Tampa Bay: Planning for large(r)-scale oyster monitoring

Photo Credit: C. McIvor, USGS

Gary Raulerson, Ecologist
Tampa Bay Estuary Program

May 23, 2018

OIMMP Workshop

GTM Research Reserve

Ponte Vedra Beach, FL

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Tampa Bay: Planning for large(r)-scale oyster monitoring: can I get some help from the village?

Photo Credit: C. McIvor, USGS

Gary Raulerson, Ecologist

Tampa Bay Estuary Program

May 23, 2018

OIMMP Workshop

GTM Research Reserve

Ponte Vedra Beach, FL

TBEP

TAMPA BAY ESTUARY PROGRAM

PARTNERSHIP FOR A HEALTHY BAY

Co-Authors and Partners

- Serra Herndon – TBW
- Andy Lykens – TBW
- Ryan Moyer – FWRI
- Eric Plage – TBW
- Kara Radabaugh - FWRI

TAMPA BAY WATCH
Restoring the Bay Every Day

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

What to expect

- Tampa Bay setting
- Historical background
- Restoration
- Monitoring

- Looking for thoughts, comments, ideas on preferred metrics
- Standardization!

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

TAMPA BAY ENVIRONMENTAL RESTORATION FUND

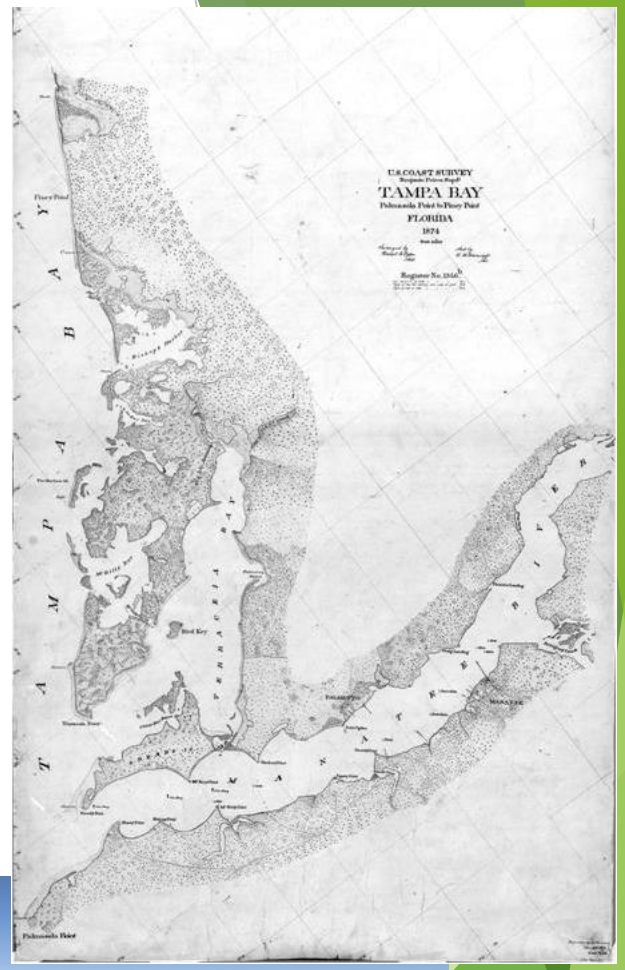
Questions to Address

- Variables influencing success?
- How does location factor in?
- Are project goals reasonable and useful?
- Identify appropriate standardized monitoring protocols?

TBEP TAMPA BAY ESTUARY PROGRAM PARTNERSHIP FOR A HEALTHY BAY

Restoration/Protection Process

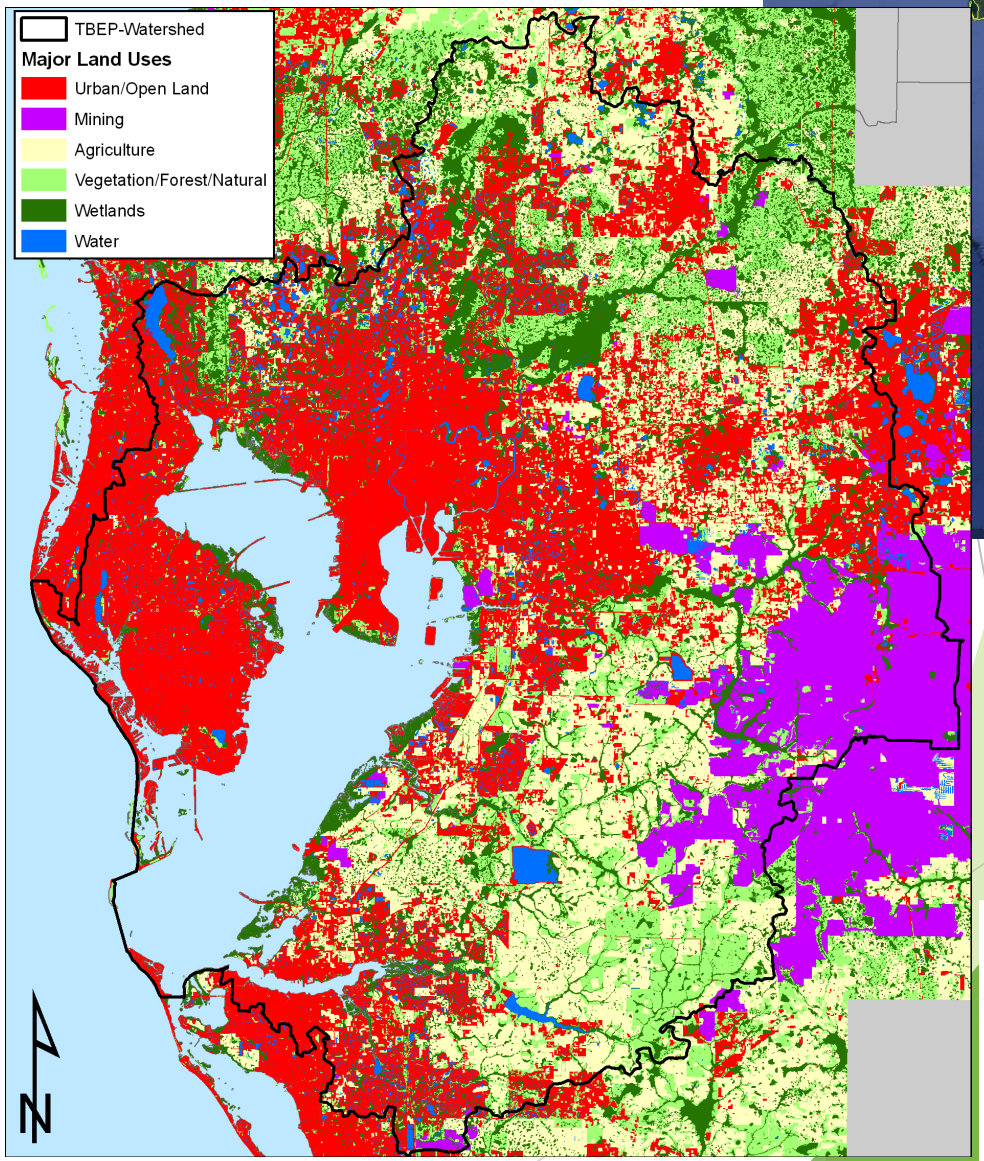
- Identify habitat(s) of interest
- Estimate historical extent
- Determine current area/functionality
- Establish targets
- Create restoration recommendations
- Initiate actions
- **Assess projects**
- Non-linear

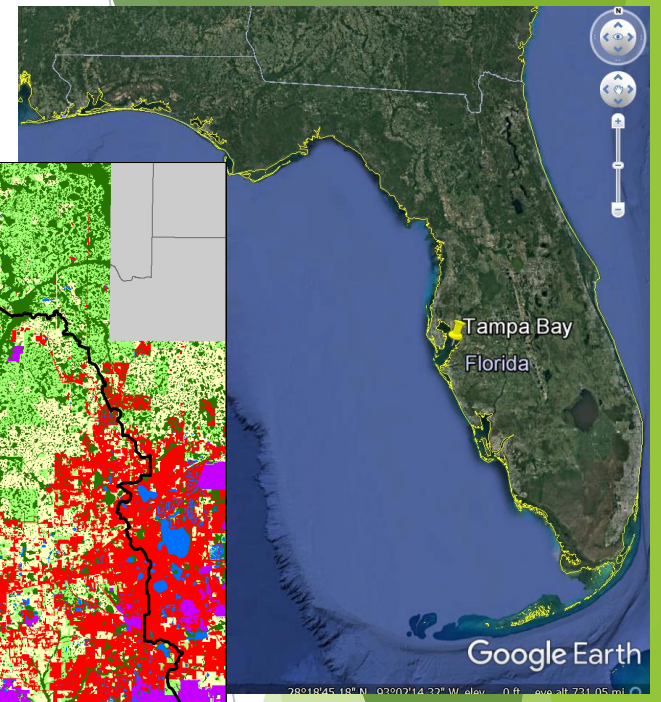


TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Tampa Bay Fast Facts

- Urbanized, 3 million people
- Open water – 400 sq. mi.
- Watershed – 2200 sq. mi.
- Avg Depth – 11 feet
- Max Depth – 45 feet
- Salinity – 1-35 ppt
- Economic driver - $22 Billion

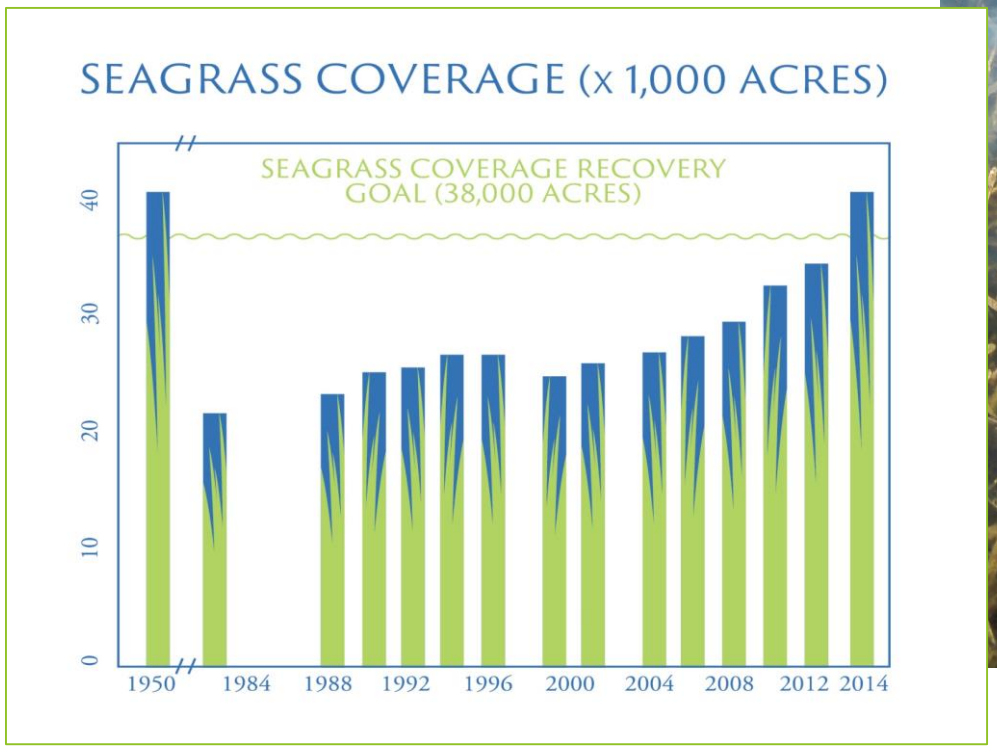


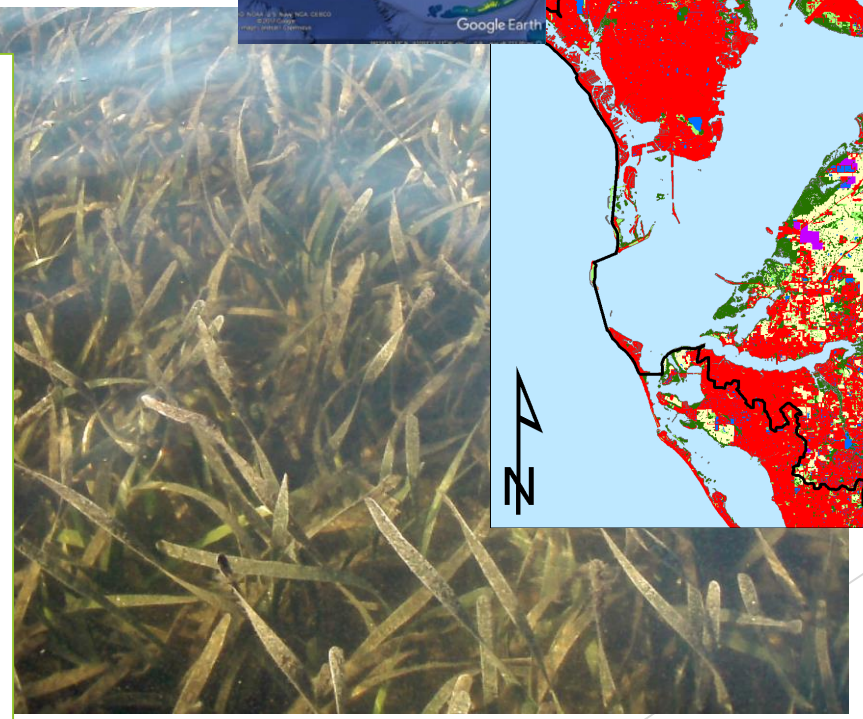


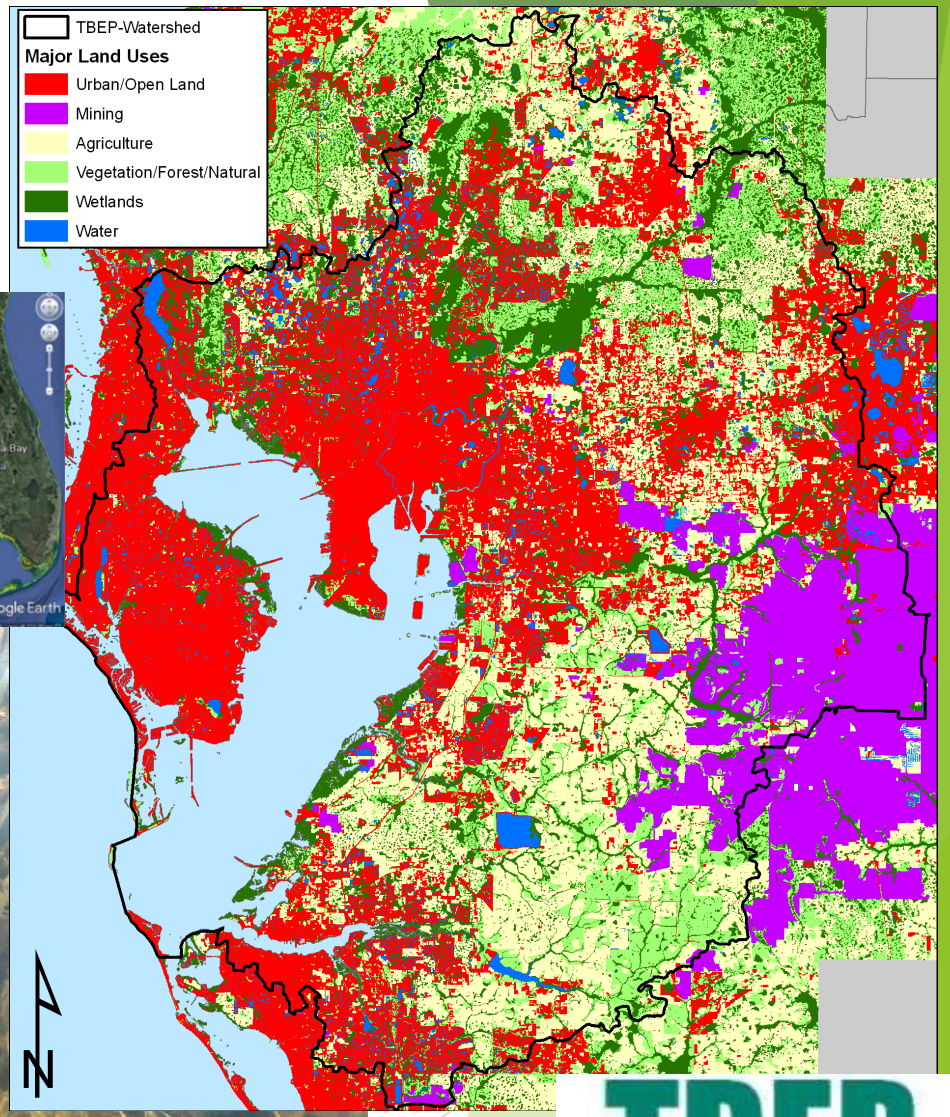
TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

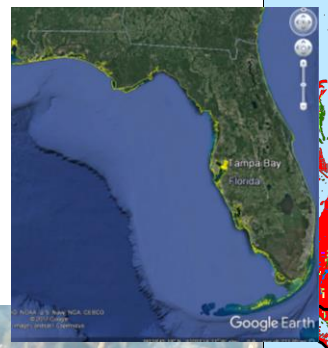
Tampa Bay (Seagrass)

- Established goal of 1950s acreage
- Seagrass goal met in 2014 & 2016
- Science-based goals & success
- Applying to hard-bottom habitats





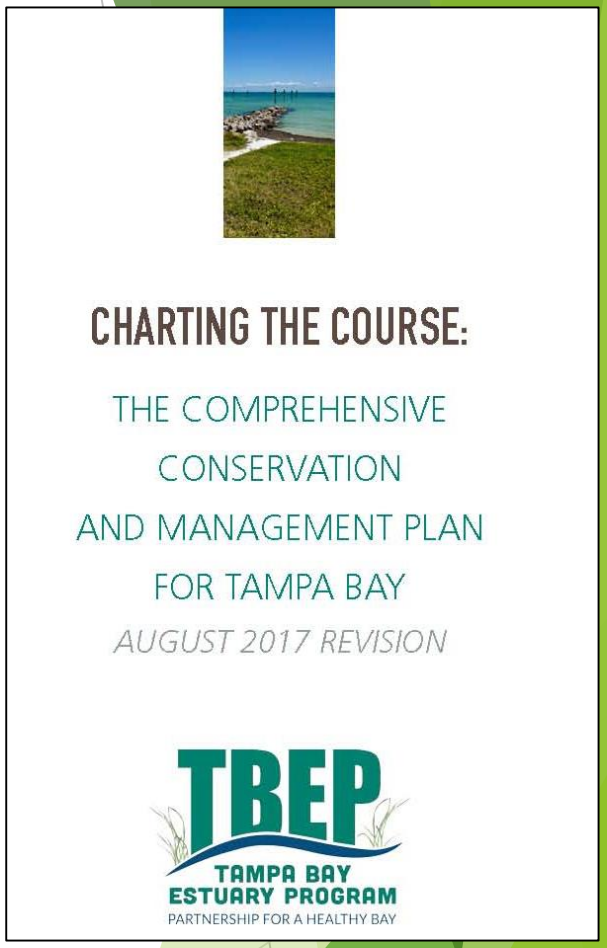




TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

TBEP 2017 CCMP Actions for Oysters

- BH-1: Implement the Tampa Bay Master Plan for Habitat Restoration and Protection (*2006 and current update with greater attention to oysters/hard bottom/tidal flats*).
- BH-2: Implement mitigation criteria for Tampa Bay, and identify priority sites for mitigation.
- BH-4: Identify hard-bottom communities and avoid impacts.
- BH-8: Expand habitat mapping and monitoring programs.



TBEP
TAMPA BAY
ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

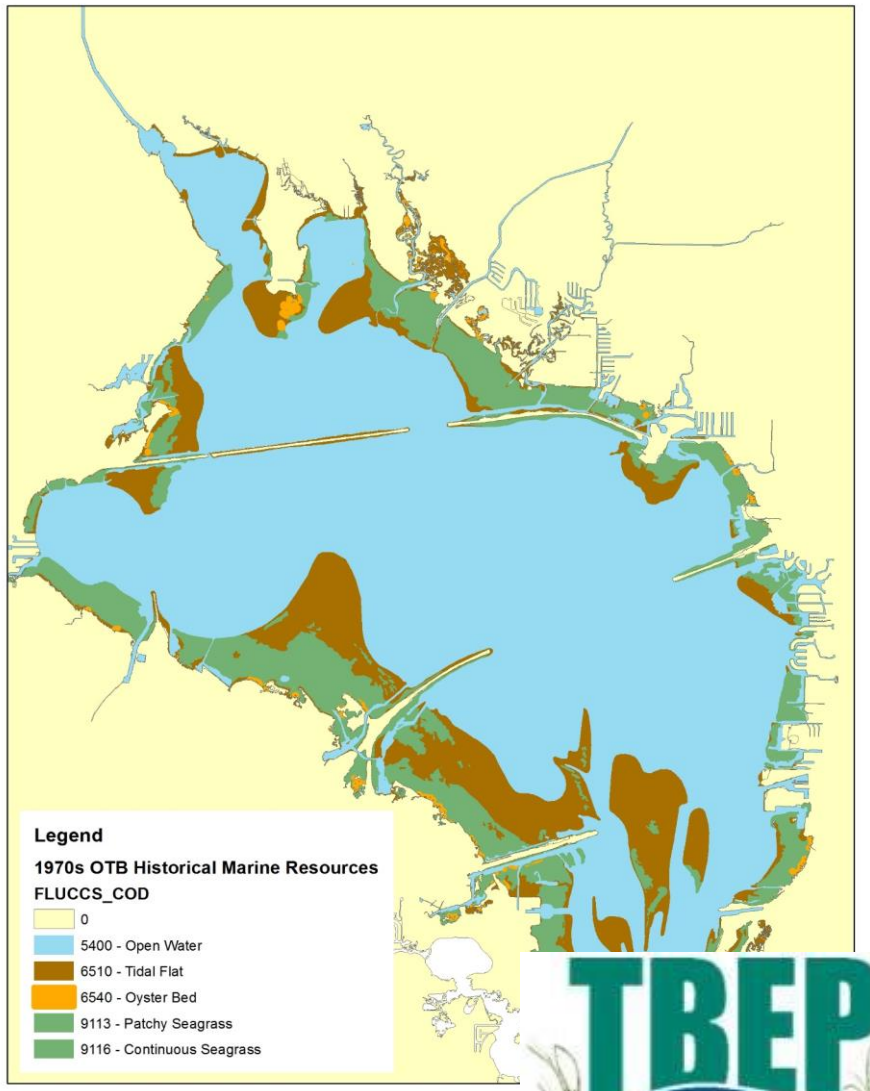
2017 CCMP Research and Monitoring Priorities

- *Implement habitat mitigation & restoration within the watershed that provides multiple benefits. Further assess the effectiveness and functionality of mitigation and restoration projects.*
- *Better understand the status, trends and restoration progress of critical coastal habitats currently lacking complete information (e.g. oysters, hard/live bottom, tidal flats, artificial habitats, tidal creeks & coastal uplands).*
- *Evaluate and monitor living shoreline techniques that potentially improve habitat and ecosystem value of altered Tampa Bay shorelines.*

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Historical Oyster Information

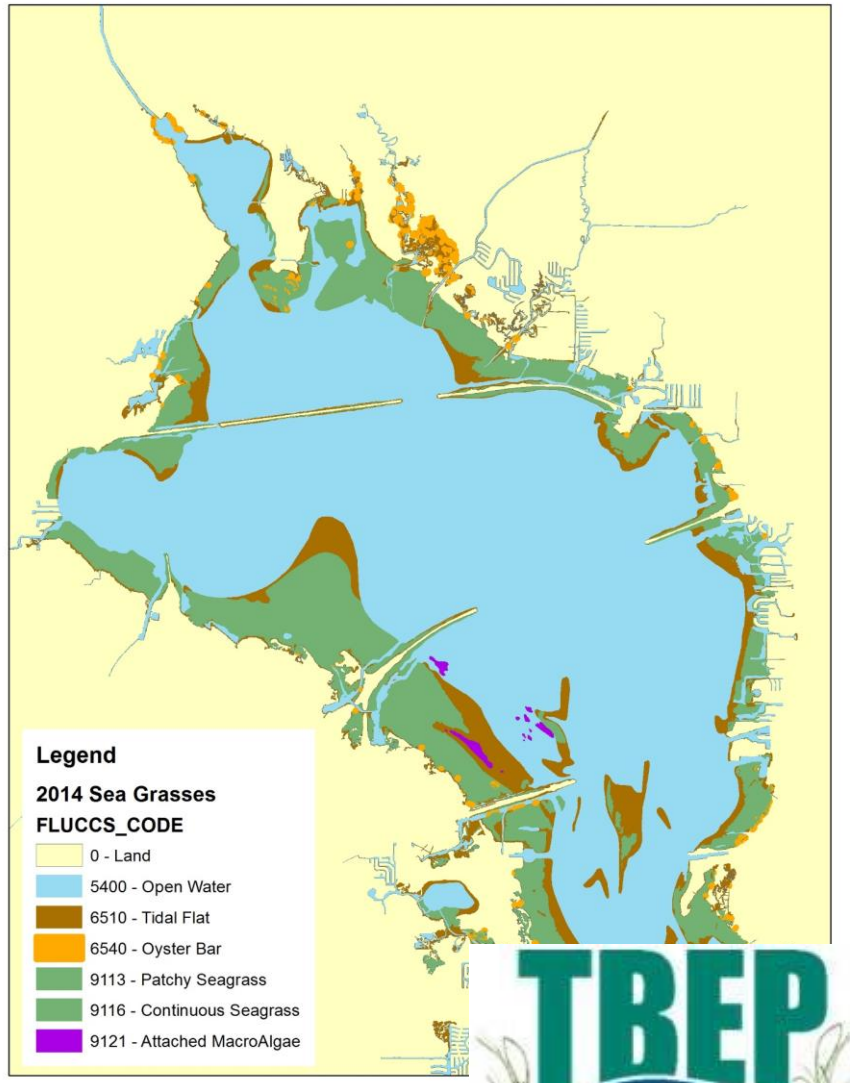
- Estevez (2010) – 2 sq mi (pre-historic)
- Smeltz (1898)
  - Oysters “everywhere” during 1876 visit
  - Depleted <25 years later
- Ingersoll (1881, DOI Census)
  - 1,500 bushels/yr
  - Mounds and shell-heaps at “Point Pinellos”
- Dawson (1953) - late 1800s with reports of 300,000+ lb oyster harvests
- Shell mining in 1930s-1950s (651K cy)
- Intertidal



TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Recent Oyster Monitoring/Mapping

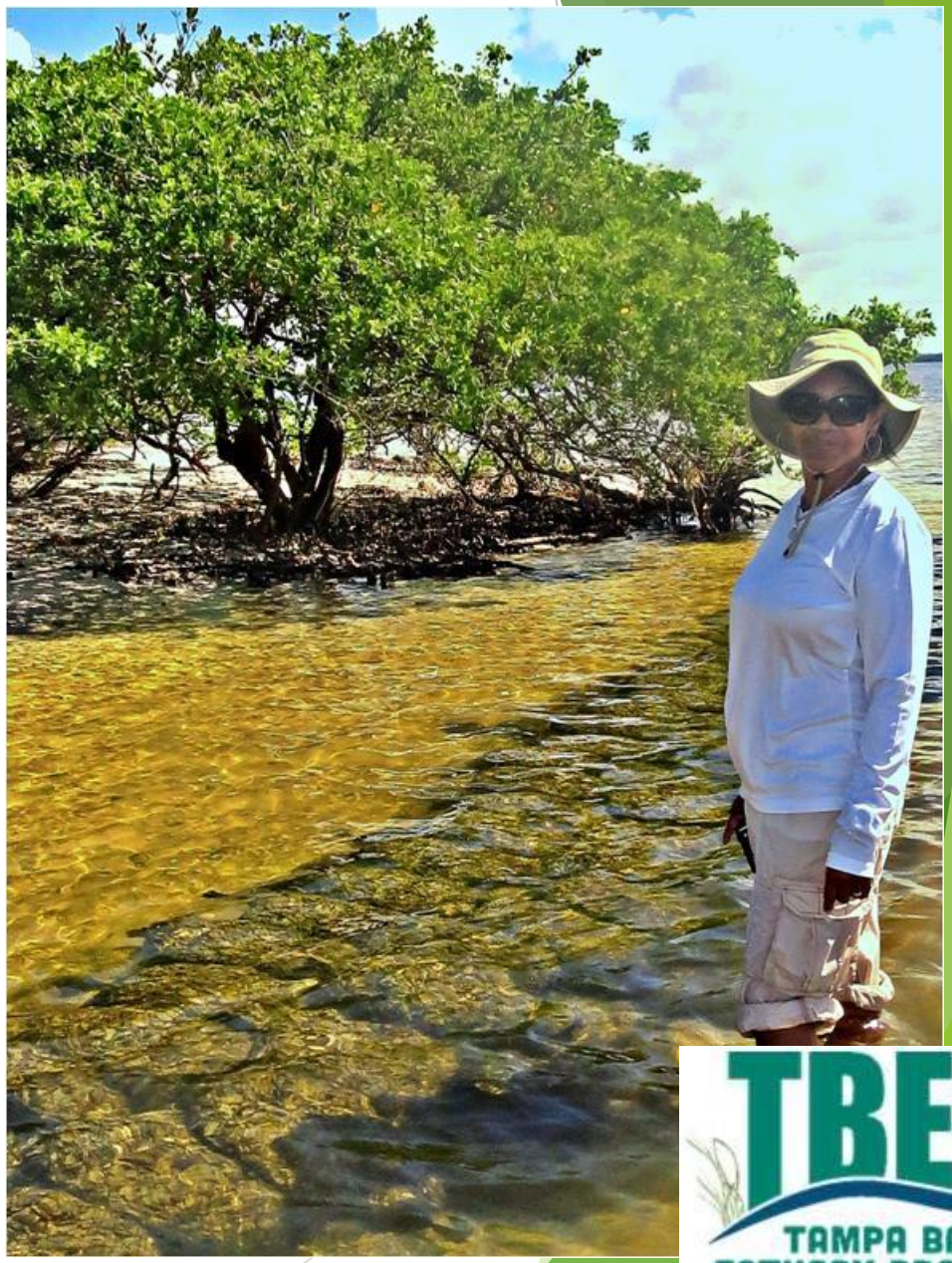
- Drexler MS Thesis 2011 (USF)
  - Density, biomass
  - Reefs, mangroves, seawalls, (restoration)
- TBW – % Cover, live/dead, sediment…
- 2006 FWRI project mapped 43.5 acres
- SWFWMD added oysters to bi-annual aerial SAV assessment in 2014
  - 2016 -166 ac bay-wide (up 35 ac from 2014)
  - Caveats - no mangroves, live/dead…
- FWRI – M. Parker's presentation yesterday!



TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Project Plan

- Site identification – history, materials, goals, metrics
- EPA QAPP – establish monitoring protocols, data analysis, oversight
- MacDill enhancement
- Monitoring restored & natural sites
- Report on monitoring results and recommendations



TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

MacDill Oyster Restoration

- Tampa Bay Watch
- Bagged shell
- 400 linear feet
- Part of larger project(s)

TAMPA Estuary Program

TB Oyster Restoration Projects

- TBW, Manatee County
- SWFWMD/SWIM, Audubon
- **MacDill enhancement (BACI)**
- Potential monitoring sites
  - Oyster restoration
  - Intertidal restoration
  - Natural areas, seawallls
- Criteria for selection
  - Location
  - Age
  - Materials
  - Nearby reference sites
  - ???

Photo credit TBW

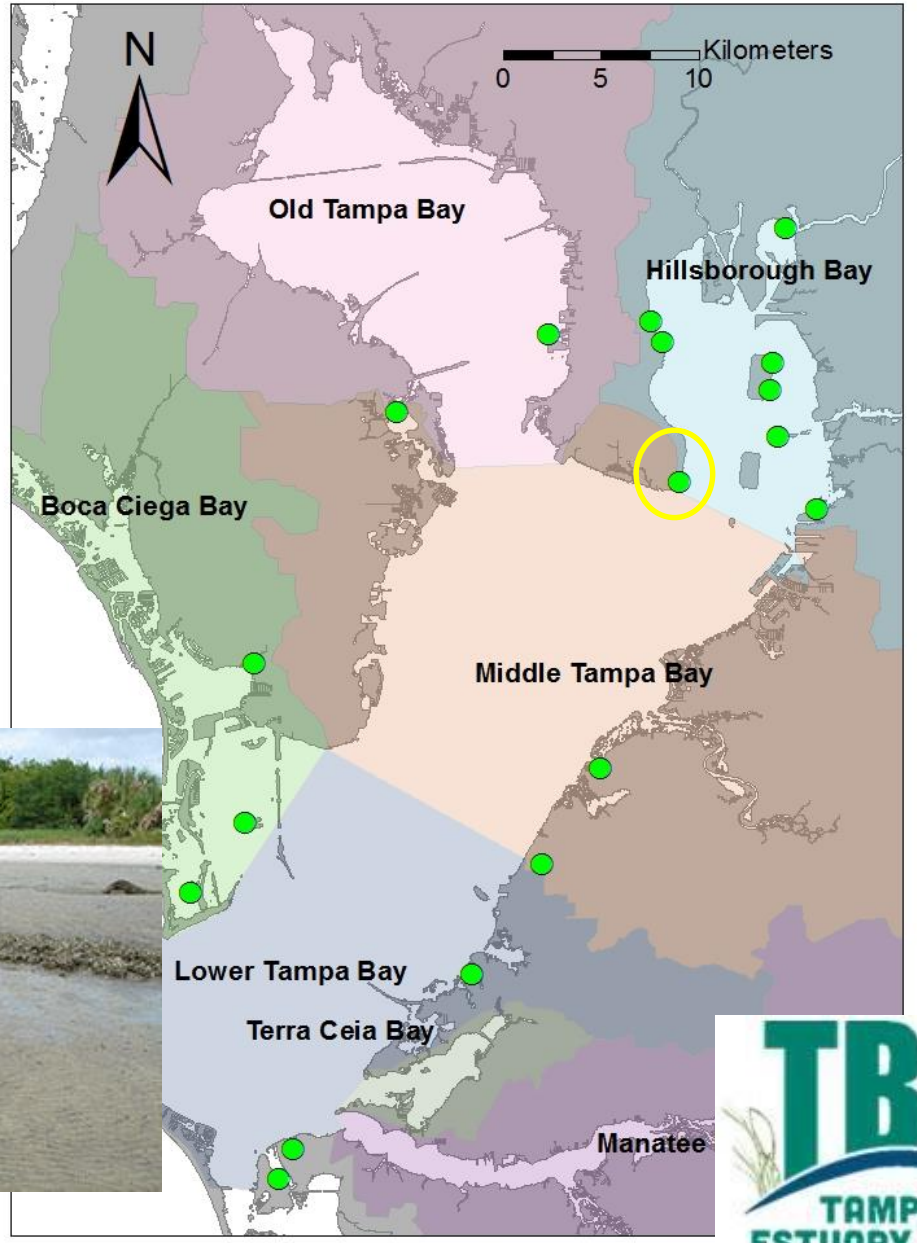
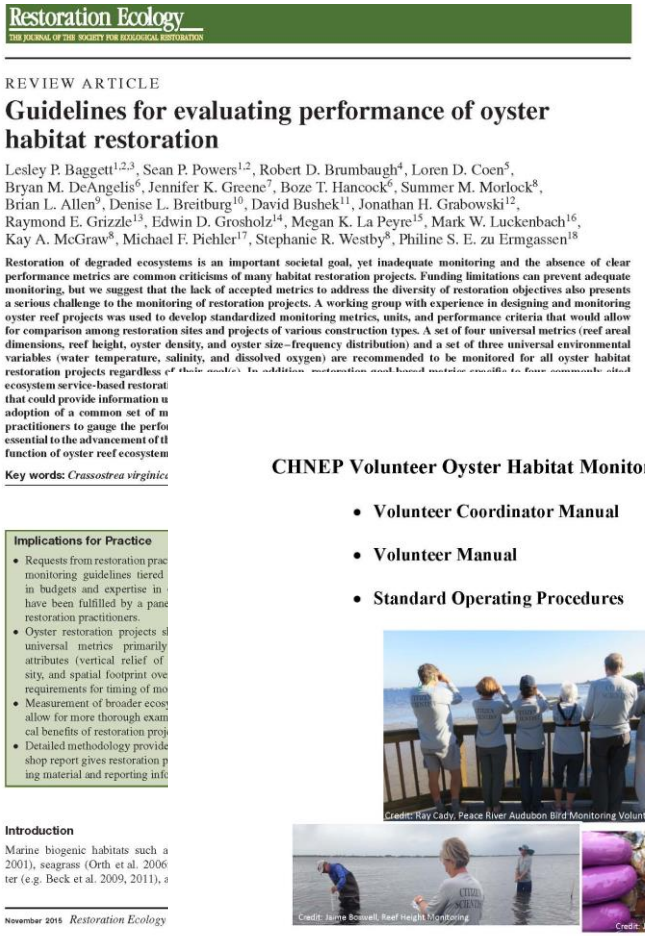


Figure 1. Potential oyster restoration monitoring sites in Tamp

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Monitoring Data

- Biological (1 or 2 years)
  - Density, live/dead, size
  - *Health/disease?*
  - *Infauna? – Boring sponges?*
- Physical
  - Reef height
  - Area
- Ecosystem services
  - Sediment (RTK)
  - Wave attenuation
- Reef, modules, prop roots, seawalls



Restoration Ecology

THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION

REVIEW ARTICLE

Guidelines for evaluating performance of oyster habitat restoration

Lesley P. Baggett[1,2,3], Sean P. Powers[1,2], Robert D. Brumbaugh[4], Loren D. Coen[5], Bryan M. DeAngelis[6], Jennifer K. Greene[7], Boze T. Hancock[6], Summer M. Morlock[8], Brian L. Allen[9], Denise L. Breitburg[10], David Bushek[11], Jonathan H. Grabowski[12], Raymond E. Grizzle[13], Edwin D. Grosholz[14], Megan K. La Peyre[15], Mark W. Luckenbach[16], Kay A. McGraw[8], Michael F. Piehler[17], Stephanie R. Westby[8], Philine S. E. zu Ermgassen[18]

Restoration of degraded ecosystems is an important societal goal, yet inadequate monitoring and the absence of clear performance metrics are common criticisms of many habitat restoration projects. Funding limitations can prevent adequate monitoring, but we suggest that the lack of accepted metrics to address the diversity of restoration objectives also presents a serious challenge to the monitoring of restoration projects. A working group with experience in designing and monitoring oyster reef projects was used to develop standardized monitoring metrics, units, and performance criteria that would allow for comparison among restoration sites and projects of various construction types. A set of four universal metrics (reef areal dimensions, reef height, oyster density, and oyster size–frequency distribution) and a set of three universal environmental variables (water temperature, salinity, and dissolved oxygen) are recommended to be monitored for all oyster habitat restoration projects regardless of their goal(s). In addition, restoration goal-based metrics specific to four commonly cited ecosystem service-based restorat… that could provide information u… adoption of a common set of m… practitioners to gauge the perfo… essential to the advancement of t… function of oyster reef ecosystem

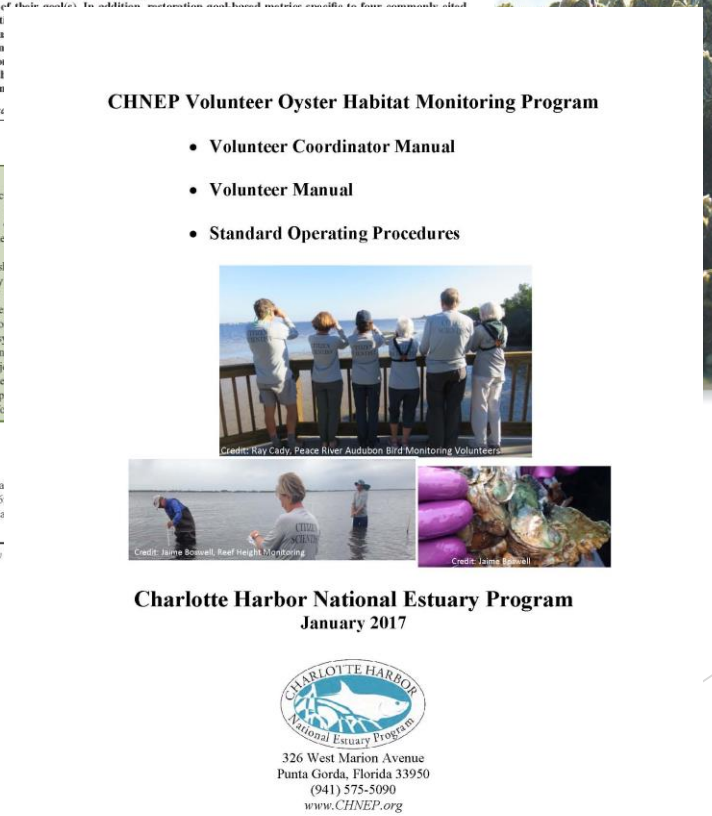
Key words: *Crassostrea virginic…*

Implications for Practice

- Requests from restoration prac… monitoring guidelines tiered … in budgets and expertise in … have been fulfilled by a pane… restoration practitioners.
- Oyster restoration projects s… universal metrics primarily … attributes (vertical relief of … sity, and spatial footprint ove… requirements for timing of mo…
- Measurement of broader ecos… allow for more thorough exam… cal benefits of restoration proj…
- Detailed methodology provide… shop report gives restoration p… ing material and reporting info…

Introduction

Marine biogenic habitats such a… 2001), seagrass (Orth et al. 2006… ter (e.g. Beck et al. 2009, 2011), …



CHNEP Volunteer Oyster Habitat Monitoring Program

- **Volunteer Coordinator Manual**
- **Volunteer Manual**
- **Standard Operating Procedures**

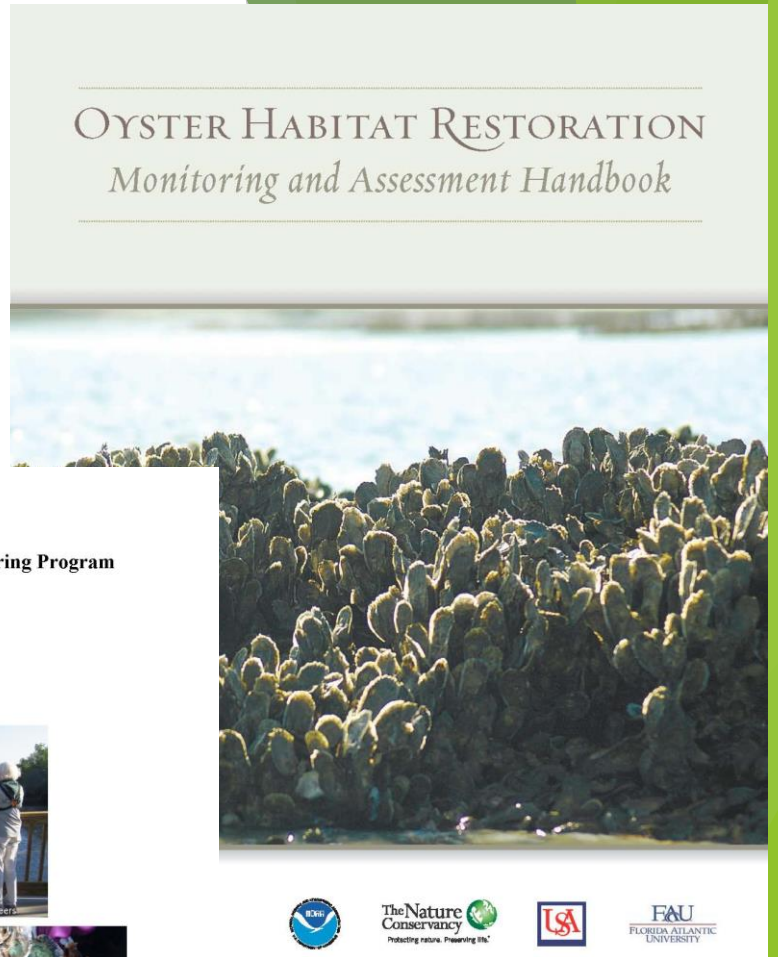
Credit: Ray Cady, Peace River Audubon Bird Monitoring Volunteers

Credit: Jaime Boswell, Reef Height Monitoring

Credit: Jaime Boswell

Charlotte Harbor National Estuary Program
January 2017

326 West Marion Avenue
Punta Gorda, Florida 33950
(941) 575-5090
www.CHNEP.org



OYSTER HABITAT RESTORATION
Monitoring and Assessment Handbook

The Nature Conservancy
Protecting nature. Preserving life.

FAU
FLORIDA ATLANTIC UNIVERSITY

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Next steps

- Contracting & SOW
- QAPP
- ***Looking for additional comments/thoughts***
- Habitat Master Plan Update
- 3-year project

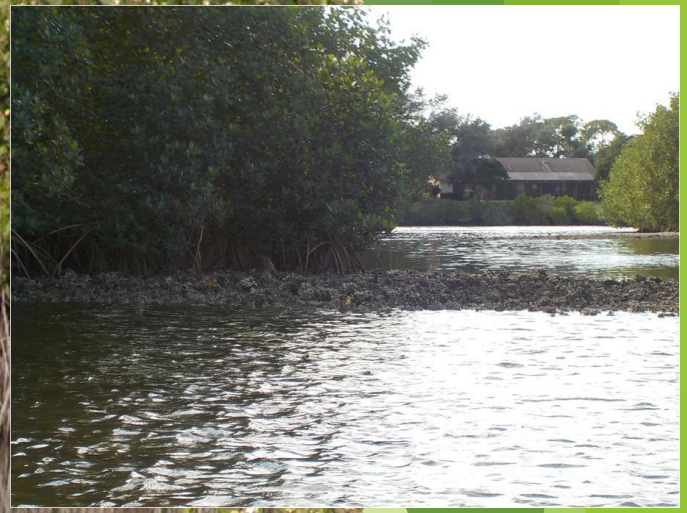
TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Random thoughts

- How far do we take standardization?
- Side x side training opportunities?

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY

Gary Raulerson, TBEP
graulerson@tbep.org
727-893-2765
www.tbep.org
www.tbeptech.org



Thanks,
any questions?

TBEP
TAMPA BAY ESTUARY PROGRAM
PARTNERSHIP FOR A HEALTHY BAY