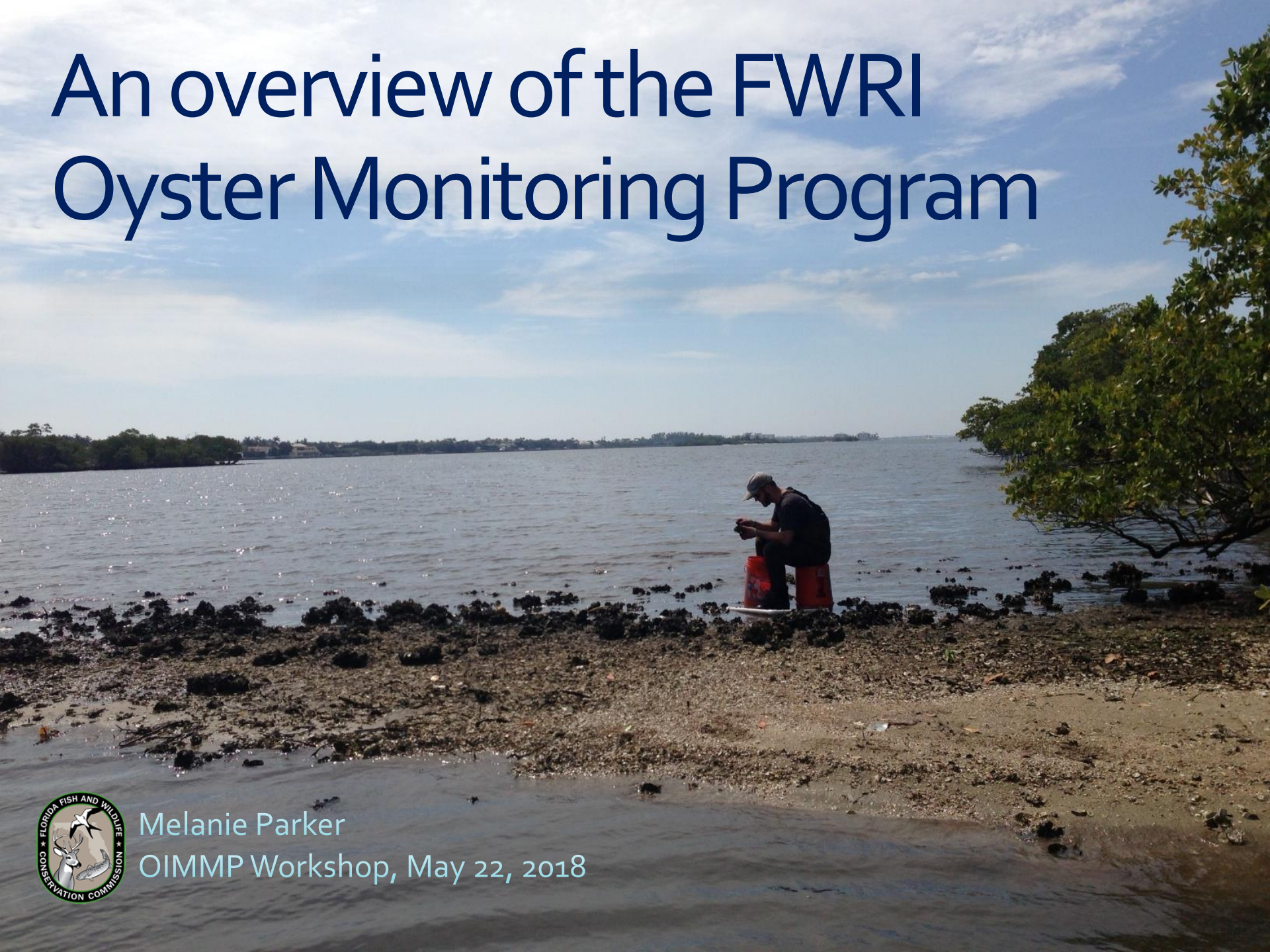
An overview of the FWRI Oyster Monitoring Program



Melanie Parker

OIMMP Workshop, May 22, 2018

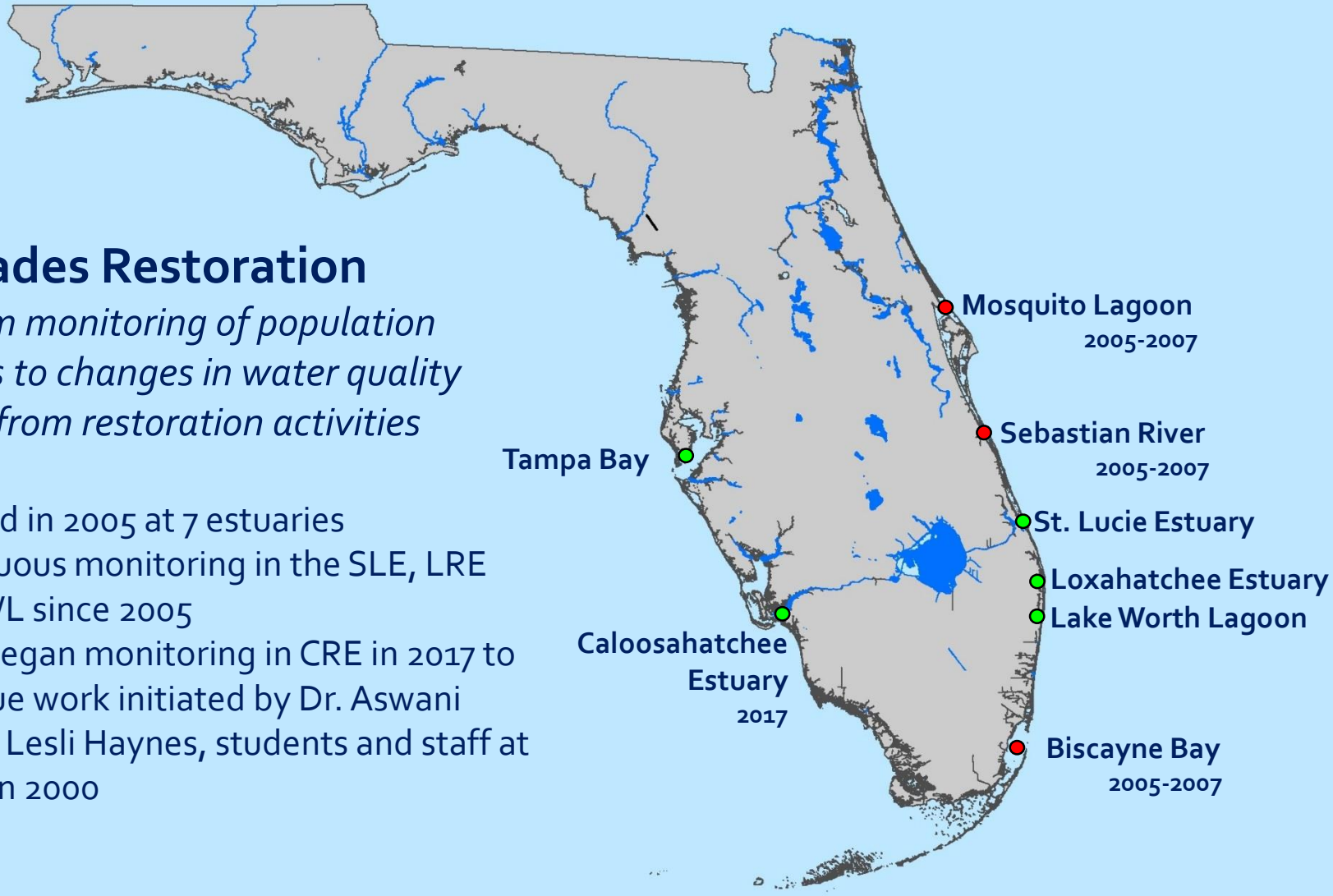
FWRI Oyster Monitoring

Two major components:

1) South Florida
   - Funded by the South Florida Water Management District (SFWMD) as part of the Comprehensive Everglades Restoration Plan (CERP)
   - Additional projects funded by Martin County and Palm Beach County

2) Apalachicola Bay
   - Funded by the National Fish and Wildlife Foundation with oil spill money
   - Funded by the Department of Economic Opportunity with Federal Disaster money
   - State-funded monitoring program

South Florida Oyster Monitoring



Everglades Restoration

Long-term monitoring of population responses to changes in water quality resulting from restoration activities

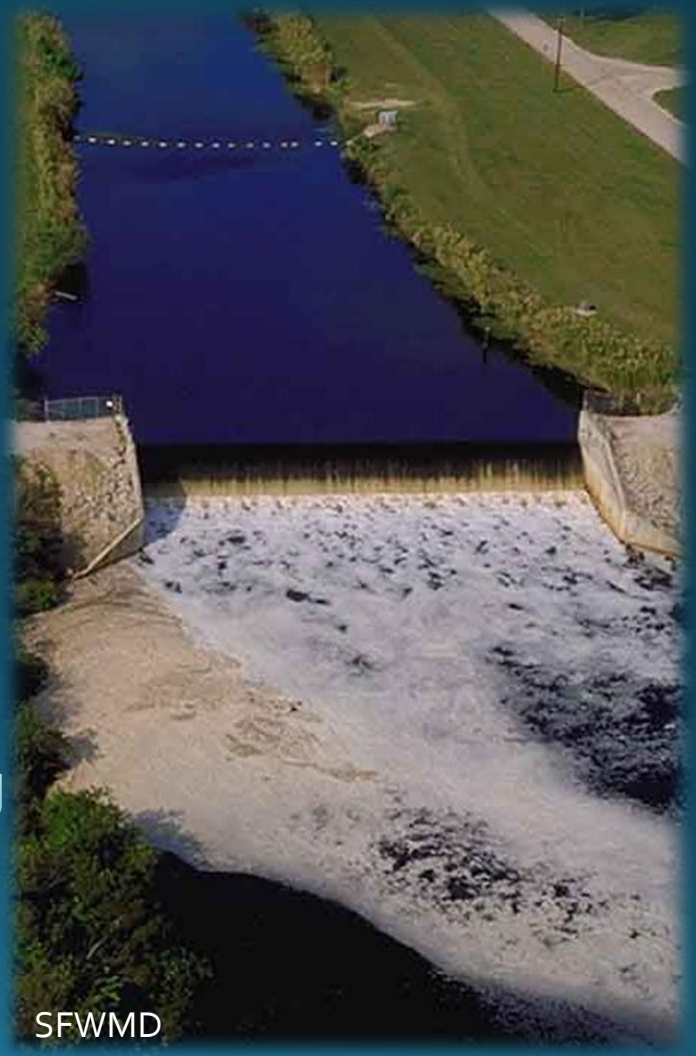
- Initiated in 2005 at 7 estuaries
- Continuous monitoring in the SLE, LRE and LWL since 2005
- FWRI began monitoring in CRE in 2017 to continue work initiated by Dr. Aswani Volety, Lesli Haynes, students and staff at FGCU in 2000

Water Flow in South Florida

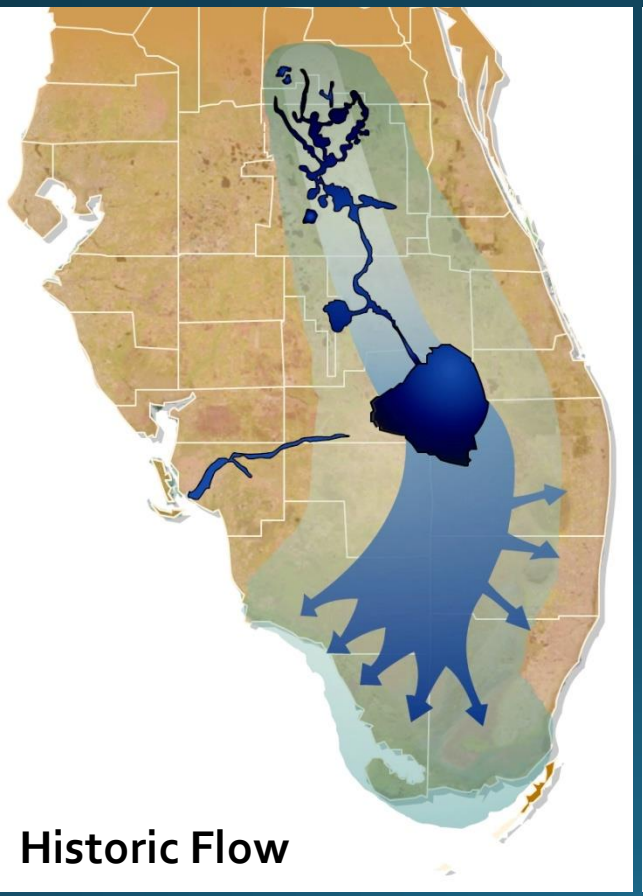
Historically, drainage patterns were characterized by slow, surface flows through rivers, creeks, sloughs and marshes

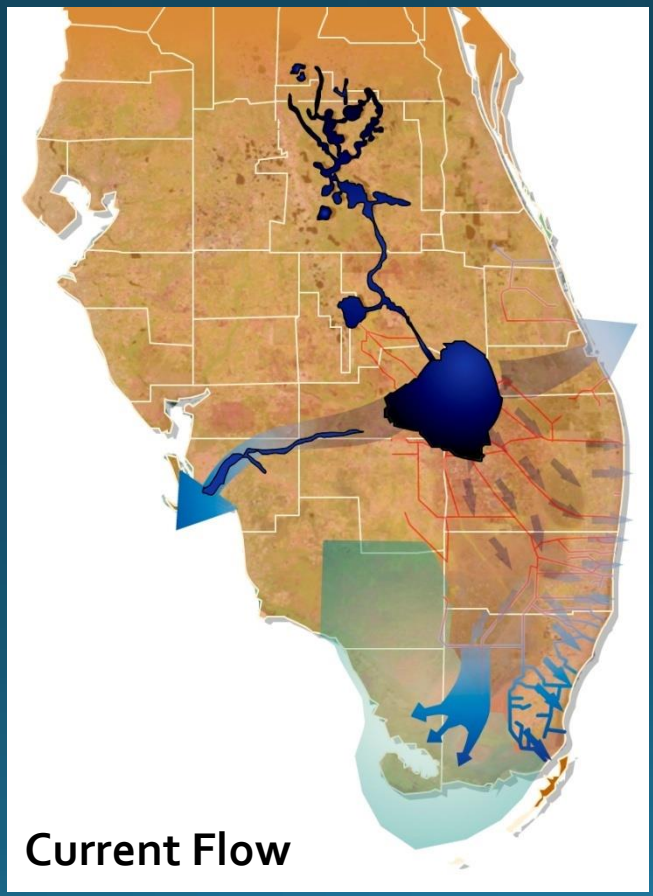
- Natural system absorbed floodwater, promoted ground water recharge, assimilated nutrients and removed suspended materials

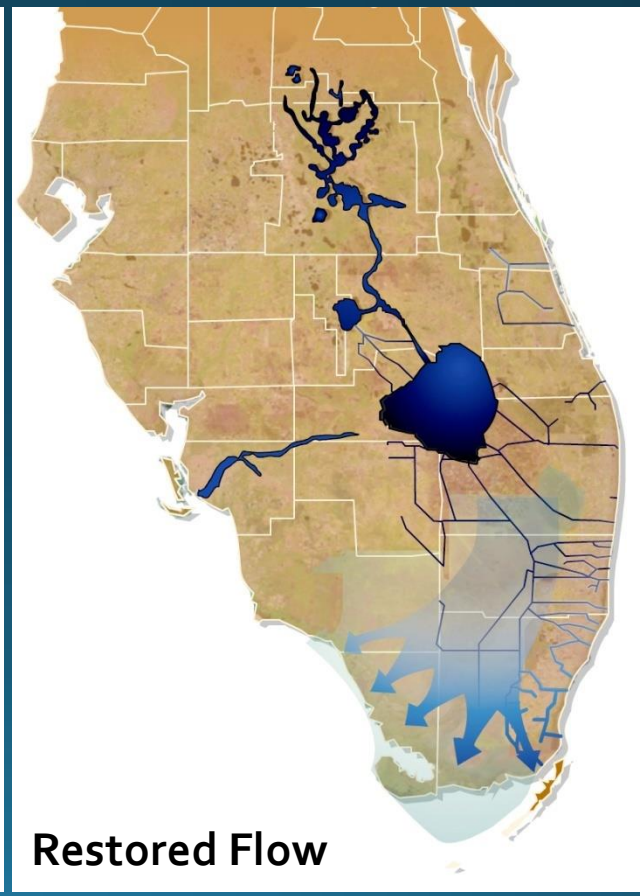
As south Florida developed, the resulting canal network drastically altered the quality, quantity, timing and distribution of freshwater entering the estuaries



Water Flow in South Florida







U.S. Army Corps of Engineers, Jacksonville District

Everglades Restoration

Goals

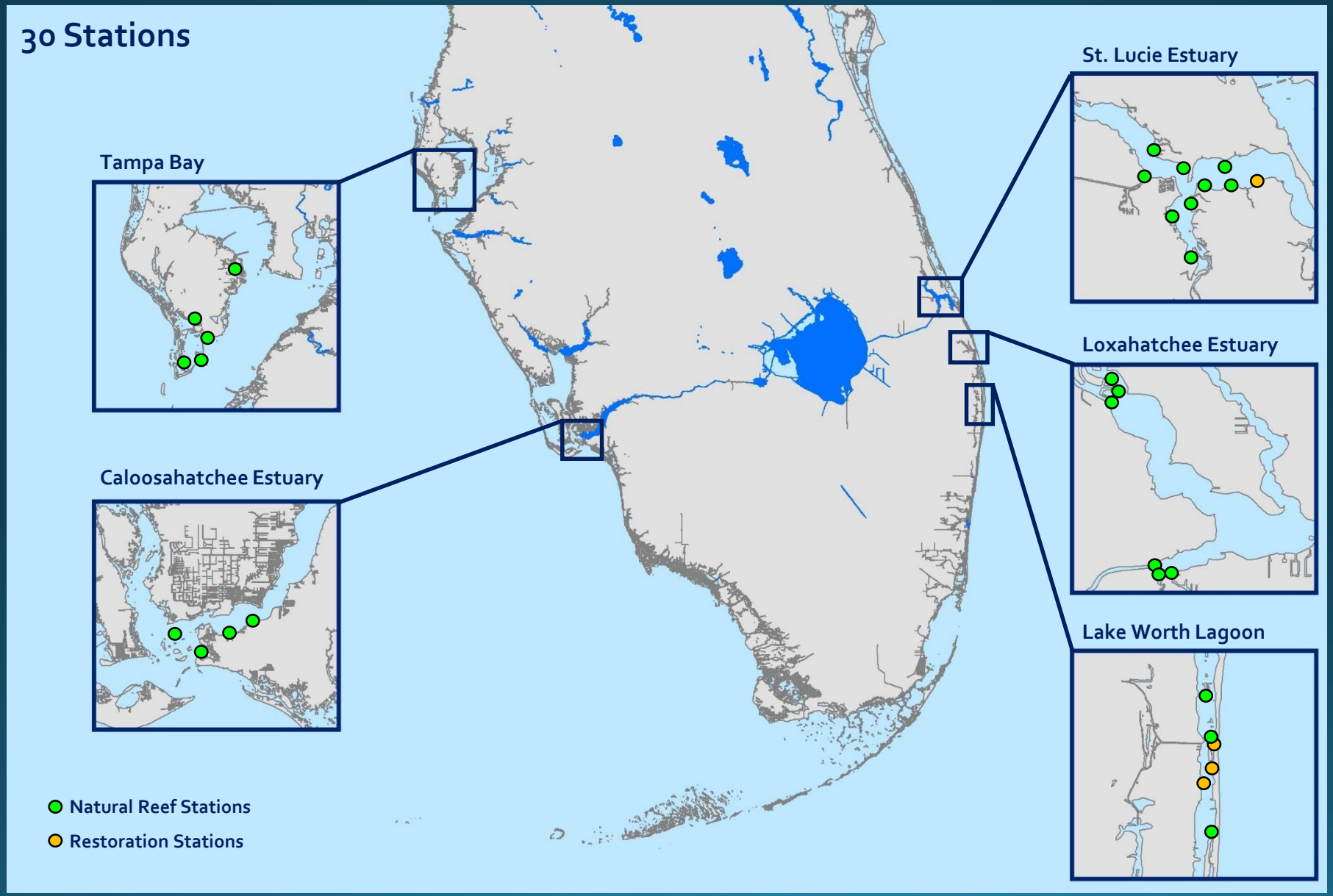
- Reduce impacts of freshwater releases
- Restore more natural freshwater inflows to estuaries
  - Improved salinity regime, reduction in nutrient loads , improved water clarity
- Promote reestablishment of healthy oyster reefs
  - Added benefit to other organisms that use reef as habitat and food source

Why Oysters ?

Eastern oyster chosen as Indicator Species for CERP

- Dominant species in FL estuaries
- Keystone species – habitat, filtration, shoreline stabilization
- They can't leave! Can generate cause-and-effect relationships between environment and oyster health

South Florida Oyster Monitoring



Semi-Annually or Quarterly

- Oyster Density and Size Frequency
- 15 quadrats per station (at most stations)

Monthly

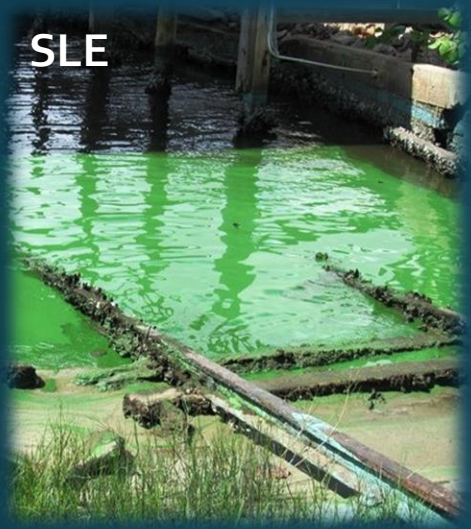
Reproductive Development

Spat Settlement

Disease Analyses

Growth and Survivorship

13+ Years of Monitoring!



Oyster Program: Part Two

Apalachicola Bay Oyster Monitoring

NFWF Oyster Restoration

Research to determine the most efficient methods for increasing potential oyster habitat and resilience of the commercial fishery

- Oyster Density and Size Frequency
- Predator Densities
- Oyster Health

Funded by NFWF Oil Spill Funds from 2014 – 2019

Fishery Disaster Recovery

Monitoring to evaluate the success of large-scale habitat restoration following the collapse of the commercial oyster fishery in 2012

- Pre and Post Season Assessments of Oyster Density and Distribution
- Monthly Spat Settlement Rates

Funded by Federal Disaster Funds from 2014 – 2019

Population Monitoring

Monitoring of Apalachicola's commercially fished oyster bars for fisheries management purposes

- Oyster Health
- Reproductive Development
- Predator Densities

Funded each year by the State of Florida since July 1, 2015

NFWF Oyster Restoration

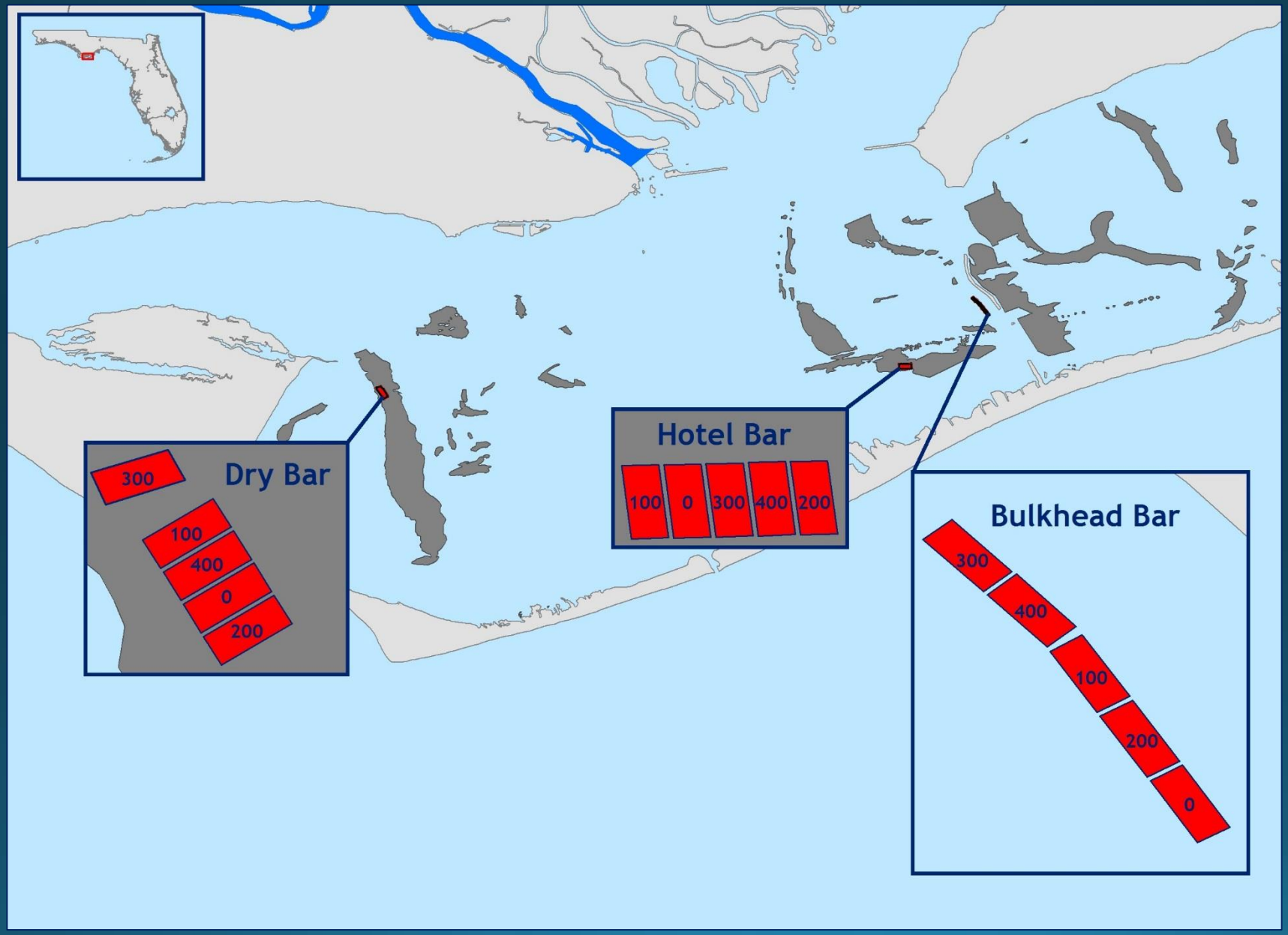
National Fish & Wildlife Foundation, Gulf Environmental Benefit Fund – Oil Spill Money

- Cultching at three 10-acre sites:
  - Dry Bar, Hotel Bar, and Bulkhead Bar
- Each site has five 2-acre plots planted with different densities of fossil shell cultch:
  - 0, 100, 200, 300, and 400 yds^3/ac

Purpose is to identify most optimal and cost effective shell cultching strategies for future restoration efforts

Karl Havens, Florida Sea Grant

NFWF Sites


Dry Bar
300
100
400
0
200
Hotel Bar
100
0
300
400
200
Bulkhead Bar
300
400
100
200
0

NFWF Oyster Restoration

Collaborative Project

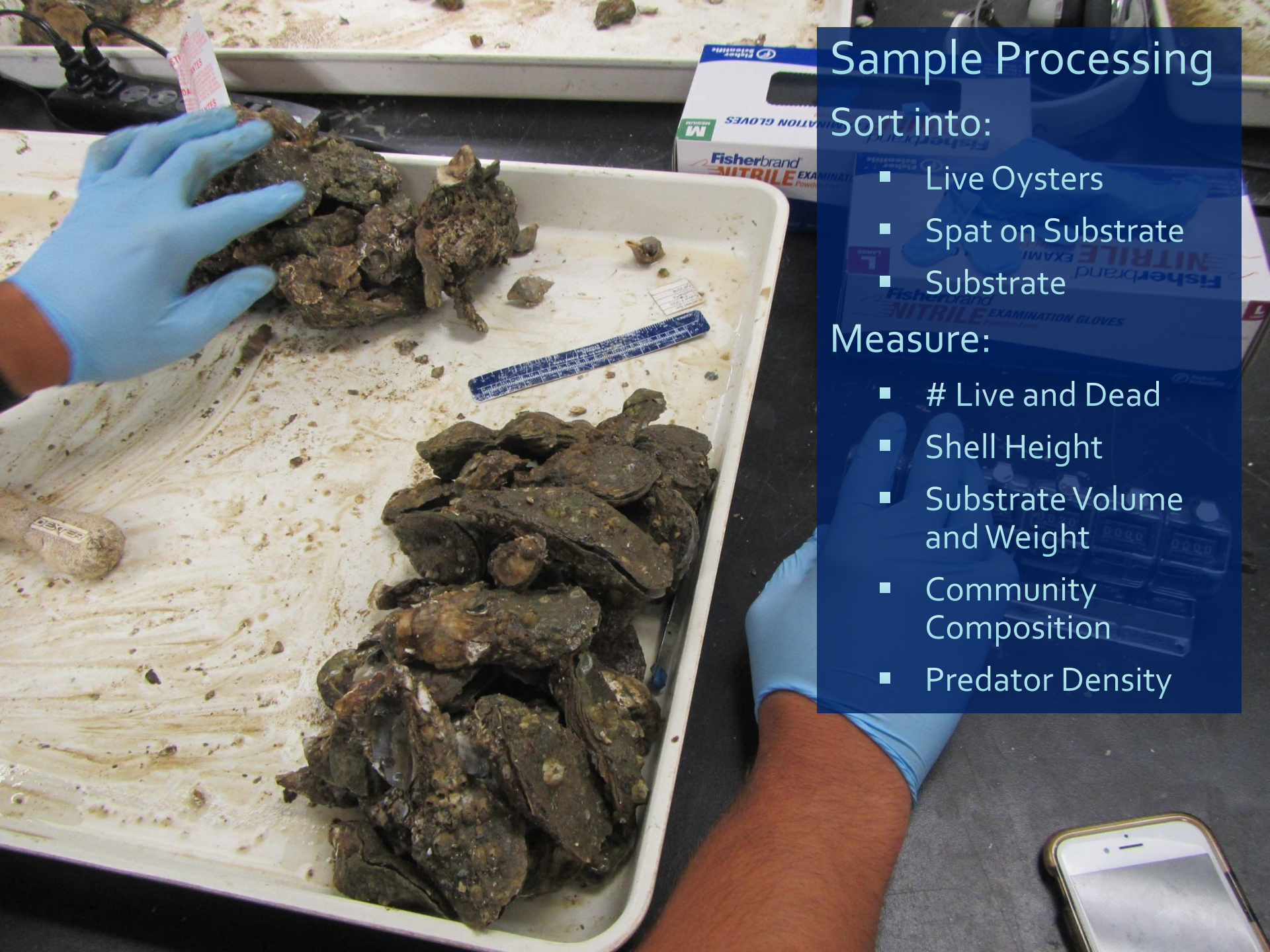
- FDACS – planning and oversight of barge shelling
- FWC – monitoring oyster density and size structure; and predator densities
- University of Florida – monitoring oyster health and condition, community outreach and communications
- University of New Hampshire – mapping and groundtruthing of study sites

Joe Shields, FDACS

Sample Collection

¼-m² Quadrats

- Quarterly
- 15 at each 2-acre plot (225 / quarter)
- Processed in the lab*



Sample Processing

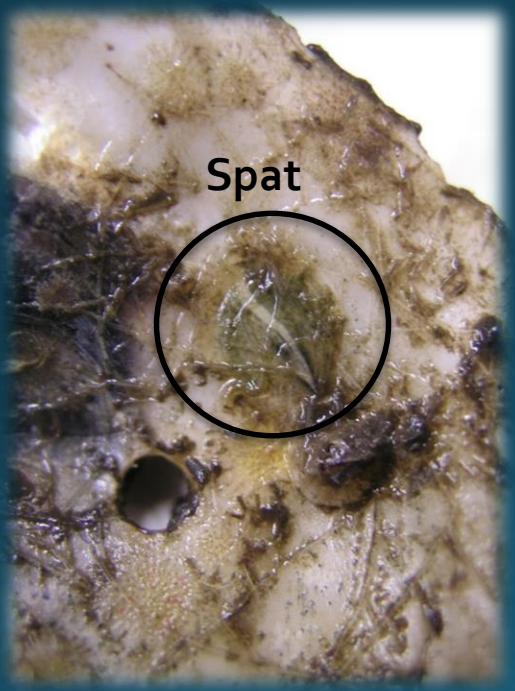
Sort into:

- Live Oysters
- Spat on Substrate
- Substrate

Measure:

- # Live and Dead
- Shell Height
- Substrate Volume and Weight
- Community Composition
- Predator Density

Oyster Size



Spat (< =25 mm)

< 1 inch

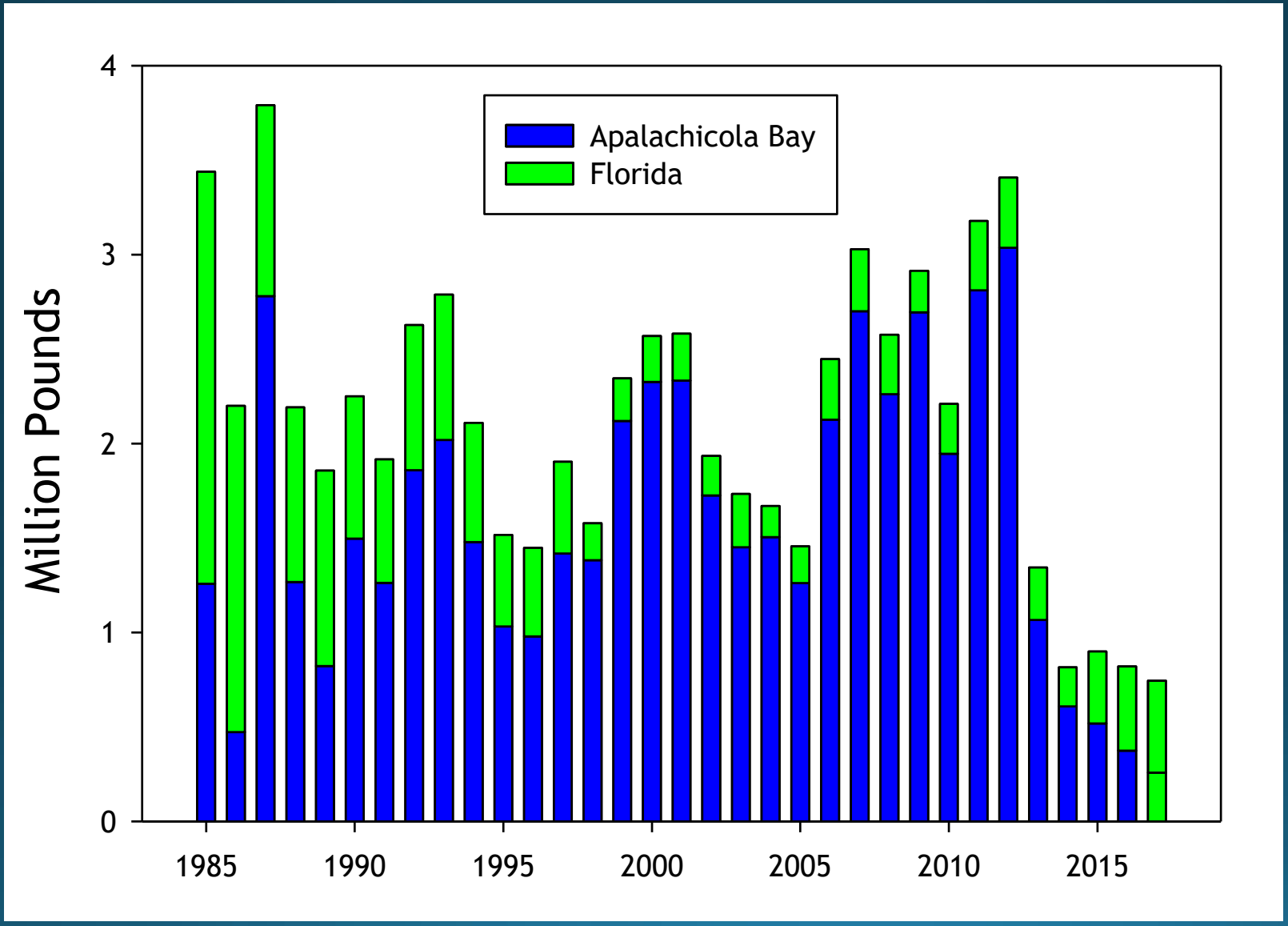
Sublegal (26-75 mm)

1-3 inches

Legal (>75 mm)

3+ inches

Fishery Disaster Recovery Project



Fishery Disaster Recovery Project

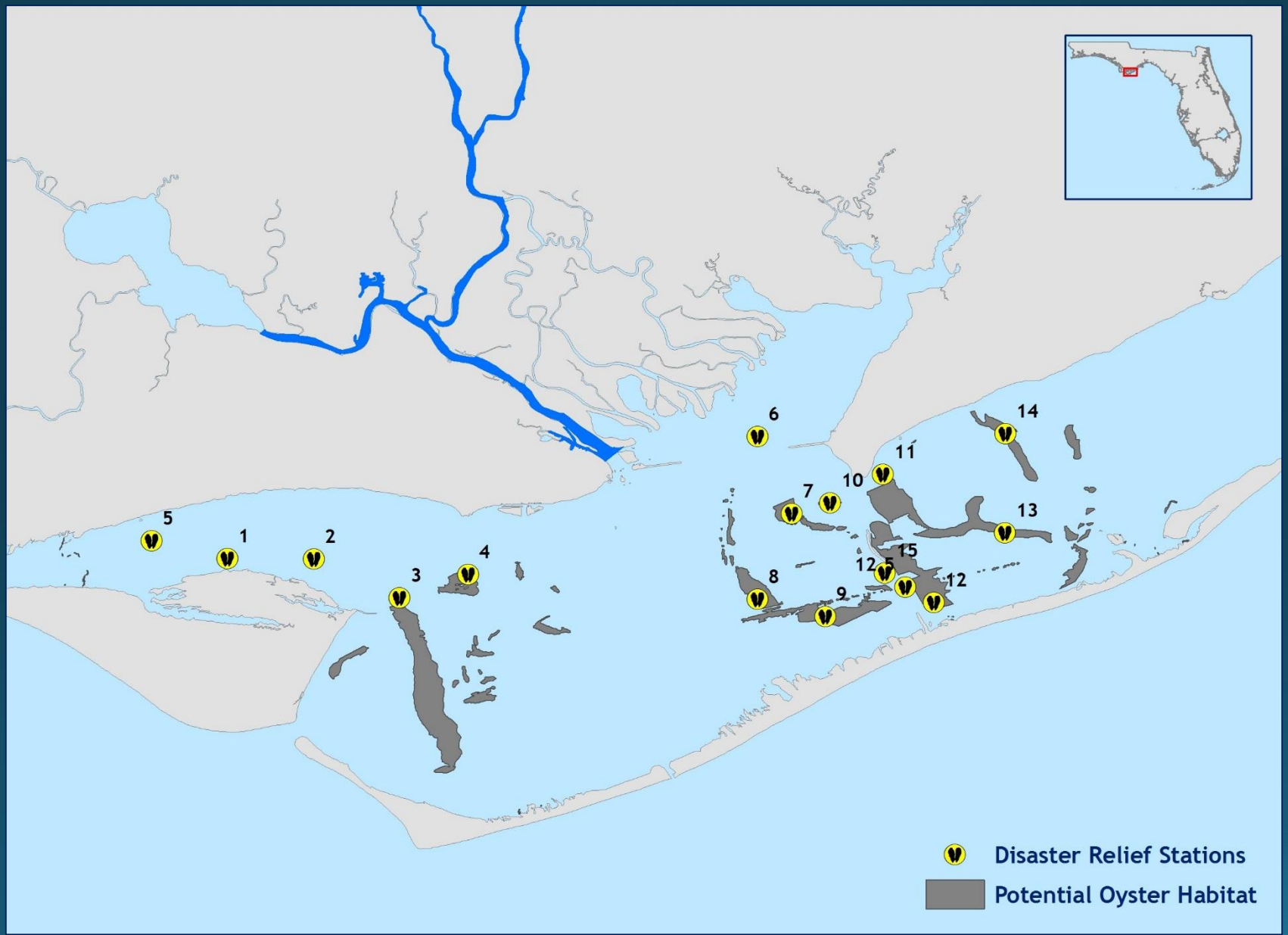
Florida officials requested a declaration of commercial fishery failure in late 2012

- Granted by U.S. Dept. of Commerce on August 12, 2013
- Money to Department of Economic Opportunity

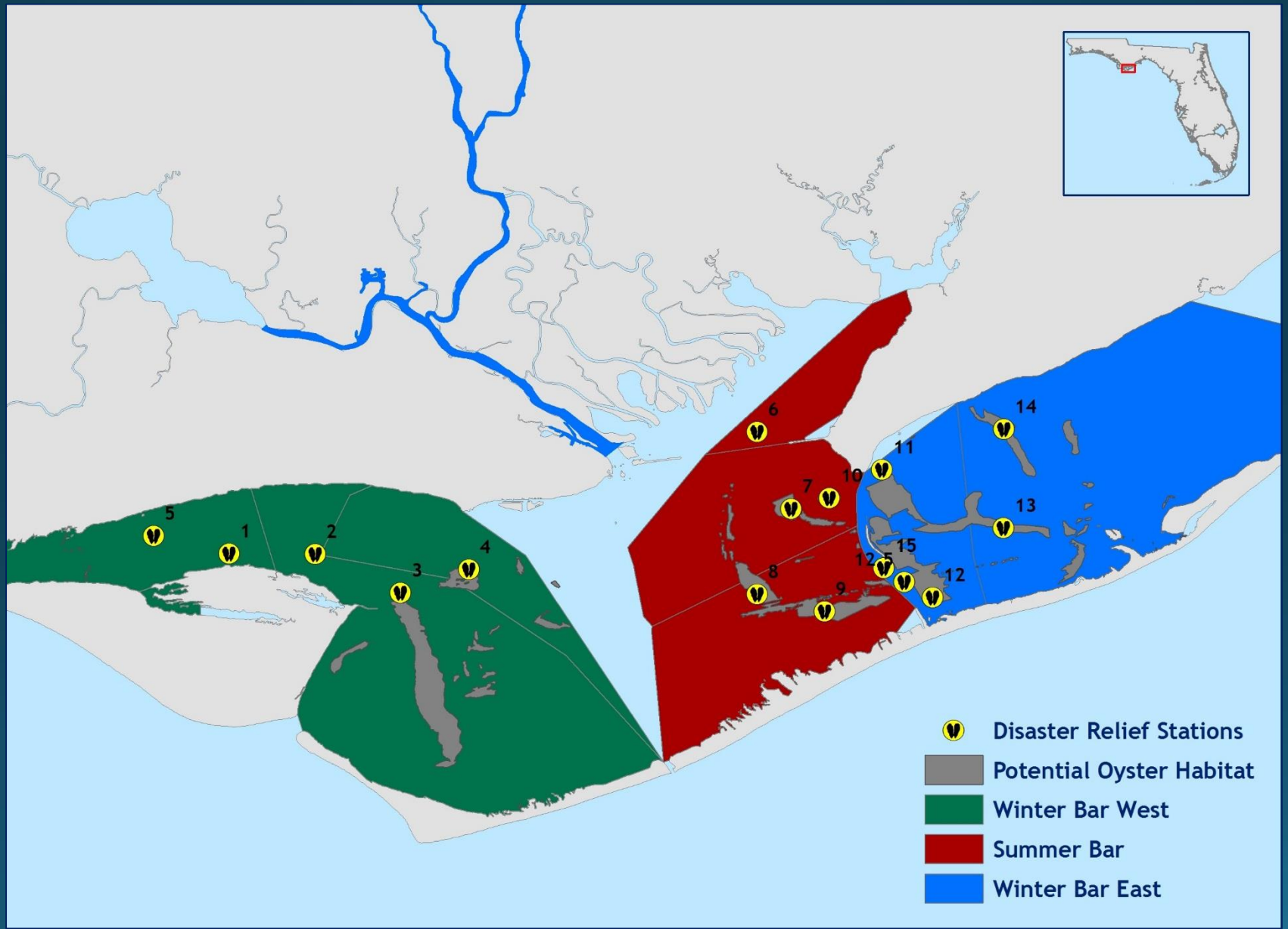
Disaster funds are being used for the following:

- Restoration of oyster habitat
- Monitoring of existing oyster resources and restoration efforts
- Vocational and educational training for affected oyster fishermen and their communities
- Processor facilities upgrades

Fishery Disaster Stations



Fishery Disaster Stations



Oyster Disaster Monitoring

Pre and Post Commercial Season Surveys

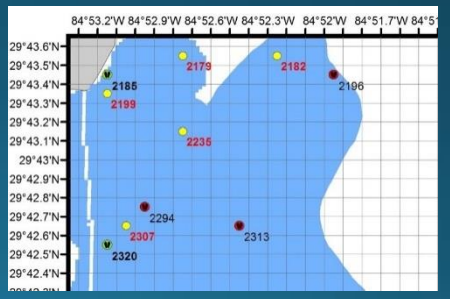
- Replicate quadrat surveys at 15 stations
- Prior to 2015, conducted by Florida Department of Agriculture and Consumer Services (FDACS)

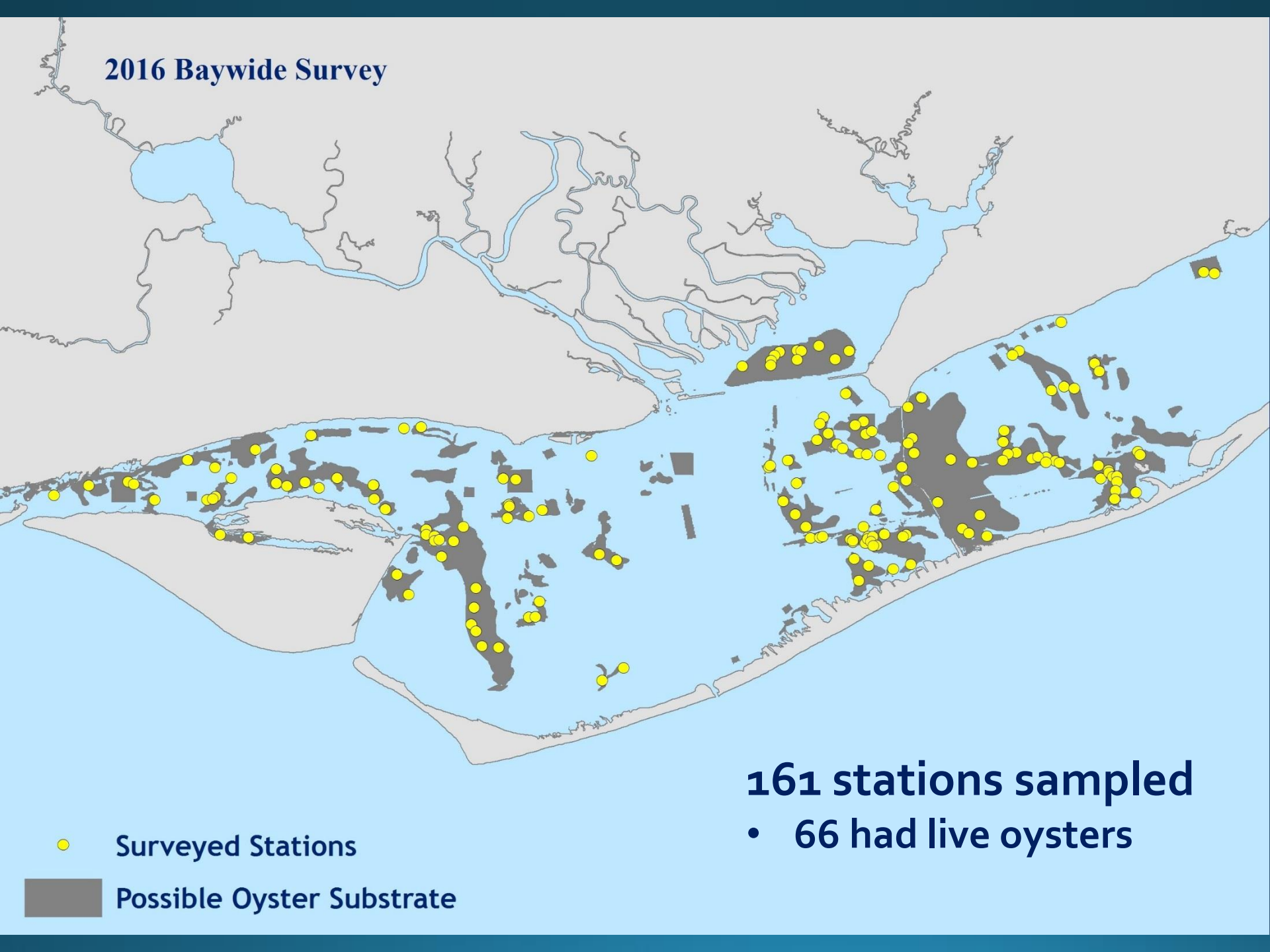
Monthly recruitment/settlement monitoring

- Replicate shell strings deployed at 15 stations

Baywide Fisheries Independent Survey

- Summer 2016
- Stations randomly selected from 0.026 km² grid squares of "possible" oyster habitat
- Replicate quadrat surveys
- Target was to survey a minimum of 90 stations




2016 Baywide Survey
161 stations sampled
• 66 had live oysters
Surveyed Stations
Possible Oyster Substrate

State-Funded Oyster Monitoring

Will continue work being done under Fishery Disaster Recovery Project

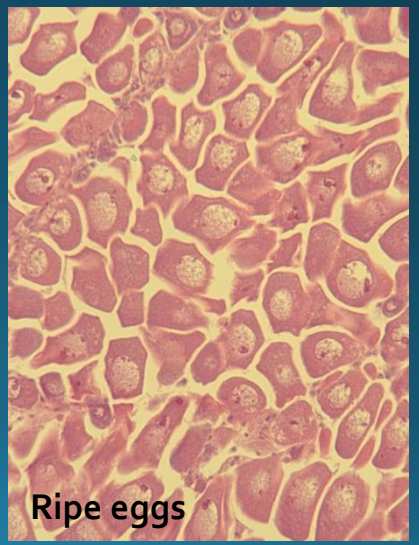
- Monthly spat settlement monitoring
- Pre and Post commercial season surveys

Monitoring several other parameters:

- Condition of oysters
- Disease (dermo)
- Shell Pests
- Reproductive development
- Predator densities
- Sedimentation Rate

Boring Sponge holes
Picture from NOAA Tech. Mem

Oyster drill

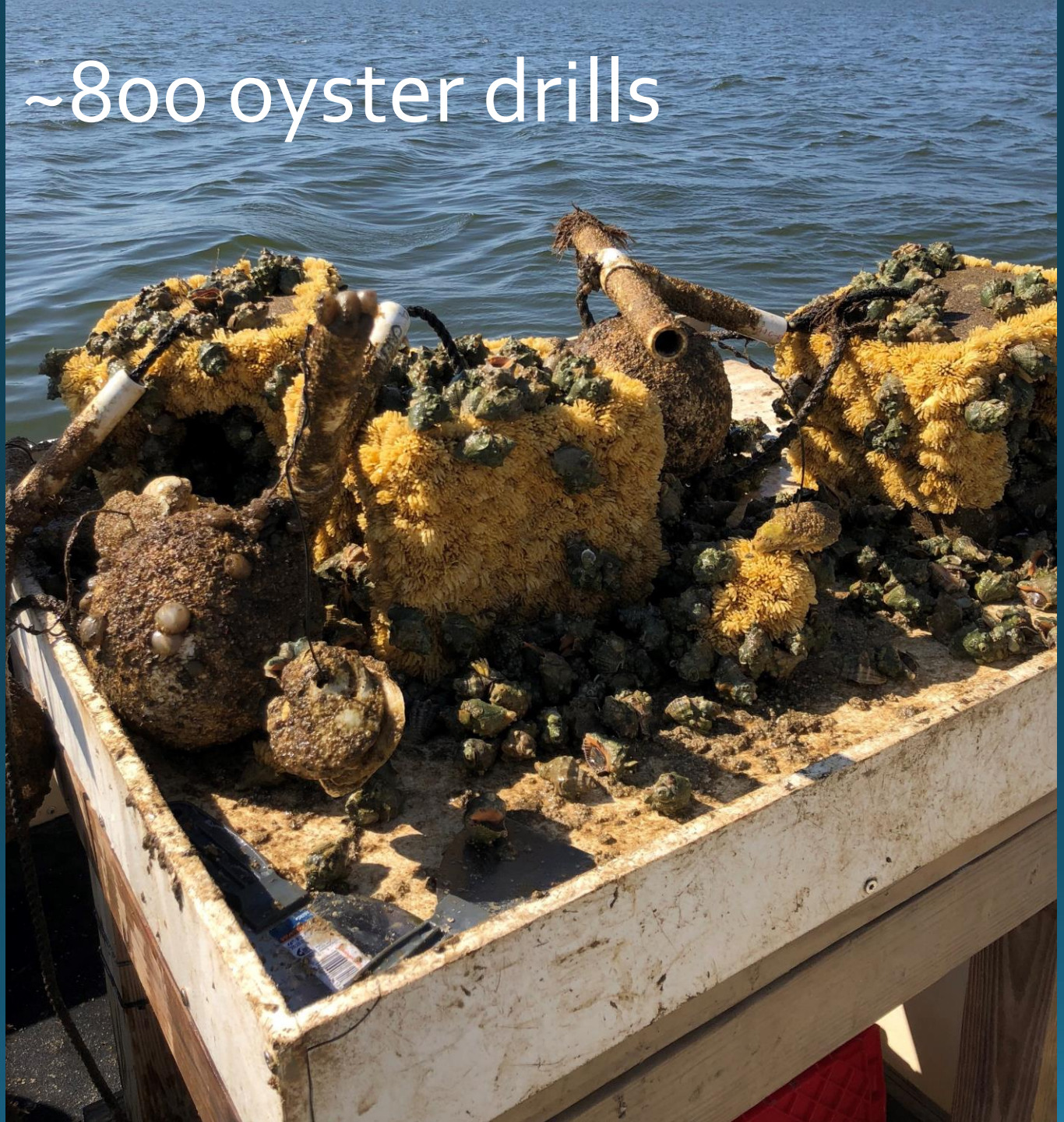


Ripe eggs

“Clean” Spat Block

Predators

~800 oyster drills




Deployed 1 month

Questions?