Oyster Integrated Mapping and Monitoring Program (OIMMP)

OIMMP workshop

May 22-23 2018

Guana Tolomato Matanzas

National Estuarine Research Reserve

Kara Radabaugh, Ryan Moyer, Steve Geiger

Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

GTM RESEARCH RESERVE

OIMMP introduction

- OIMMP is funded by Florida's State Wildlife Grants (SWG) Program in order to support the study of high-priority coastal habitats and meet requirements of the State Wildlife Action Plan

OIMMP Team

Ryan P. Moyer, Ph.D. (PI)

Kara Radabaugh, Ph.D. (Coordinator, Co-PI)

Steve Geiger, Ph.D. (Co-PI)

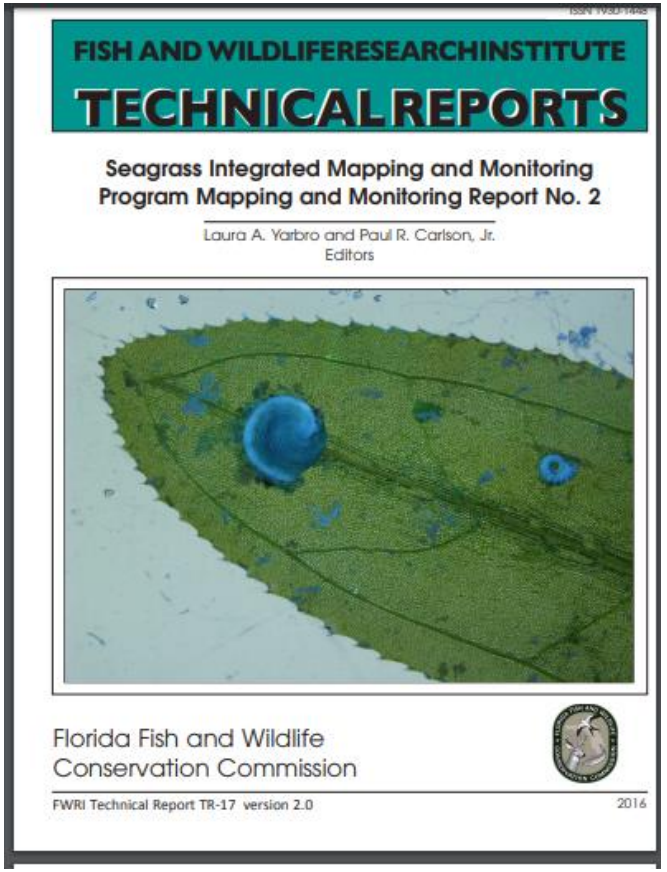
Christi Santi (GIS specialist)

Kathleen OKeife (Geospatial support)

Many statewide collaborators!

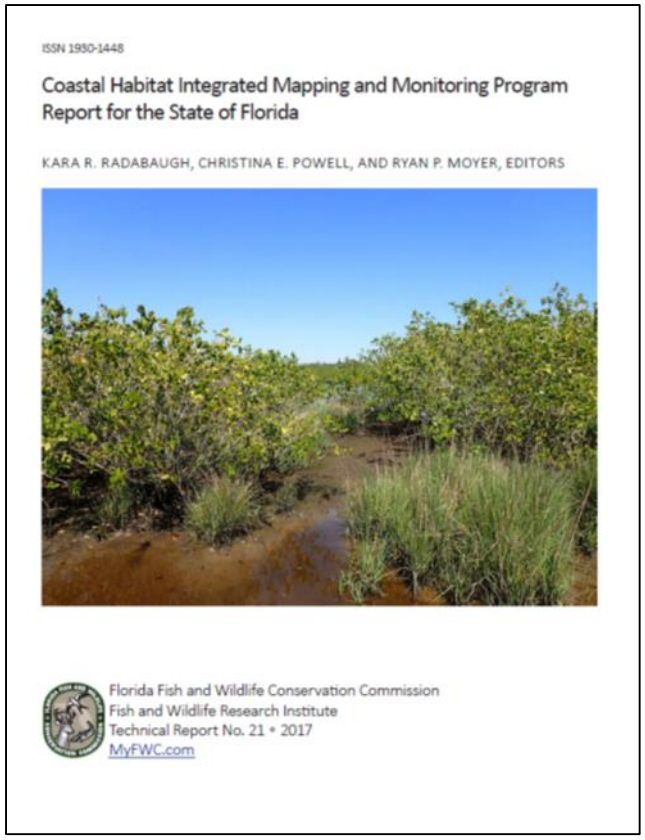
IMMP Origins: SIMM

- Seagrass Integrated Mapping and Monitoring (SIMM) program by Laura Yarbro and Paul Carlson
- SIMM report: myfwc.com/research/habitat/seagrasses/projects/active/simm/



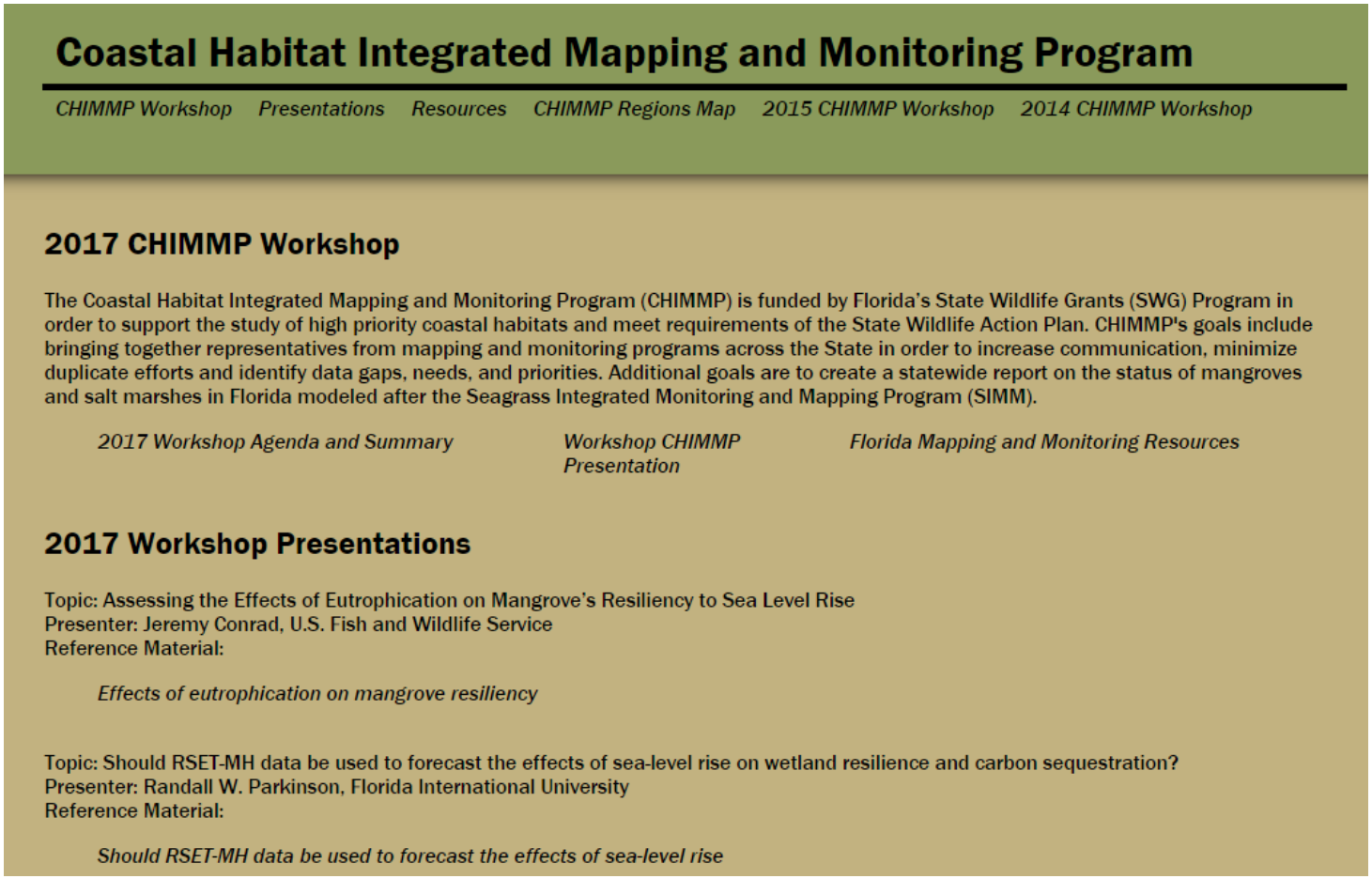
IMMP Origins: CHIMMP

- Coastal Habitat Integrated Mapping and Monitoring Program (CHIMMP)
- CHIMMP report made with 48 statewide contributors: http://myfwc.com/research/habitat/coastal-wetlands/projects/chimmp/



IMMP Origins: CHIMMP

- Four year program, 2013-2017 funded by SWG
- Resources and presentations from three workshops available at http://ocean.floridamarine.org/CHIMMP/



Coastal Habitat Integrated Mapping and Monitoring Program

CHIMMP Workshop *Presentations* *Resources* *CHIMMP Regions Map* *2015 CHIMMP Workshop* *2014 CHIMMP Workshop*

2017 CHIMMP Workshop

The Coastal Habitat Integrated Mapping and Monitoring Program (CHIMMP) is funded by Florida's State Wildlife Grants (SWG) Program in order to support the study of high priority coastal habitats and meet requirements of the State Wildlife Action Plan. CHIMMP's goals include bringing together representatives from mapping and monitoring programs across the State in order to increase communication, minimize duplicate efforts and identify data gaps, needs, and priorities. Additional goals are to create a statewide report on the status of mangroves and salt marshes in Florida modeled after the Seagrass Integrated Monitoring and Mapping Program (SIMM).

2017 Workshop Agenda and Summary *Workshop CHIMMP Presentation* *Florida Mapping and Monitoring Resources*

2017 Workshop Presentations

Topic: Assessing the Effects of Eutrophication on Mangrove's Resiliency to Sea Level Rise
Presenter: Jeremy Conrad, U.S. Fish and Wildlife Service
Reference Material:

Effects of eutrophication on mangrove resiliency

Topic: Should RSET-MH data be used to forecast the effects of sea-level rise on wetland resilience and carbon sequestration?
Presenter: Randall W. Parkinson, Florida International University
Reference Material:

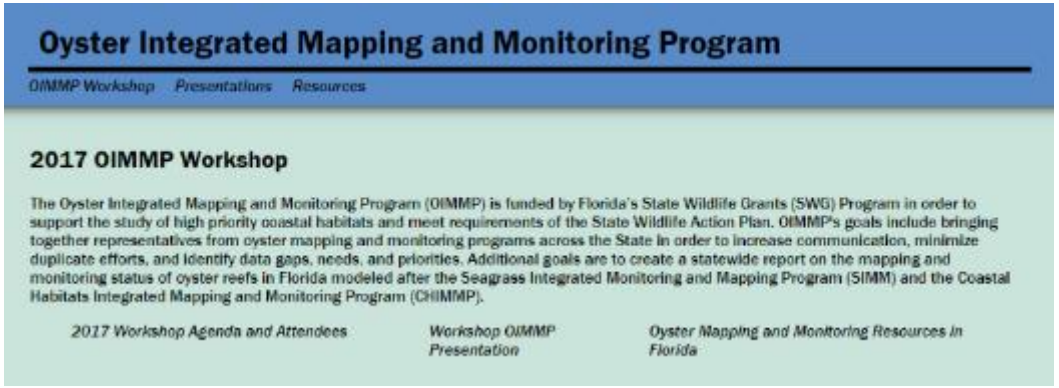
Should RSET-MH data be used to forecast the effects of sea-level rise

OIMMP goals

- **Inventory existing mapping and monitoring programs**
  - Create publicly available mapping layer and collaborative statewide report
- **Bring together representatives from mapping and monitoring programs across the state**
  - Increase communication
  - Compare current mapping and monitoring methods
  - Identify data gaps, needs, and priorities for future efforts
- **Complete pilot studies of oyster mapping and monitoring**

OIMMP workshops

- First workshop held in February 2017 at GTMNERR
- 2017 presentations available on OIMMP website http://ocean.floridamarine.org/OIMMP/



GTM RESEARCH RESERVE

Workshop Agenda

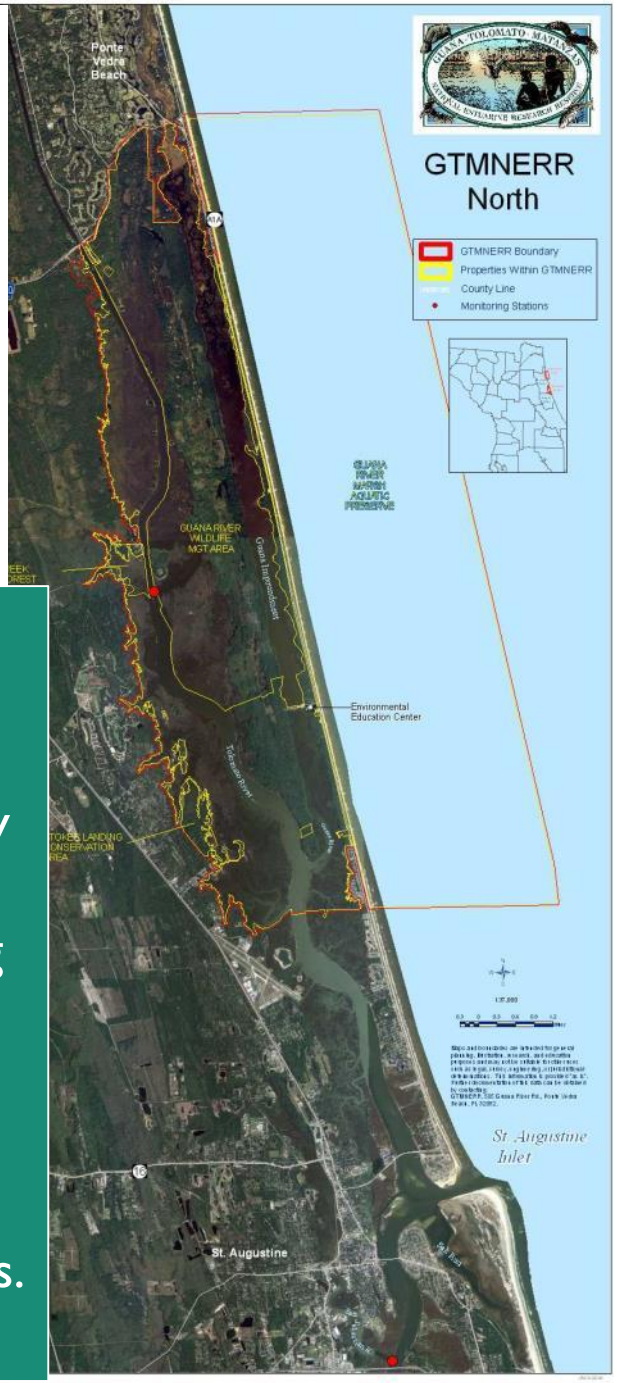
- **Day 1**
  - OIMMP updates and resources
  - Attendee presentations
  - Social event at Mill Top Tavern
- **Day 2**
  - Continuation of attendee presentations
  - Breakout groups

GTM

RESEARCH RESERVE

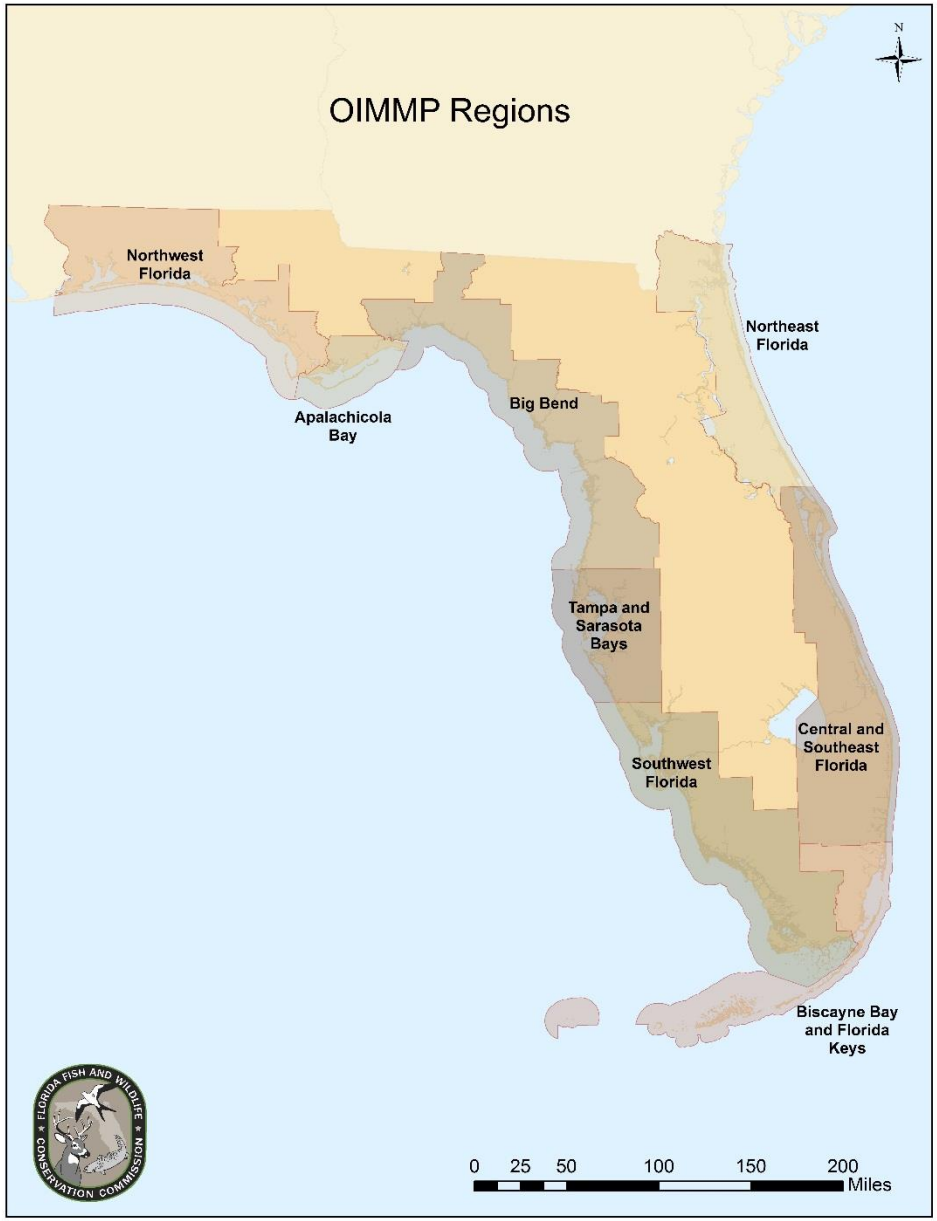
MISSION

To achieve the conservation of natural biodiversity and cultural resources by using the results of research to guide science-based stewardship and education strategies.



OIMMP Report updates

- Regions for statewide report determined at 2017 workshop



Chapter	Contributor	Affiliation
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	Steve Geiger	FWC
	Ryan Moyer	FWC
All, GIS	Christi Santi	FWC
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	Loren Coen	FAU
	Steve Geiger	FWC
	Ryan Moyer	FWC
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	Katie Davis	FDEP
	Patrice Couch	St. Andrew Bay Watch
Apalachicola Bay	Ray Grizzle	UNF
	Melanie Parker	FWC
	Anne Birch	TNC
	Megan Lamb	ANERR
	Emma Dontis	FWC
Big Bend and Springs Coast	Stephen Hesterberg	USF
	Sean King	SWFWMD
	Gregory Herbert	USF
	Peter Frederick	UF
	William Pine	UF
Tampa/ Sarasota Bay	Gary Raulerson	TBEP
	Jay Leverone	SBEP
	Allison Conner	CHNEP
	Aaron Brown	SWFWMD
	Kris Kaufman	NOAA
	Andrew Lykens	Tampa Bay Watch
	Kathryn Meaux	Sarasota County
Southwest Florida	Anne Birch	TNC
	Eric Milbrandt	SCCF
	Mark Thompson	SCCF
	Thomas Ries	ESA Scheda
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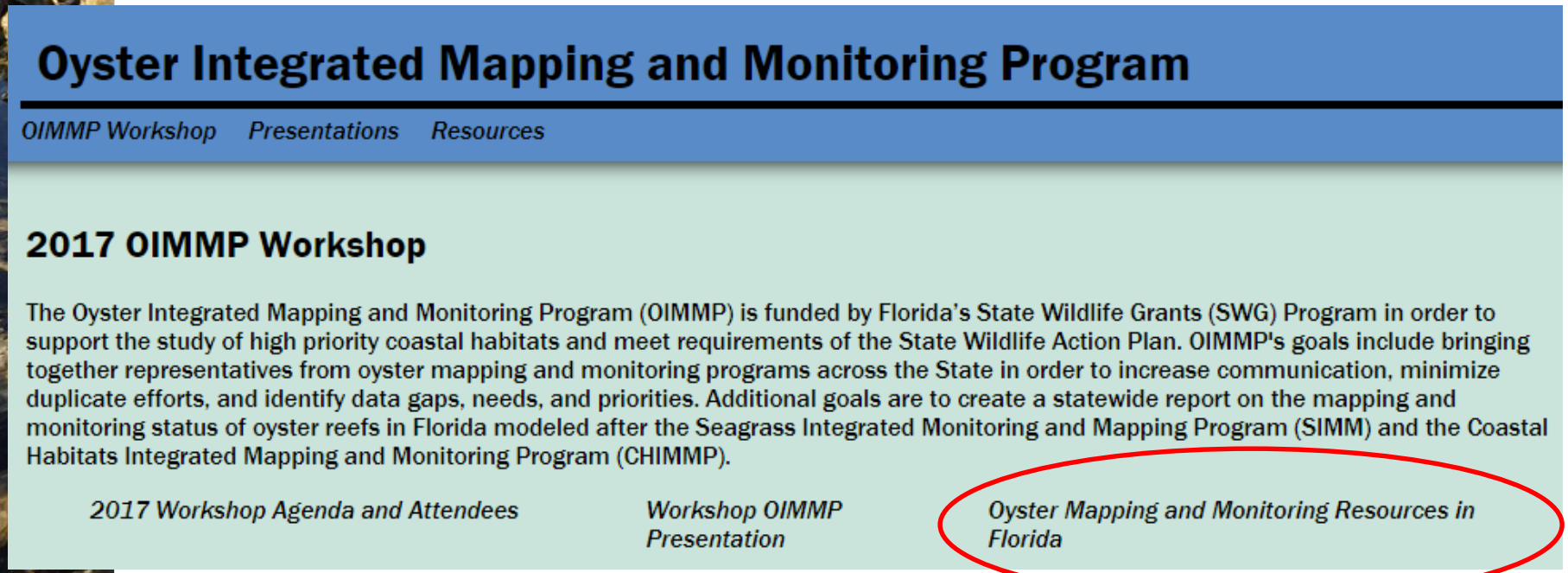
	Steve Geiger	FWC
	Ryan Moyer	FWC
Central and Southeast Florida	Melanie Parker	FWC
	Vincent Encomio	FOS
	Jeff Beal	FWC
	Phyllis Klarmann	SFWMD
	Emily Dark	FDEP
	Joshua Breithaupt	UCF
Northeast Florida	Nikki Dix	GTMNERR
	Linda Walters	UCF
	Erica Hernandez	SJRWMD
	Annie Roddenberry	FWC
	Stephanie Garvis	UCF
	Matthew Anderson	FDEP

39+ statewide contributors

OIMMP Report

- Introduction to Florida oyster reefs
  - Overview of methods used for mapping and monitoring
  - Summary of benthic habitat classification schemes
  - Summary of oyster reef mapping data
  - Summary of oyster monitoring parameters and resources

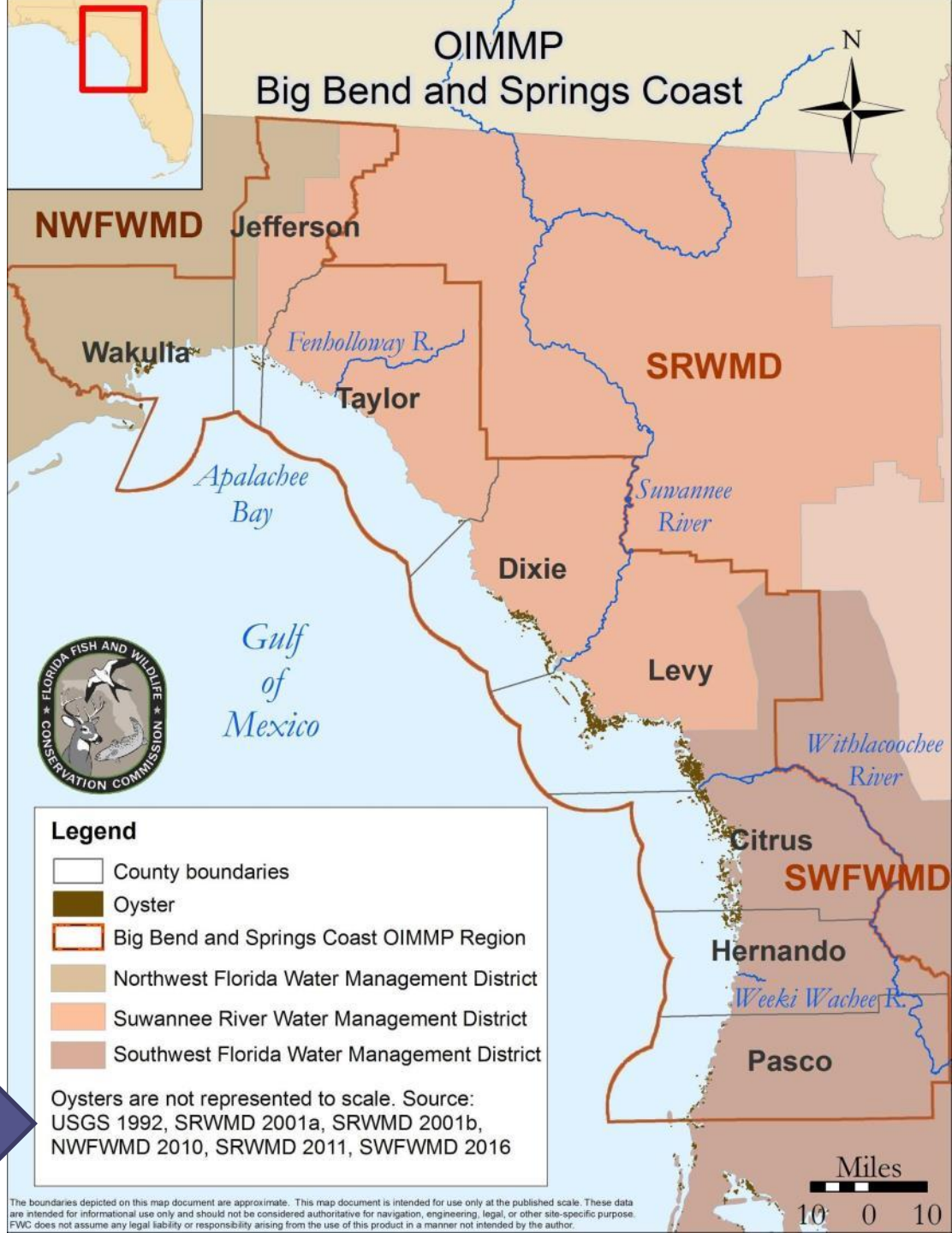


OIMMP report chapter contents

- Regional maps
- Introduction to regional history/ecology, description of local oysters
- Threats to oyster reefs
- Summary of regional mapping and monitoring programs
- Recommendations for management, mapping, and monitoring

OIMMP Report example: Big Bend and Springs Coast

Mapping linked to published reports and websites
Map shapefiles available for downloads at http://geodata.myfwc.com/datasets/oyster-beds-in-florida



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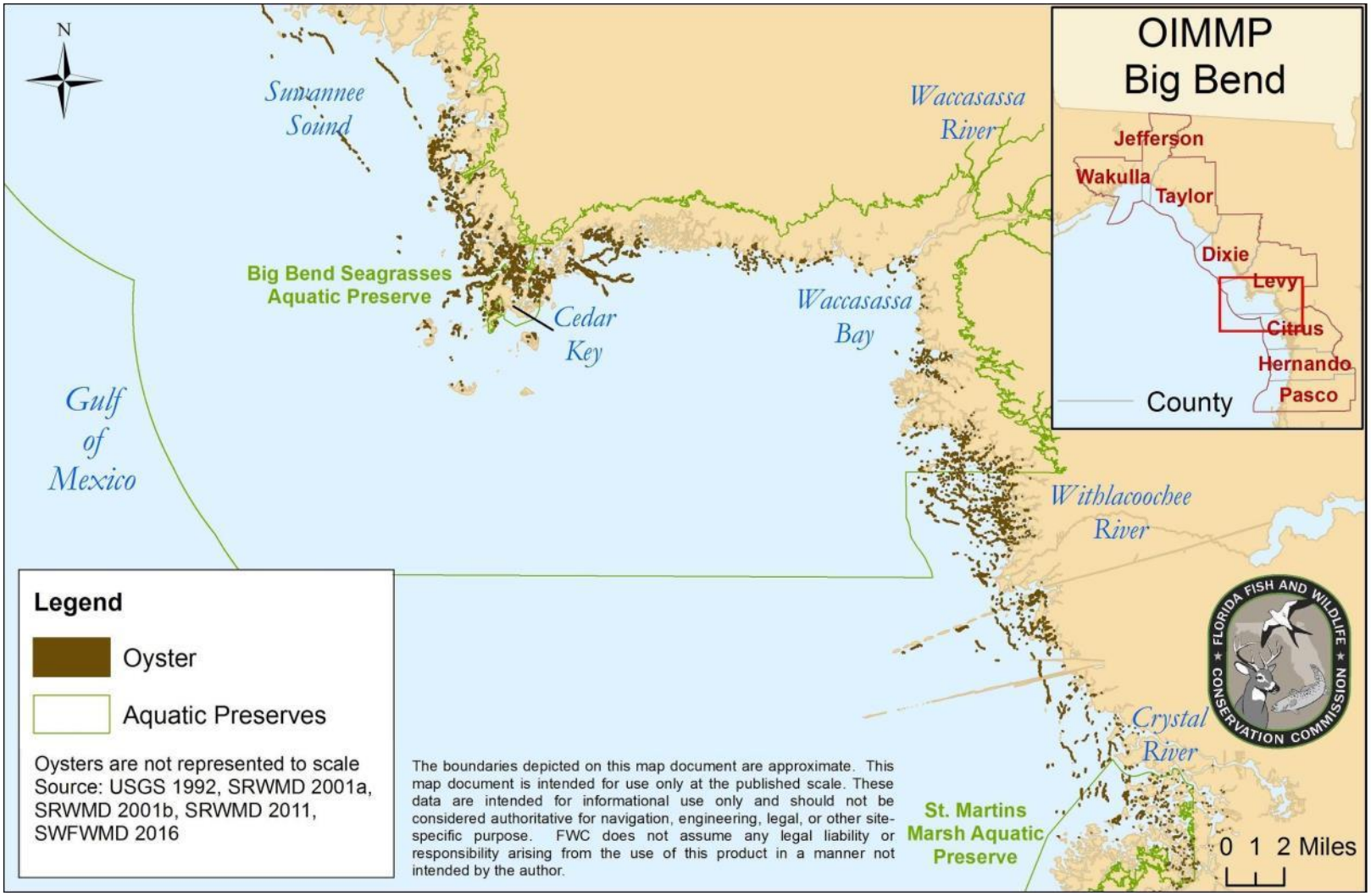

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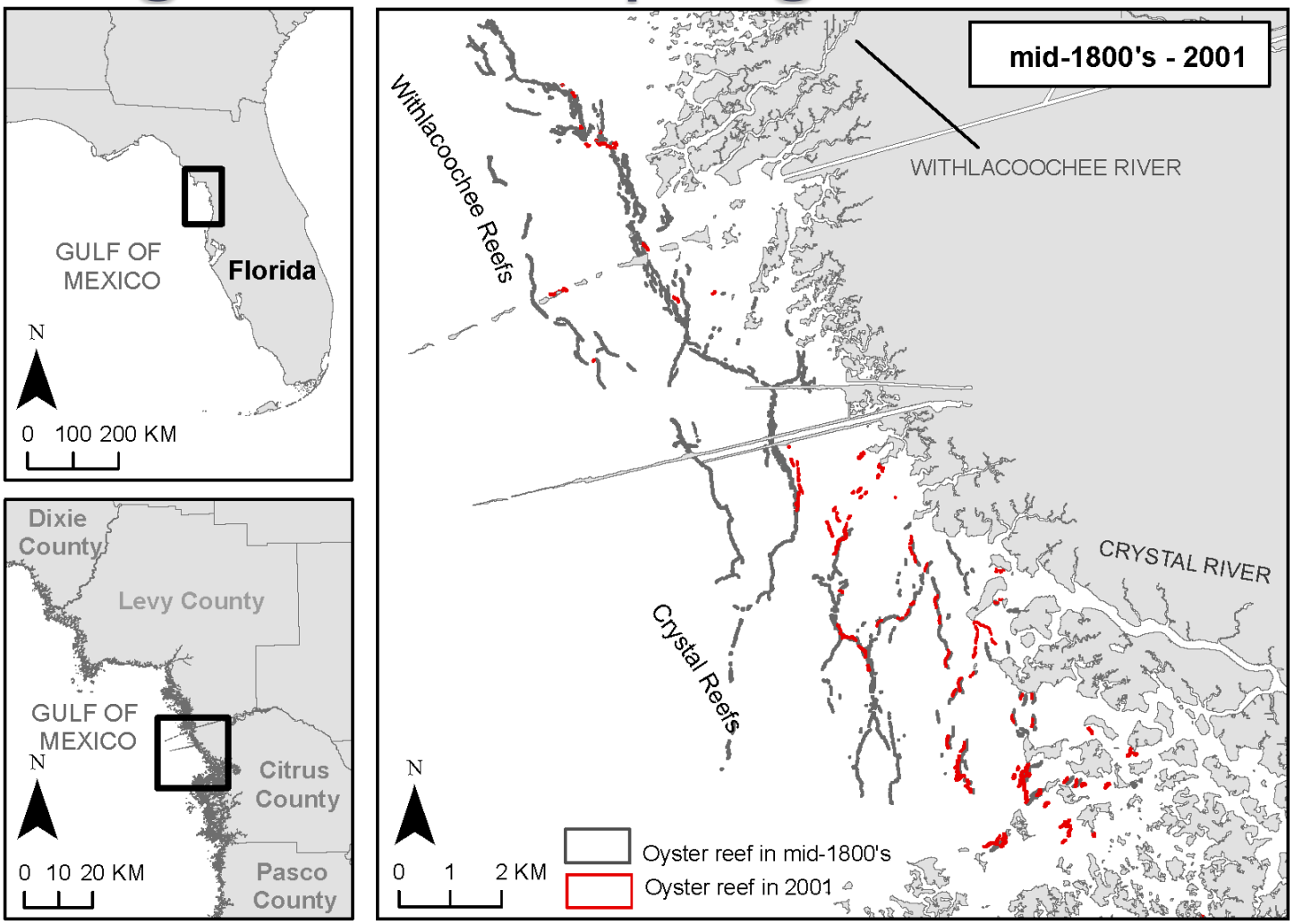
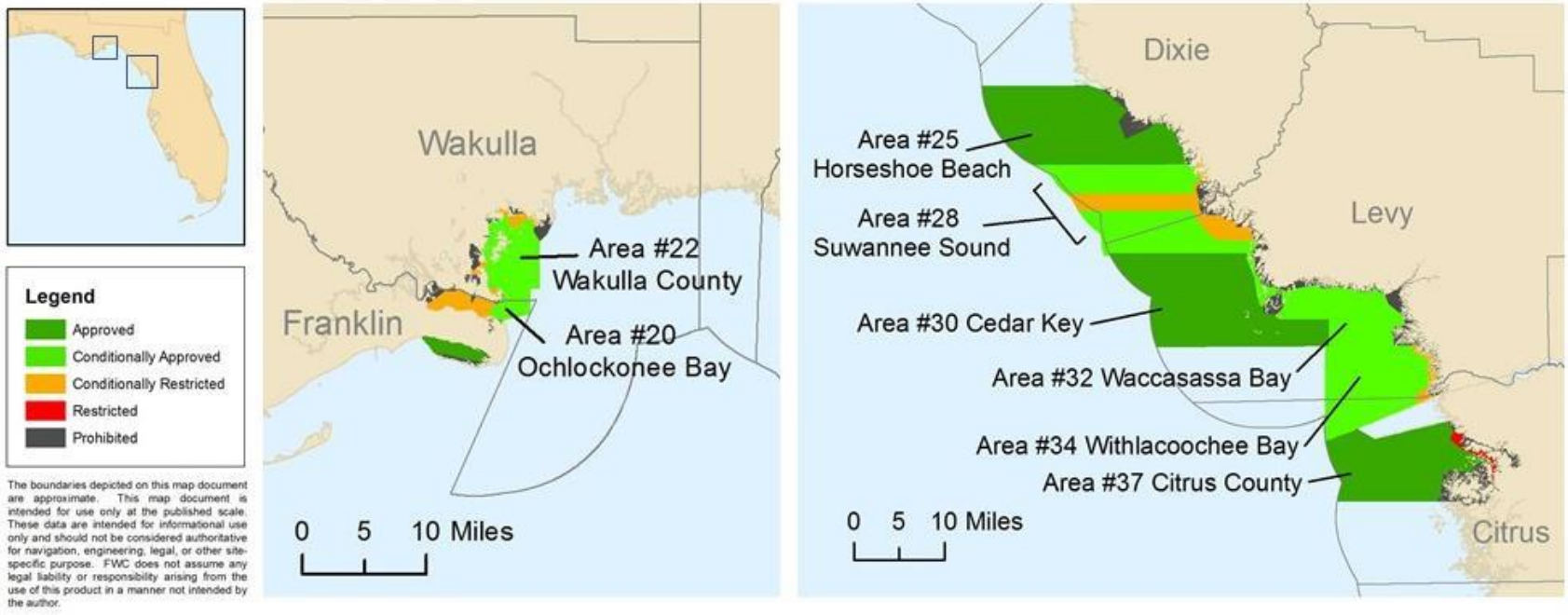


Figure 4.7. Oyster reef extent offshore of Withlacoochee and Crystal rivers in the mid-1800s and 2001. Map by Stephen Hesterberg. Data sources: Raabe et al. 2004, SRWMD 2001a.

OIMMP Report example: Big Bend and Springs Coast



FDACS Shellfish Harvesting Areas (SHAs) downloadable shapefiles:

Winter SHAs:

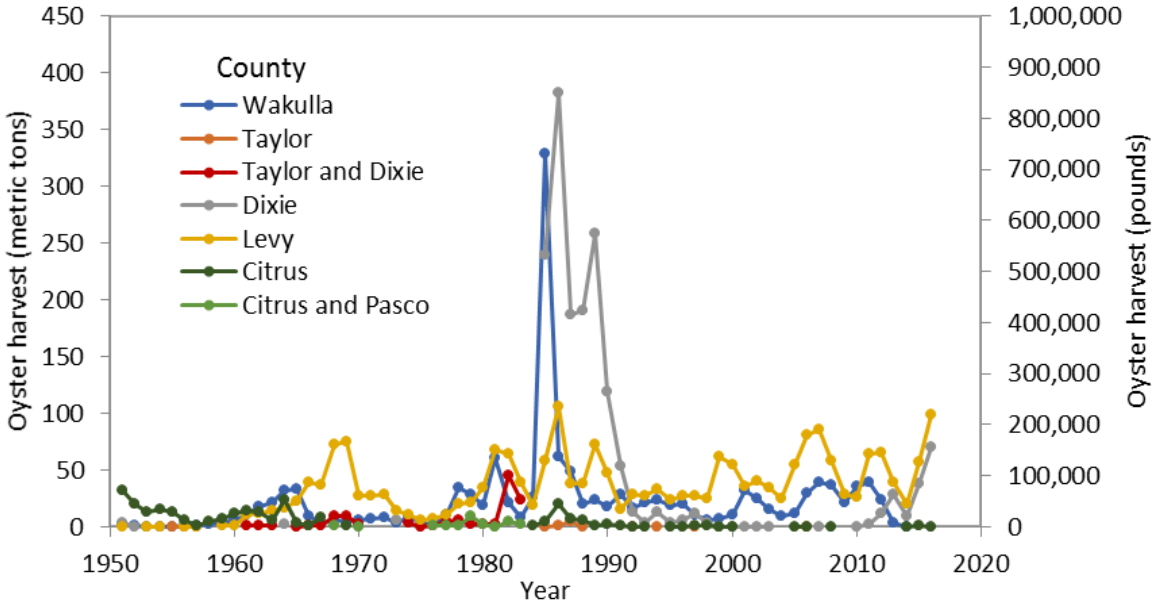
https://www.arcgis.com/home/item.html?id=ac228ede47b04ac0ad69abcdc06e3a1f#overview

Non-Winter SHAs:

https://www.arcgis.com/home/item.html?id=6cf9f4ec8edb4dd8949cb23bb591745a#overview

Oyster harvest data

- 1950 – 1983 data from printed copies of Summaries of Florida Commercial Marine Fish Landings
  - Will be available on OIMMP website and published as a report appendix
- 1984 – present data from https://public.myfwc.com/FWRI/PFDM/ReportCreator.aspx
- 1986 – Initiation of mandatory FWC reporting system



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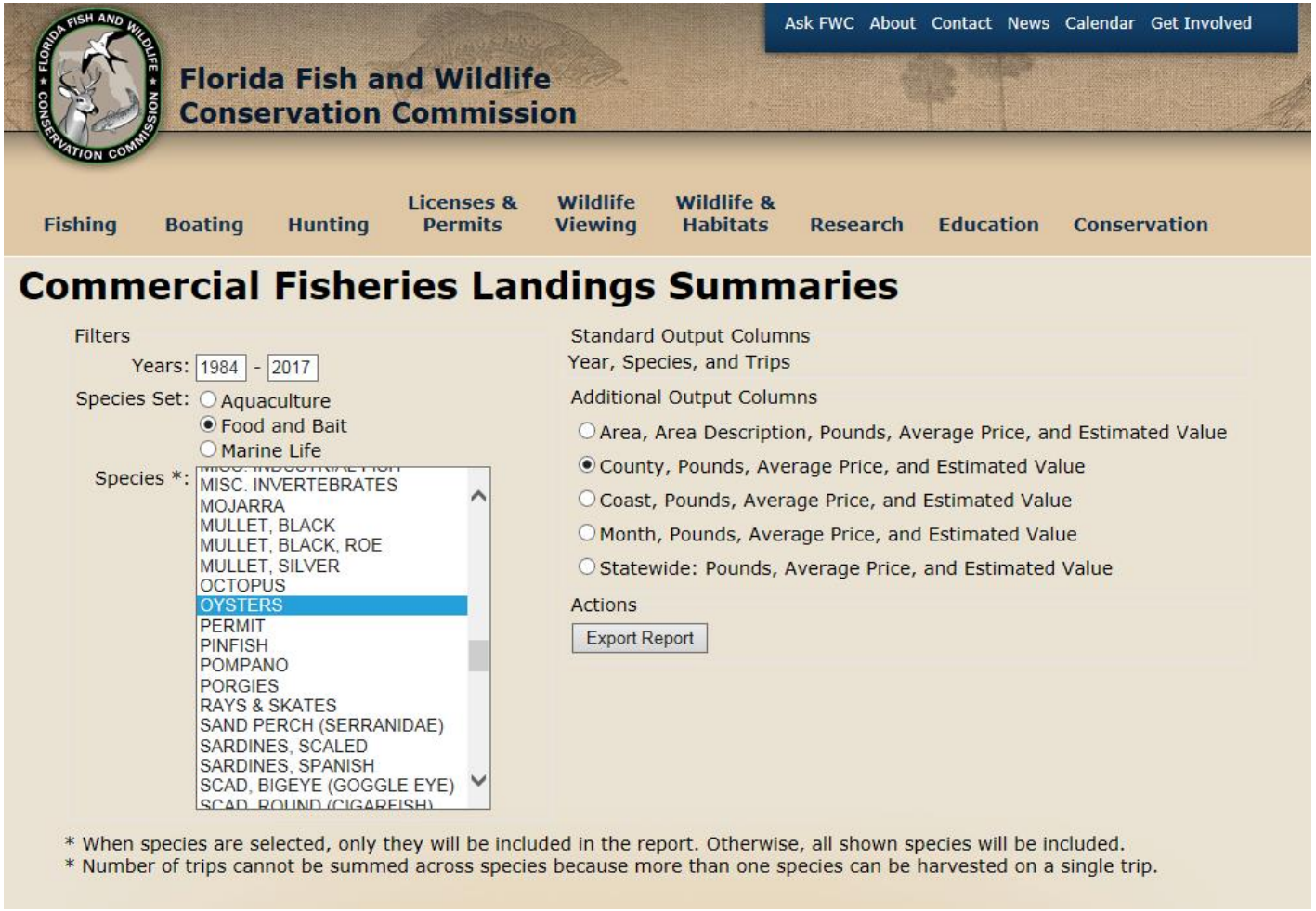


OIMMP Report Status

- Approved for FWRI Technical Report publication
- Drafts written for 5 (of 9) chapters and well underway for 3 more chapters
- Writing & review process
  - Write draft (Kara Radabaugh & coauthors)
  - OIMMP editor revisions (Kara Radabaugh, Ryan Moyer, Steve Geiger)
  - Technical review & revisions (Bill Arnold, Amber Whittle)
  - Science & copy editor review & revisions (Bland Crowder)
  - Formatting (Bland Crowder)

Statewide Oyster Mapping and FWC GIS Resources

Christi Santi

Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

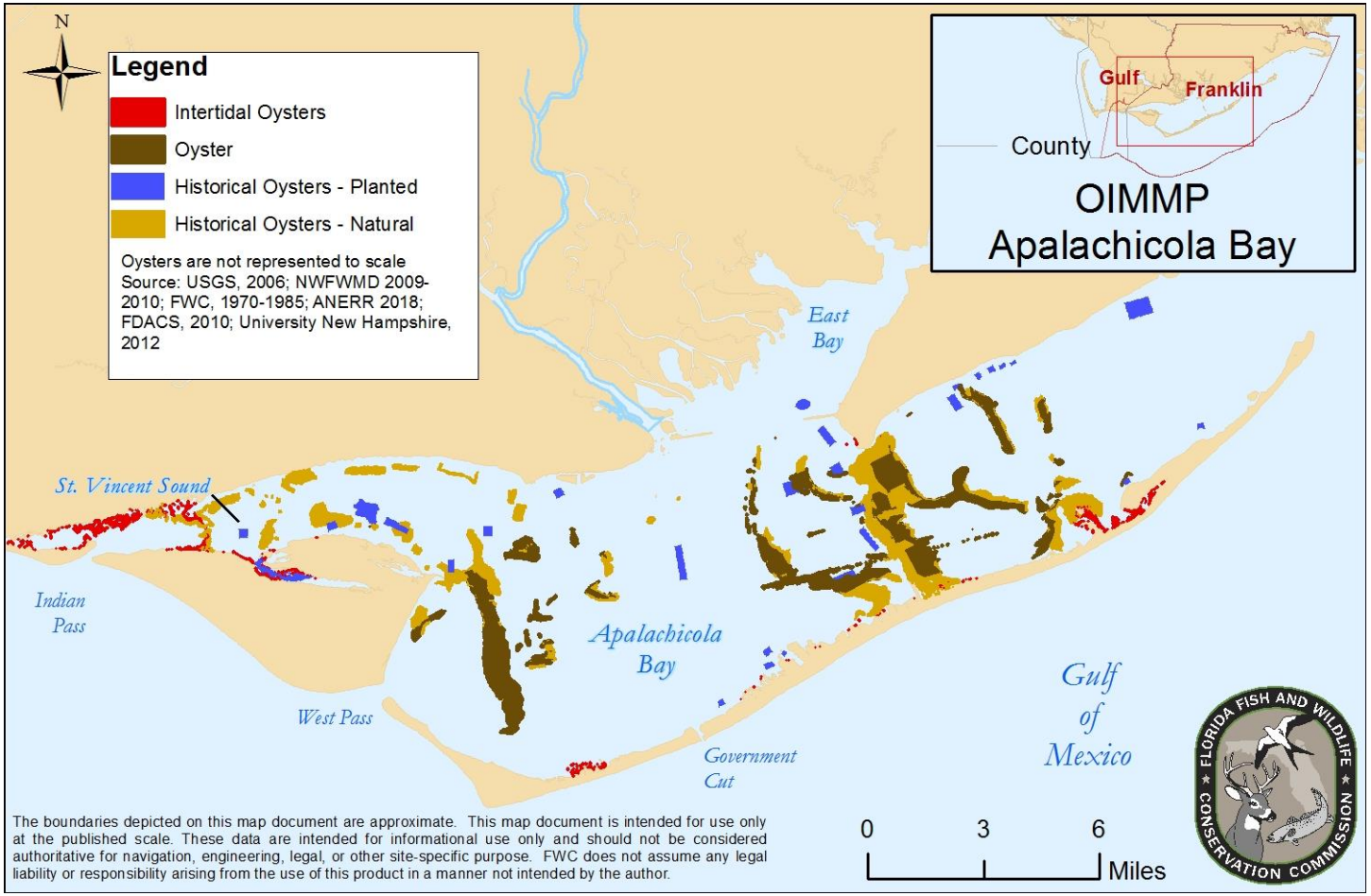
Statewide Oyster Progress

- Data were added from 15 sources in additional areas or updates to existing areas.
- Any overlaps between multiple data sources were resolved.
- Additional "Comments" are added to retain details present in source data.

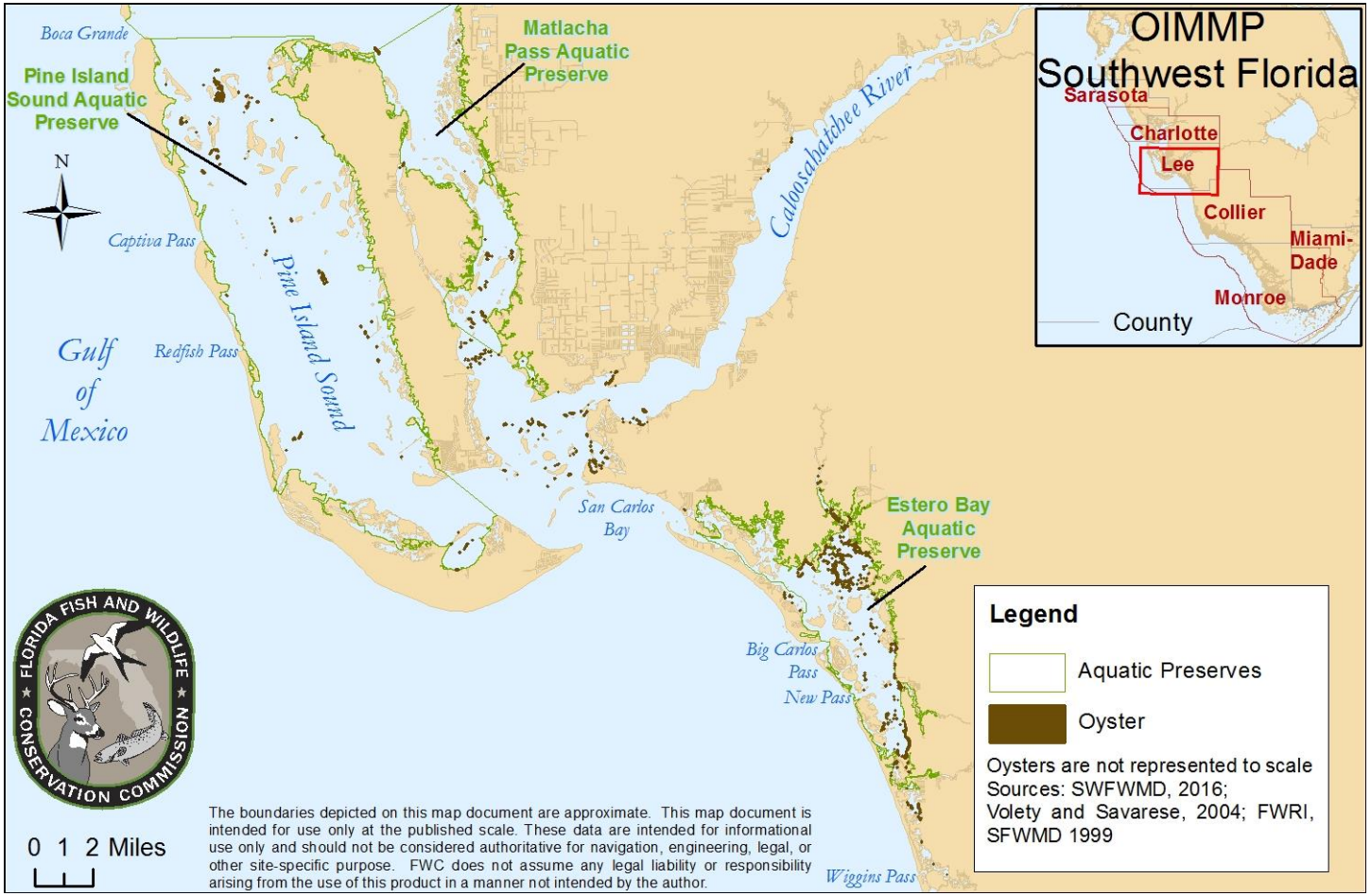
Statewide Oyster Progress

Statewide Oyster Progress

Updated Area: Apalachicola Bay



Updated Area: Lee County



Mapping Gaps

Vague maps

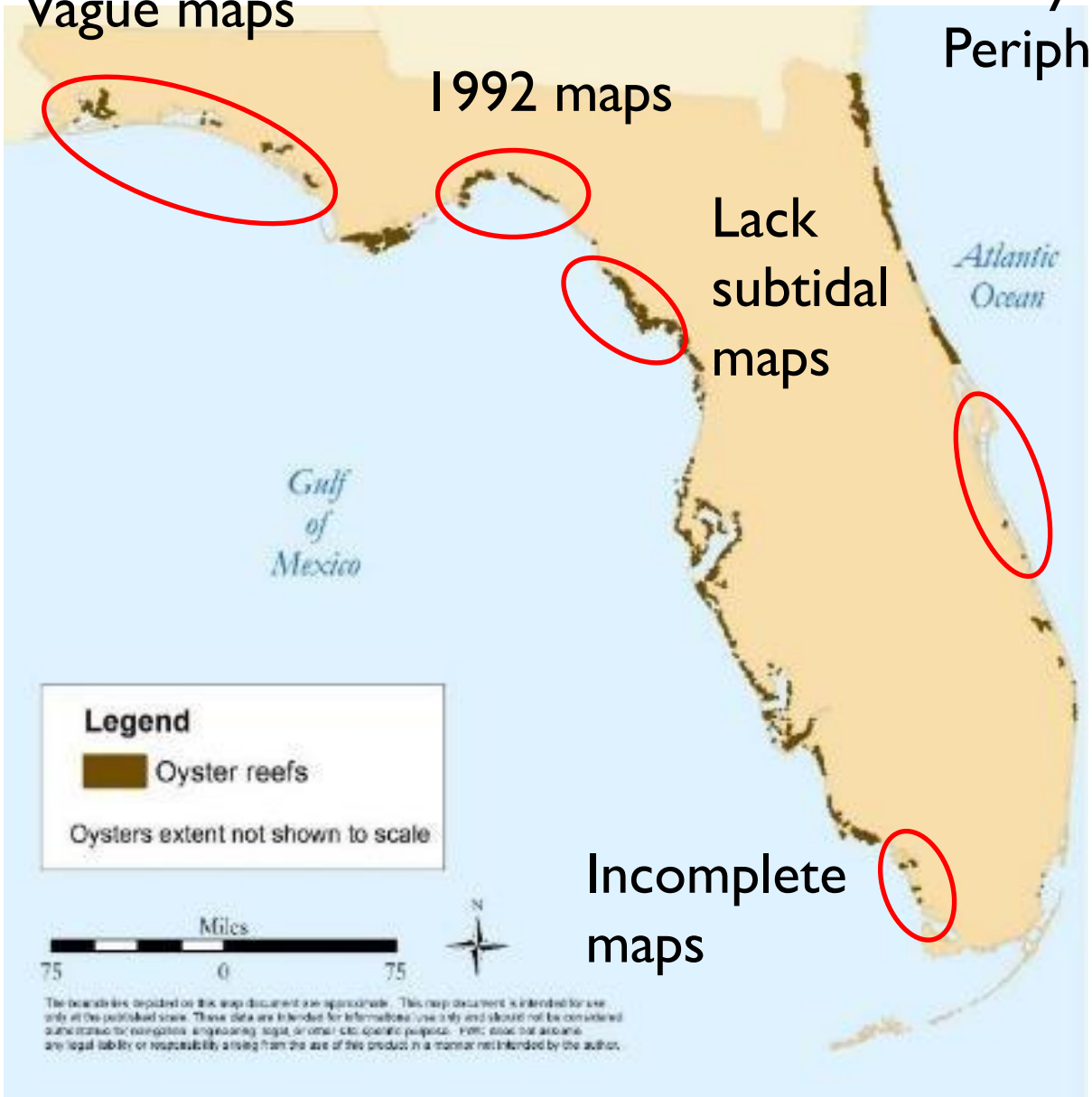
1992 maps

Lack subtidal maps

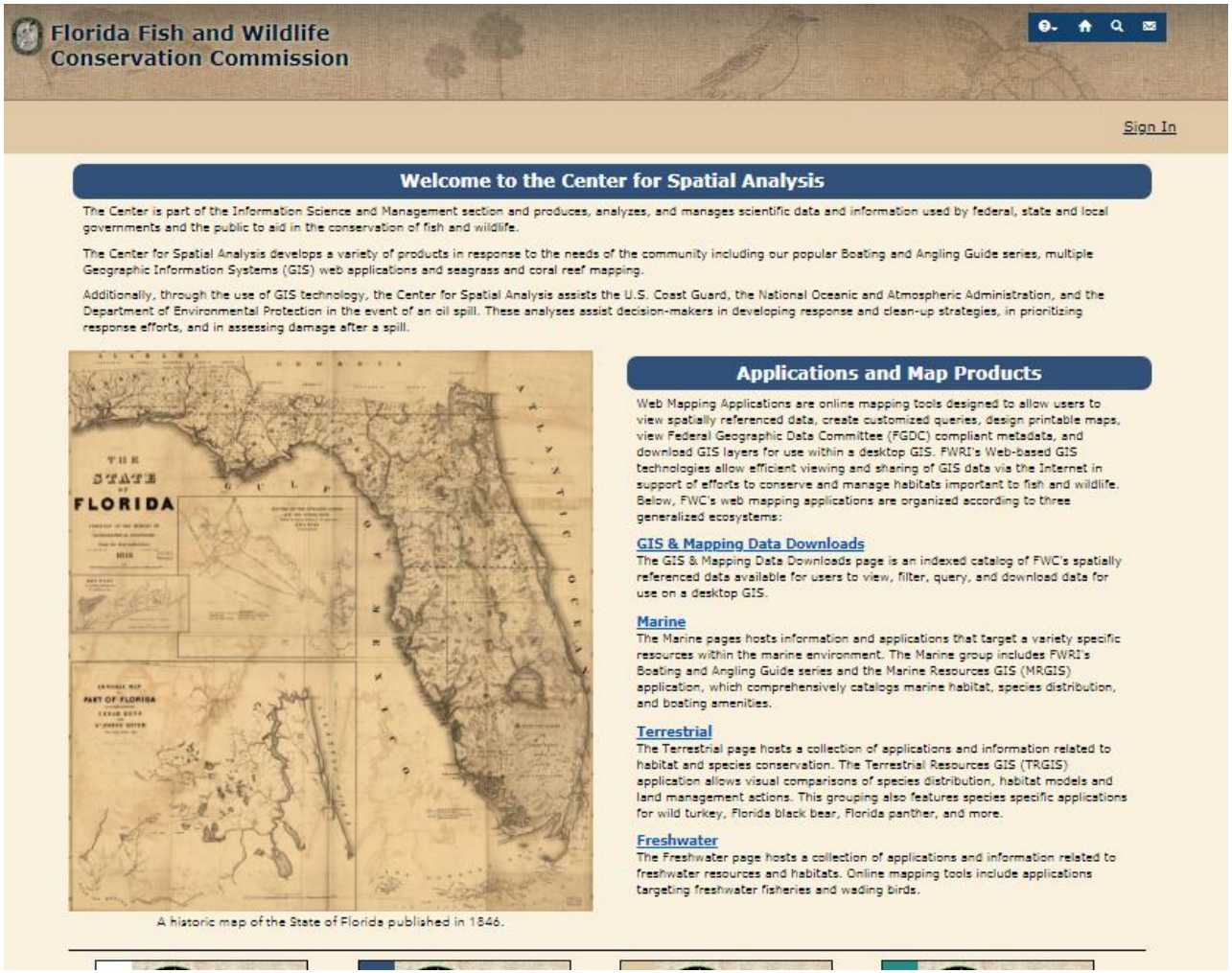
Everywhere: Peripheral oysters

Incomplete maps

Incomplete maps



FWC GIS Data



http://geodata.myfwc.com/

FWC GIS Data

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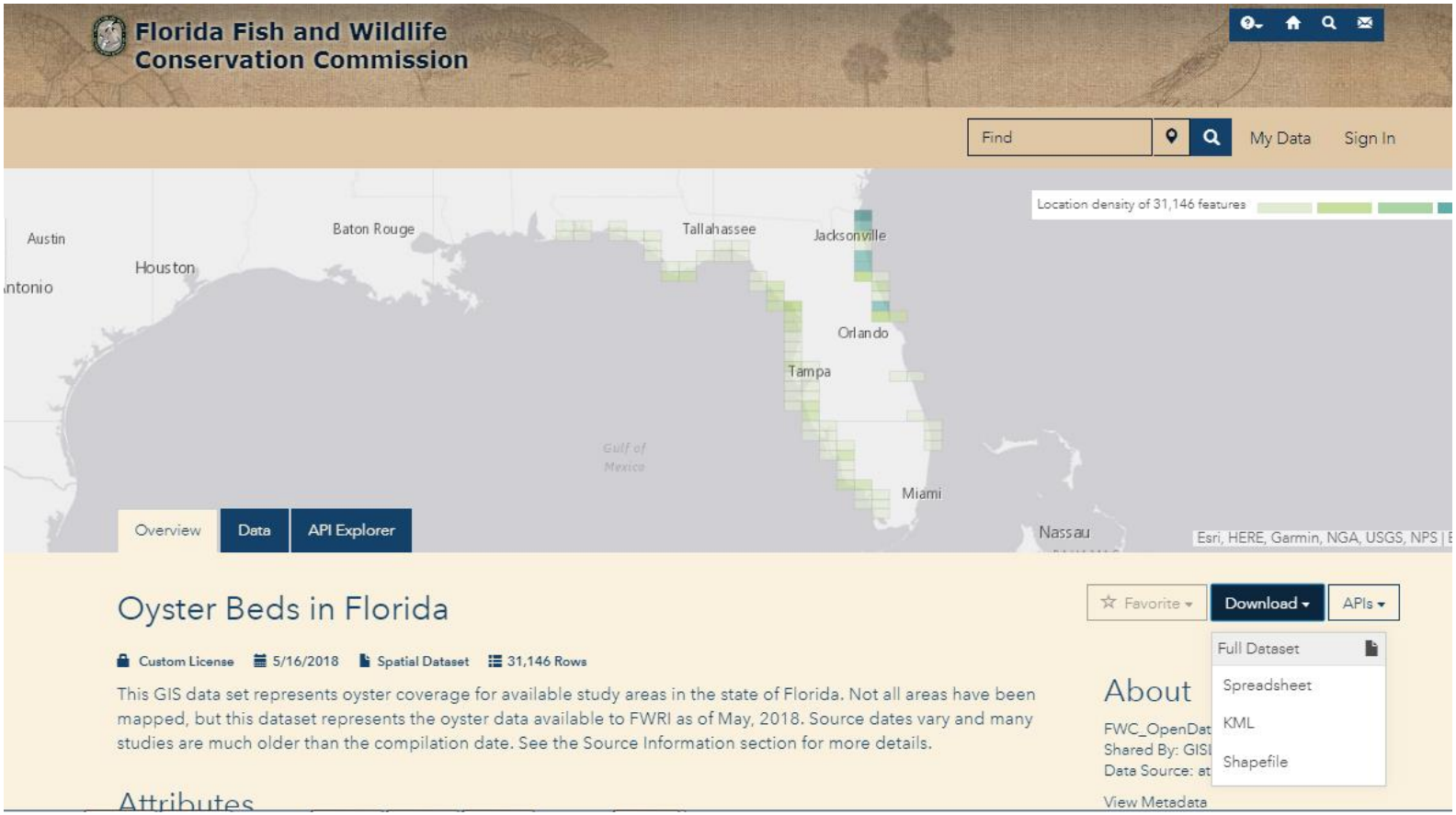

http://geodata.myfwc.com/

Resource links

- FWC GIS Downloads and Map Products: http://geodata.myfwc.com/
- FWC GIS Email: GISLibrarian@MyFWC.com

Mapping Gaps

Vague maps

1992 maps

Lack subtidal maps

Everywhere: Peripheral oysters

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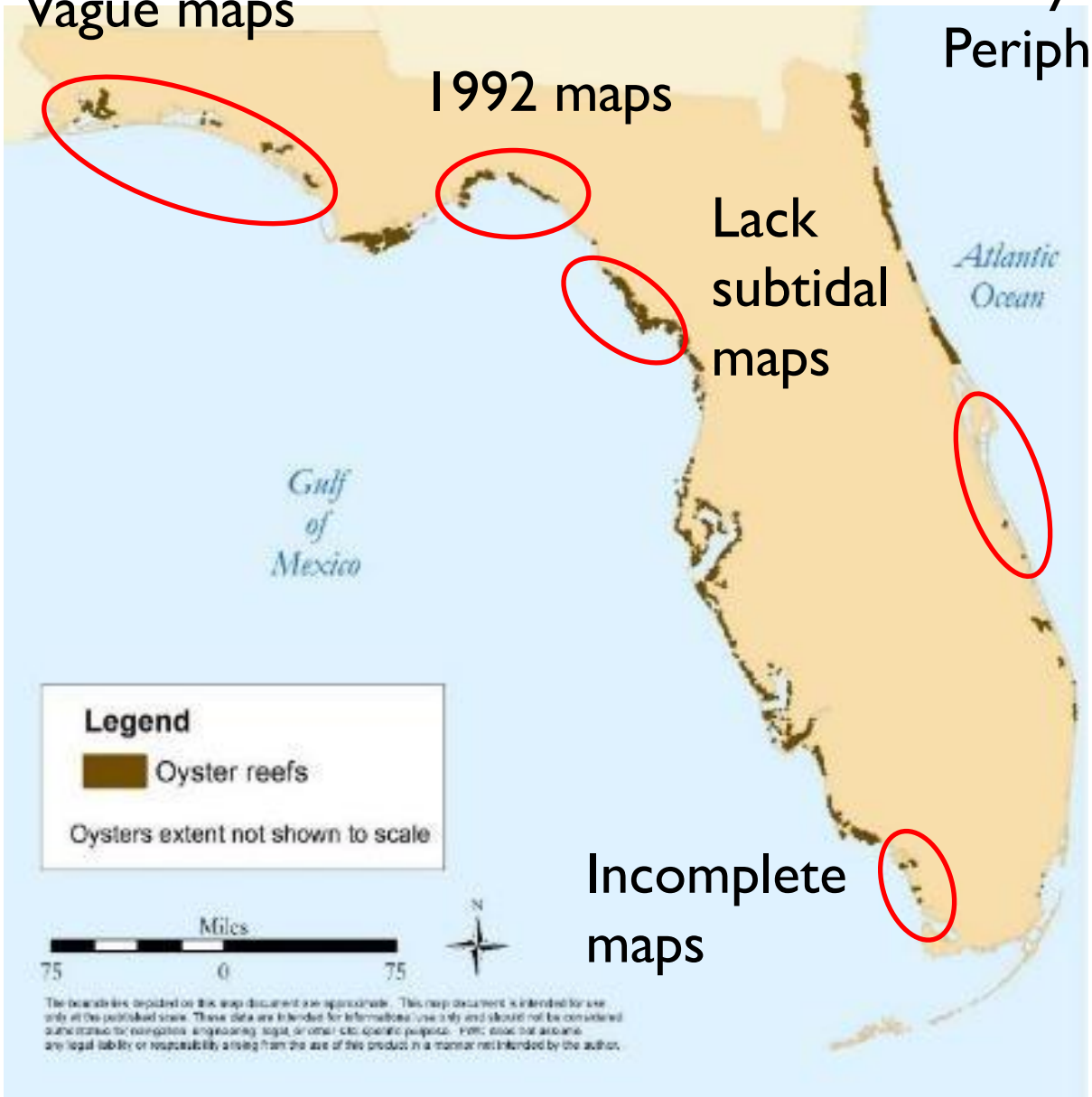


Monitoring Gaps

- Monitoring efforts highly localized
  - Limited comparison among bays
    - (but note Parker et al. 2013 Journal of Shellfish Research 32:695–708)
  - Not all bays monitored
  - Need standardized, long-term monitoring
- Need data hub
  - FDEP's SEACAR program
  - https://floridadep.gov/fco/fcmp/content/seacar-goals
- Need transition of data to management
  - Need harvest management plan

Major Threats

- Altered hydrology
  - Salinity (predation, disease, mortality)
- Loss of substrate
  - Dredging, sedimentation, harvest
  - Shoreline construction
- Climate change & sea-level rise
- Metapopulations

Pilot monitoring study

- Comparison of monitoring methods used by FWC and Northern Coastal Basin group (Walters et al. 2016)

Effort to fill mapping gaps

- Collaboration with UF to map subtidal oysters in Suwannee River sound

Online Resources

- SIMM/CHIMMP/OIMMP websites
- FWC oyster compilation shapefile
- FDACS Shellfish harvesting areas shapefiles
- Oyster harvesting data
- Oyster restoration workgroup
- Oyster fisheries data
- Historical habitat data

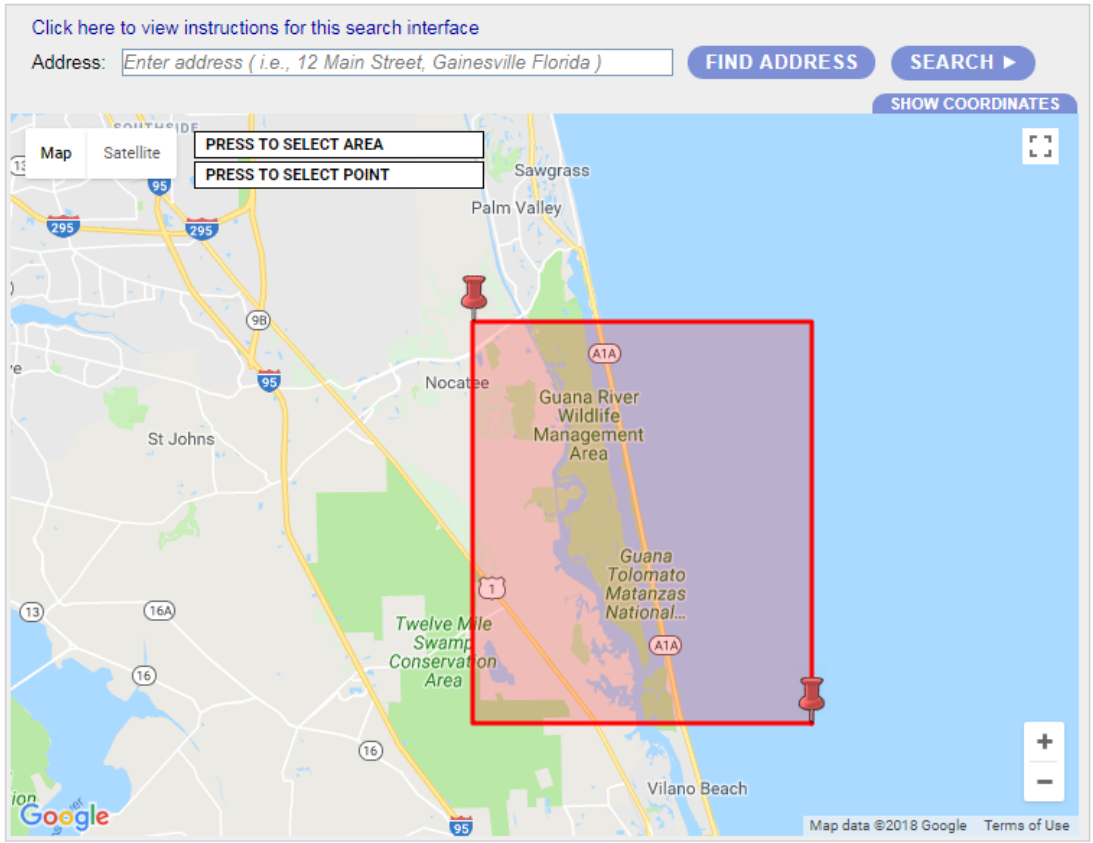
Online Resources

- Oyster restoration workgroup
- http://www.oyster-restoration.org

Online Resources

- Historical habitat data
- University of Florida Aerial Photo Library

http://ufdc.ufl.edu/aerials



Online Resources

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http://ufdc.ufl.edu/aerials

Aerial photographs of Flagler County - Flight 10 (1952)

Publication Date:	1952
Creator:	U.S. Department of Agriculture
Publisher:	U.S. Department of Agriculture
Format:	Flight of aerial photography
Source Institution:	University of Florida

Aerial photographs of St. Johns County - Flight 4C (1942)

Publication Date:	1942
Creator:	U.S. Department of Agriculture
Publisher:	U.S. Department of Agriculture
Format:	Flight of aerial photography
Source Institution:	University of Florida

Online Resources

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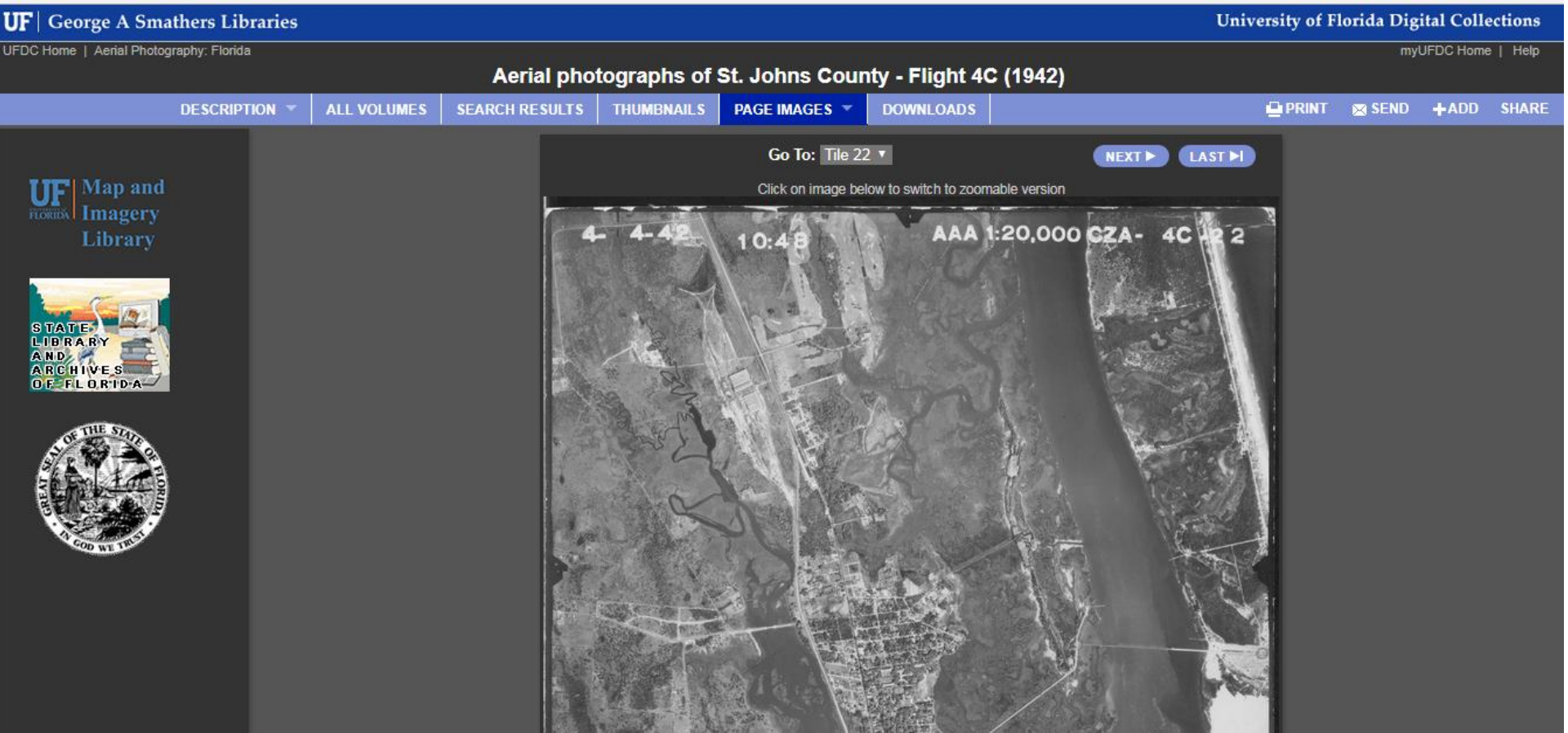
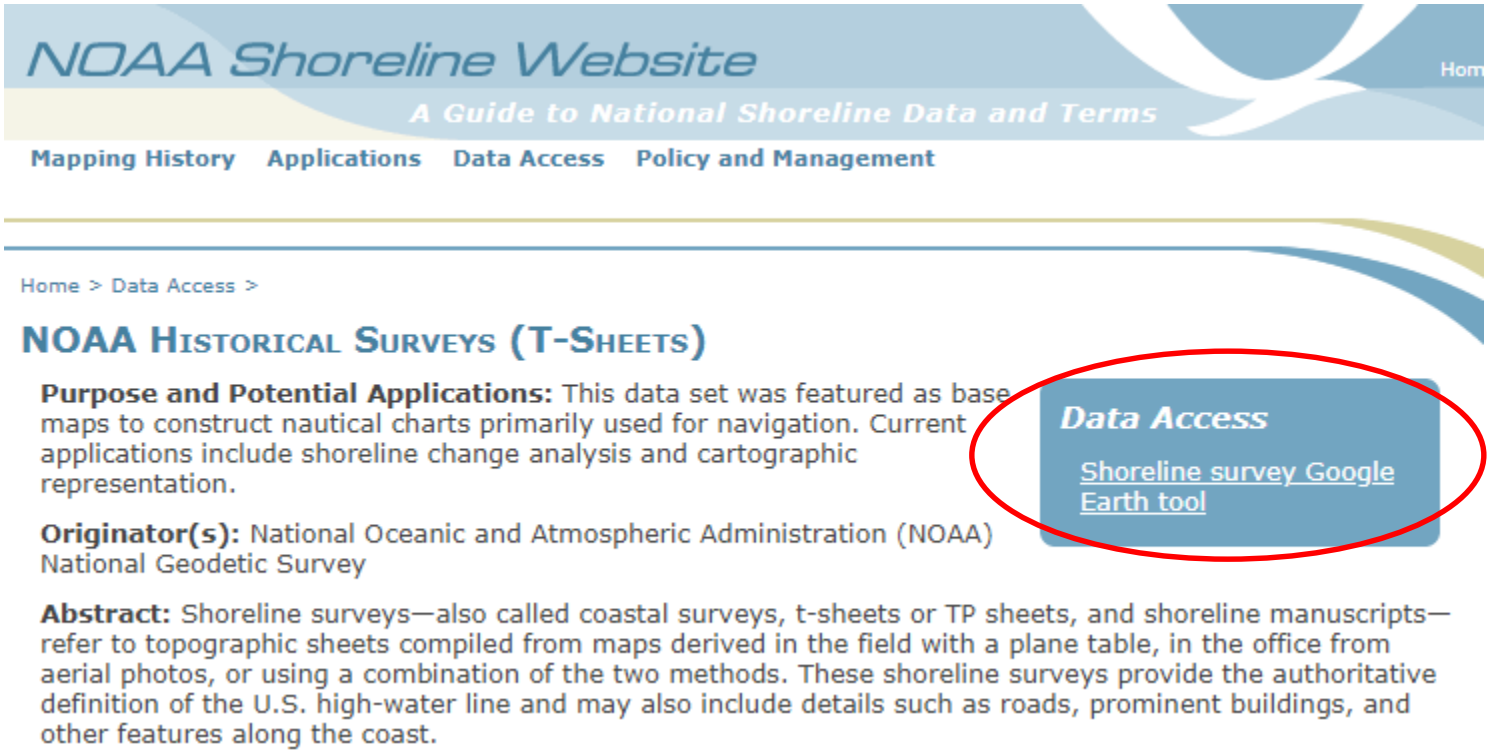


Online Resources

- Historic habitat data
- NOAA topographic surveys (T-sheets)
- https://shoreline.noaa.gov/data/datasheets/t-sheets.html



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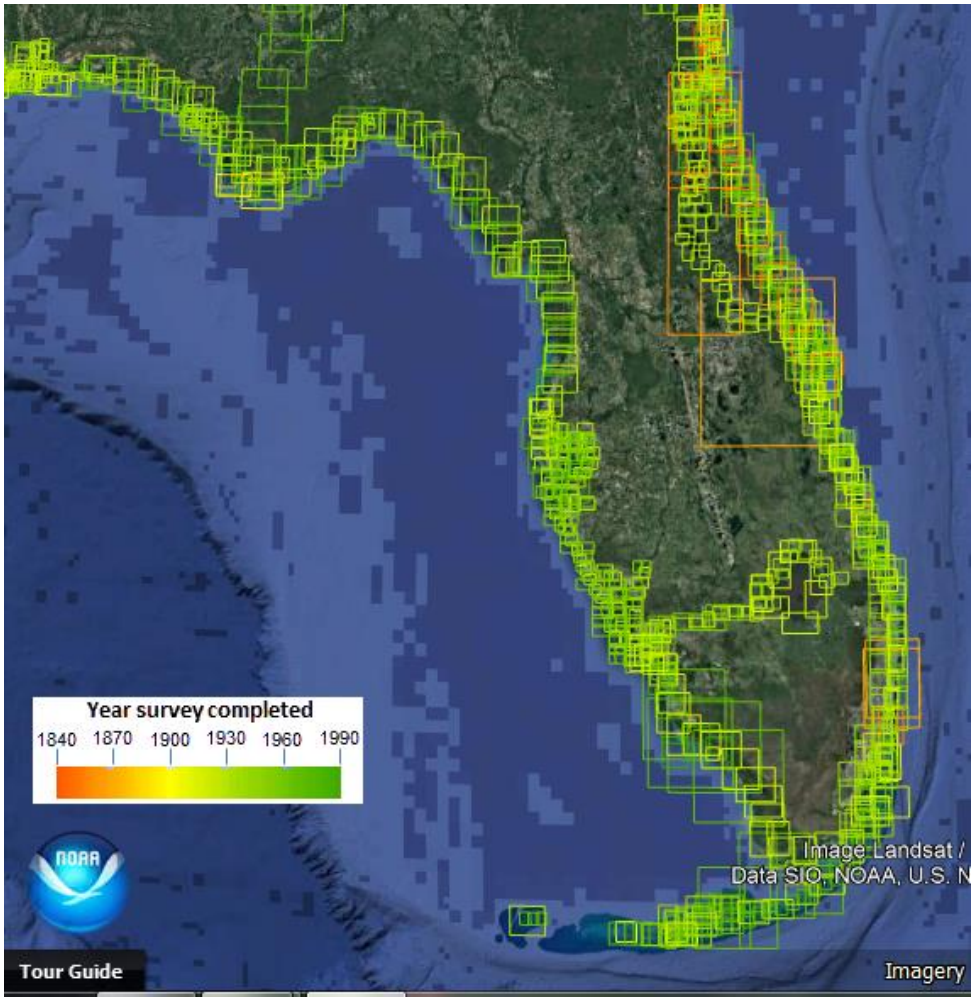

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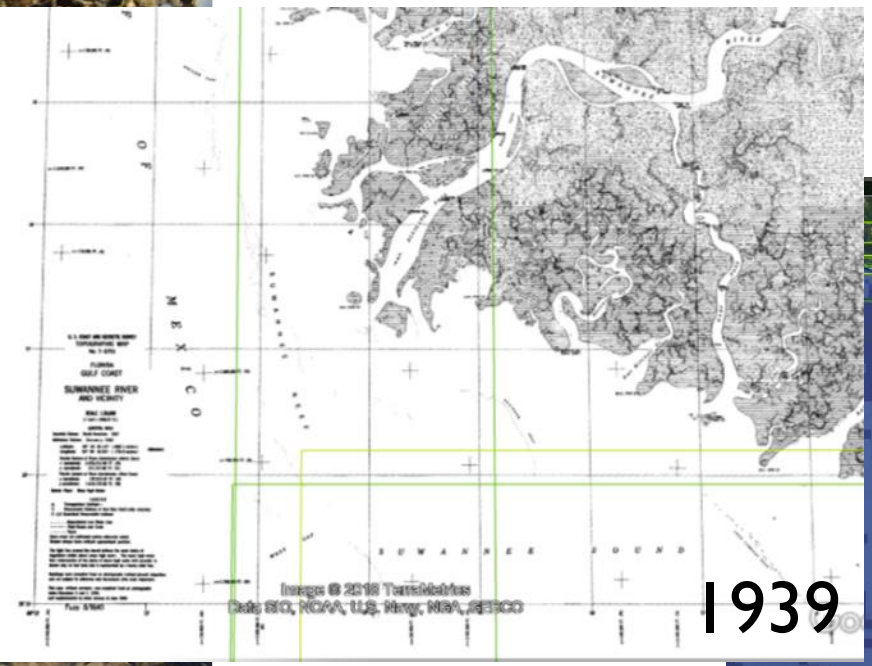
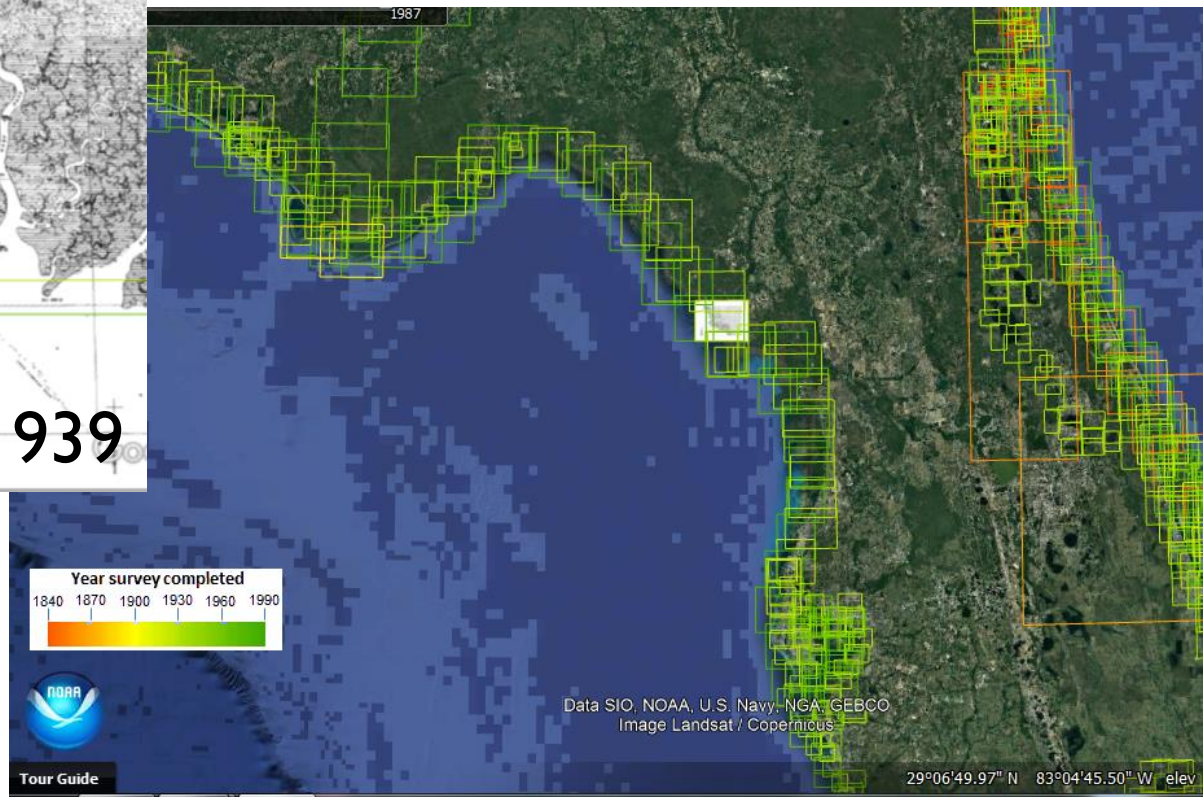
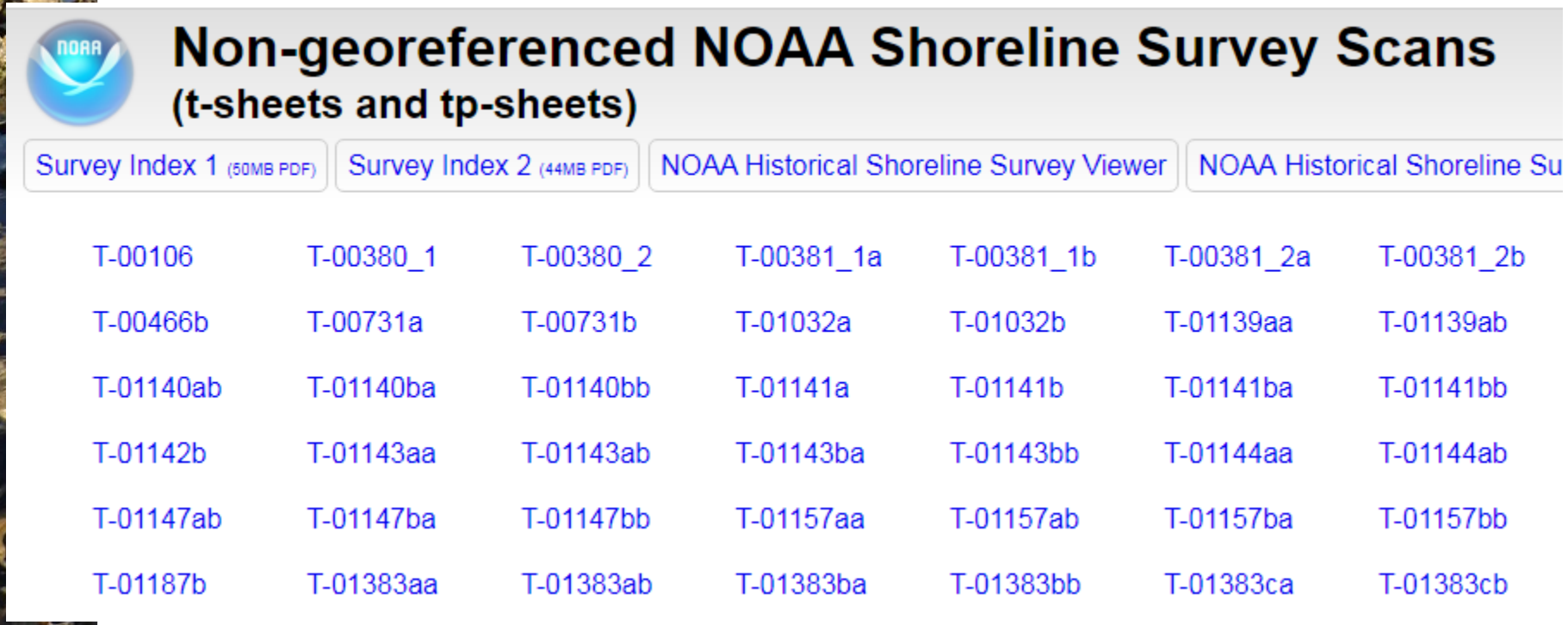




Online Resources

- Historic habitat data
- NOAA topographic surveys (T-sheets)
  - Not all georeferenced (especially older T-sheets from 1800s)



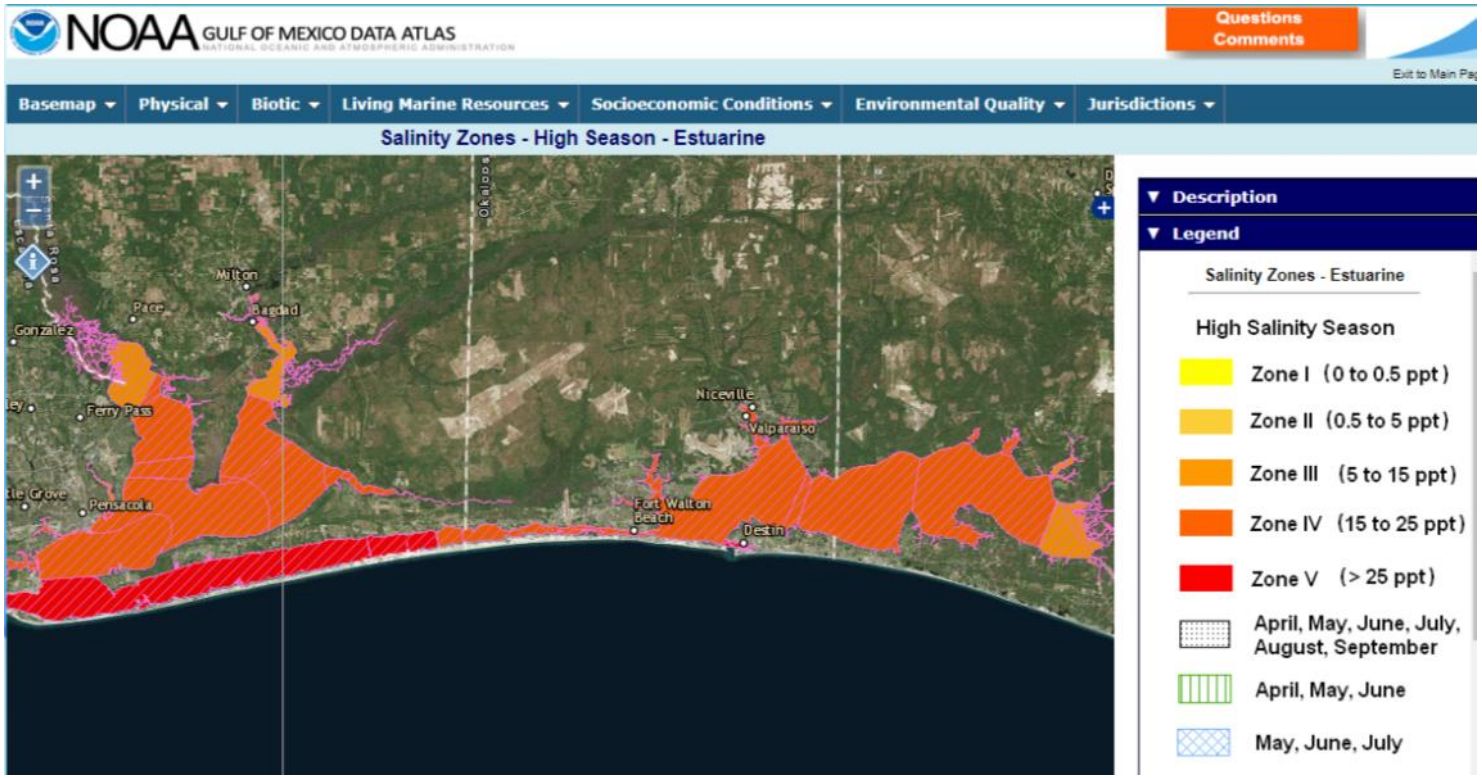
Non-georeferenced NOAA Shoreline Survey Scans
(t-sheets and tp-sheets)

Survey Index 1 (50MB PDF) | Survey Index 2 (44MB PDF) | NOAA Historical Shoreline Survey Viewer | NOAA Historical Shoreline Su

T-00106	T-00380_1	T-00380_2	T-00381_1a	T-00381_1b	T-00381_2a	T-00381_2b
T-00466b	T-00731a	T-00731b	T-01032a	T-01032b	T-01139aa	T-01139ab
T-01140ab	T-01140ba	T-01140bb	T-01141a	T-01141b	T-01141ba	T-01141bb
T-01142b	T-01143aa	T-01143ab	T-01143ba	T-01143bb	T-01144aa	T-01144ab
T-01147ab	T-01147ba	T-01147bb	T-01157aa	T-01157ab	T-01157ba	T-01157bb
T-01187b	T-01383aa	T-01383ab	T-01383ba	T-01383bb	T-01383ca	T-01383cb

Online Resources

- Salinity model for bays along the Gulf of Mexico
- https://www.ncddc.noaa.gov/website/DataAtlas/atlas.htm?plate=Salinity%20-%20Zones



Monitoring resources

http://ocean.floridamarine.org/OIMMP/

Name	Association	Focus	Reference
Design and monitoring of shellfish restoration projects	The Nature Conservancy	Instructional guide for bivalve restoration projects and monitoring	Brumbaugh et al. 2006
Oyster habitat restoration monitoring and assessment handbook	NOAA, TNC, University of South Alabama, Florida Atlantic University	Instructional guide for monitoring and characterization of oyster restoration sites	Baggett et al. 2014
Science-based restoration monitoring of coastal habitats	NOAA	Volume 1: A framework for monitoring plans under the estuaries and clean waters act of 2000; Volume 2: Tools for monitoring coastal habitats	Thayer et al. 2003, Thayer et al. 2005
Best management practices for shellfish restoration	Interstate Shellfish Sanitation Conference, TNC, NOAA	Methods for shellfish restoration including community outreach and harvesting concerns	Leonard and Macfarlane 2011
Restoration goals, quantitative metrics and assessment protocols for evaluating success on restored oyster reef sanctuaries	Chesapeake Bay Program	Monitoring protocols and success metrics for restored oyster reefs	Oyster Metrics Workgroup 2011
Effective monitoring to evaluate ecological restoration in the Gulf of Mexico	National Research Council	General and specific guidelines for monitoring numerous restored habitats, including oyster reefs	NRC 2017
Oyster-generated marine habitats: their services, enhancement, restoration, and monitoring.	Florida Atlantic University, University of Rhode Island	TBD, in press	Coen and Humphries, in press
Oyster Condition Assessment Protocol	UCF, SJRWMD, GTMNERR, NE Florida Aquatic Preserves	Instructional guide for standardized oyster reef monitoring	Walters et al. 2016

Questions or comments?