Monitoring long-term trends in critical coastal habitats to inform preservation and restoration efforts in Tampa Bay

Coastal Habitat Integrated Mapping and Monitoring Program

& Mangrove Working Group Workshop

January 16-17, 2024

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The Watershed

Size

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

Depth

Average Depth: 11 Feet
Maximum Depth: 43 Feet

Population

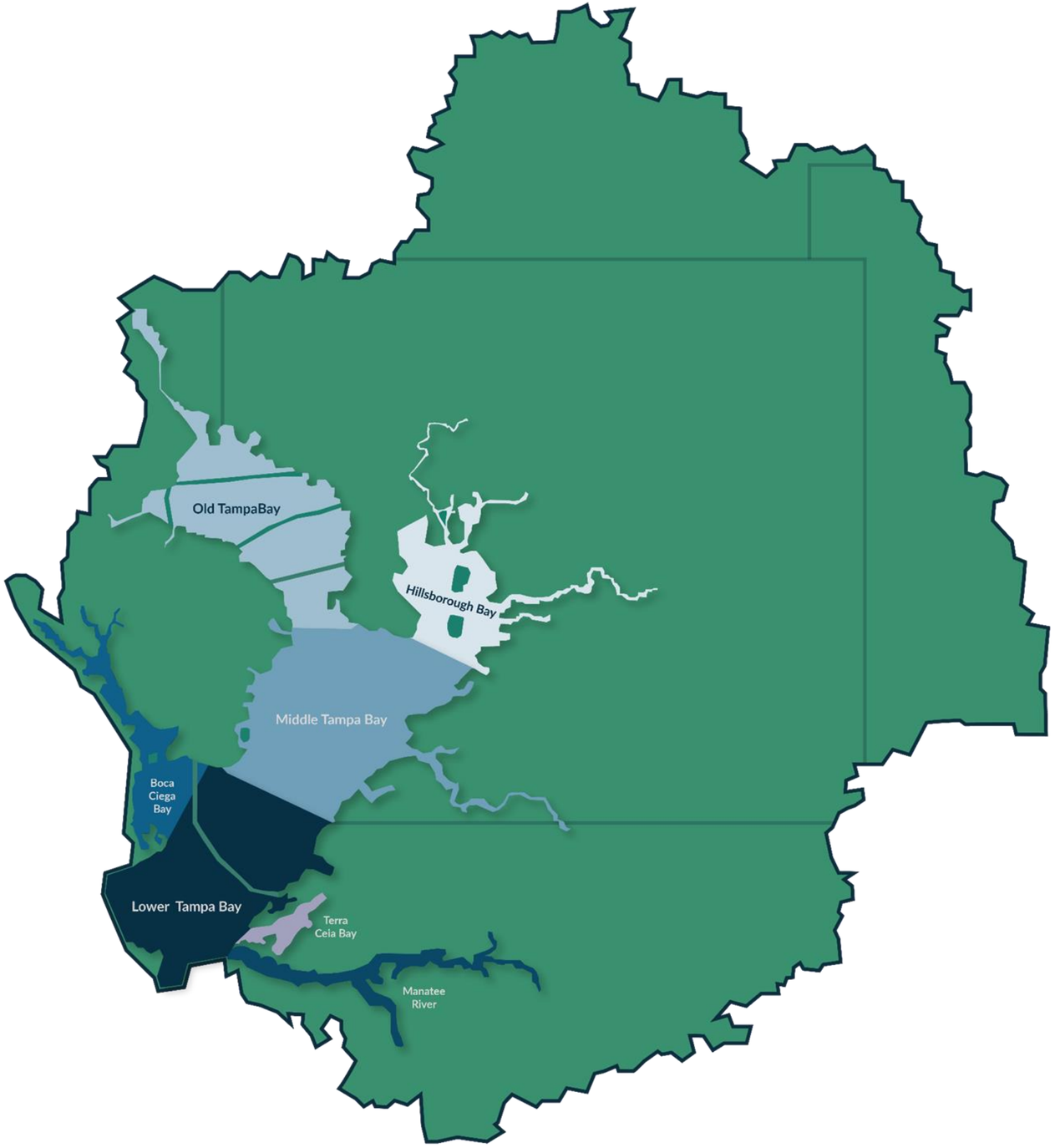
> 3 million in watershed

Major Tributaries

Hillsborough, Alafia, Little Manatee, and Manatee Rivers

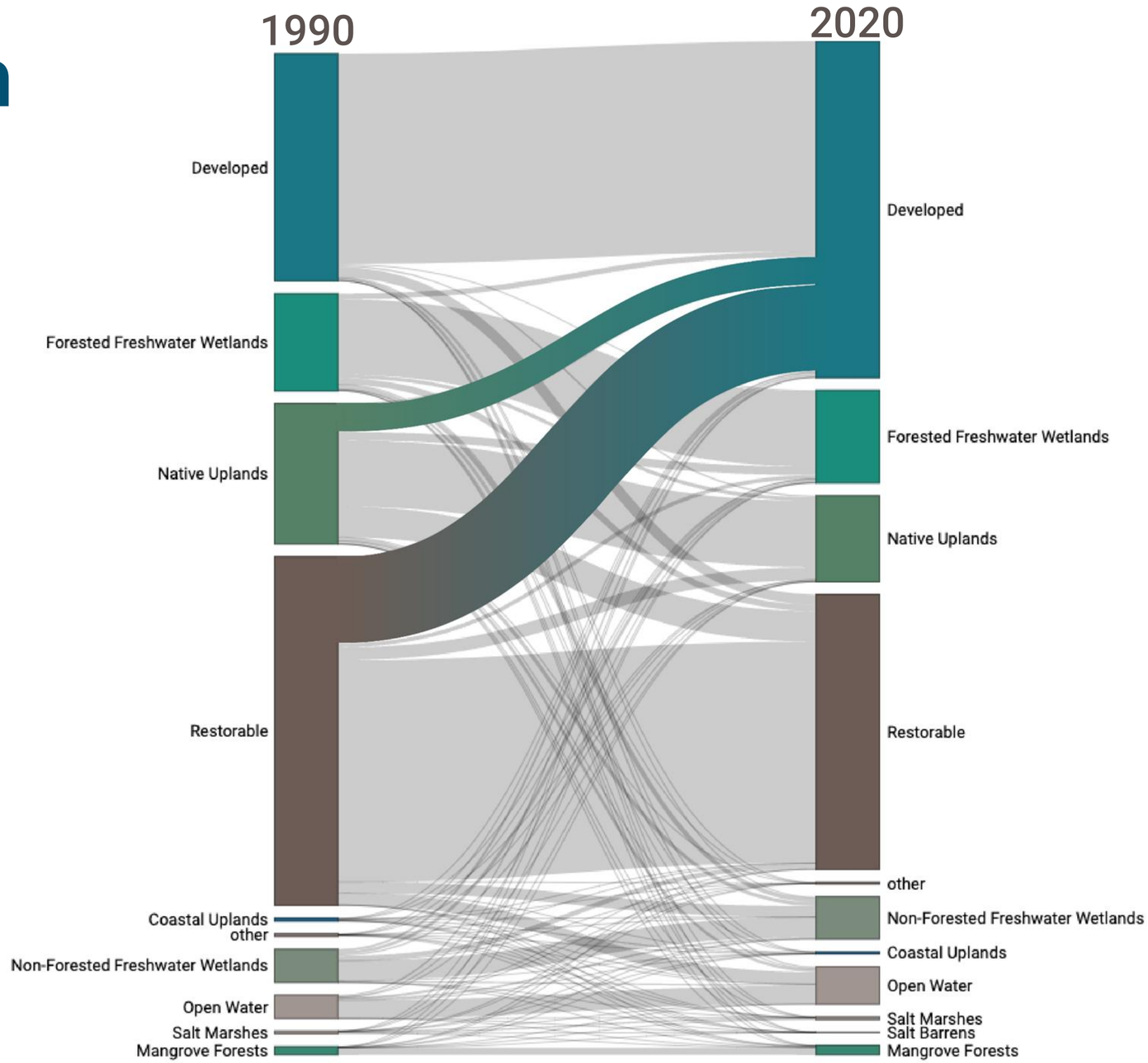
Land Use

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



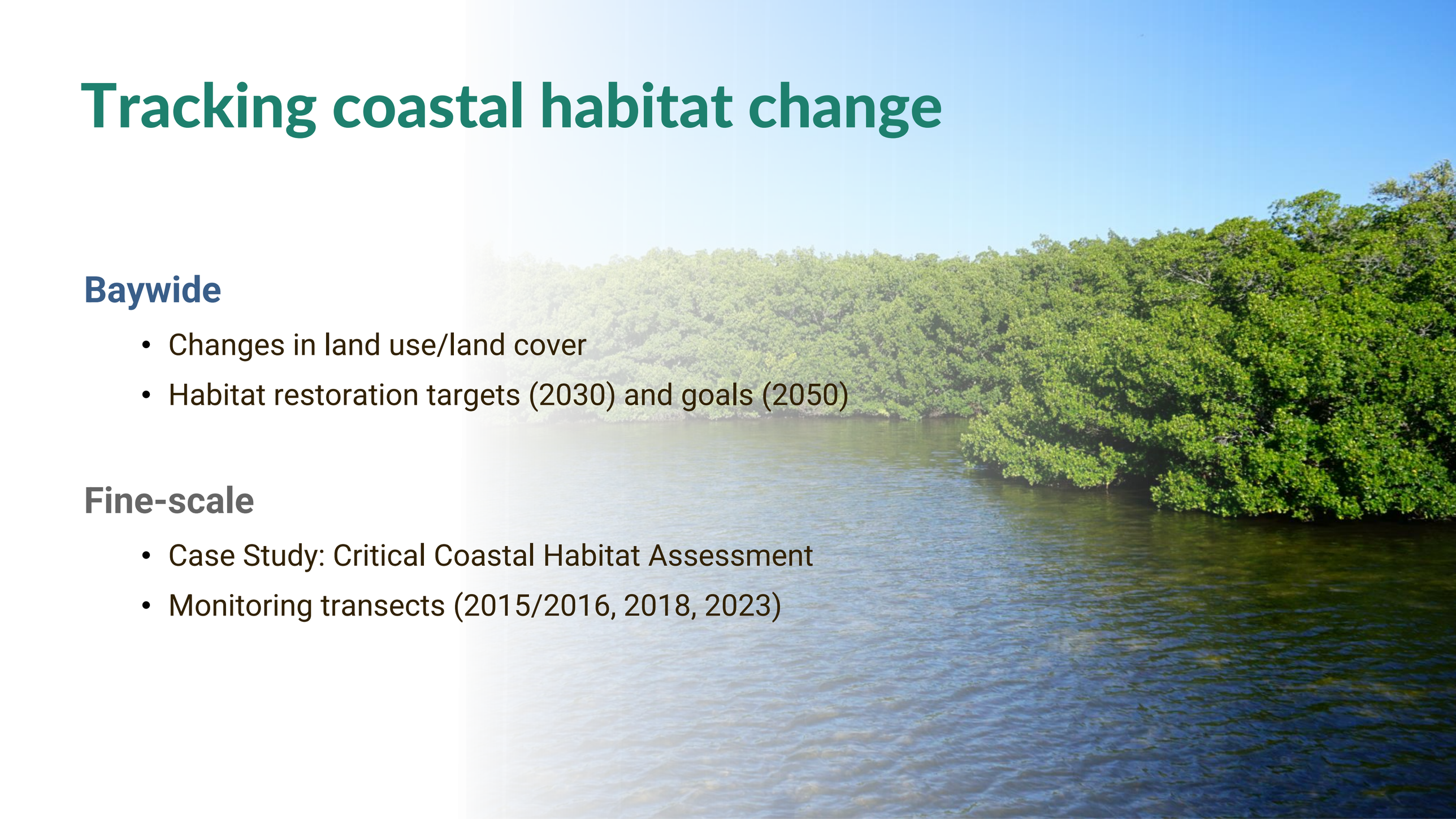
Diminishing Restoration Opportunities

- Watershed land use change analysis from 1990 (left) to 2020 (right)
- Urgency for restoration to capitalize on remaining opportunities



Beck MW, Robison DE, Raulerson GE, Burke MC, Saarinen J, Sciarrino C, Sherwood ET and Tomasko DA (2023) Addressing climate change and development pressures in an urban estuary through habitat restoration planning. Front. Ecol. Evol. 11:1070266. doi: 10.3389/fevo.2023.1070266

Tracking coastal habitat change



Baywide

- Changes in land use/land cover
- Habitat restoration targets (2030) and goals (2050)

Fine-scale

- Case Study: Critical Coastal Habitat Assessment
- Monitoring transects (2015/2016, 2018, 2023)

Maximizing the potential

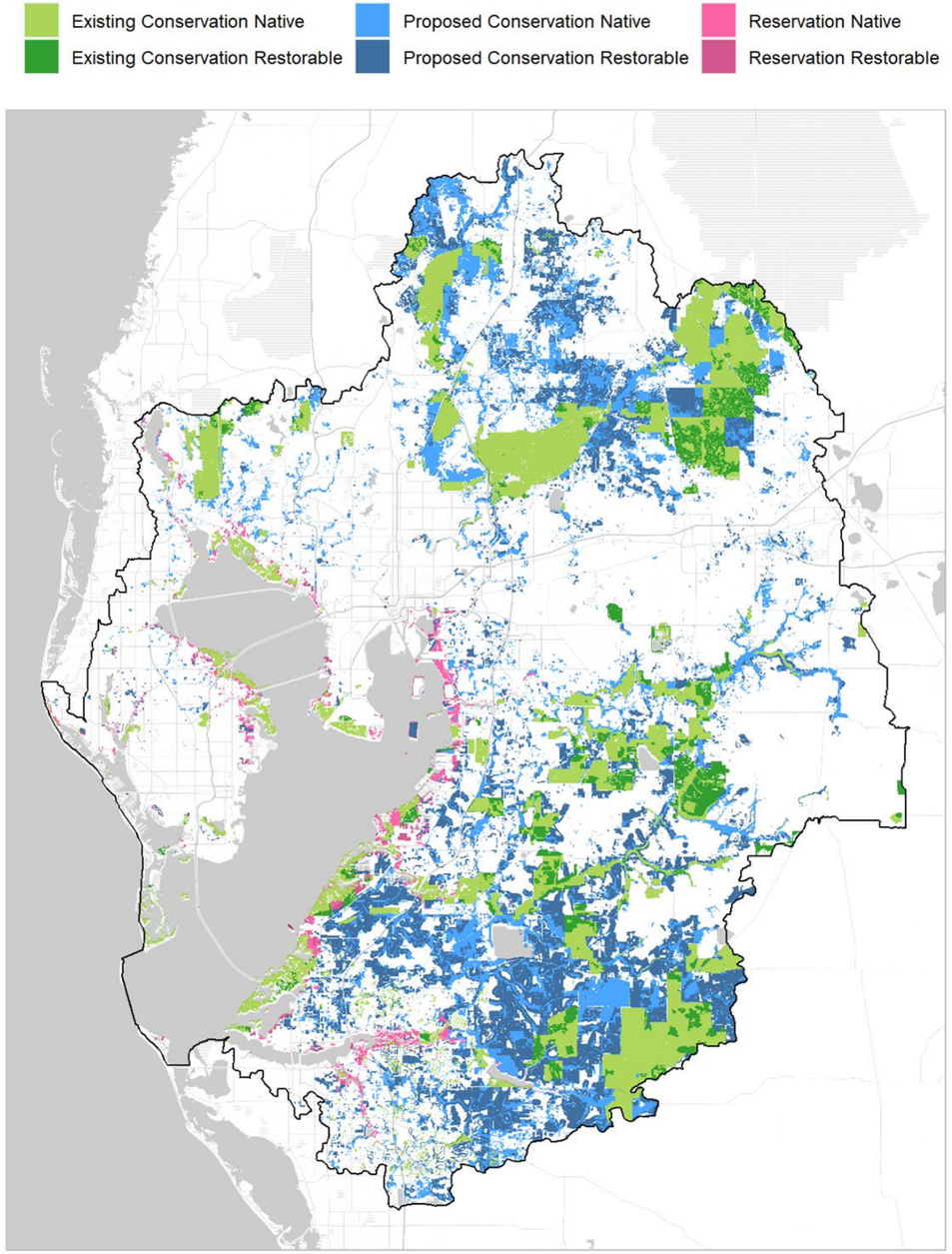
TAMPA BAY ESTUARY PROGRAM:

2020 HABITAT MASTER PLAN UPDATE

AUGUST 2020

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Mapped Extent



Progress updated over time

Habitat Type	Current Extent	2030 Target	2030 Target to go	2050 Goal	2050 Goal to go
Subtidal					
Hard Bottom	429 ac	>423 ac	-6 ac	>423 ac	-6 ac
Artificial Reefs	217 ac	>166 ac	-51 ac	>166 ac	-51 ac
Tidal Flats	24,180 ac	16,220 ac	-7,960 ac	16,220 ac	-7,960 ac
Seagrasses	30,137 ac	>40,000 ac	**9,863 ac**	>40,000 ac	**9,863 ac**
Oyster Bars	230 ac	221 ac	-9 ac	471 ac	**241 ac**
Intertidal					
Total Intertidal	20,649 ac	21,353 ac	**704 ac**	23,803 ac	**3,154 ac**
Mangrove Forests	15,485 ac	>15,300 ac	-185 ac	>15,300 ac	-185 ac
Salt Barrens	575 ac	546 ac	-29 ac	796 ac	**221 ac**
Salt Marshes	4,588 ac	4,807 ac	**219 ac**	5,457 ac	**869 ac**
Living Shorelines	11 mi	21 mi	**10 mi**	56 mi	**45 mi**
Tidal Tributaries	387 mi	391 mi	**4 mi**	405 mi	**18 mi**
Supratidal					
Coastal Uplands	3,638 ac	3,769 ac	**131 ac**	4,219 ac	**581 ac**
Non-Forested Freshwater Wetlands	69,494 ac	68,937 ac	-557 ac	71,787 ac	**2,293 ac**
Forested Freshwater Wetlands	151,925 ac	152,282 ac	**357 ac**	152,732 ac	**807 ac**
Native Uplands	141,179 ac	141,050 ac	-129 ac	142,100 ac	**921 ac**

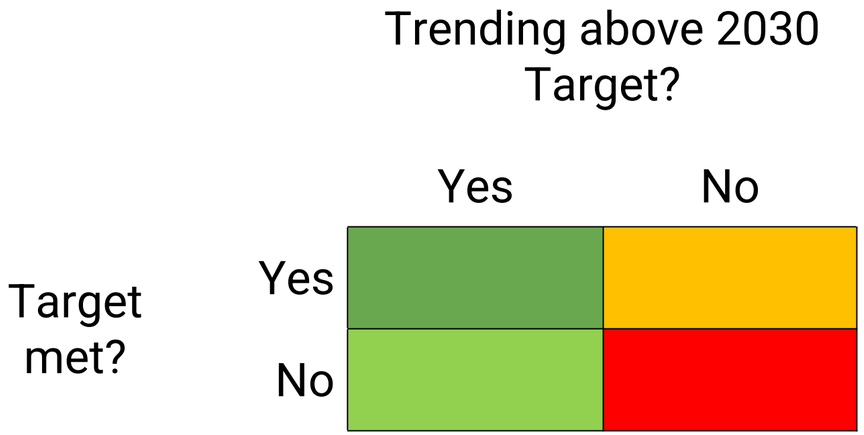
Habitat Restoration Report Card: Scoring Criteria

1 — Target is currently met AND recent trend suggests target will be achieved in 2030.

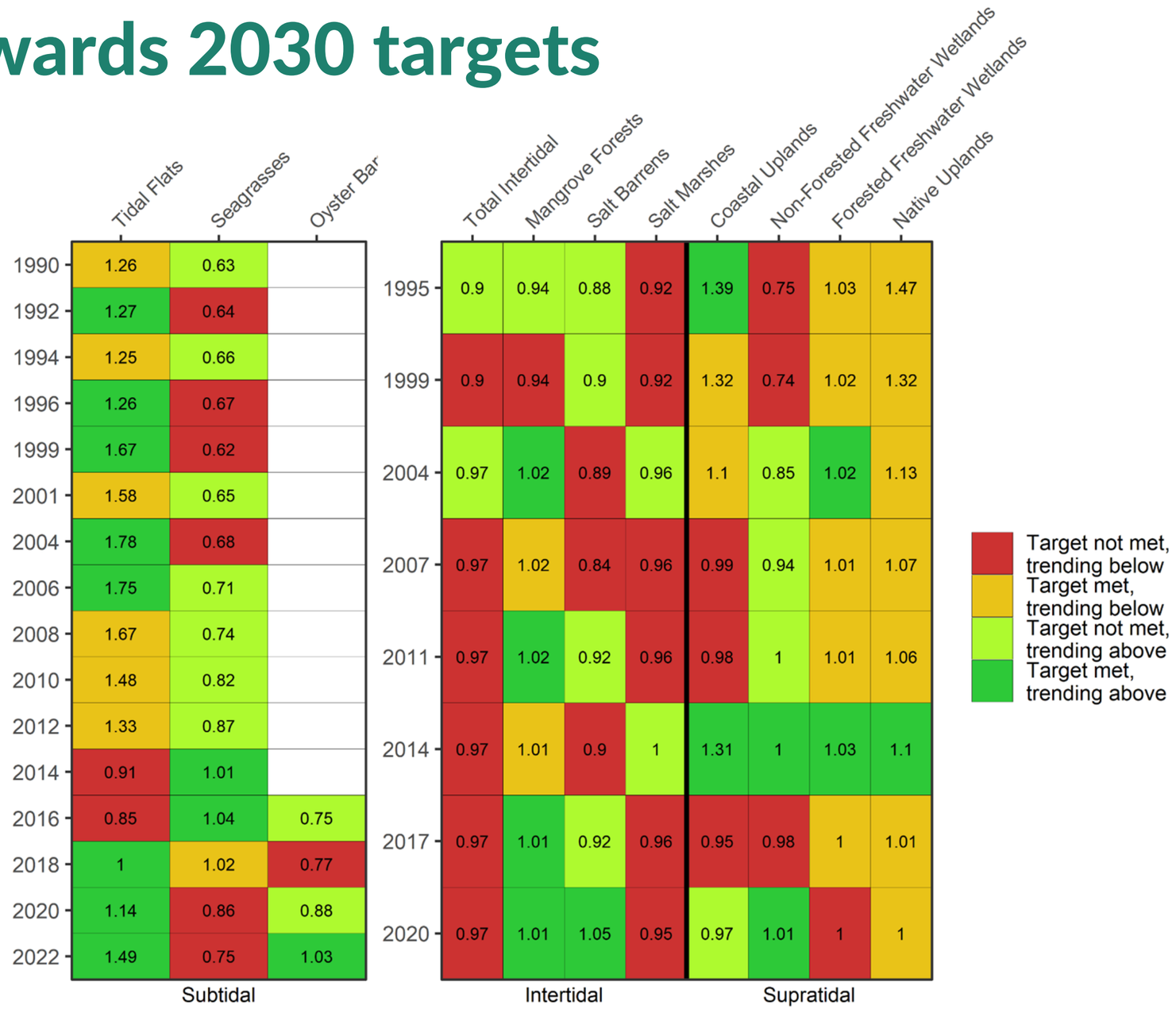
0 — Target is met but recent trend suggests target will not be achieved.

0.5 — Target is not met but trend suggests target may be achieved

-1 — Target is not, and will not be, met at current trend



Progress towards 2030 targets



Focusing Restoration Effort

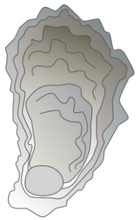
PRIORITIES

Seagrass

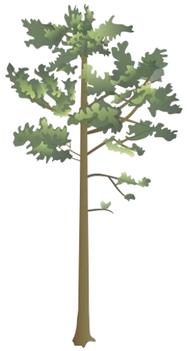
Salt marsh

Forested Freshwater Wetlands

KEEP IT UP



Oyster bars



Uplands (coastal and non-coastal)

DOING FINE

Mangroves

Icons: University of Maryland, Center for Environmental Science Integration and Application Network

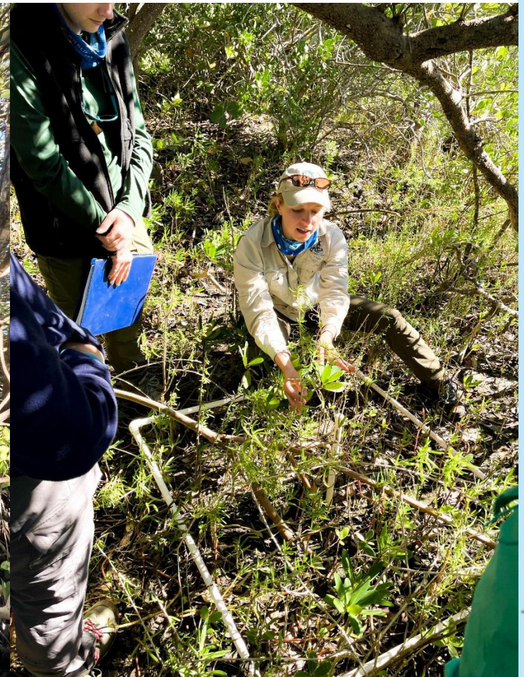
Critical Coastal Habitat Assessment

9 transects established **2015/2016**

Monitoring **2018**

Streamlined Methods, Monitoring **2023**

Repeat every 3-5 years

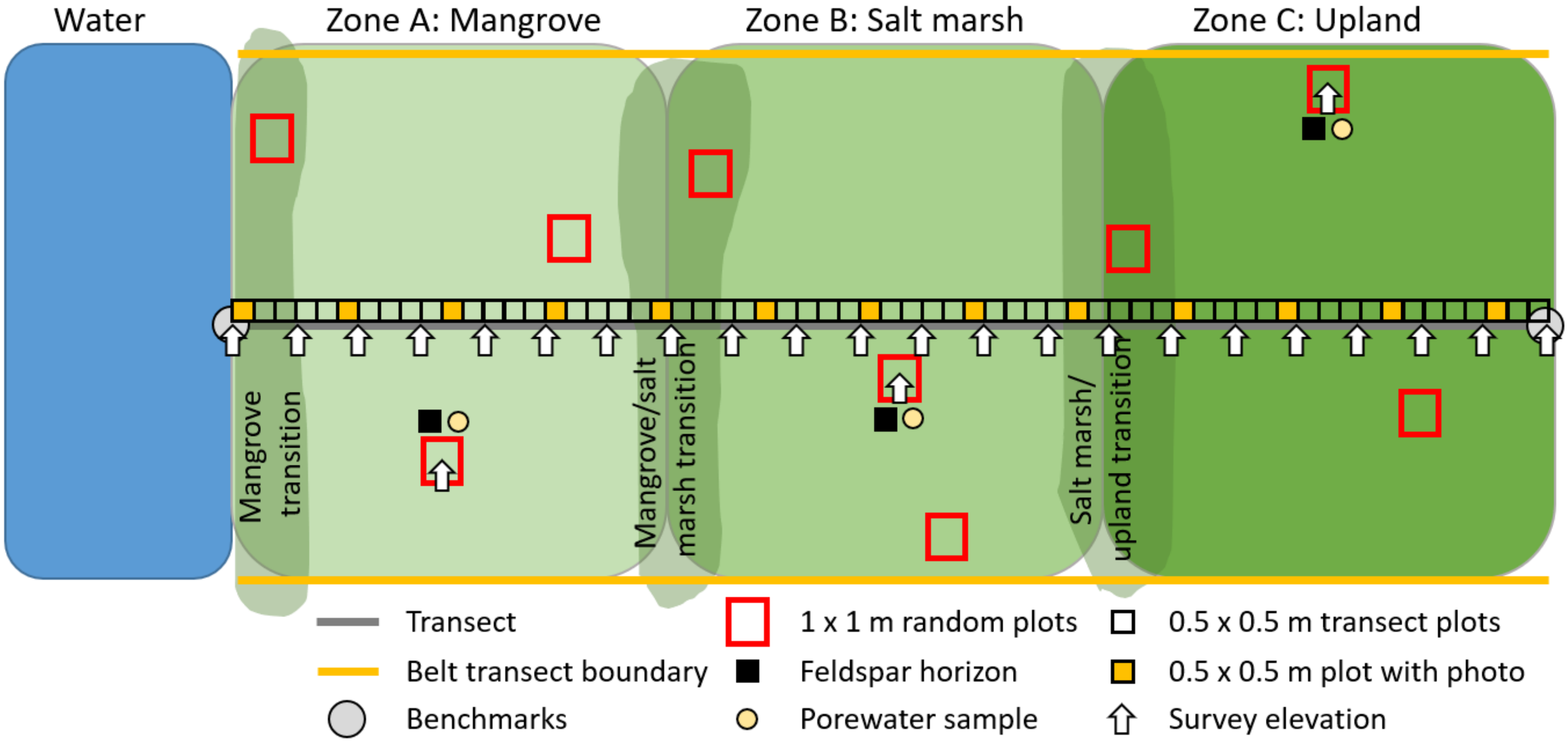


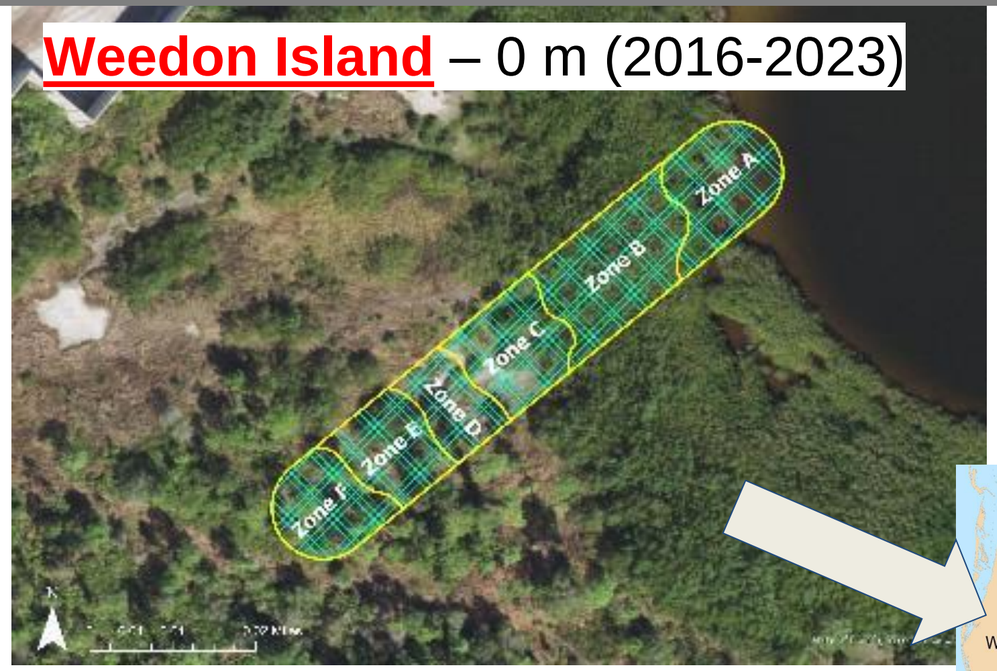
Methods

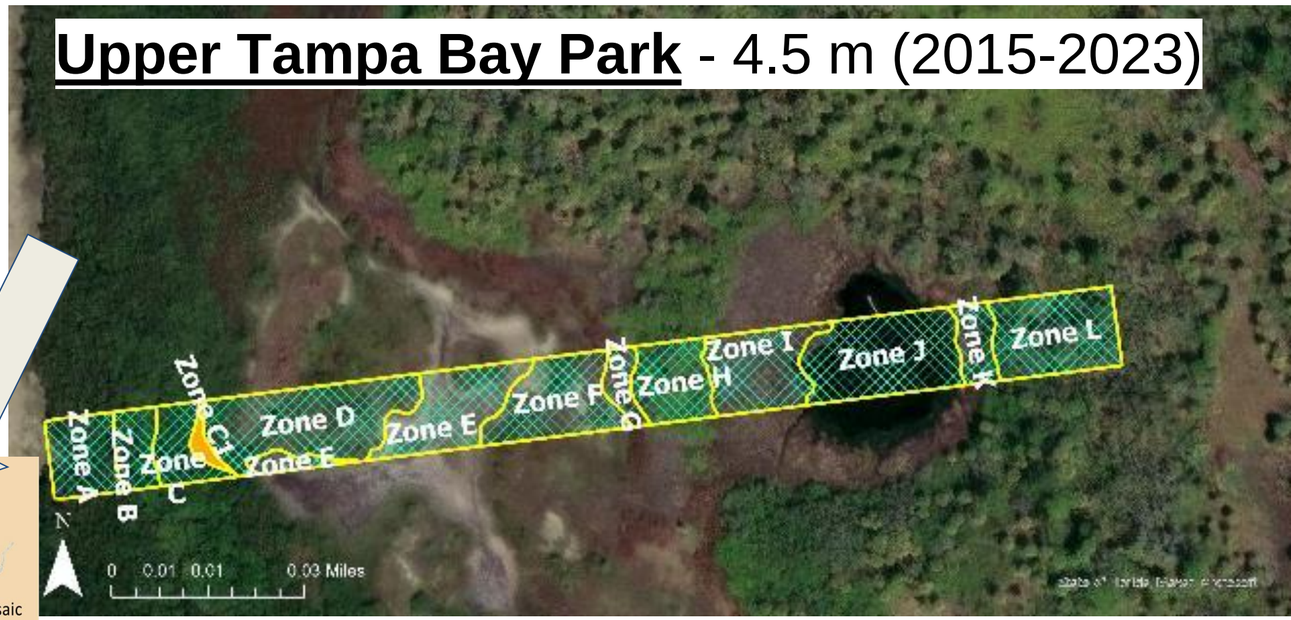
- Plant community composition and density
- Elevation
- Porewater depth and salinity
- Soil accretion, bulk density, organic matter content
- Faunal abundance

Training manual and video, Quality Assurance Project Plan

Methods: Sampling Design

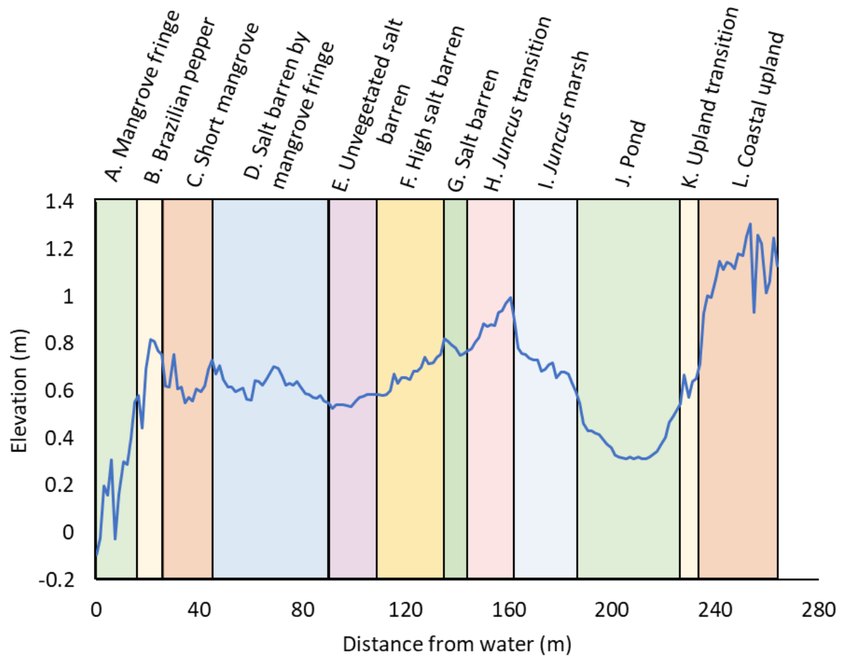



Weedon Island – 0 m (2016-2023)
Zone A
Zone B
Zone C
Zone D
Zone E
Zone F

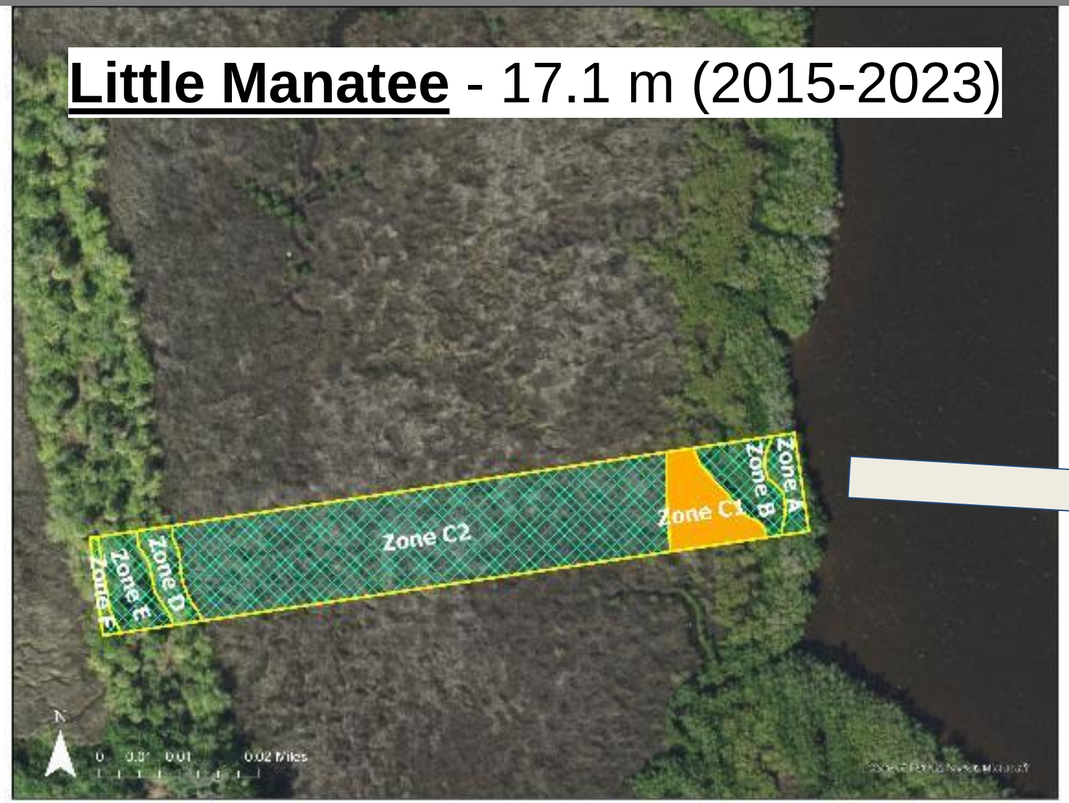

Upper Tampa Bay Park - 4.5 m (2015-2023)
Zone A
Zone B
Zone C
Zone D
Zone E
Zone F
Zone G
Zone H
Zone I
Zone J
Zone K
Zone L
0 0.01 0.01 0.03 Miles

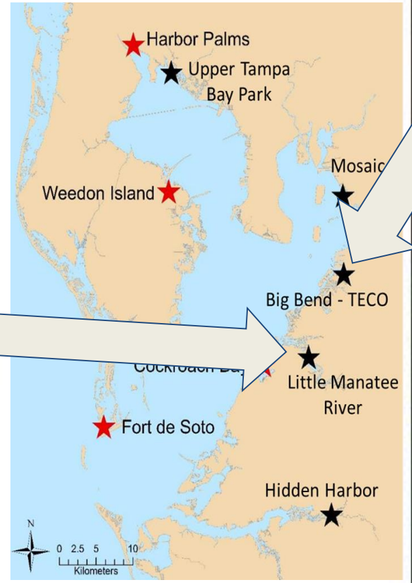

Harbor Palms
Upper Tampa Bay Park
Mosaic
Weedon Island
Big Bend - TECO
Cockroach Bay
Little Manatee River
Fort de Soto
Hidden Harbor
0 2.5 5 10
Kilometers


Fort Desoto – 0.7 m (2016-2023)
Zone A
Zone B
Zone C
Zone D
Zone E
Zone F
Zone G

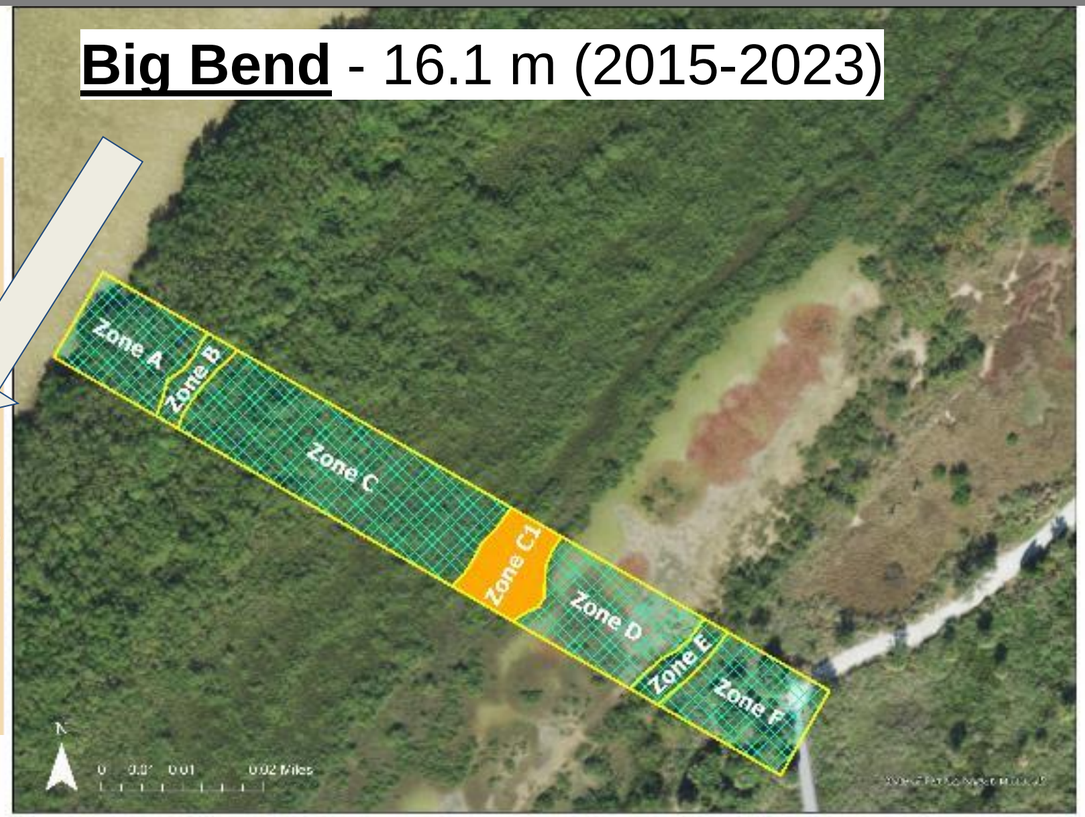

A. Mangrove fringe
B. Brazilian pepper
C. Short mangrove
D. Salt barren by mangrove fringe
E. Unvegetated salt barren
F. High salt barren
G. Salt barren
H. Juncus transition
I. Juncus marsh
J. Pond
K. Upland transition
L. Coastal upland
Elevation (m)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
0
40
80
120
160
200
240
280
Distance from water (m)

Little Manatee - 17.1 m (2015-2023)

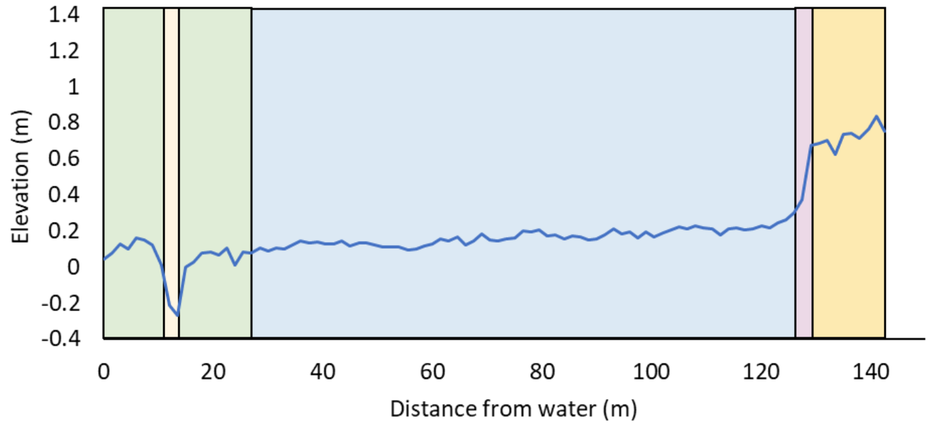




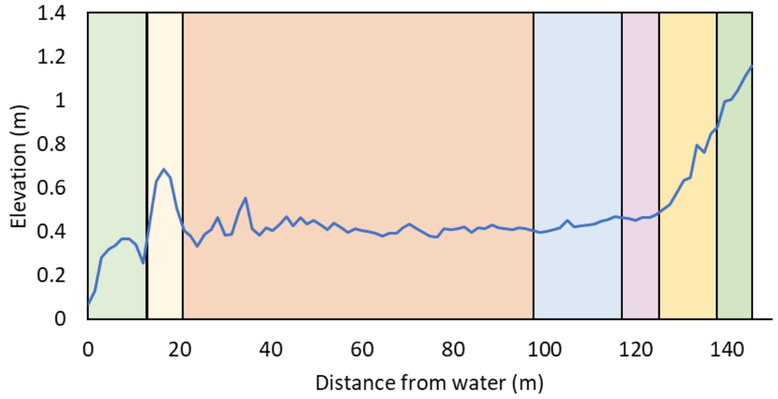
Big Bend - 16.1 m (2015-2023)



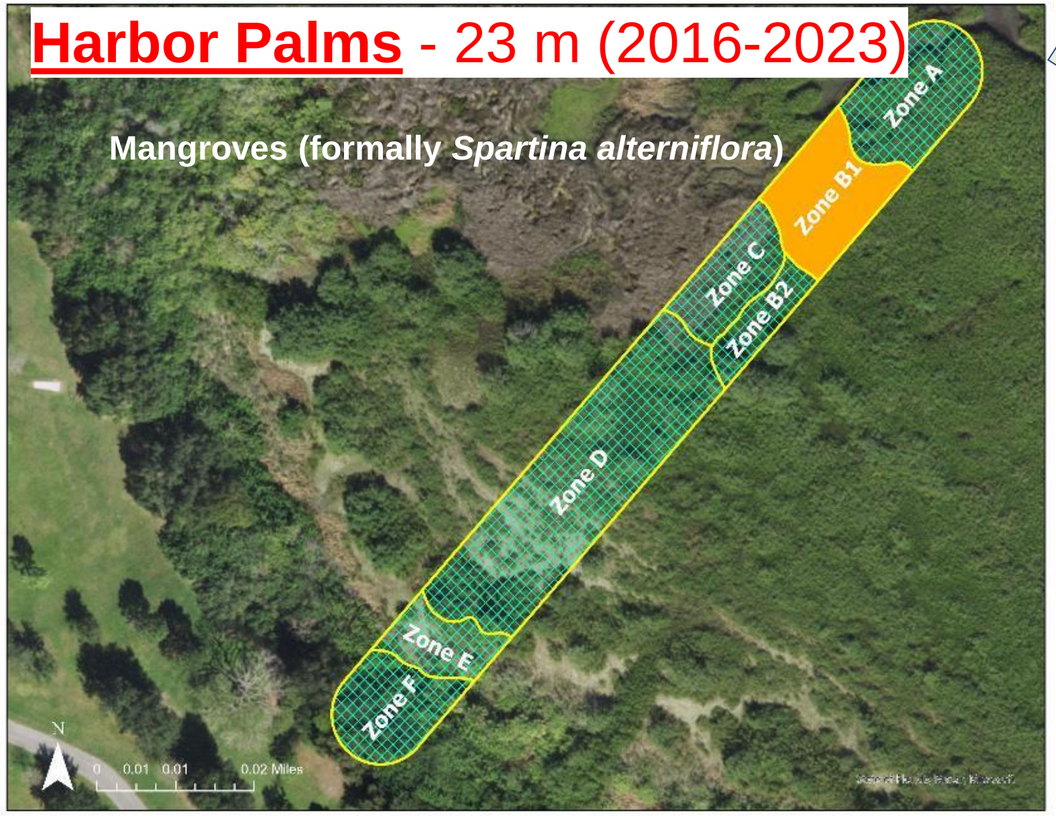
B. Channel
A. Mangrove fringe A. Mangrove fringe
C. *Juncus* marsh
D. Transitional wetland
E. Coastal upland

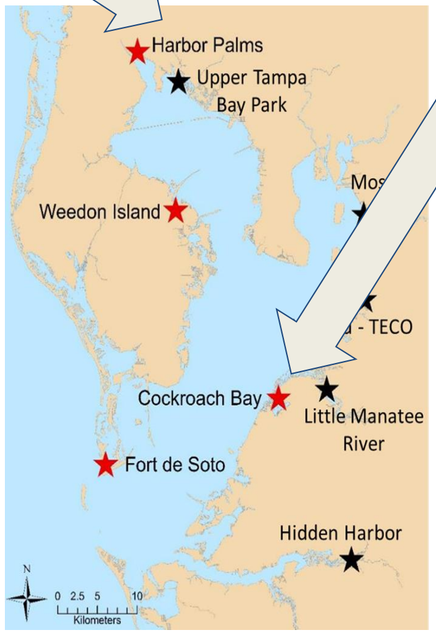


B. Brazilian Pepper berm
A. Mangrove C. Immature mangrove fringe
D. Salt marsh F. Transitional wetland
E. Salt barren G. Coastal upland

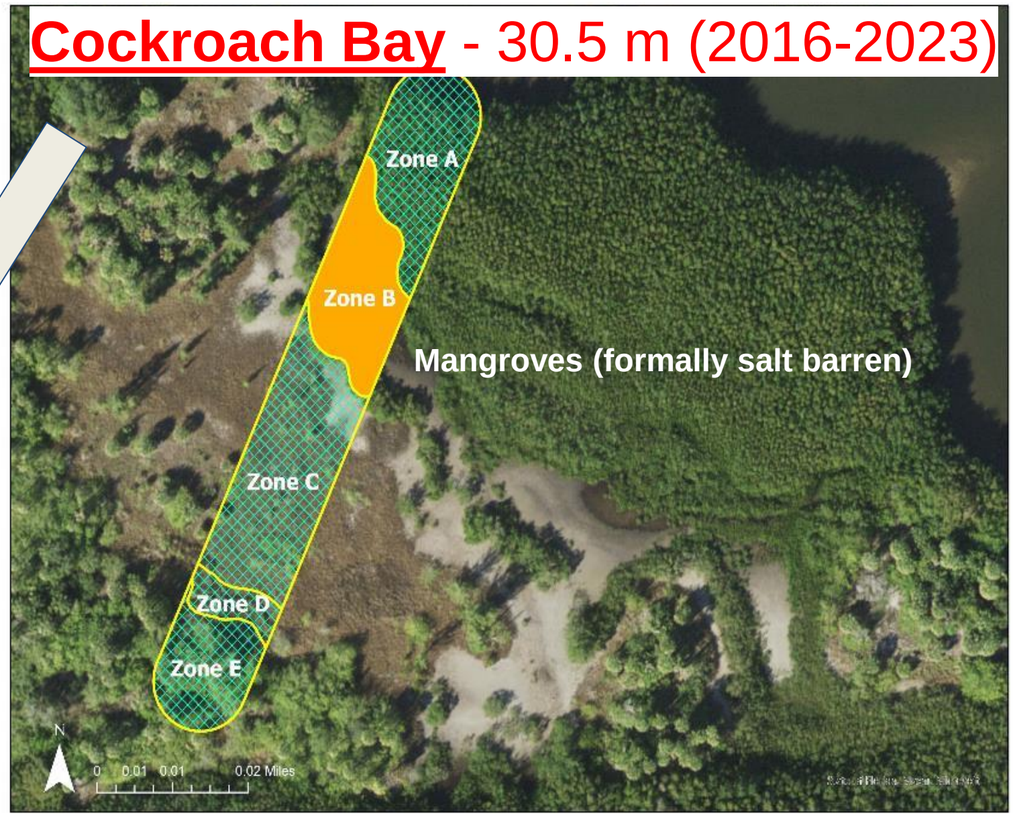


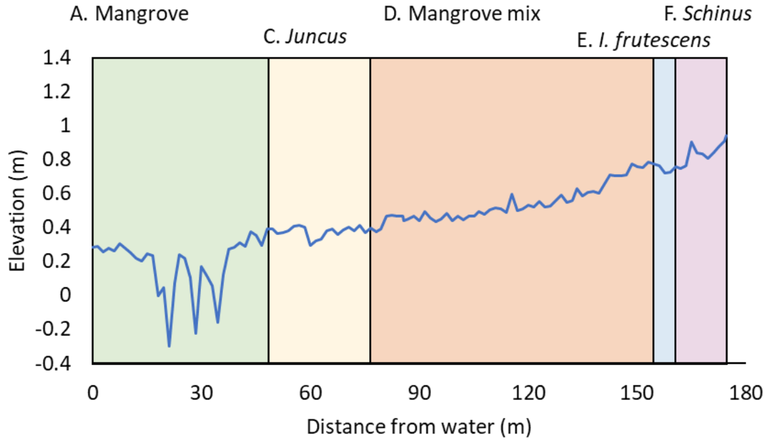
Harbor Palms - 23 m (2016-2023)

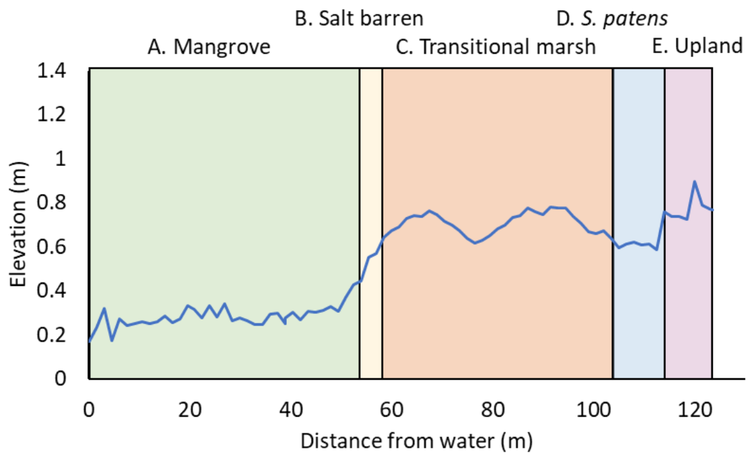




Cockroach Bay - 30.5 m (2016-2023)



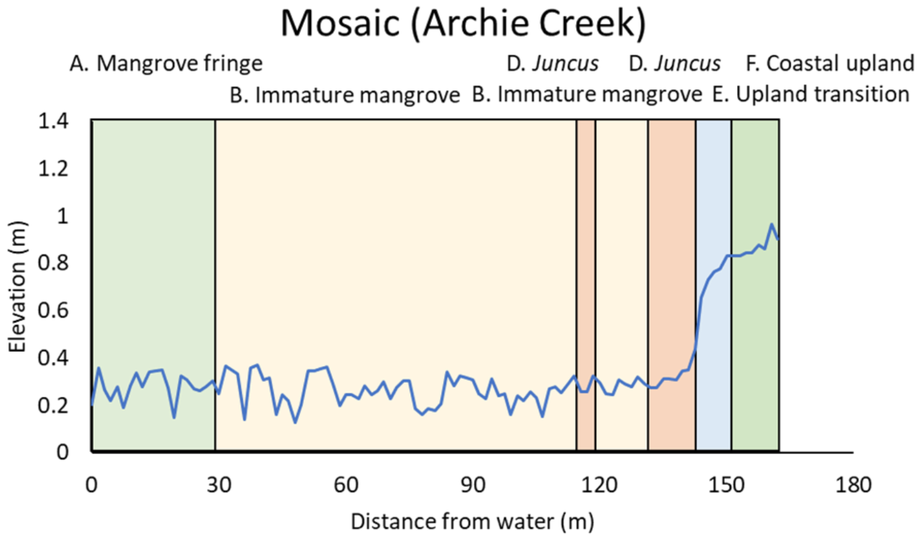




FINE-SCALE HABITAT MONITORING

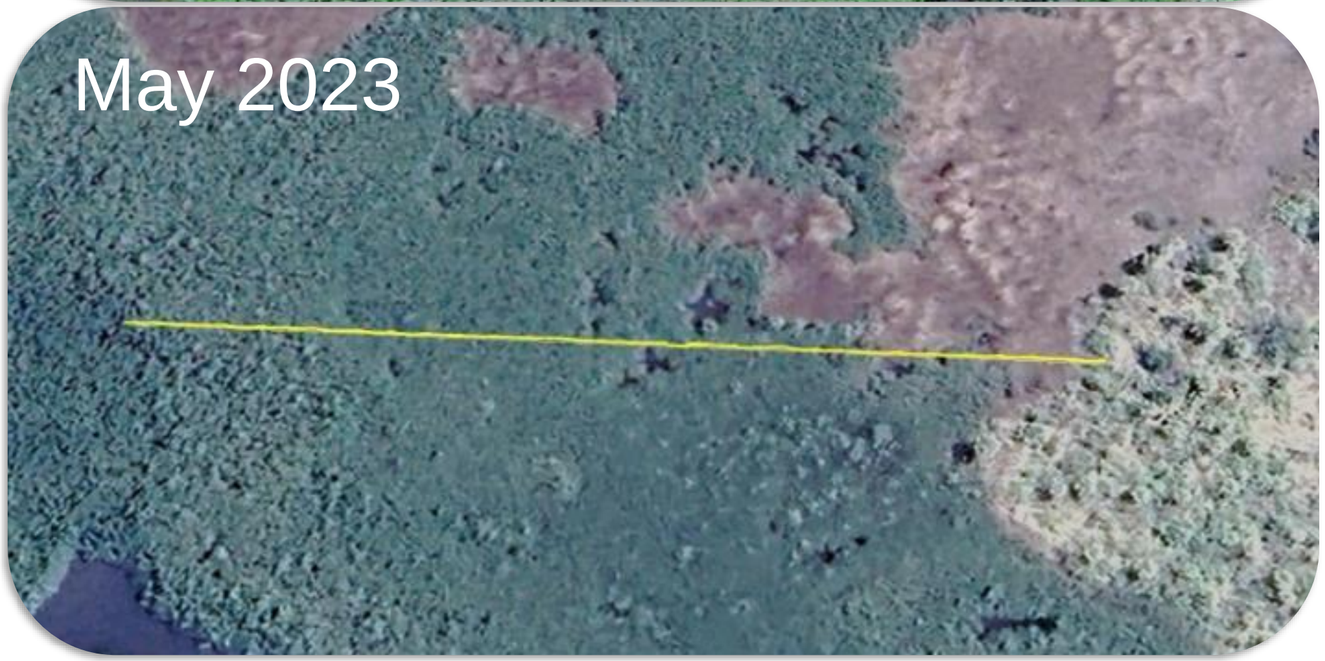
Mosaic

82.5 m of mangrove expansion in 7 yrs!!



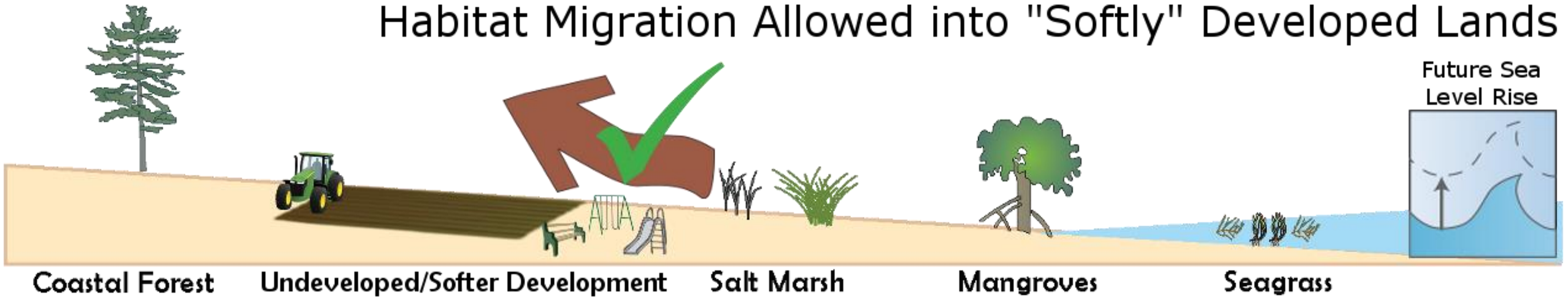
Mosaic

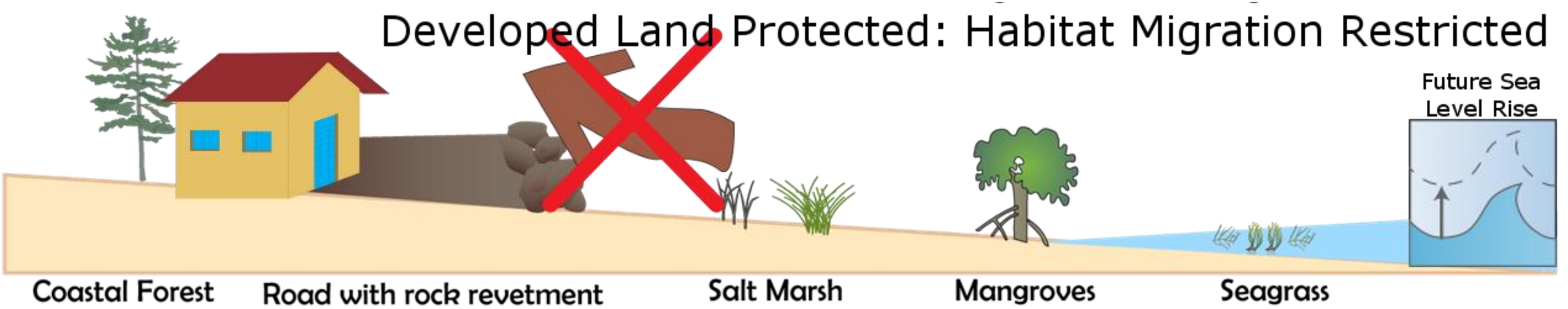
82.5 meters of expansion



“Coastal Squeeze”

maps.wateratlas.usf.edu/blue-carbon/





Symbols are courtesy of the Integration and Application Network, University of Maryland Center for Environmental Science (ian.umces.edu/symbols/).

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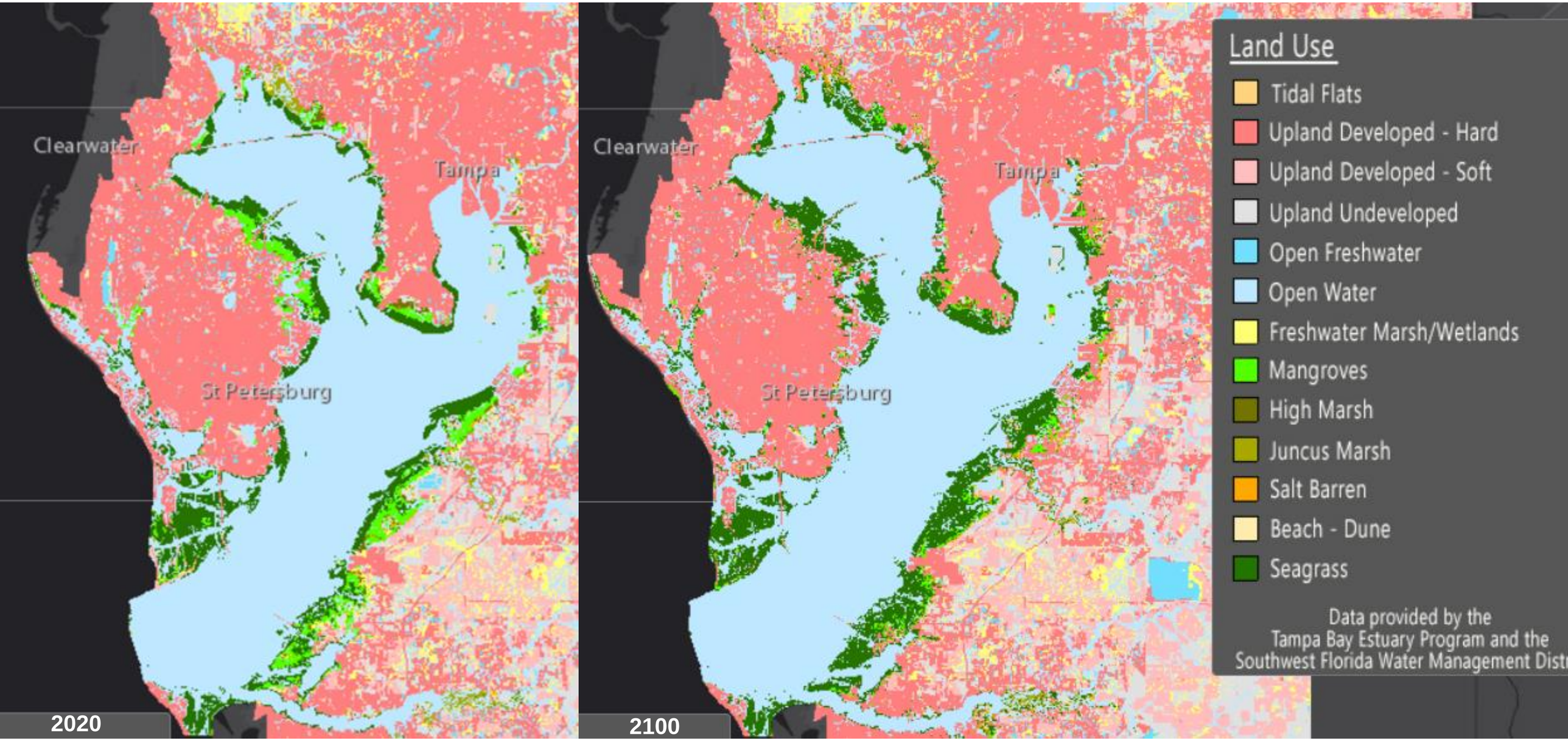


Critical Coastal Habitats in Tampa Bay

3 Key Takeaways

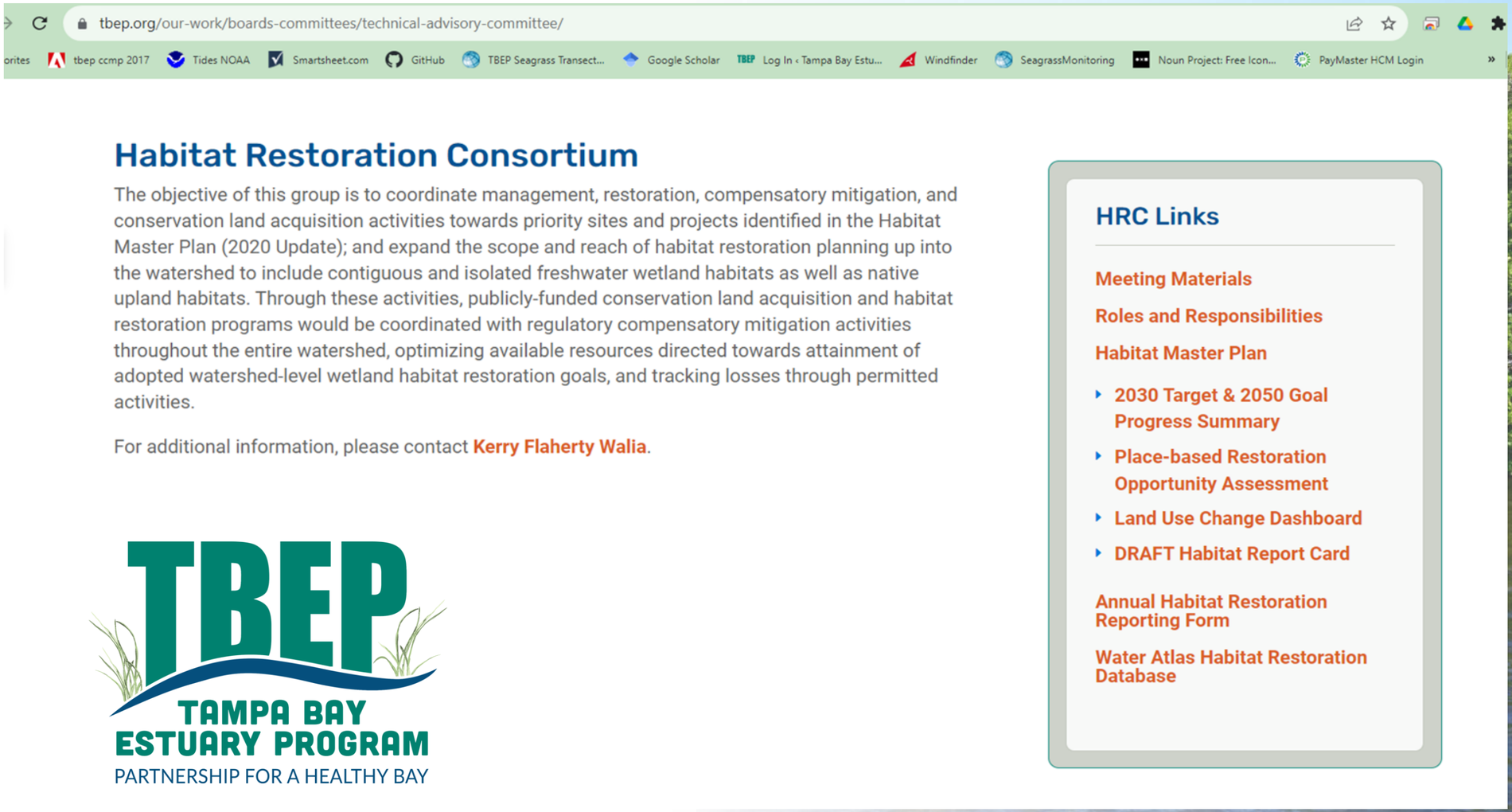
01 The Urgency of Preservation and Restoration

02 Recent baywide and fine-scale increases in mangroves

03 Mangrove survival with sea level rise will depend on accretion rates and landward habitat availability

Resources

https://tbep.org/our-work/boards-committees/technical-advisory-committee/



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- Pamela Latham, Research Planning Inc.
- Lindsay Cross, Tampa Bay Estuary Program
- David Loy, Atkins North America

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QUESTIONS?