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State of The Bay & Getting It 'Back on Track'

Tampa Bay Sailing Squadron, Apollo Beach, FL

August 21, 2023



tbep.org



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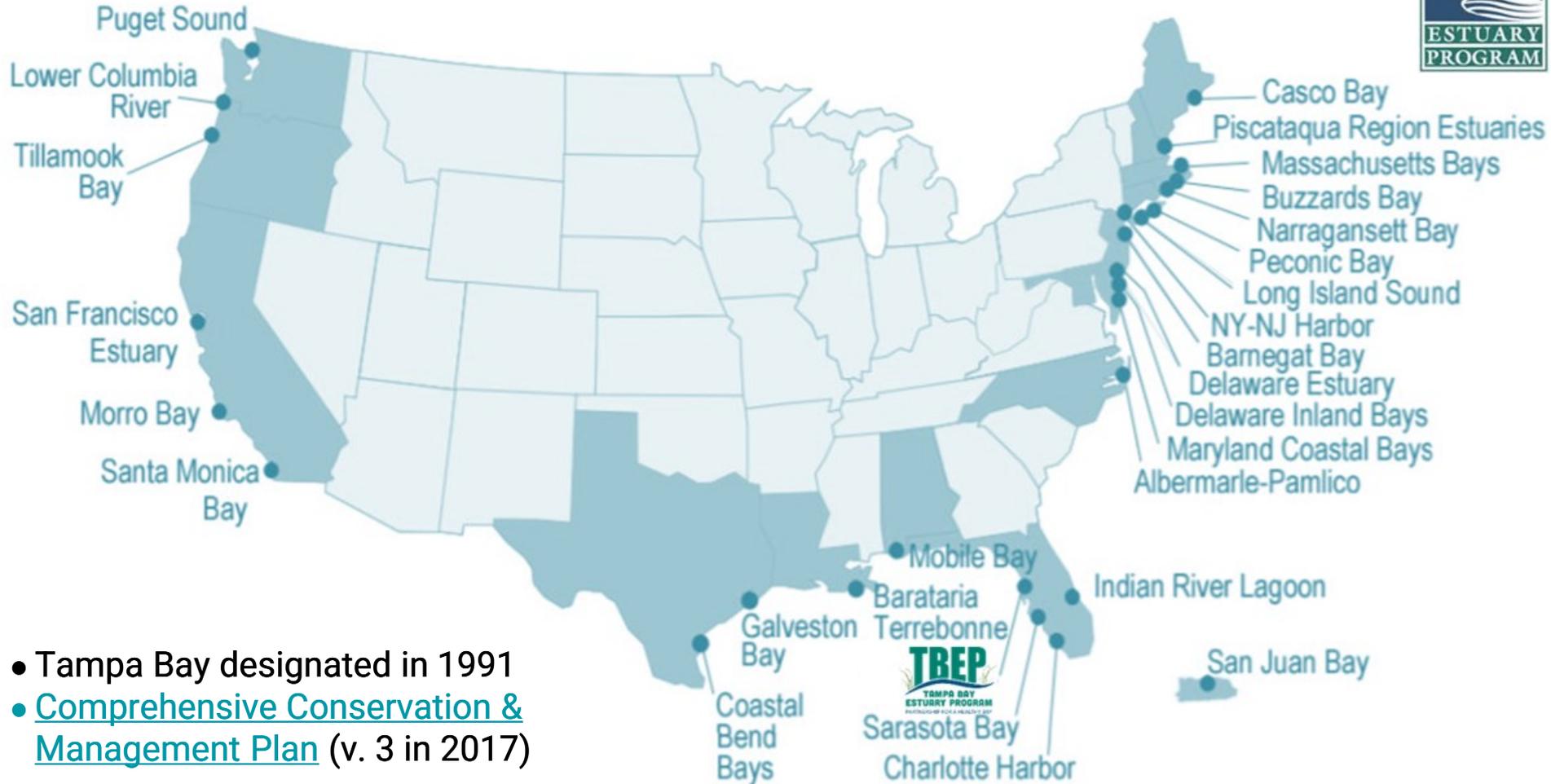
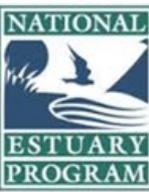
Restoration
Ecologist



Blake Simmons

Social Scientist

28 Estuaries of National Significance



- Tampa Bay designated in 1991
- [Comprehensive Conservation & Management Plan](#) (v. 3 in 2017)



Clean Waters
& Sediments



Thriving Habitats
& Abundant Wildlife



Informed, Engaged,
& Responsible Community

Program Priorities

ccmp.tbep.org

Tampa Bay Watershed



Size

Tampa Bay Proper: 400 square miles
Tampa Bay Watershed: 2,200 square miles



Depth

Average Depth: 11 Feet
Maximum Depth: 43 Feet



Major Tributaries

Hillsborough, Palm, Alafia, Little Manatee,
Manatee & Braden Rivers



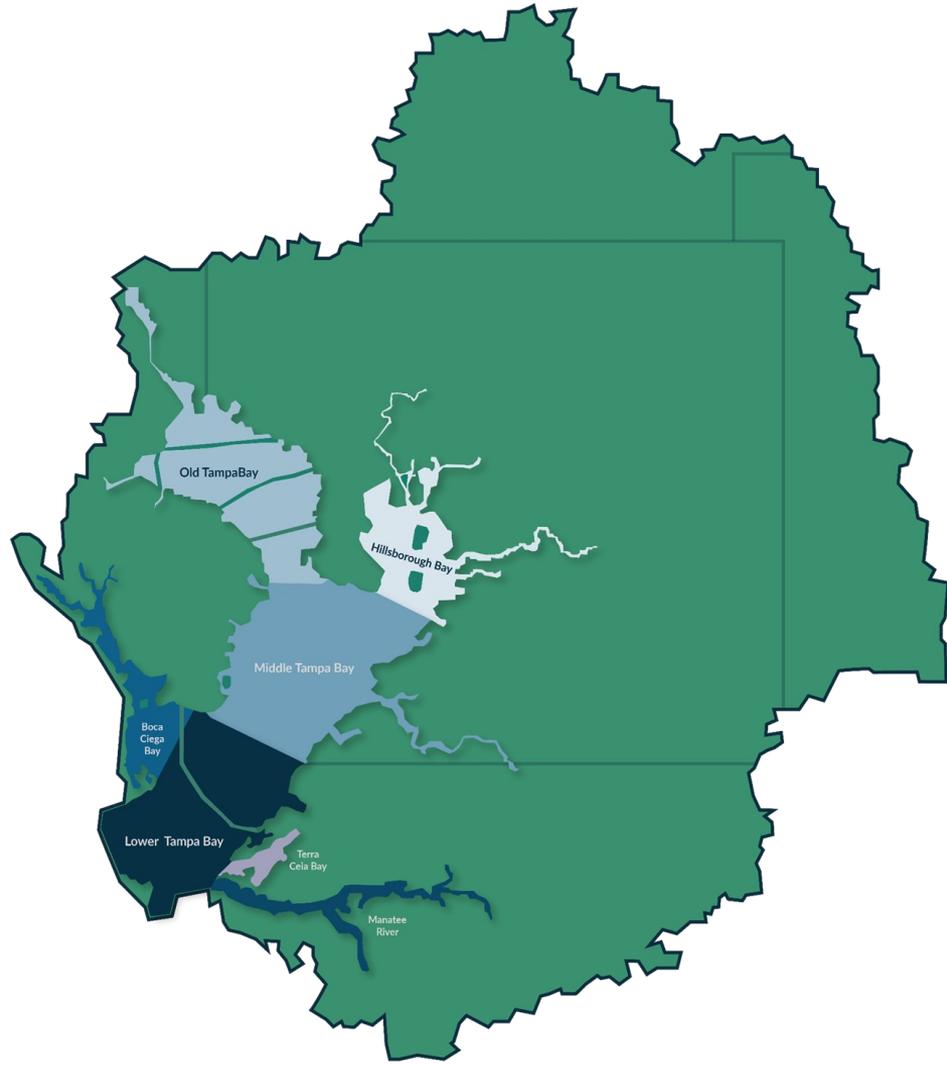
Population

> 3.1 million in watershed

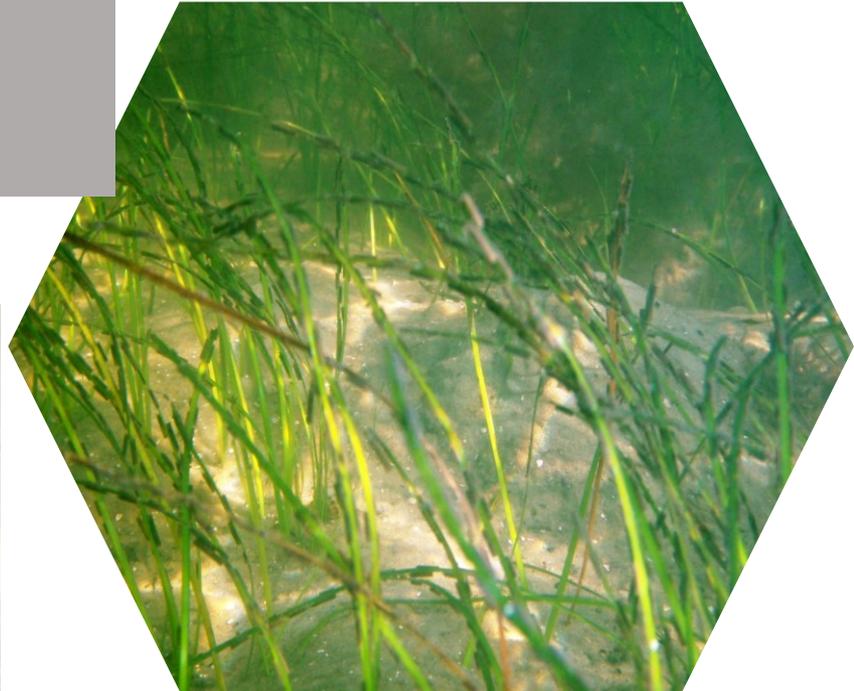
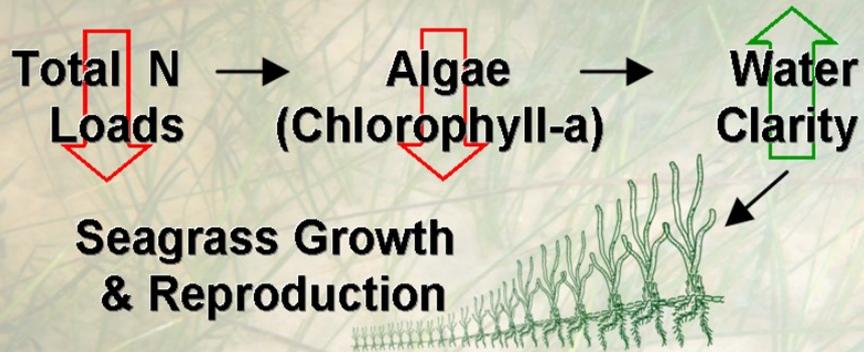


Land Use

32% Undeveloped
17% Agriculture
42% Urban/Suburban
9% Mining

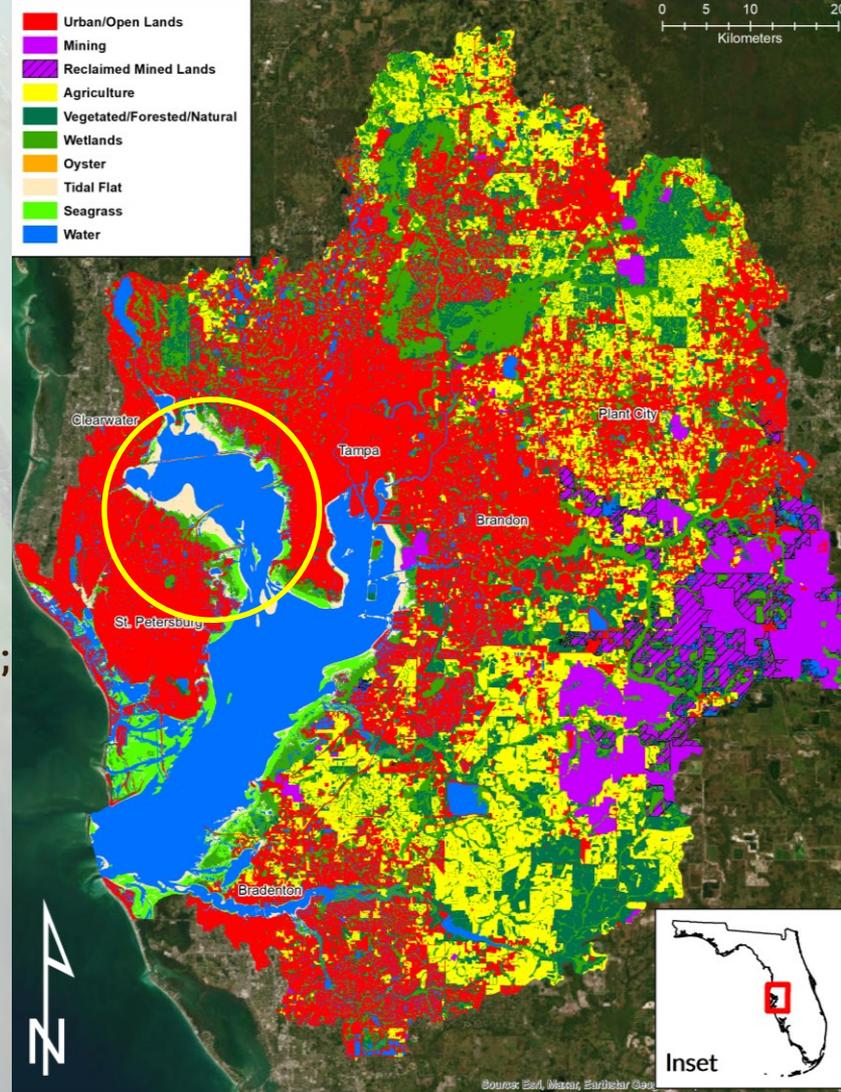


Target Root Causes

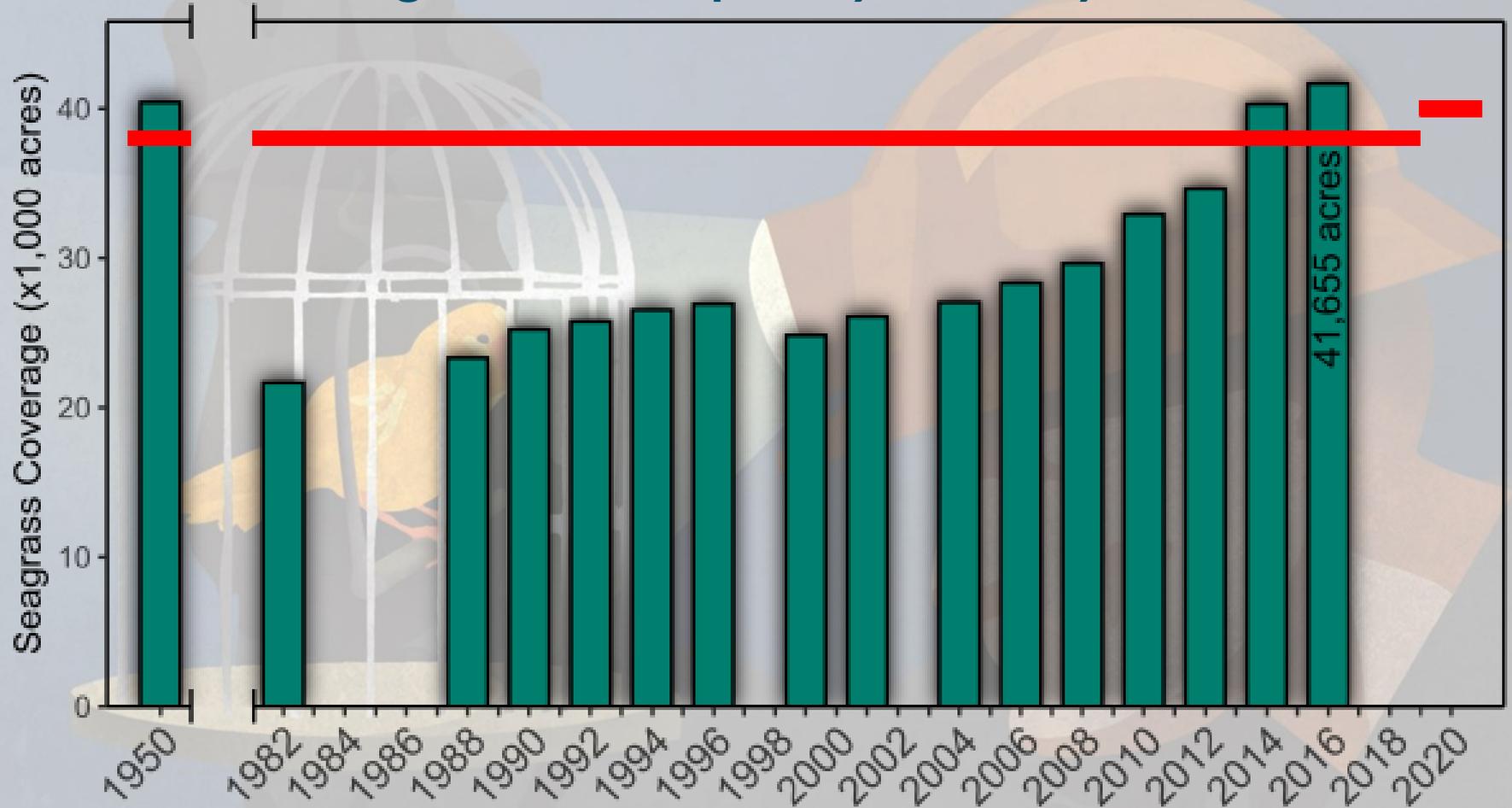


Tampa Bay 2023: An Urban Estuary *Still* in Recovery

- 1950 – 1980: Nearly ½ of seagrasses lost
- 1980 – 1990: Initial point source and nonpoint source regulations enacted
- 1991: Tampa Bay Estuary Program
- 1994 – 1996: Tampa Bay Nitrogen Management Consortium formed to more fully address loads to Bay
- 1992 – 2017: >470 TN Reduction projects implemented; 530 Tons of TN precluded >\$2.5 Billion invested
- 2014 – 2018: Sustaining seagrass coverage above 1950s & Restoration Goal levels
- 2018 – 2022: **Seagrass losses in upper Tampa Bay drop baywide coverage below Restoration Goal**



Underwater Seagrasses: Tampa Bay's Canary in the Coal Mine

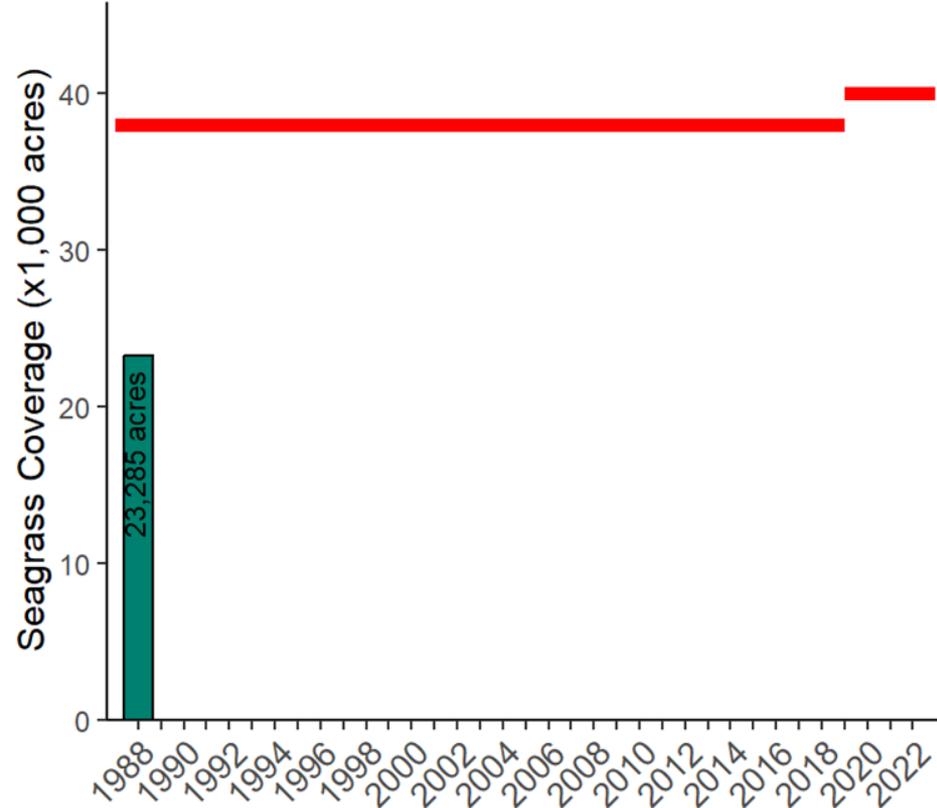


Tampa Bay's Underwater Seagrass

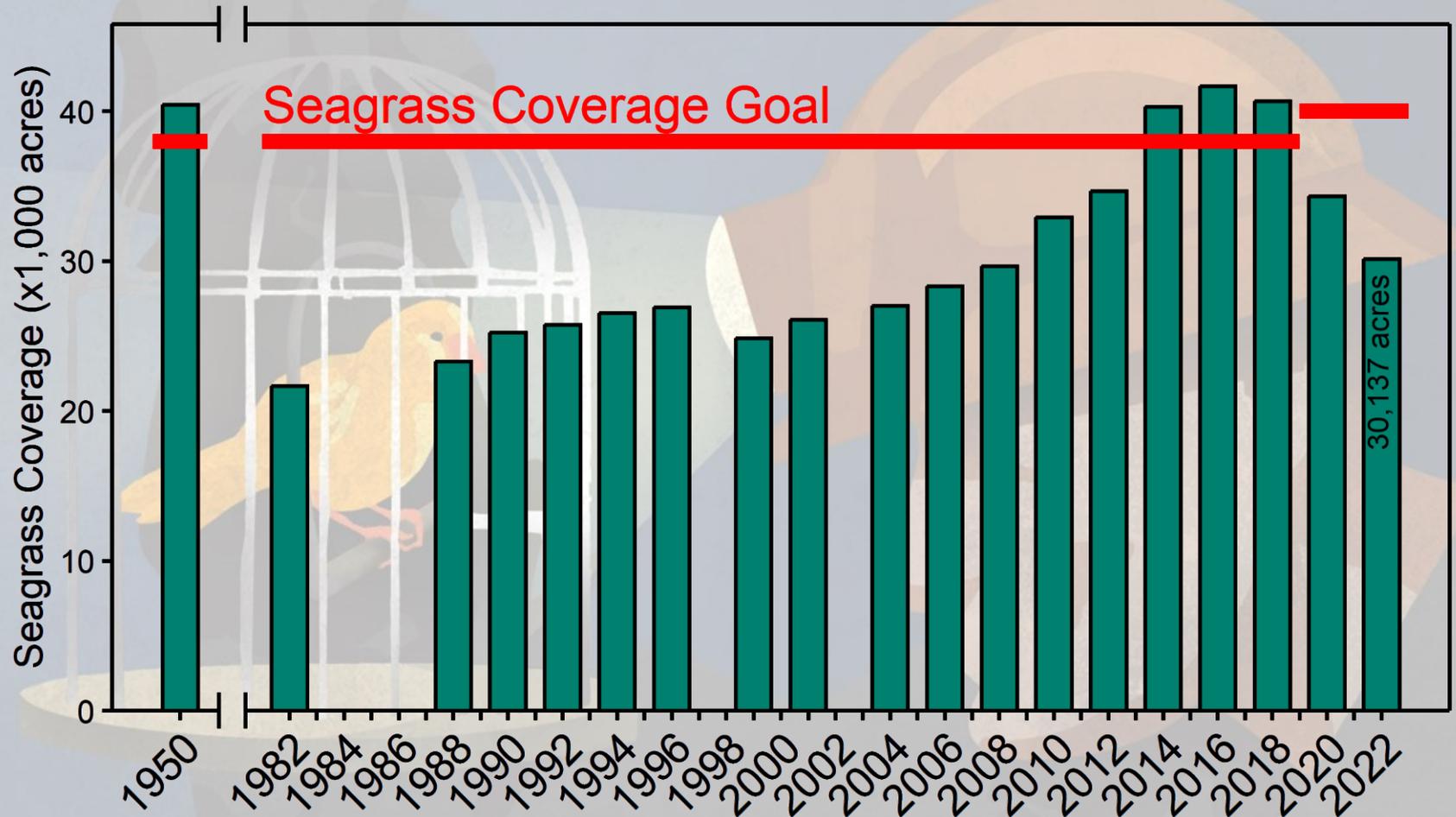
- Lost >11,500 acres from 2016 to 2022

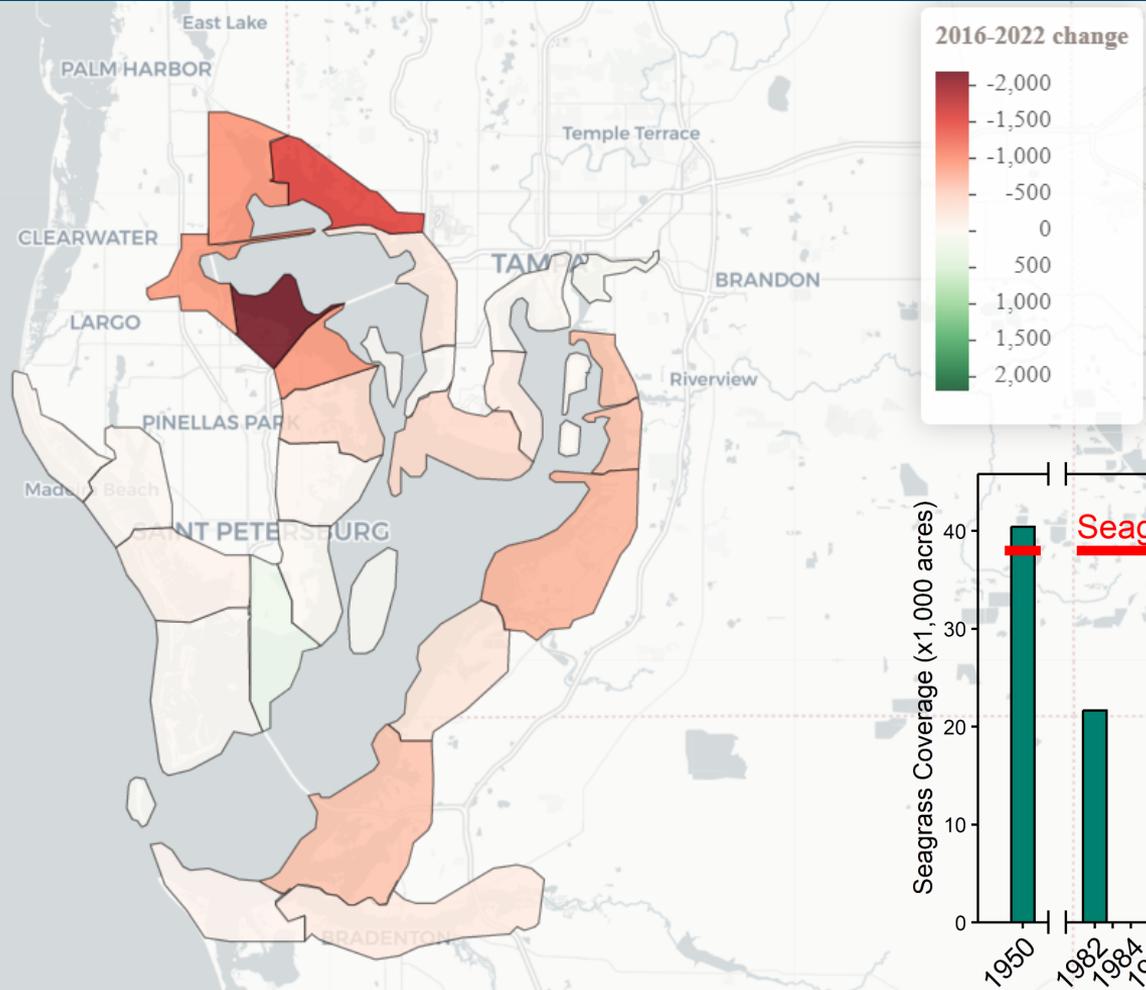
- Three consecutive assessments with declines

1988

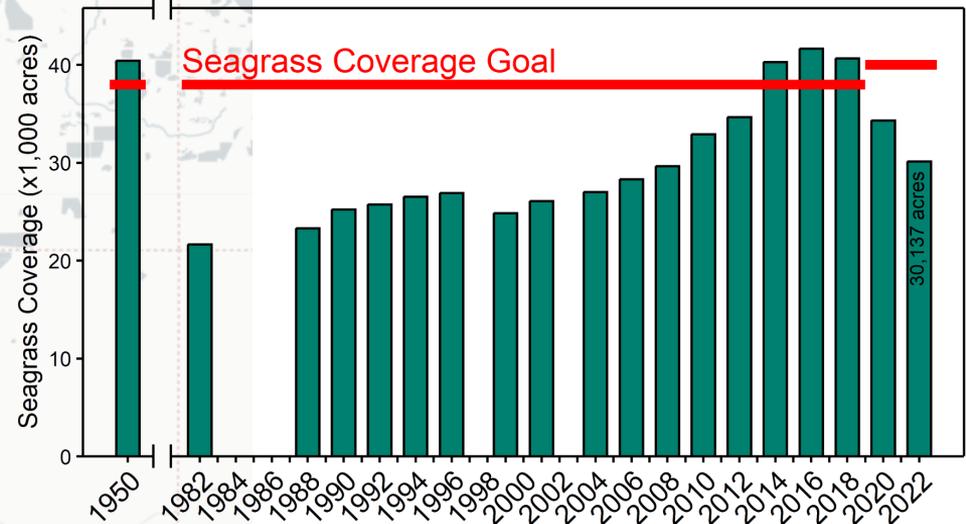


Underwater Seagrasses: Tampa Bay's Canary in the Coal Mine

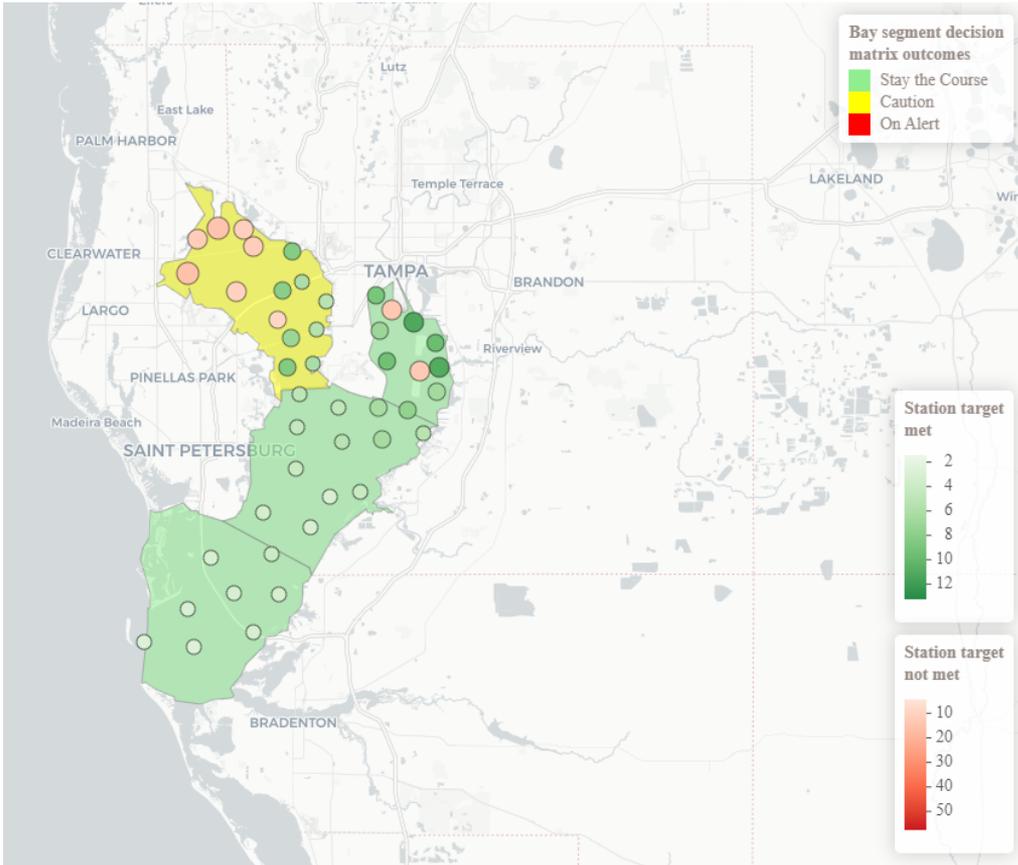




Seagrass Trends

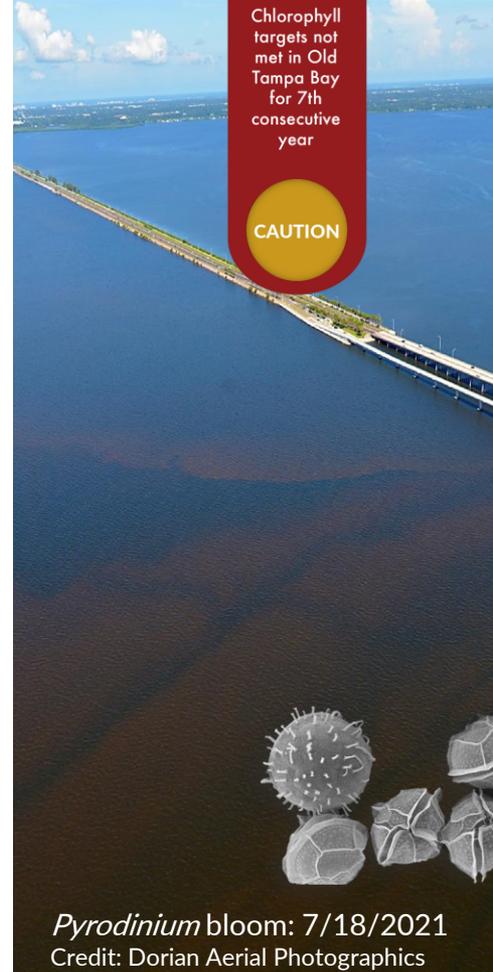


Recent Water Quality Results

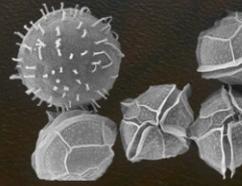


↓

	OTB	HB	MTB	LTB
1975	R	R	R	G
1976	R	R	R	Y
1977	R	R	R	R
1978	R	R	R	Y
1979	R	R	R	R
1980	R	R	R	R
1981	R	R	R	R
1982	R	R	R	R
1983	R	Y	R	R
1984	R	G	R	Y
1985	R	R	R	Y
1986	R	Y	R	G
1987	R	Y	R	G
1988	Y	G	Y	G
1989	R	Y	R	Y
1990	R	G	R	Y
1991	G	Y	Y	Y
1992	Y	G	Y	Y
1993	Y	G	Y	Y
1994	Y	Y	R	R
1995	R	Y	R	Y
1996	Y	G	Y	G
1997	Y	G	R	Y
1998	R	R	R	R
1999	Y	G	Y	Y
2000	G	G	Y	Y
2001	Y	G	Y	Y
2002	Y	G	G	G
2003	R	Y	G	Y
2004	R	G	G	Y
2005	G	G	Y	Y
2006	G	G	G	G
2007	G	G	G	G
2008	Y	G	G	Y
2009	Y	Y	G	G
2010	G	G	G	G
2011	R	G	Y	G
2012	G	G	G	G
2013	G	G	G	G
2014	G	G	G	G
2015	Y	G	Y	G
2016	Y	G	G	G
2017	Y	G	G	G
2018	Y	G	G	G
2019	Y	G	G	G
2020	Y	G	G	G
2021	Y	G	G	G
2022	G	G	G	G

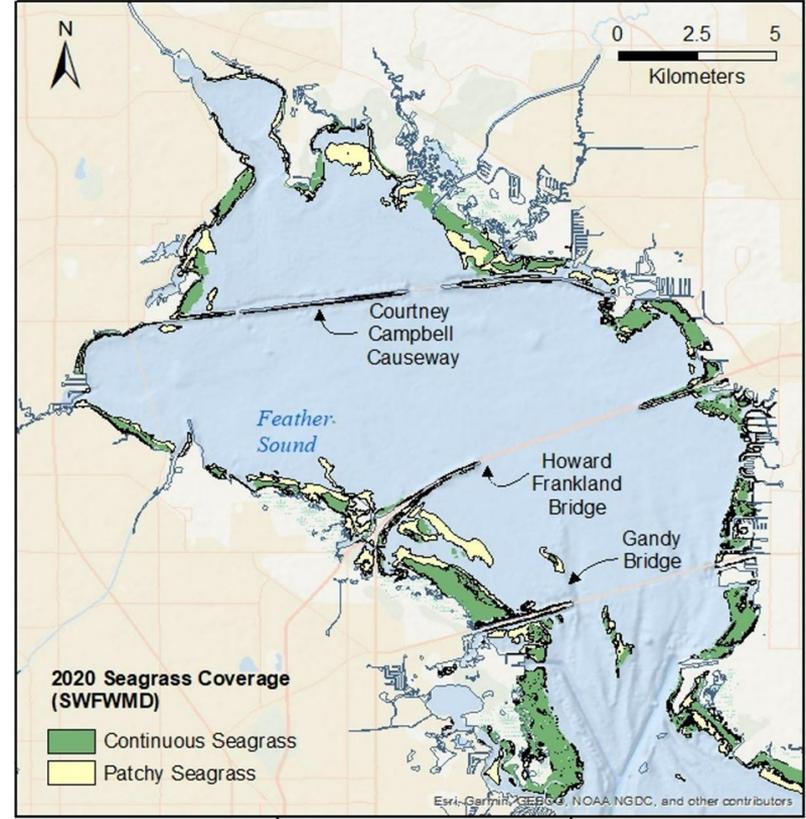
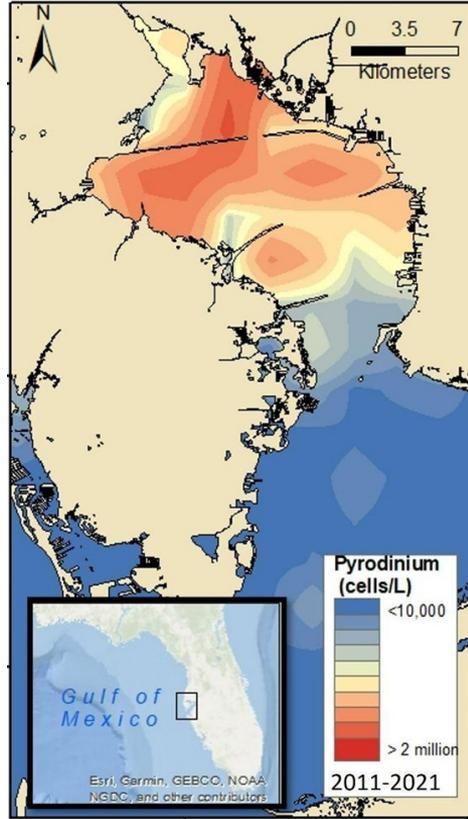
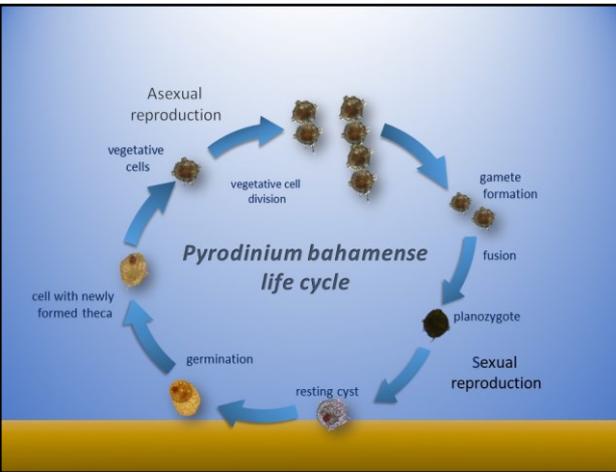


Chlorophyll targets not met in Old Tampa Bay for 7th consecutive year



Pyrodinium bloom: 7/18/2021
Credit: Dorian Aerial Photographics

Pyrodinium bahamense capitalizing on nutrients + other physical factors prevalent in Old Tampa Bay





What is the State of Tampa Bay?

3 Key Takeaways

tbep.org/state-of-the-bay/

01

Old Tampa Bay Needs Our Help

Upper portions of Tampa Bay show clear indicators of stress. We need to refocus efforts to reduce nutrients and invest in projects that enhance water quality, like reducing nutrient inputs, improving tidal circulation, and conserving coastal habitats.

02

The Urgency of Restoration

As development continues to increase throughout the watershed, the amount of habitat available for restoration decreases. We need to act fast, capitalizing on the restoration opportunities that remain before they are lost in the coming years.

03

Community Support Increasing

A new leaders advocating for the Bay's restoration have emerged, thanks in part to media coverage of issues like Piney Point, red tide, and manatee mortalities. Consequently, additional resources are becoming available to support community-focused collaborations and bay improvement efforts.

Some Simple Actions that Can Make a Real Difference

Americans buy more than **HALF A BILLION** BOTTLES OF WATER EACH WEEK—more than enough plastic to fill **RAYMOND JAMES STADIUM**.

DRINK LOCAL.

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

PLEASE CLEAN UP AFTER YOUR PET

In the Tampa Bay area, an average of **50 TONS OF DOG POOP** *is LEFT ON THE GROUND* each day.

THE AVERAGE-SIZE DOG PRODUCES ABOUT A HALF-POUND OF POOP PER DAY.

THERE ARE ABOUT 500,000 DOGS IN THE TAMPA BAY REGION.

ALTOGETHER, THEY GENERATE ABOUT 125 TONS OF POOP EACH DAY.

40% OF PEOPLE DON'T PICK UP AFTER THEIR DOGS.

SCOOP THE POOP.

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

Use **IRON** instead of **FERTILIZER** in summer to keep your grass green without growing faster. Side benefit: Less mowing. **MORE HAMMOCK TIME!**

SKIP THE FERTILIZER IN SUMMER

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

The license tag has provided **\$1.6 MILLION** to schools, neighborhoods and community groups for **GRASSROOTS PROJECTS** TO HELP THE BAY.

REEL IN THE TAMPA BAY ESTUARY TAG

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

"We could never have loved the earth so well if we had had no childhood in it."

- GEORGE ELIOT

CUT THE [NATURE] DEFICIT

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

HOW TO Floridify Your Yard, with the Fam

PICK ONE:

- ANIMALS: Land, Water, Tree
- NATURE: Dirt, Mosses, Painted
- ART: Land, Water, Tree, Dirt, Mosses, Painted

Plant a butterfly garden. Make a pond. Plant a tree. Make a compost bin. Make a pathway. Decorate a birdhouse.

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

GO SLOW

USE A PUSH POLE OR TROLLING MOTOR in shallow water to protect **UNDERWATER SEAGRASSES** and the **MANATEES** that feed on them.

BOAT SLOW WHERE SEAGRASSES GROW.

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

MOBILE SOURCES CONTRIBUTE **4x MORE** NITROGEN OXIDE POLLUTION to the watershed than power plants, and **TWICE AS MUCH** POLLUTION directly to Tampa Bay.

DRIVE LESS AND DRIVE SMALL.

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

95% OF THE WORLD'S INSECTS are either **HELPFUL OR HARMLESS**. LEARN TO RECOGNIZE GOOD GUYS LIKE LADYBUGS, ASSASSIN BUGS AND YES, SPIDERS!

GIVE POISON A PASS.

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

FIFTY VOLUNTEERS can plant **5,000 SPRIGS** OF SALT MARSH in **TWO HOURS**.

BE A GIVER, NOT A TAKER.

A message from #LOVE Tampa Bay LOVETAMPABAY.ORG

Robinson Preserve

When you build it, they will come ... Investing in habitat preservation & restoration also bolsters important fish nurseries in the Bay



RESEARCH ARTICLE

Coastal wetland restoration improves habitat for juvenile sportfish in Tampa Bay, Florida, U.S.A.

Kalle Schulz^{1,2}, Philip W. Stevens¹, Jeffrey E. Hill^{1,3}, Alexis A. Trotter¹, Jared L. Rutch¹, Kyle L. Williams¹, Joshua T. Patterson^{1,4}, Quenton M. Tucker^{1,5}

Increasing human populations and urban development have led to losses of estuarine habitats for fish and wildlife. Where resources are limited, restoration efforts are best made to provide habitat that is suitable for juvenile sportfish. An 18-month study was conducted to compare juvenile sportfish use of natural, restored, and impinged sites along Tampa Bay, Florida, shorelines. Juvenile sportfish densities at restored sites were broadly comparable to natural sites and greater than at impinged sites. However, interspecific differences in sportfish use did occur within site types. For example, one restored site had significantly higher densities of all three juvenile sportfish species than other sites. High density blue pigfish densities were found in a study at another restored site. To evaluate whether the restored sites are providing suitable habitat for juvenile fish, we assessed growth (estimated from counts of daily rings in otoliths) and condition (observed by field analysis of growth) of common weak Y croaker and snook. An enriched coastal wetland-dependent species, croaker (8.5–8.56 mm SL/day) and snook (4.4–6.3 % lipid of dry weight) exhibited such site-specific differences and did not vary among restored, natural, and impinged site types. Although mortality rates of juvenile sportfish were not determined, use of a 40-m site fence that excludes all nonindigenous predators to three restored wetlands were relatively low compared to unexcavated sites of open-estuarine habitats. The restoration and creation of coastal wetlands in Tampa Bay provides improved habitat for juvenile sportfish.

Key words: croaker snook, estuary, habitat metrics, impinged wetland, Tampa Bay

Implications for Practice

- Specifics represent an important segment of habitat management to allow successful fishing for economic and ecological implications. This habitat restoration effort aims to support juvenile populations.
- In estuaries with several juvenile sportfish species on juvenile, habitat heterogeneity and site-specific wet systems are important. Linkages between habitat structure and sportfish use will be beneficial to assess benefits of restoration.
- In addition to natural and simulated fish growth and mortality of recruitment are addressed. Required sites with high sportfish densities for fish growth and condition may be critical to restore habitat quality and provide the best habitat for restoration.
- Overall, results support coastal habitat restoration as a viable management strategy to achieve the aim of supporting juvenile populations.

Introduction
Fishes that are dependent upon estuaries and other coastal habitats may be particularly vulnerable to population declines (Stevens et al. 2006; Stevens et al. 2017). Wetland loss, the reduction of submergent vegetation and decaying complex

PLOS ONE

Coastal restoration evaluated using dominant fish habitat characteristics and associated fish communities

Kalle Schulz^{1,2}, Philip W. Stevens¹, Jeffrey E. Hill^{1,3}, Alexis A. Trotter¹, Jared L. Rutch¹, Kyle L. Williams¹, Joshua T. Patterson^{1,4}, Quenton M. Tucker^{1,5}

1 Program in Fisheries and Aquatic Sciences, School of Forest Resources and Conservation, University of Florida, Gainesville, Florida, United States of America, **2** Fish and Wildlife Research Institute, University of Florida, Gainesville, Florida, United States of America, **3** Florida Agricultural Experiment Station, University of Florida, P.O. Box 1109, Lake Wales, Florida, United States of America, **4** Florida Agricultural Experiment Station, University of Florida, P.O. Box 1109, Lake Wales, Florida, United States of America, **5** Florida Agricultural Experiment Station, University of Florida, P.O. Box 1109, Lake Wales, Florida, United States of America

OPEN ACCESS

Citation: Schulz K, Stevens PW, Hill JE, Trotter AA, Rutch J, Williams KL, et al. (2018) Coastal restoration evaluated using dominant fish habitat characteristics and associated fish communities. *PLoS ONE* 13(10): e0202222. doi:10.1371/journal.pone.0202222

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 Funding: This project was funded by the Florida Fish and Wildlife Conservation Commission (FFWCC) and the Florida Department of Environmental Protection (FDEP). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Data Availability Statement: All data are available in the Dryad Digital Repository. <https://doi.org/10.7554/739>



Behavior Change: Be Floridian

- Reduce stormwater nutrient pollution in Tampa Bay by encouraging homeowners to skip fertilizing during the Summer rainy season and adopt Florida-Friendly landscaping practices
- Reinforce awareness of municipal ordinances that preclude N fertilizer applications during a June-September blackout period



HOW TO FERTILIZE LIKE A **FLORIDIAN**

And Follow Hillsborough County Law

In Florida, summer rains wash fertilizers with nitrogen and phosphorus into our lakes and oceans, damaging what makes this state so beautiful. That's why it's illegal in Hillsborough County to sell or use fertilizer with nitrogen or phosphorus during the rainy season, and why slow-release is required the rest of the year.

The good news is there are lots of ways to keep your yard looking great – while keeping algae-feeding nitrogen and phosphorus out of our waterways.

DURING THE MONTHS OF

OCTOBER | NOVEMBER | DECEMBER | JANUARY | FEBRUARY | MARCH | APRIL | MAY

- **Twice is nice.** Fertilize just twice a year, in April and October.
- **Watch the weather.** Rainstorms don't turn fertilizer, they wash it away. That wastes money and pollutes our water.
- **Skip the phosphorus.** The Tampa Bay region is naturally rich in phosphorus. Only use phosphorus-based fertilizer if a soil test turns up a deficiency.
- **Go slow by half.** Nitrogen in lawn or landscape fertilizers must be at least 50% slow-release (also called timed-release, controlled release or slowly available) from October to May. Slow-release provides nourishment over a longer period, saving you money and starving the algae.

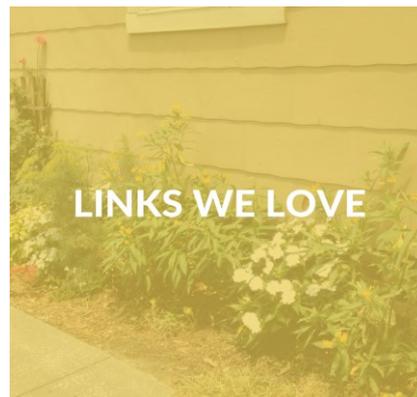
DURING THE MONTHS OF

JUNE | JULY | AUGUST | SEPTEMBER

- **Just say no to nitrogen and phosphorus.** Hillsborough County law bans the sale or use of any lawn or landscape fertilizer containing nitrogen or phosphorus from June 1 to September 30.
- **Pump some iron.** Use Florida-friendly yard products that contain iron or other micronutrients to green up your lawn during the summer.
- **Get better dirt.** Give your garden a boost by adding compost, composted cow or chicken manure, perlite or other soil amendments.
- **Pick better plants.** Florida-friendly landscaping needs less fertilizer, water and overall care – leaving you more time for fun. Ask a sales rep or visit BeFloridian.org to learn more.

Enjoy Florida. It's where you live now.

BeFloridian.org



Behavior Change: Pipe Up

- Reduce nutrient and bacteriological pollution in Tampa Bay by encouraging homeowners and homebuyers to inspect, repair, or replace aging private lateral sewer lines to prevent sanitary sewer overflows into Tampa Bay



PIPE UP KEEP POOP IN ITS PLACE

Learn more about lateral sewer lines and camera scope inspections

Download and share this handout to help your team and your clients learn more about lateral sewer lines.

DOWNLOAD



+10,581

Campaign
Webpage Visits



57%

Ad Video View
Rate



+8

Home
Inspectors
added to our
directory



~575

Repair Permits
issued in 2021
(Pinellas, St.
Pete & Largo)

Community-Focused Living Shoreline & Habitat Restoration Initiatives

- Waterfront homeowner initiatives (VOGs=Vertical oyster gardens)
- Community waterfront, habitat restoration, stormwater and flood abatement (e.g. green infrastructure implementation)
- TBEP Bay Mini Grant & Tampa Bay Environmental Restoration Fund



Before: Safety Harbor Waterfront



After: Safety Harbor Living Shoreline & Marsh Restoration



HOW TO ADOPT AND INSTALL
**VERTICAL
OYSTER
GARDENS**



[/youtu.be/kvht0DNbTek](https://youtu.be/kvht0DNbTek)



Gulfport Rain Garden



Capitalizing on Remaining Restoration Opportunities + Address Stormwater Nutrients

- Increase coastal resiliency in an urban estuary
- Attenuate stormwater nutrient loads
- Support other baywide coastal habitat restoration goals (enhance salt marsh habitats)

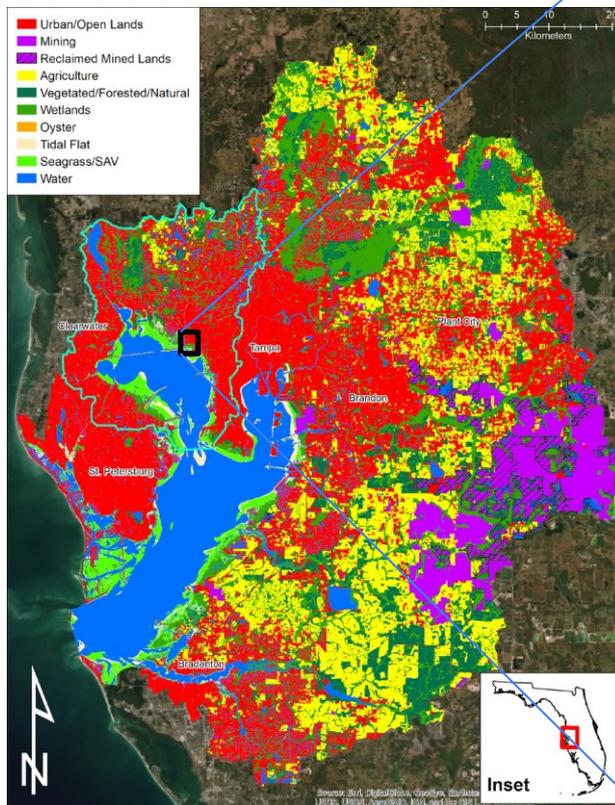


Figure 2
Priority Area 2
Rocky Point Golf Course
Habitat Restoration
Tampa, FL

Tarpon Tag

Funds from the Tampa Bay Speciality License Plate (Tarpon Tag) support community-based restoration projects

Bay Mini-Grant proposals due 9/15/2023

<https://tbep.org/bay-mini-grants>

2019-2021 Metrics

6,931 plates registered

230K awarded to **57** Bay Mini-Grants

6,931 total Tampa Bay Speciality License Plates registered in Florida in 2021



COVER STORY

CLEAN WATER MEANS MORE THAN YOU THINK

Despite massive growth, water quality in Tampa Bay has improved dramatically in 20 years



Dorian Photography Inc.

TAMPA BAY SUPPORTS

**\$32.1
BILLION**
IN TOTAL ANNUAL
OUTPUT

207,068
EMPLOYEES
1 IN 10 JOBS

\$52,769
VALUE ADDED TO
EACH NEARBY
HOME

**\$3.2
BILLION**
ADDED REGIONAL
PROPERTY VALUE

**\$52.3
MILLION**
IN ANNUAL
CARBON
SEQUESTRATION

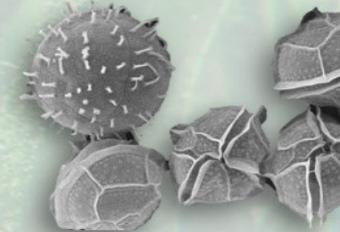
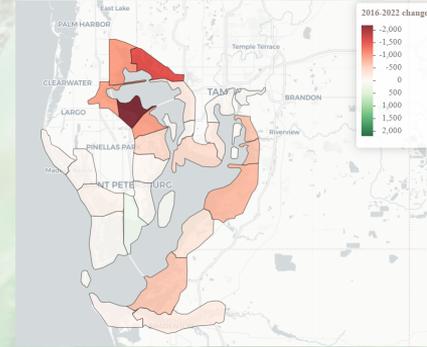
**\$714.5
MILLION**
IN ANNUAL
DENITRIFICATION
SERVICES

**\$924.4
MILLION**
IN FLOOD
PROTECTION
SERVICES

[2022\\$ TBRPC Economic Footprint
of Tampa Bay Update](#)

Summary

- Community can rally around Tampa Bay as the environmental and economic centerpiece for the region
- Bay's ecology is responding to continuing urban development pressures & new climate related stressors (warming waters, greater rain-driven stormwater runoff)
- Persistent *Pyrodinium bahamense* blooms are a vexing challenge to water quality and seagrass coverage maintenance – new investments needed
- **Nitrogen Management 2.0:** Multifaceted nutrient loading, tidal circulation and habitat/ecosystem restoration approach is necessary



Questions?

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#**LOVE**
Tampa Bay

Extra Slides

STAY THE COURSE

Continue planned projects to maintain water quality in 3 of 4 bay segments



Long-term total nitrogen loading generally declined in all bay segments

CAUTION

Chlorophyll targets not met in Old Tampa Bay for 7th consecutive year



Clean Waters & Sediments
2019-2021

Baywide benthic condition assessment remains "fair"

FAIR

50 of the 225 tidal tributaries pass the 2021 assessment period

MONITOR

Hillsborough Bay receives "poor" Benthic Index score in 2019

POOR



Mangroves, salt marshes, & freshwater wetlands see continued gains

**HABITAT
MASTER
PLAN**

Habitat Master Plan updated in 2020



Developed land increased by 15,295 acres. Total restoration opportunities declined by 17,448 acres



Nekton communities are robust in 3 of 4 bay segments

**STAY THE
COURSE**

171 projects & 1,288 acres of habitats restored



Thriving Habitats & Abundant Wildlife

2019-2021

Fisheries monitoring in Hillsborough Bay needed to ensure future improvements

CAUTION



25 Give-A-Day
events completed



\$2.8M in total funding
& \$1.7 in matching
funds awarded to 25
projects through
TBERF



3,395 new
followers across
TBEP's social
channels



Informed, Engaged, Responsible Community 2019-2021

6,931 total Tampa
Bay Speciality License
Plates registered in
Florida in 2021



\$230k awarded to 57
community-based
projects through Bay
Mini-Grants



63 media
interviews
completed by
TBEP staff