenile pink shrimp)
  - Recreational important species populations (spotted seatrout, gray snapper, common snook)
- Provide vital nursery and forage habitat for fish and wading birds.
- Support imperiled species including West Indian manatee, American crocodile, several sea turtle species, small-tooth sawfish, and numerous federal and state listed avian species.

CERP as it Relates to SCS





- **CERP Goal of "Getting the Water Right" for SCS means restoring freshwater flows into coastal wetlands and downstream estuarine and coastal waters.**
- **Threats include: increasing salinity, sea level rise, increasing water temperatures, increase in storm severity and frequency.**

Ecological Indicators

What is an ecological indicator or attribute?

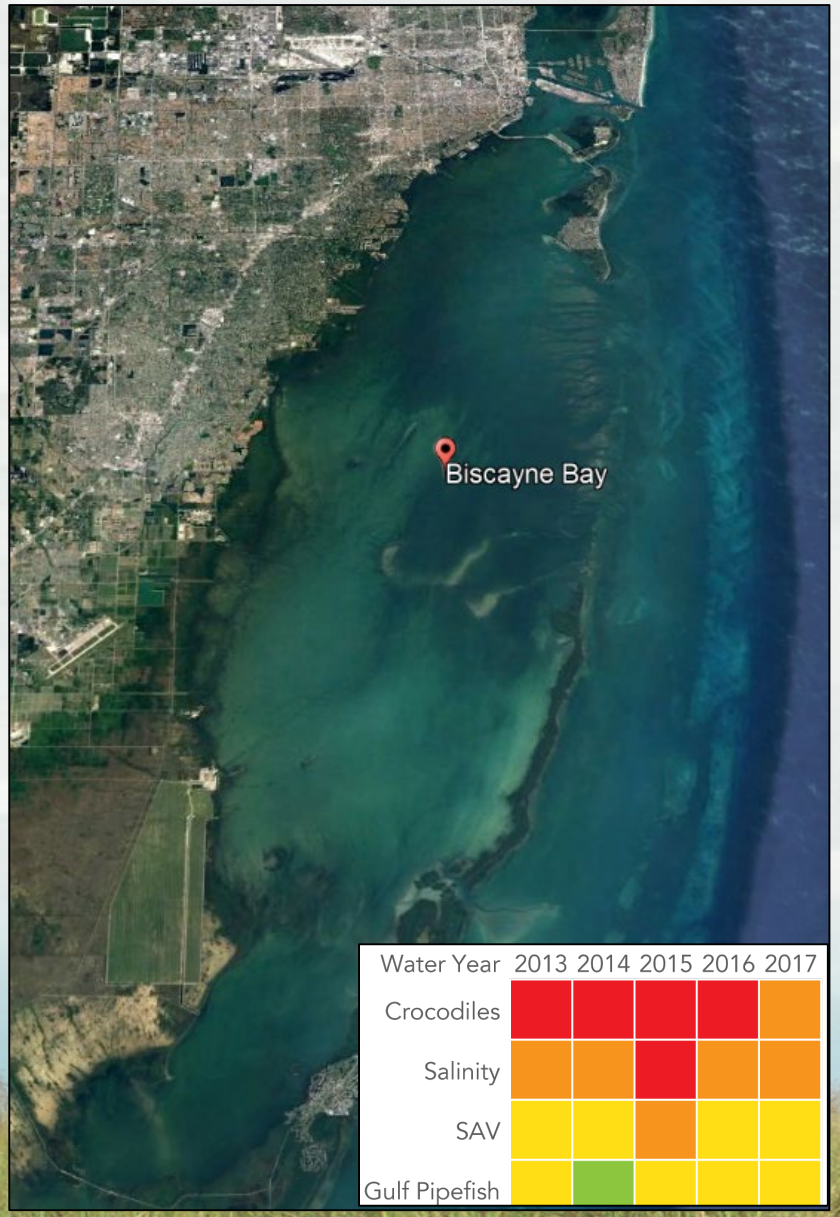
- A parsimonious subset of ecosystem components that are thought to be representative of overall ecological conditions of the system.
- Typically are populations, species, guilds, communities, or processes.

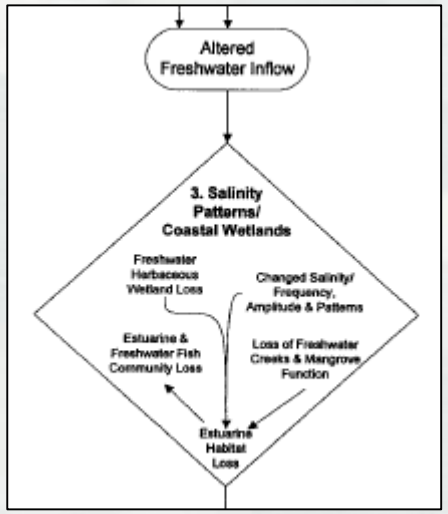
What are the reasons for selecting an ecological indicator?

- Known or hypothesized to be sensitive to ecological effects.
- Are elements of the ecosystem that are highly valued by a wide variety of people.
- CERP has consistently monitored the status and trends.

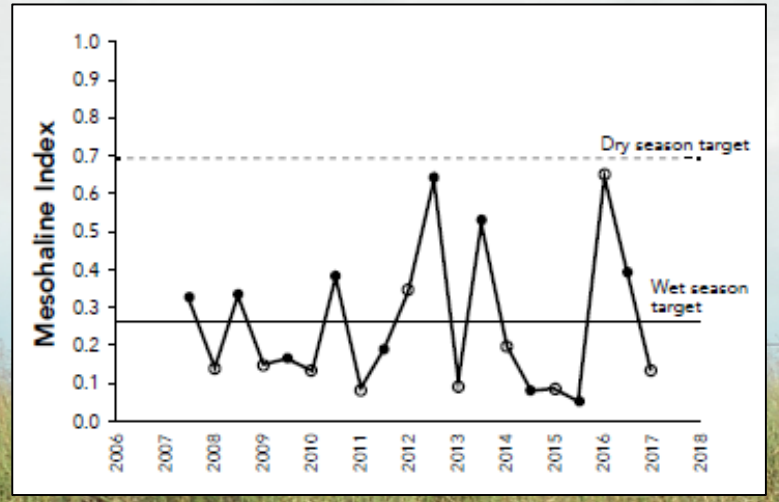


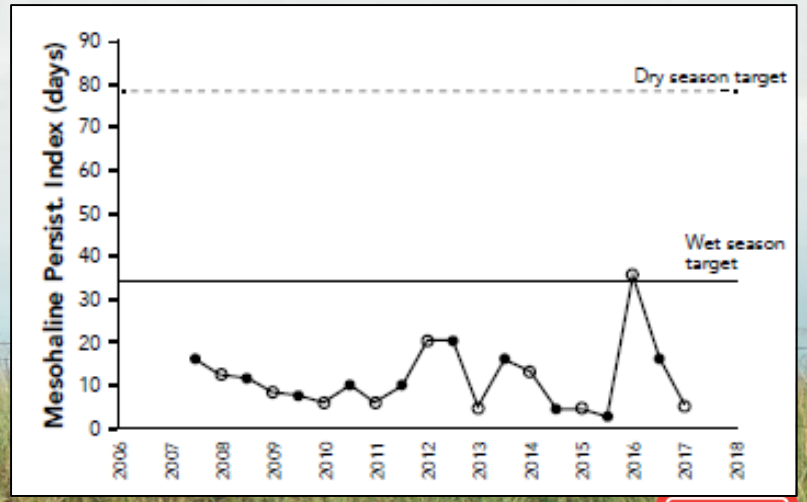

Status of Biscayne Bay



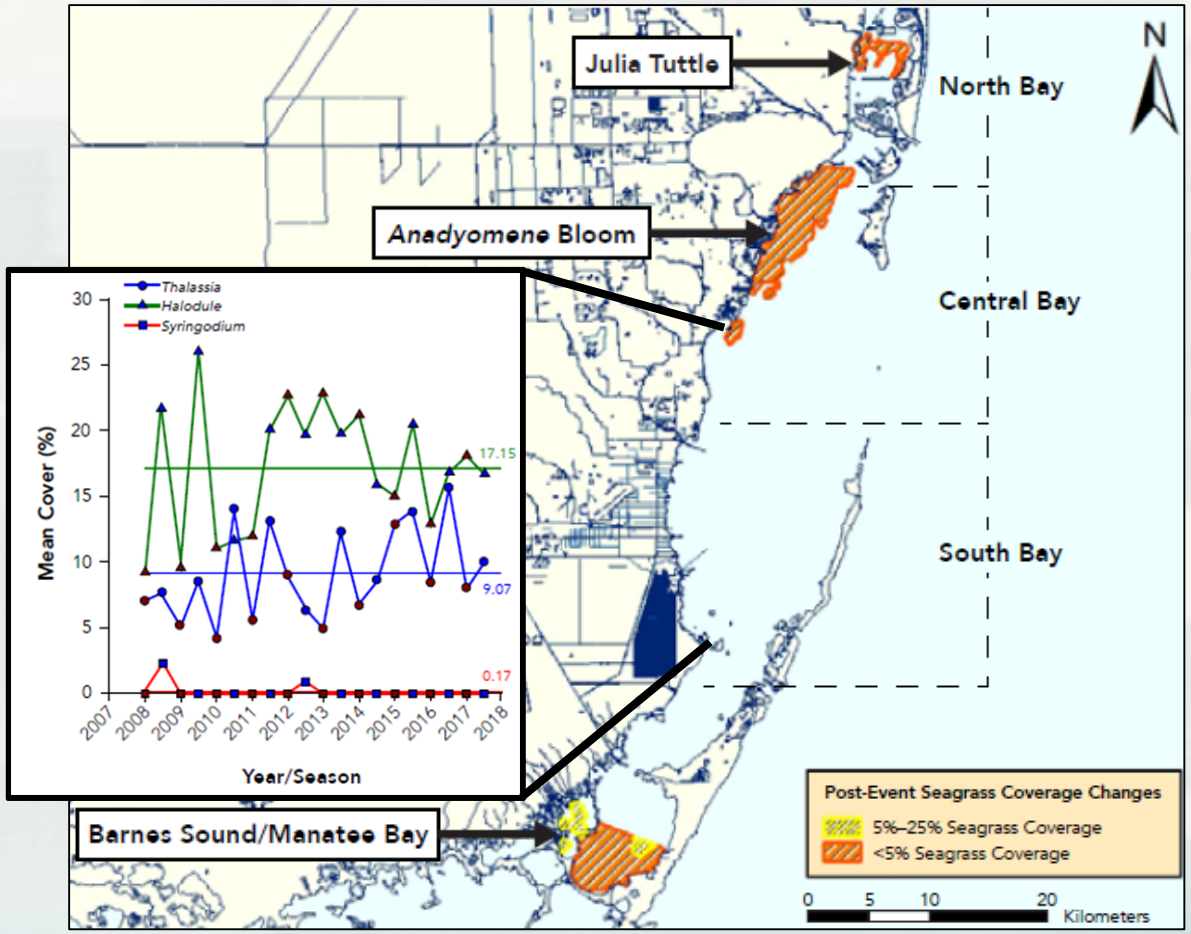


- Salinity is among the most important abiotic variables in the SCS.
- Freshwater flow has a significant impact on the salinity found throughout the bay.
- The “Nearshore” (<100m) Salinity Target is 5-18 psu (mesohaline condition).
- Salinity measurements over the past decade indicate freshwater flows to the Bay’s southwestern perimeter are lacking in both volume and duration.





Status of Biscayne Bay



Event	Before event	Present	Lost area	Percent decrease
Anadyomene Bloom Area	51.2 km² (2000–2003)	12.1 km² (2014–2016)	39.1 km²	76.40%
Julia Tuttle Area	12.0 km² (2002–2008)	6.6 km² (2016)	5.4 km²	45.00%
Barnes Sound/ Manatee Bay	24.5 km² (2005)	12.6 km² (2014–2016)	11.9 km²	48.60%
Total	87.7 km²	31.3 km²	56.4 km²	64.31%

Status of Florida Bay

- Salinity is among the most important abiotic variables in the SCS.
- Freshwater flow has a significant impact on the salinity found throughout the bay.
- Restore oligohaline (0.5-5 psu) to mesohaline (5-18 psu) conditions in the “nearshore” (<100m) environment.
- Reduce the frequency, duration, magnitude, and spacial extent of hypersalinity (>40 psu).

Region	2012	2013	2014	2015	2016	2017
North Bay	18	33	37	7	28	25
East	23	45	27	15	45	30
East-central	26	69	37	17	37	31
Central	22	47	51	13	26	26
South	30	83	61	20	44	30
West	33	53	51	30	46	38

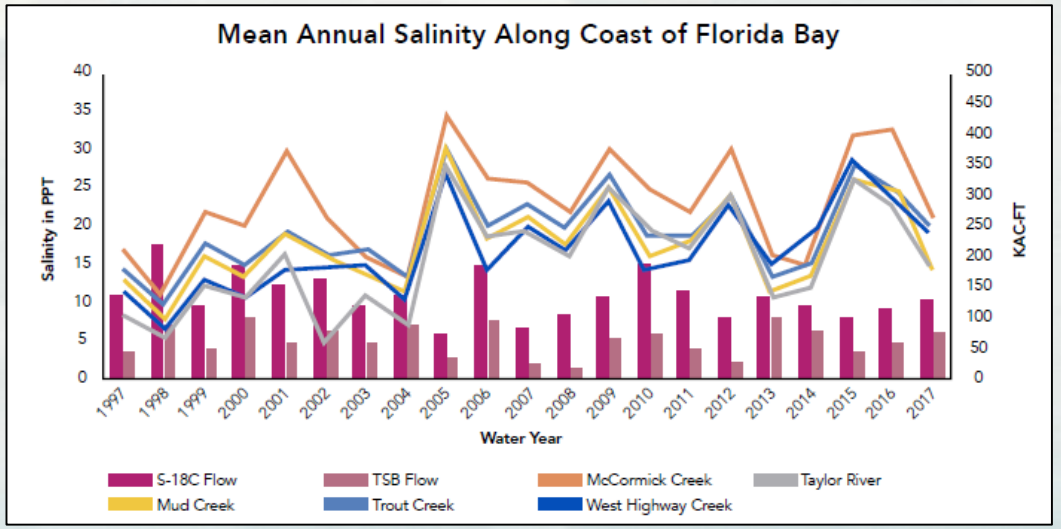


Table 6.8. Mean annual salinity for the current period (WY2014–2017) and the period of record (WY1997–2017).

Site	Current period	Period of record
McCormick Creek	25.0	22.5
Mud Creek	19.7	17.3
Taylor River	18.7	14.9
Trout Creek	22.1	18.7
West Highway Creek	22.8	15.7

Status of Florida Bay

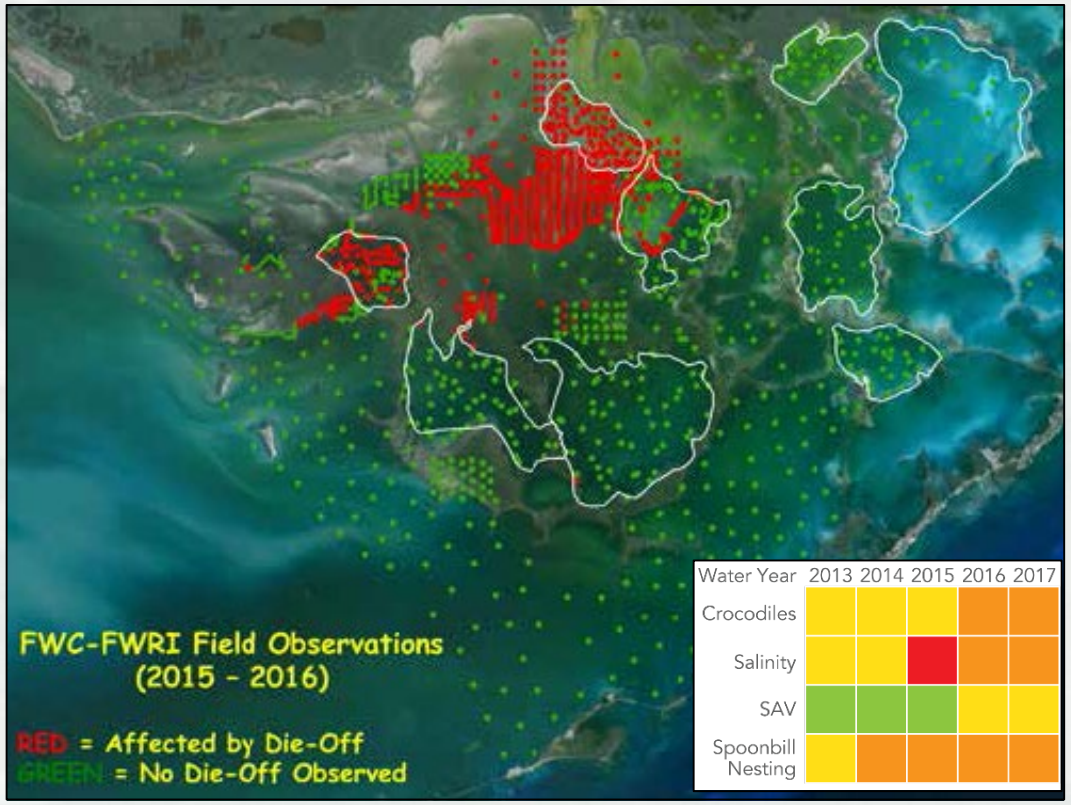


Table 6.10. SAV abundance scores (0–100%) based on abundance for individual water years (WY) 2008–2017 across Florida Bay and within regional zones. SAV sampling occurs in 19 total basins within Florida Bay and can be separated into five zones. Each zone is composed of multiple basins (n). Scores are averages across the basins that comprise each zone.

Zone	n	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Baywide	19	70	60	64	61	57	60	60	60	56	51
Northeast	6	83	83	75	83	75	92	100	83	83	83
Transition	5	90	80	70	70	60	70	60	80	60	70
Central	4	50	38	50	50	50	38	38	38	38	25
Southern	2	25	25	50	25	25	25	25	25	25	25
Western	2	100	75	75	75	75	75	75	75	75	50

Table 6.14. Summary of relative density (#/km) and body condition (Fulton's K) of American crocodiles (Crocodylus acutus) in Everglades National Park and Biscayne Bay.

Location	Relative density (#/km)	Body condition (Fulton's K)
NE Florida Bay	0.92	2.03
West Lake Area	2.94	2.18
Flamingo/Cape Sable	11.65	2.26
Biscayne Bay	*not analyzed*	2.08

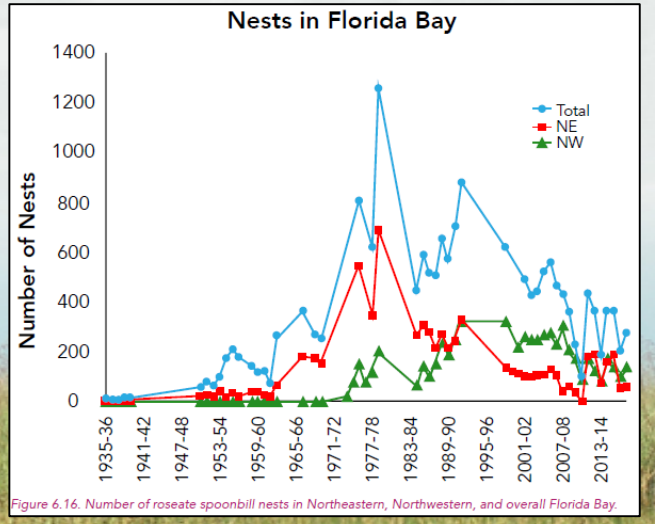


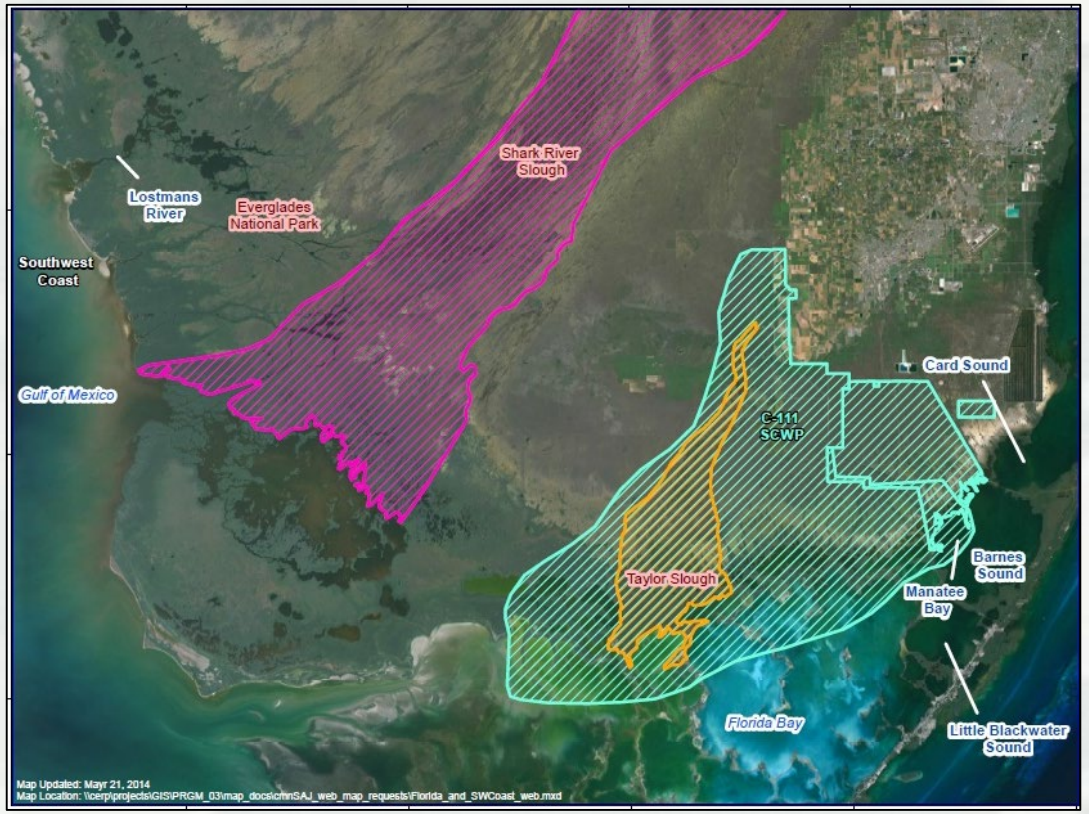
Figure 6.16. Number of roseate spoonbill nests in Northeastern, Northwestern, and overall Florida Bay.

Table 6.13. Percentage of overall fish catch that were classified as freshwater species at the spoonbill foraging location presented in Figure 6.15.

Water year	Percent freshwater species of prey community
2012–2013	4.42
2013–2014	17.08
2014–2015	0.44
2015–2016	0.35
2016–2017	2.21

Southwest Coast (Lower)

- Salinity is among the most important abiotic variables in the SCS.
- Freshwater flow has a significant impact on the salinity found throughout the southwest coast.
- Salinity performance measure metrics and targets for all of southwest coast have yet to be developed.
- Currently wrapping up a modeling effort to add salinity metric sites to the Florida Bay Performance Measure to include southwest coast.



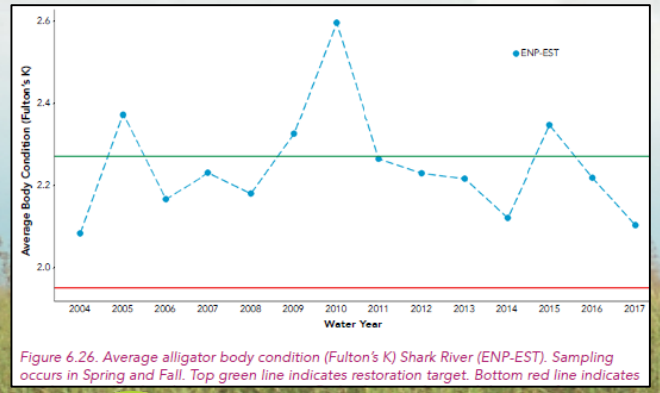


Figure 6.26. Average alligator body condition (Fulton's K) Shark River (ENP-EST). Sampling occurs in Spring and Fall. Top green line indicates restoration target. Bottom red line indicates

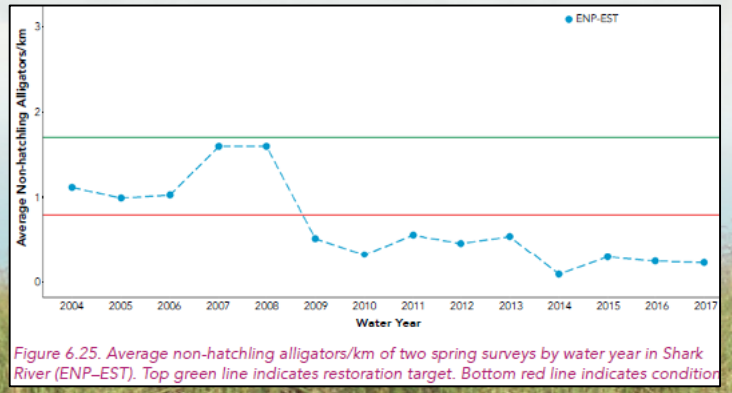
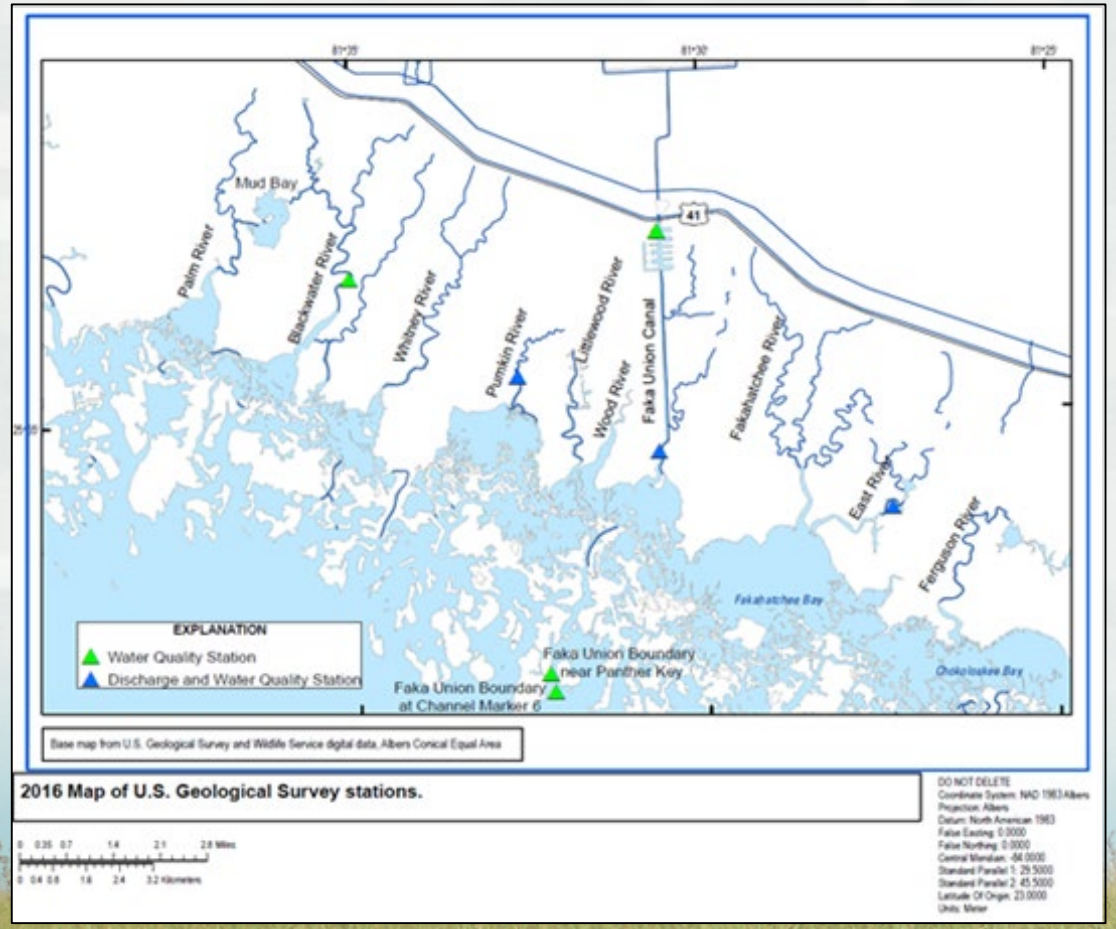


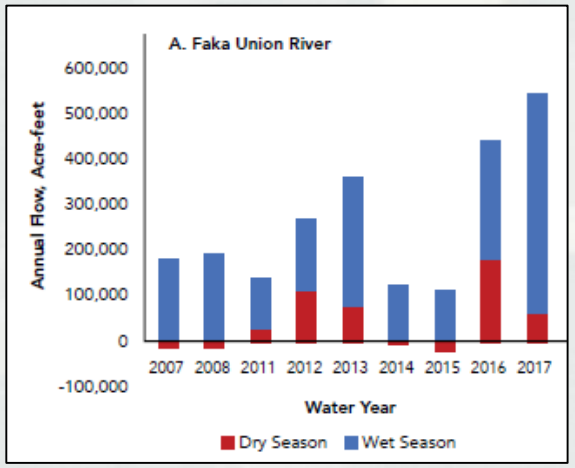
Figure 6.25. Average non-hatchling alligators/km of two spring surveys by water year in Shark River (ENP–EST). Top green line indicates restoration target. Bottom red line indicates condition

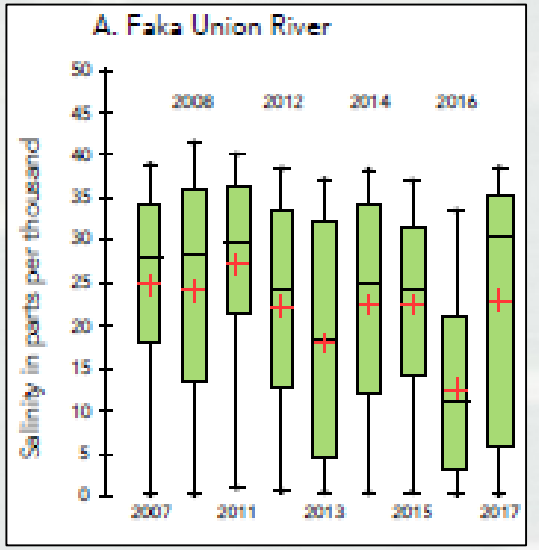
Operational periods	Flow, in acre-feet				
	Minimum	Maximum	Mean	Median	Standard deviation
WY2002–2012 (IOP)	614,450	1,961,480	1,170,660	1,206,100	410,045
WY2013–2017 (ERTP)	474,082	1,250,245	977,496	1,019,649	314,407

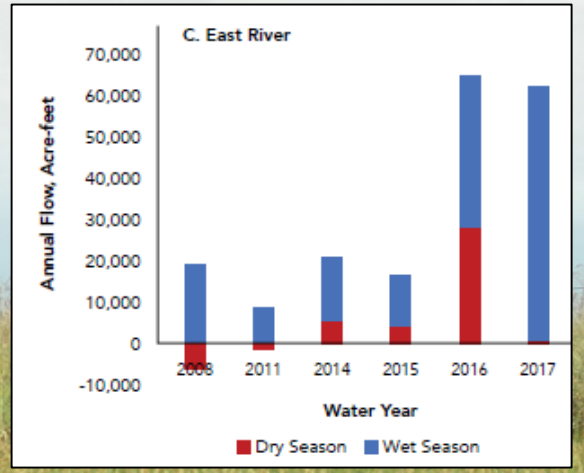
Southwest Coast (Upper)

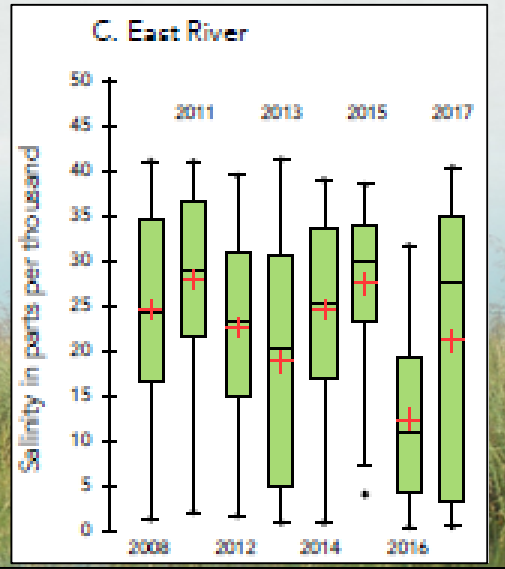


2016 Map of U.S. Geological Survey stations.









Key Findings

Early microscope

Biscayne Bay

- Submerged aquatic vegetation (SAV) loss combined with increased levels of chlorophyll a, total phosphorus, and total nitrogen suggest SAV recovery will be limited and could decline in northern Biscayne Bay, Barnes Sound, and Manatee Bay.

Florida Bay

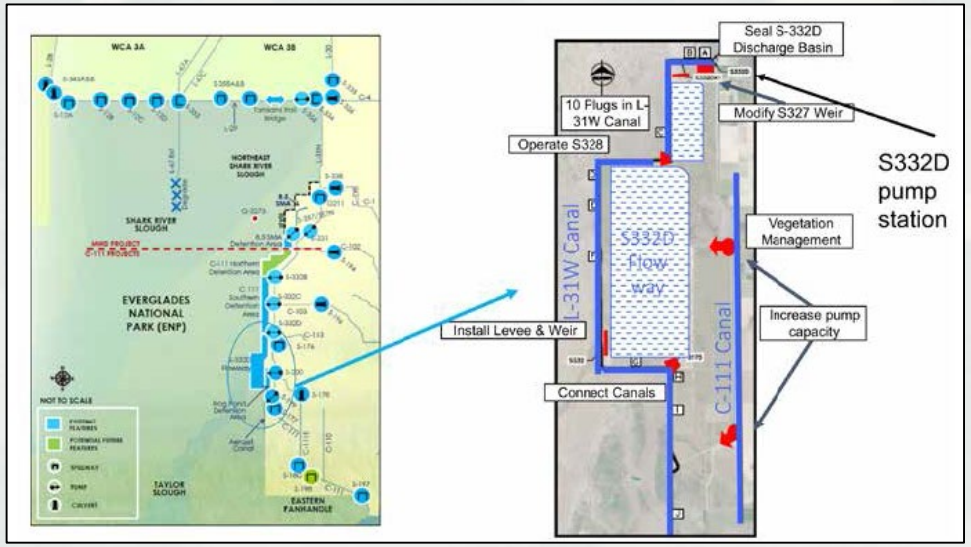
- Salinity throughout Florida Bay continues to remain high regardless of season. The lack of freshwater flow to Florida Bay, combined with sea level rise, has resulted in a prey base shift composed of fewer freshwater species.
- Coincident with high rainfall amounts, eight years of low spotted seatrout population numbers were broken in 2016 and 2017.
- Roseate spoonbill nesting effort ranged from 21% to 27% of target effort in Florida Bay with the number of nests producing a minimum of one chick declining between WY2013 and WY2017.

Southwest Coast

- Due to increasing salinity in nearshore and estuarine areas, American crocodiles have been observed further upstream in the Shark River Estuary.
- Alligator health is declining likely due to abnormally high salinities from lack of freshwater flow.
- Salinity in the Upper Southwest Coast sub-region remains spatially variable due to channelization of water flow resulting from continued pulse discharges.

Looking Ahead

Figure 1. BBCW Phase I project components.



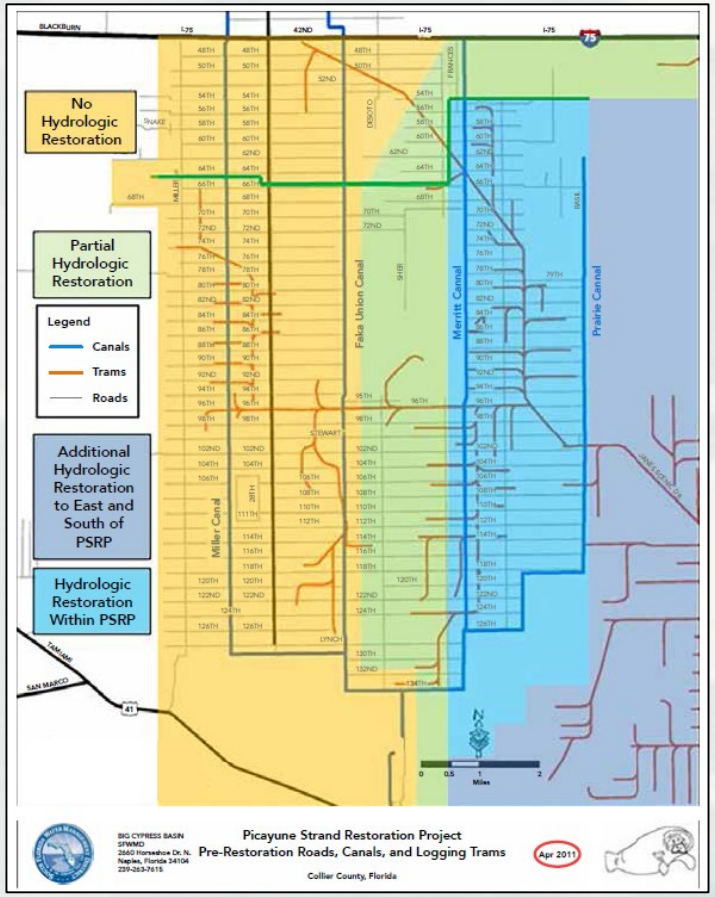


Figure 2.17. Widespread damage to trees along the coastline in Florida Bay.

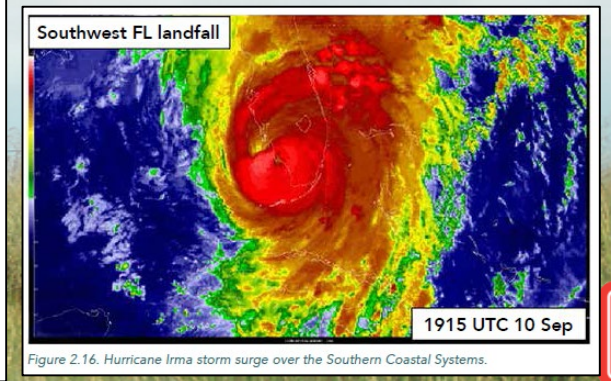


Figure 2.16. Hurricane Irma storm surge over the Southern Coastal Systems.

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