HURRICANE IAN'S IMPACTS ON SARASOTA BAY –

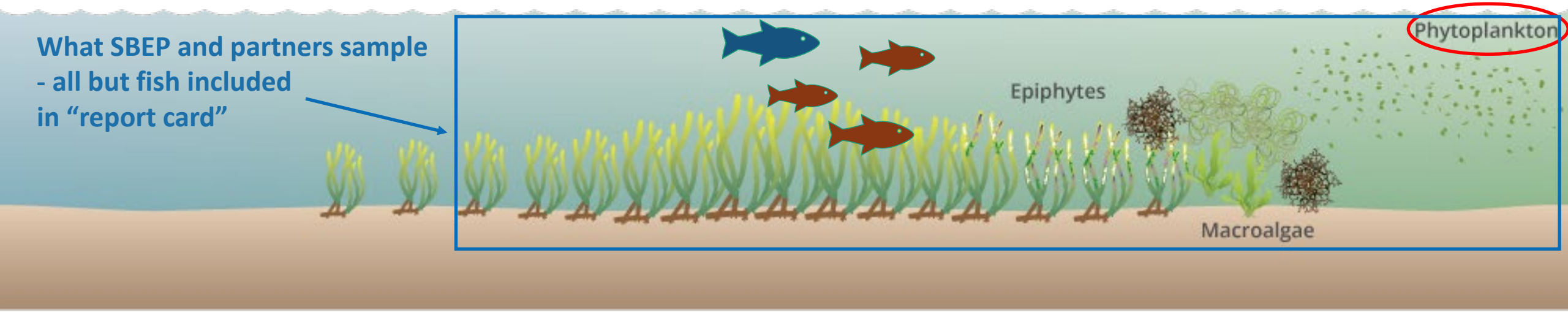
Impacts and Timeline for Recovery

SARASOTA BAY ESTUARY PROGRAM
RESTORING OUR BAYS

Managing Sarasota Bay Means Managing Nitrogen

The only thing you're required to sample (and report on)

What SBEP and partners sample - all but fish included in "report card"



LIGHT AVAILABILITY

NUTRIENT LOADING

Conceptual diagram illustrating the effect of nutrients of aquatic primary producers

Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Environmental Science. Source:

ian.umces.edu

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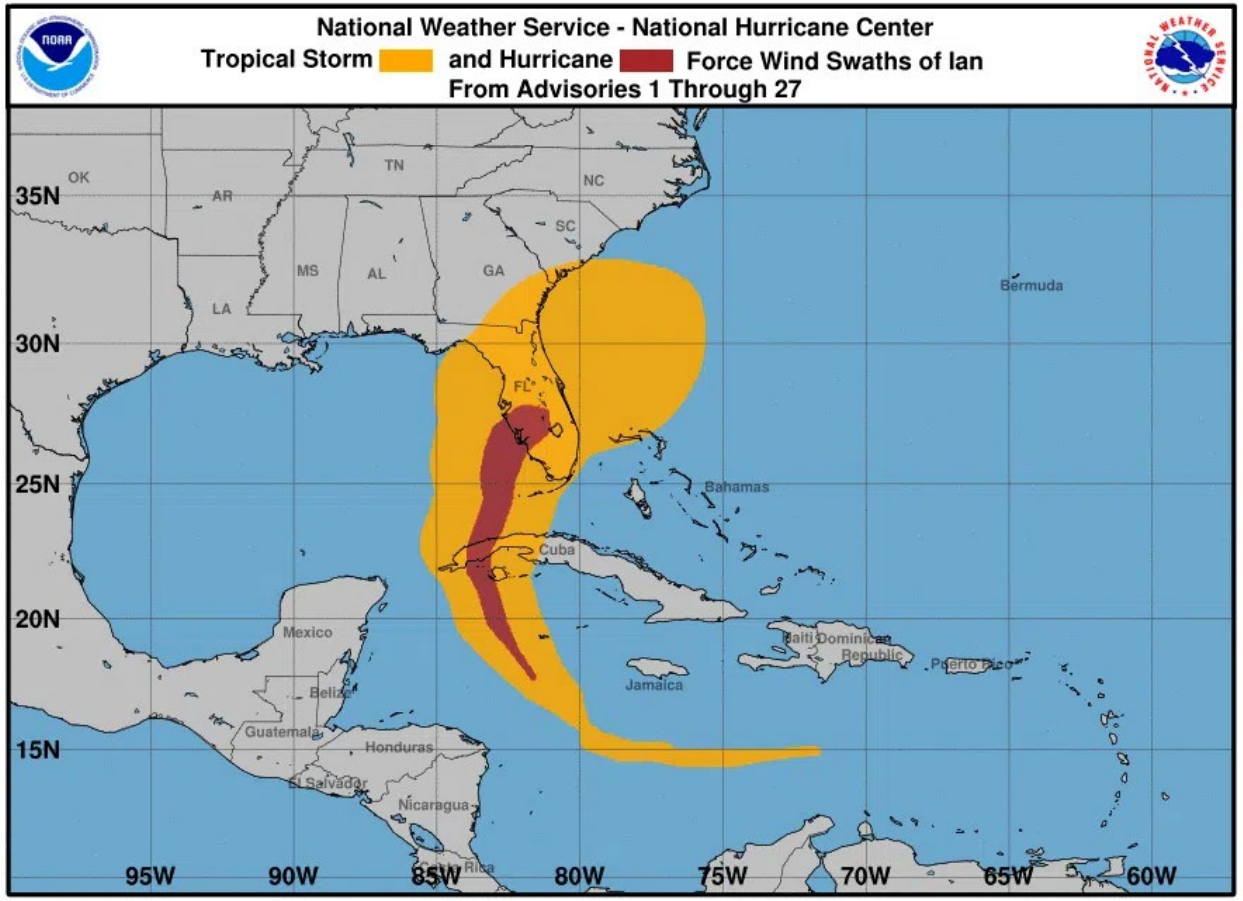
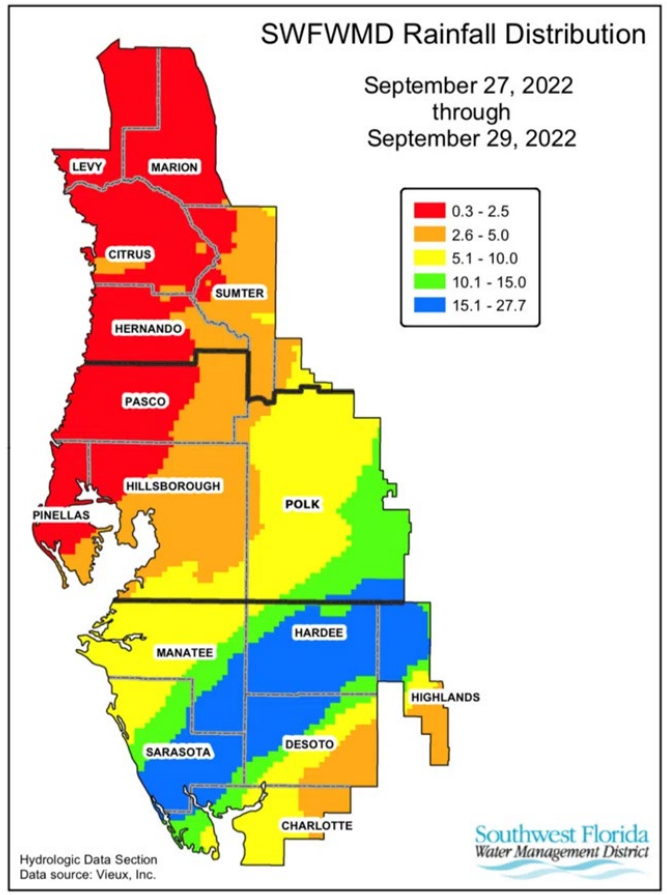
Impacts of Ian on Sarasota Bay

Winds topped out at 85 mph (Cat 1)



Rainfall topped out at > 15”



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Due to patterns of wind and rainfall, focus of study was on the southern three bay segments –

Roberts, Little Sarasota and Blackburn Bays

After Ian – water looked like root beer

Didn't smell like root beer...

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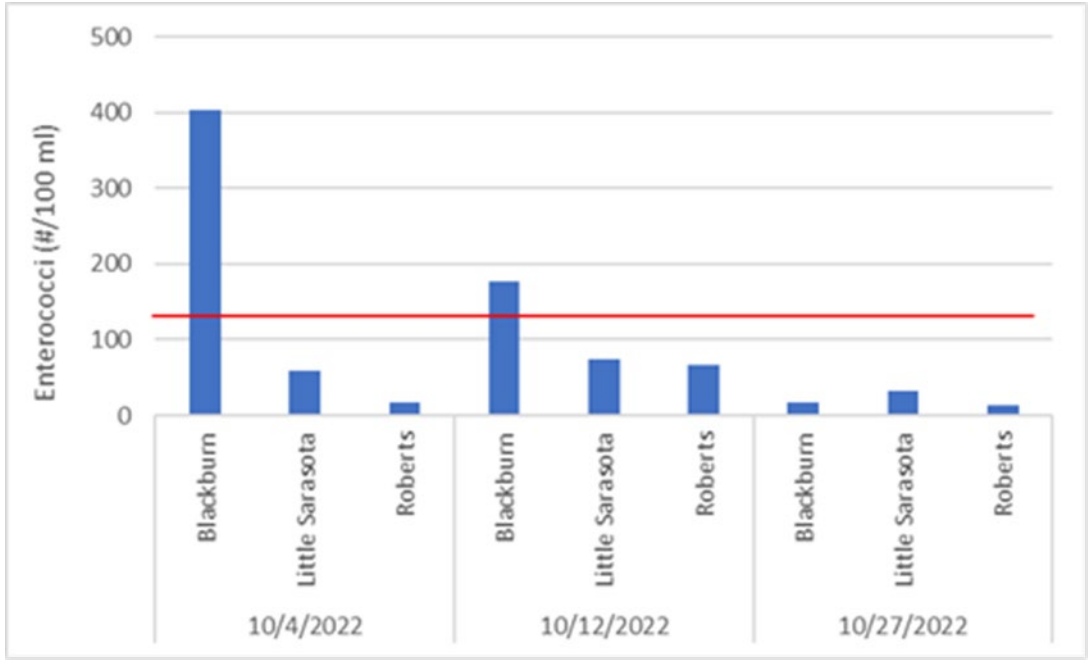
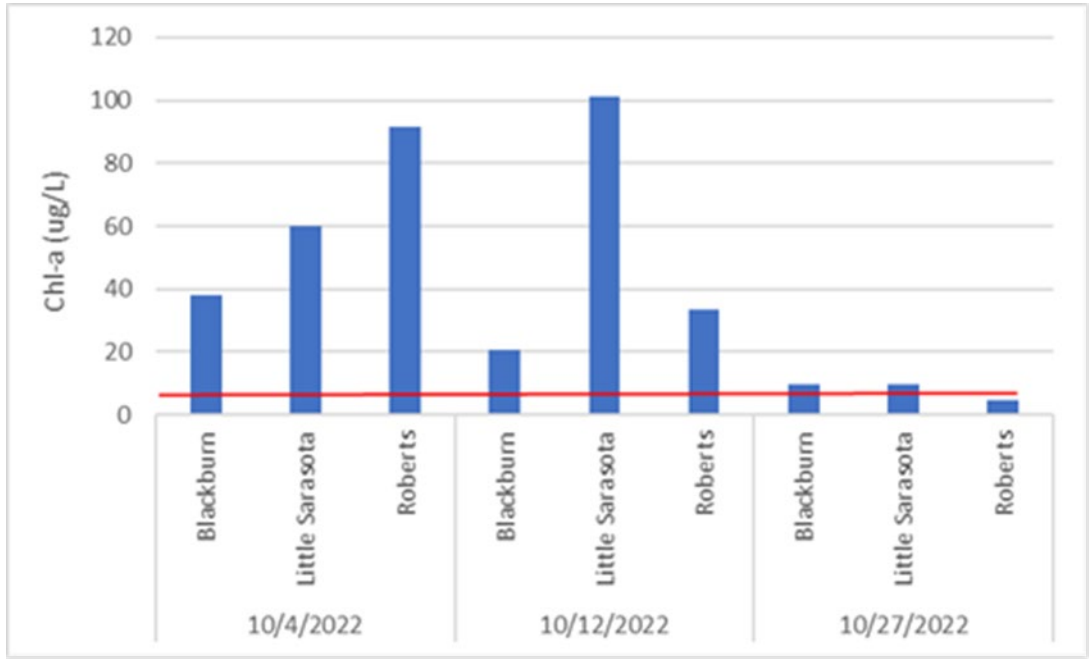
Bacteria and phytoplankton – values *way above* targets after Ian – but substantial "recovery" within 4 weeks

Bacteria



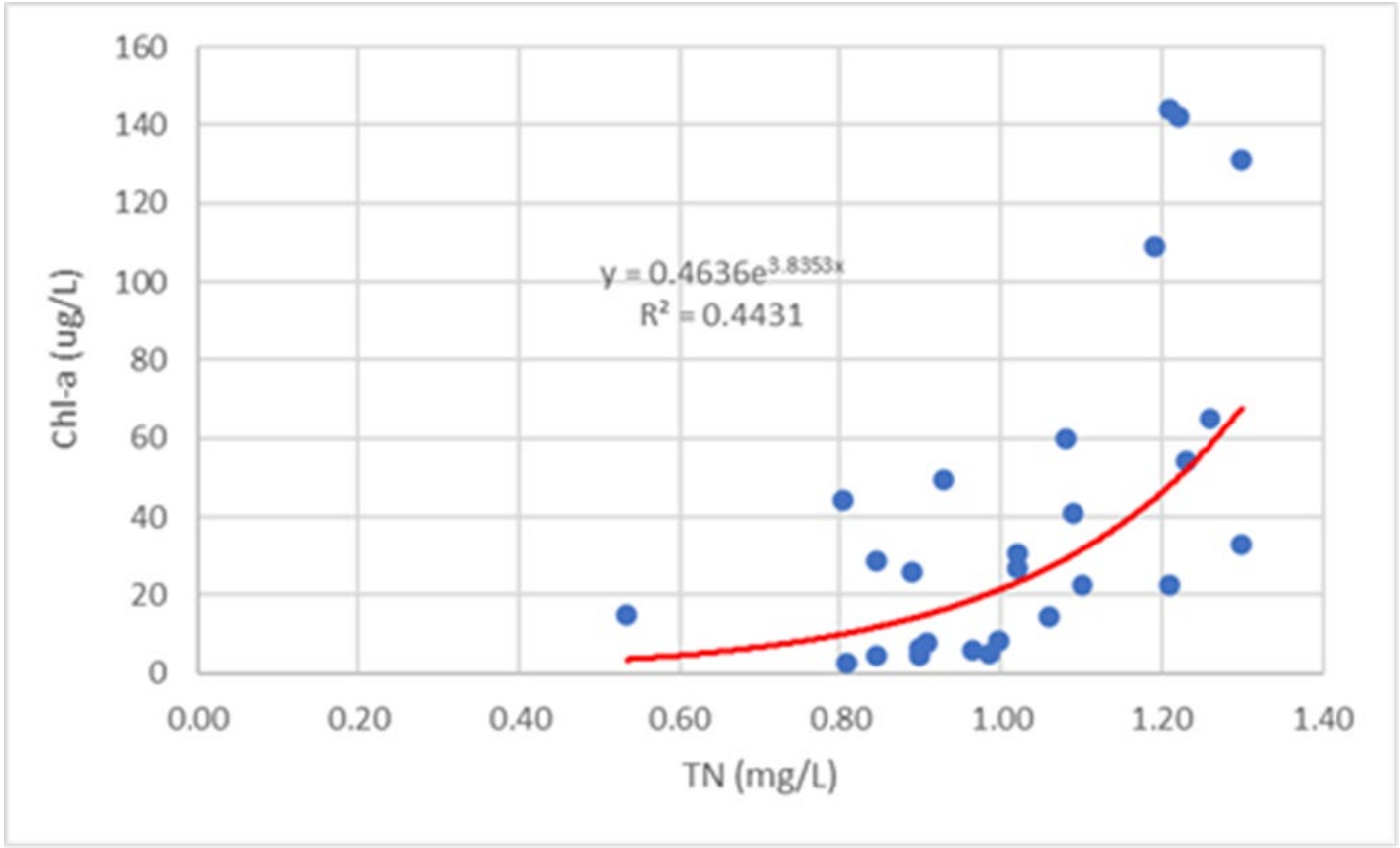
Phytoplankton



3 stations in each of 3 bay segments, visited 3 times (one, two and four weeks after landfall)

Why so much algae?

Because of the huge nitrogen load from wastewater overflows and stormwater runoff



Hypoxia only in bottom waters of salinity-stratified bay segment with the lowest tidal circulation rates

One week after Ian

Parameter	Roberts Bay	Little Sarasota Bay	Blackburn Bay
Salinity Stratification (bottom minus top; ppt)	14.3	18.39	10.39
Bottom Water Oxygen (mg/L)	4.82	2.23	4.45

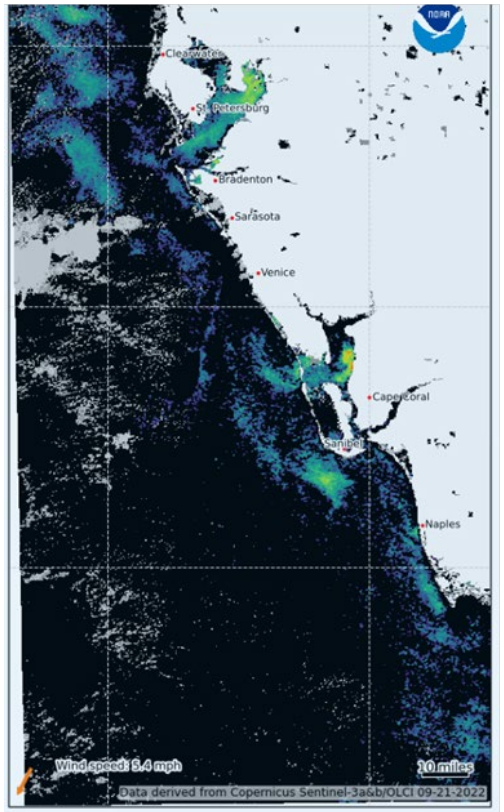
Two weeks after Ian

Parameter	Roberts Bay	Little Sarasota Bay	Blackburn Bay
Salinity Stratification (bottom minus top; ppt)	1.82	6.79	2.57
Bottom Water Oxygen (mg/L)	5.74	1.96	5.59

SBEP (2022)

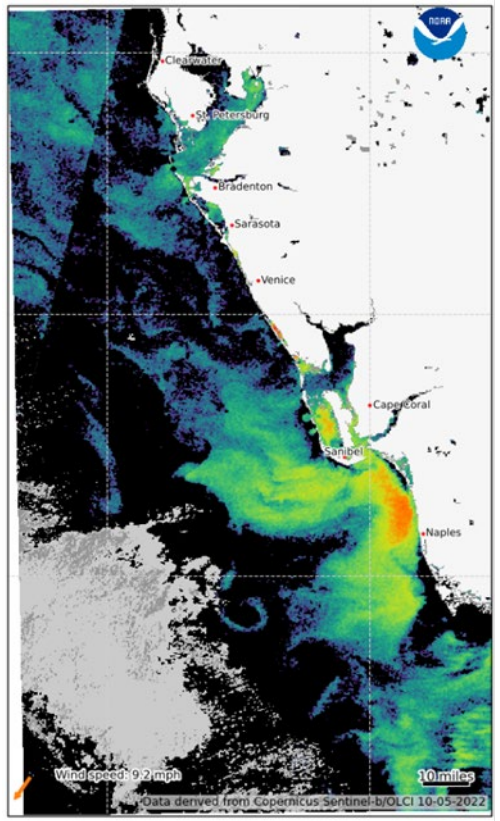
How did water quality “recover”?
Mostly via tidal exchange into the Gulf

One week before Ian



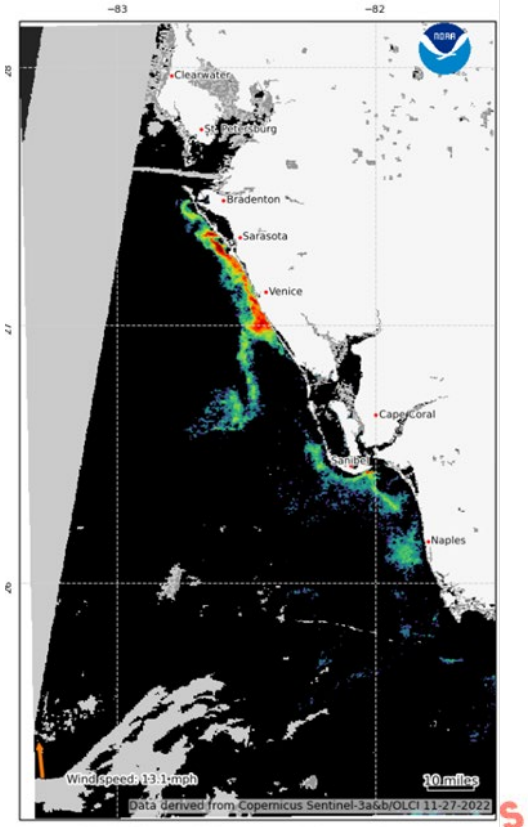
Composited Red Band Difference (RBD) showing relative fluorescence from high (red) to low (violet). A median filter was applied to remove speckle. Average wind for preceding 3 hours of satellite observation from NOAA NDBC station VENF1.

One week after Ian



Red Band Difference (RBD) showing relative fluorescence from high (red) to low (violet). A median filter was applied to remove speckle. Average wind for preceding 3 hours of satellite observation from NOAA NDBC station VENF1.

Eight weeks after Ian



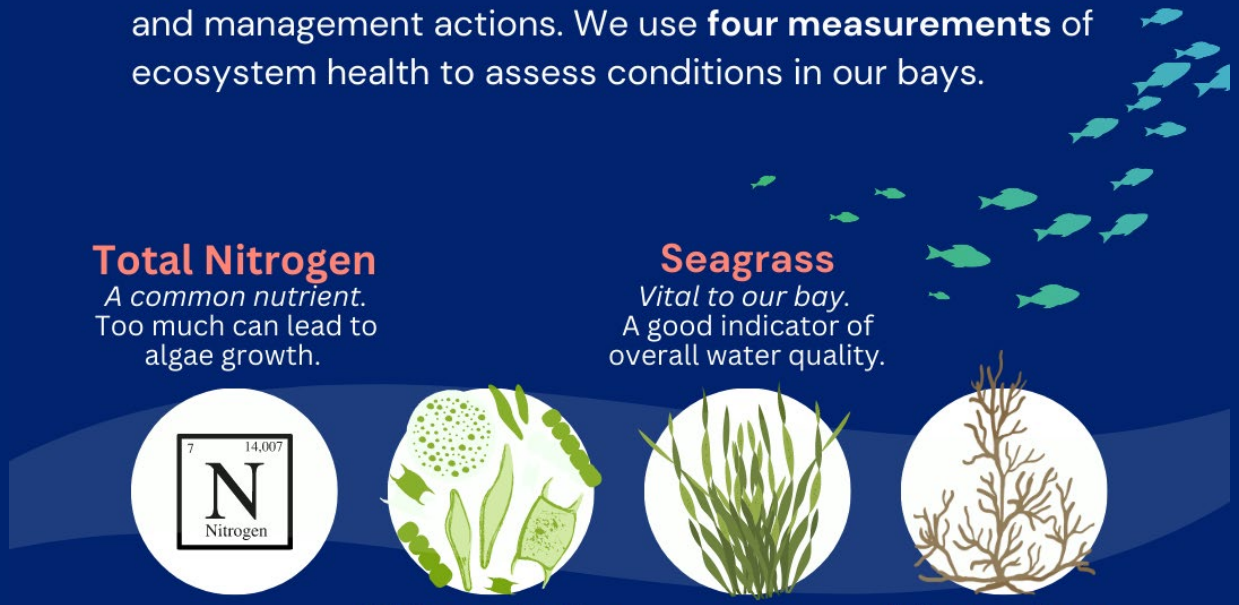
Composited Red Band Difference (RBD) showing relative fluorescence from high (red) to low (violet). A median filter was applied to remove speckle. Average wind for preceding 3 hours o
satellite observation from NOAA NDBC station VENF1.

Potential basis for the quick recovery

- Tidal mixing
  - 30 to 70% water exchange expected over 10 days
- No storm surge
  - West side of eyewall – winds pushed water out of bay
- Strong winds
  - But only Category 1
- However…very high rainfall
- Other factors?
  - ***Cleaner and healthier bay than just a few years ago***

WHAT IS THE BAY REPORT CARD?

Every year, we create an **Ecosystem Health Report Card** to track conditions in each of our five bay segments. The report card is intended to guide and prioritize monitoring and management actions. We use **four measurements** of ecosystem health to assess conditions in our bays.



Total Nitrogen
A common nutrient.
Too much can lead to algae growth.

Seagrass
Vital to our bay.
A good indicator of overall water quality.

Chlorophyll-a
Floating microscopic algae.
Too much can impact water clarity.

Macroalgae
Known as seaweeds.
Can be harmful to bay health when present in high quantities.

HOW DO WE SCORE?

We assign each bay segment one of four scores for each year based on the status of that bay segment's ecosystem health indicators. We encourage continued monitoring in bay segments with good scores while bays with poorer scores require more attention.

One poor score may not indicate an ongoing problem, but a bay with several years of yellow or red scores almost certainly needs scrutiny and management action.

A	**All signs indicate healthy water quality; continue to monitor as usual**
B	**Most signs indicate healthy water quality; monitor carefully**
C	**One or more signs indicate concern; investigate stressors, check for compliance with wastewater and stormwater permits, and plan for management actions**
D	**All signs indicate water quality degradation; take management actions**

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Report Card for Sarasota Bay

Year	Palma Sola	Upper Bay	Roberts	Little Sarasota	Blackburn
2006	3.67	3.50	3.50	3.75	3.75
2007	3.00	3.25	4.00	3.75	3.75
2008	3.67	3.00	3.00	3.25	3.25
2009	3.67	3.25	3.25	3.50	3.00
2010	3.67	3.50	3.00	2.75	2.75
2011	4.00	3.50	3.00	2.75	2.50
2012	3.00	3.25	3.25	3.00	3.00
2013	3.67	3.00	2.50	2.00	2.00
2014	4.00	3.50	2.50	2.25	2.25
2015	3.67	2.75	2.00	2.00	2.00
2016	3.67	2.75	1.75	1.75	2.25
2017	3.67	2.75	2.00	2.00	2.00
2018	4.00	2.25	2.00	1.25	1.75
2019	4.00	2.75	3.25	1.50	1.50
2020	4.00	3.00	3.00	2.25	2.00
2021	3.75	3.75	3.75	2.75	3.00
2022	4.00	3.25	2.75	2.25	2.75

Reference period

Degraded period

Improving trends

Across the bay, healthier conditions during the reference period

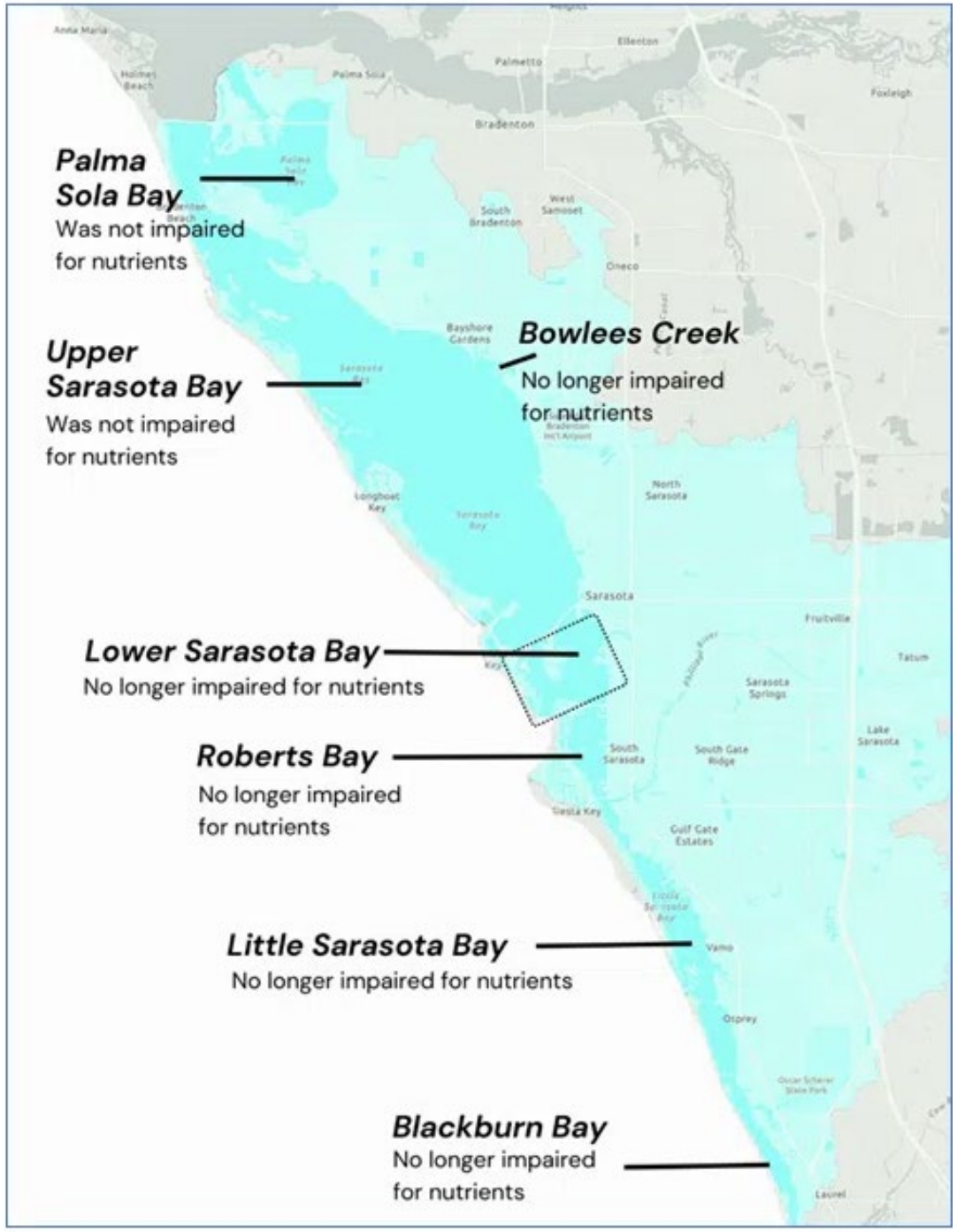
During the degraded period, bay-wide, *nitrogen loads were 20% higher* (preliminary nitrogen load reduction target; SBEP, 2021)

Despite Piney Point in 2021, and Ian in 2022, evidence of improving conditions

Actions that can reduce ***inorganic nitrogen*** loads by 12 tons (20%)

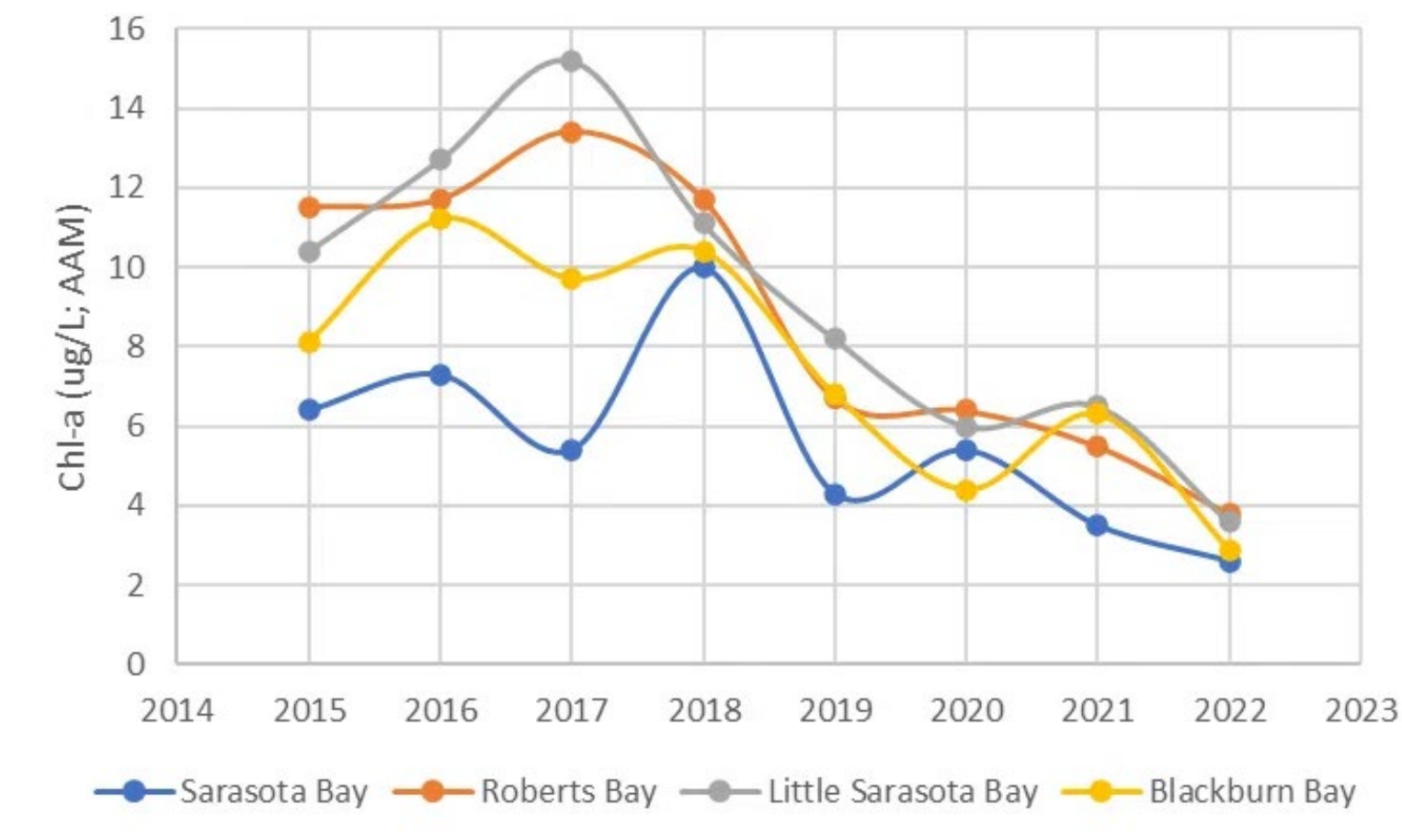
- Reclaimed water - 20 tons/yr
- Spills and overflows – up to 15 tons/yr
- It appears that this proposed load reduction target *has already been achieved*

Recent good news



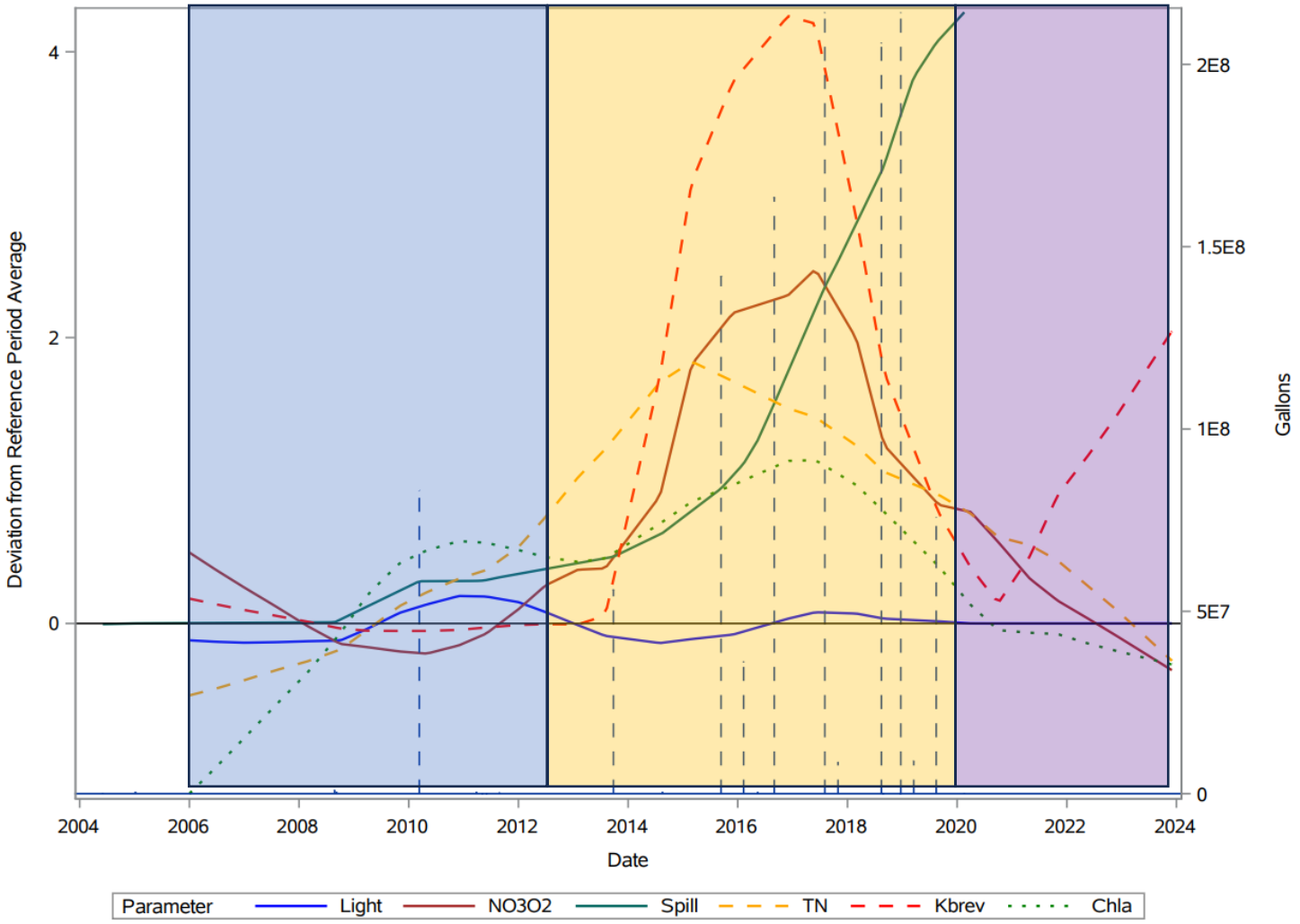
Sarasota Bay no longer “impaired” for nutrients (FDEP, 2023)

Basis for de-listing – improved water quality



Is this a regional phenomenon driven by changes in rainfall?

- In all Southwest Florida, only 10 waterbodies “delisted” for nutrients
- Half of them in Sarasota Bay
  - Sarasota Bay
  - Roberts Bay
  - Little Sarasota Bay
  - Blackburn Bay
  - Bowlees Creek



- Degraded period clearly worse for multiple indicators of trophic status
  - DIN, TN, Chl-a, *K. brevis*
- Same parameters show improvement 2020 to 2023
- Multiple wastewater spills (dashed lines) over 1 BILLION gallons in total
  - Mostly restricted to “degraded period”
- Are spills the only issue?
  - Likely that over-application of high nutrient reclaimed water preceded discharges

These actions match up with recent improvements

- **$25 million** spent by Manatee County to upgrade SWRWRF
- **$1 million** spent by SWFWMD and Sarasota County on stormwater retrofit at Hudson Bayou (800 acres)
- **$250 million** by Sarasota County to expand and upgrade Bee Ridge WWTP
- **$3 million** by SWFWMD and City of Sarasota on Bobby Jones stormwater retrofit (5,700 acres)
- **$1.8 million** from EPA for FISH Preserve Phase IV, GT Bray, and restarting artificial reef program

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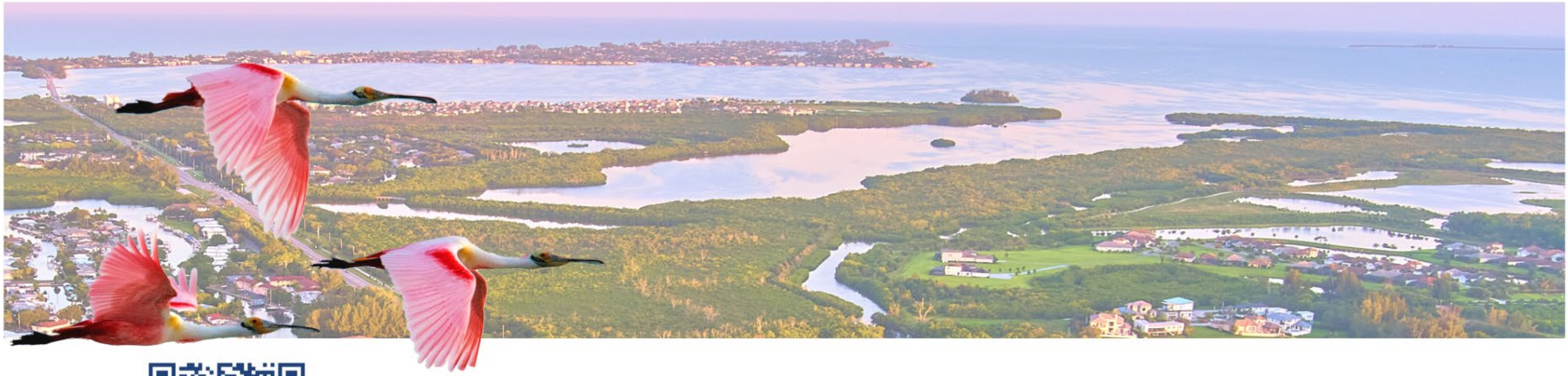
Evidence of widespread increase in seagrass coverage, with benefits to wildlife populations

A cleaner bay is a more resilient bay.



OUR PLAN

for a thriving estuary

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