Oyster Integrated Mapping and Monitoring Program (OIMMP) Workshop

Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

October 9-10 2019

Kara Radabaugh, Steve Geiger,

Ryan Moyer, Christi Santi

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)

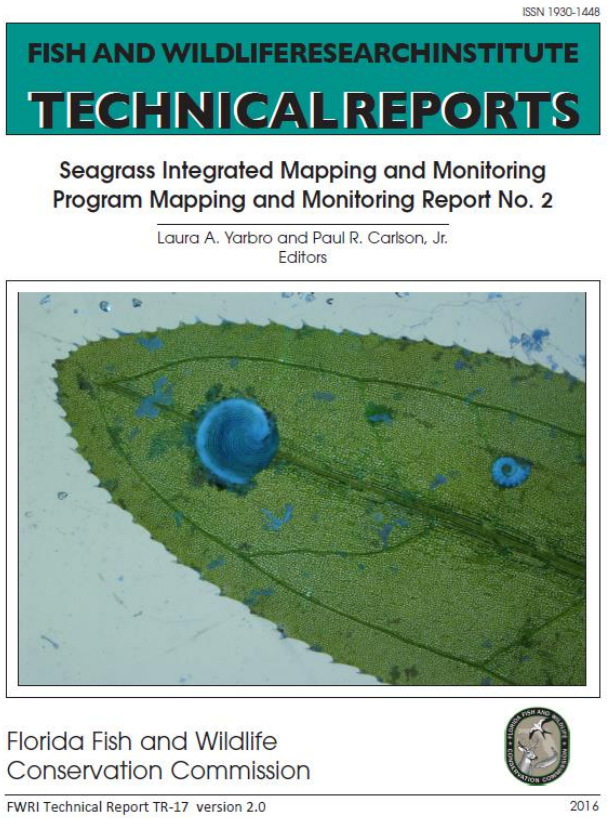
Steve Geiger, Ph.D. (Co-PI)

Christi Santi (GIS specialist)

- Many statewide collaborators!
- Workshop attendee introductions

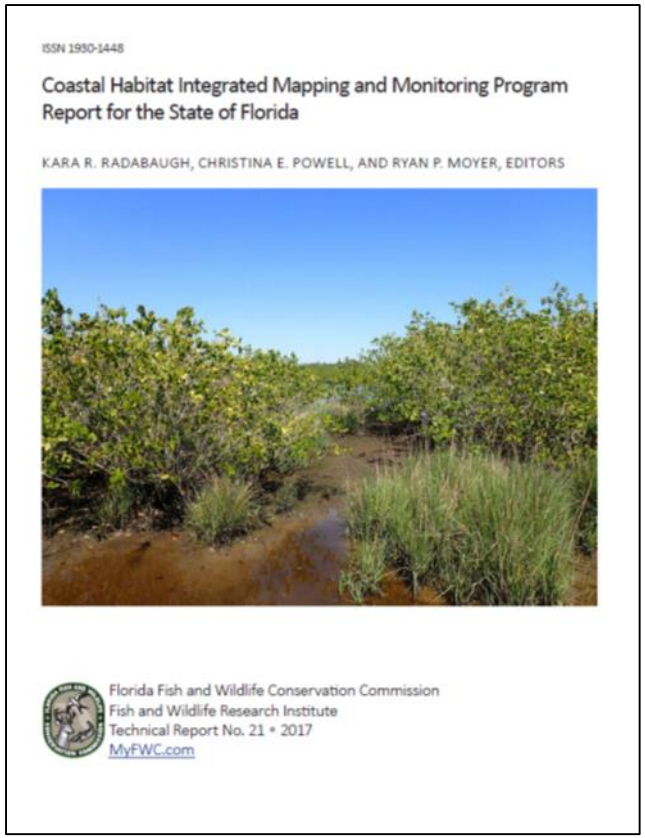
IMMP Origins: SIMM

- Seagrass Integrated Mapping and Monitoring (SIMM) program
- SIMM report: https://myfwc.com/research/habitat/seagrasses/projects/active/simm/



IMMP Origins: CHIMMP

- Coastal Habitat Integrated Mapping and Monitoring Program (CHIMMP)
- CHIMMP report published in 2017
  https://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 https://ocean.floridamarine.org/CHIMMP/
- Recently funded (2019-2020) for small-scale report updates
- CHIMMP workshop to be held in Spring 2020

Florida Fish and Wildlife Conservation Commission

Site Search

Home > FWC Fish and Wildlife Research Institute > Habitat > Coastal Wetlands > Coastal Habitat Projects > Coastal Habitat Integrated Mapping and Monitoring Program (CHIMMP)

Coastal Habitat Integrated Mapping and Monitoring Program (CHIMMP)

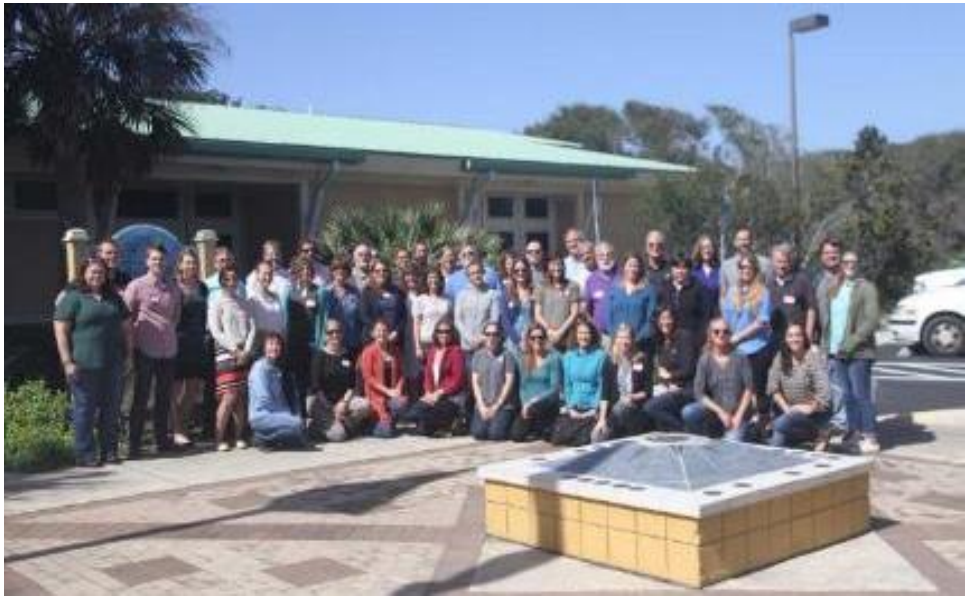
Salt marshes and mangroves provide valuable ecosystem services to coastal communities in Florida. Coastal wetlands stabilize shorelines, filter surface water runoff, sequester large amounts of organic carbon, and provide important fisheries habitat. However, the statewide extent of coastal wetlands is shifting. Future sea-level rise is expected to cause fragmentation of salt marshes and loss of acreage where hardened shorelines, coastal development, and other obstacles prevent the landward migration of salt marsh vegetation. Mangrove distribution is also changing and mangrove forests are encroaching into marsh habitats in response to climate change and sea-level rise. Thus, a coordinated statewide mapping and monitoring program was deemed necessary to better

OIMMP Goals

- **Inventory existing mapping and monitoring programs in FL**
  - Create publicly available mapping layer and collaborative statewide report
- **Bring together representatives from mapping and monitoring programs across the state and region**
  - 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**

Past OIMMP Workshops

- Workshops I (2017) and II (2018) held at GTMNERR
- Past workshop presentations available on OIMMP website https://ocean.floridamarine.org/OIMMP/



OIMMP Workshop III Agenda

- **Day 1** (Wednesday 9 October)
  - OIMMP updates and publications
  - Available Resources and Needs
  - Attendee presentations
  - Social event at Hollander Hotel 6 - 8 pm

- **Day 2** (Thursday 10 October)
  - Continuation of attendee presentations
  - Breakout Discussion
  - Conference Wrap Up

OIMMP Report Published!

https://myfwc.com/research/habitat/coastal-wetlands/projects/oimmp/

OIMMP Coauthors and Contributors

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Stephen Geiger	FWC	Caitlin Snyder	ANERR
Ray Grizzle	UNH	Mark Thompson	SCCF
Gregory Herbert	USF	Linda Walters	UCF
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Stephen Hesterberg	USF	Estelle Wilson	NOAA

FWRI Technical Report Process

- Writing & review process
  - Create maps and charts (Christi Santi & Kara Radabaugh)
  - Write draft (Kara Radabaugh & coauthors)
  - OIMMP editor revisions (Kara Radabaugh, Ryan Moyer, Steve Geiger)
  - Technical review & revisions (Bill Arnold, Amber Whittle)
  - Copy editing review & revisions (Bland Crowder)
  - Formatting (Bland Crowder)

OIMMP Regions

OIMMP report chapter contents

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

Oyster Beds in Florida Map

Statewide oyster map available for download at http://geodata.myfwc.com/datasets/oyster-beds-in-florida

Statewide Oyster Mapping and FWC GIS Resources

Christi Santi

Florida Fish and Wildlife Conservation Commission

Fish and Wildlife Research Institute

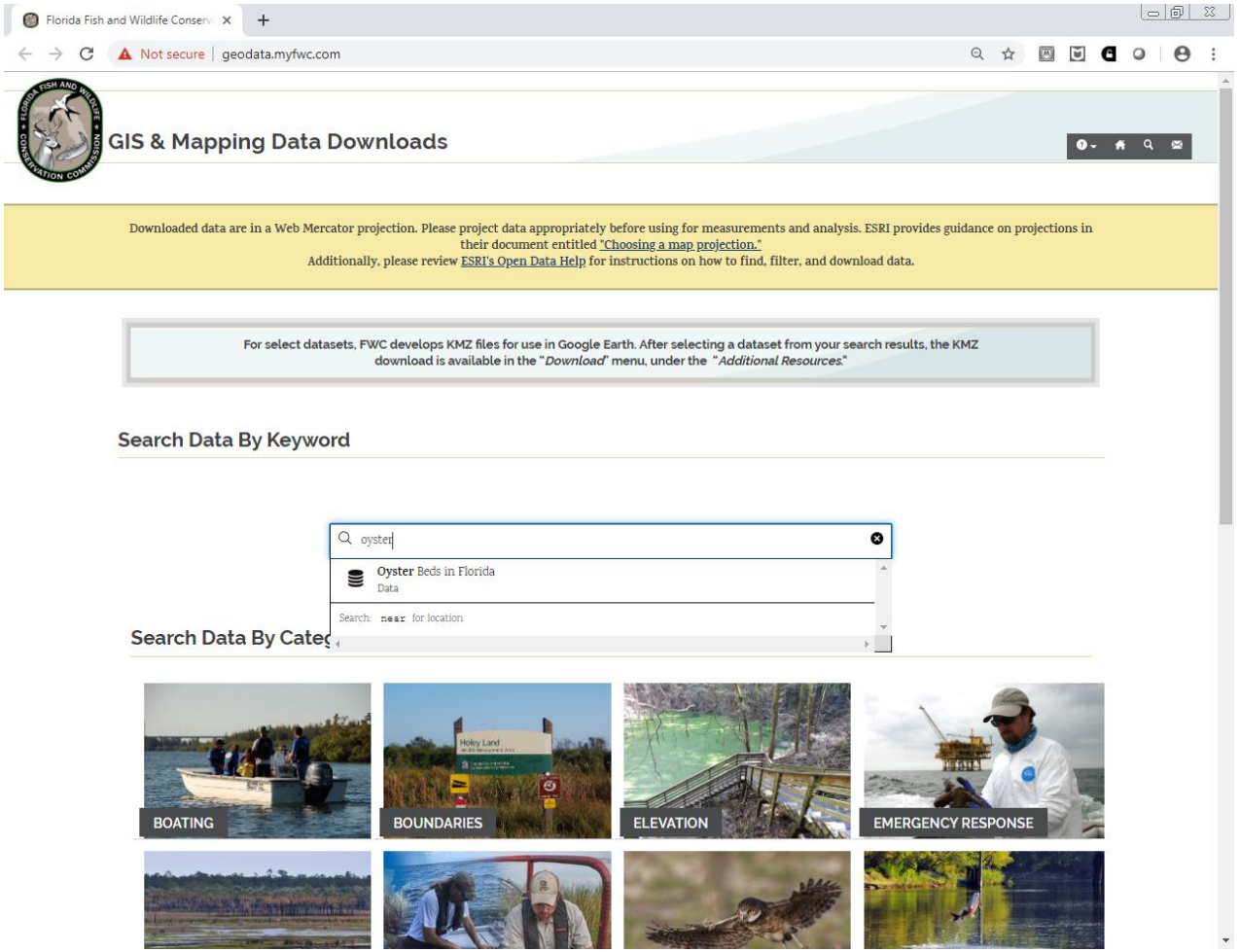
Statewide Oyster Progress

- Now 31 total source datasets.
- 3 areas with additions – Indian River Lagoon, Chokoloskee, West Bay
- Minor revision in Choctawhatchee Bay

Statewide Oyster Progress

Statewide Oyster Progress

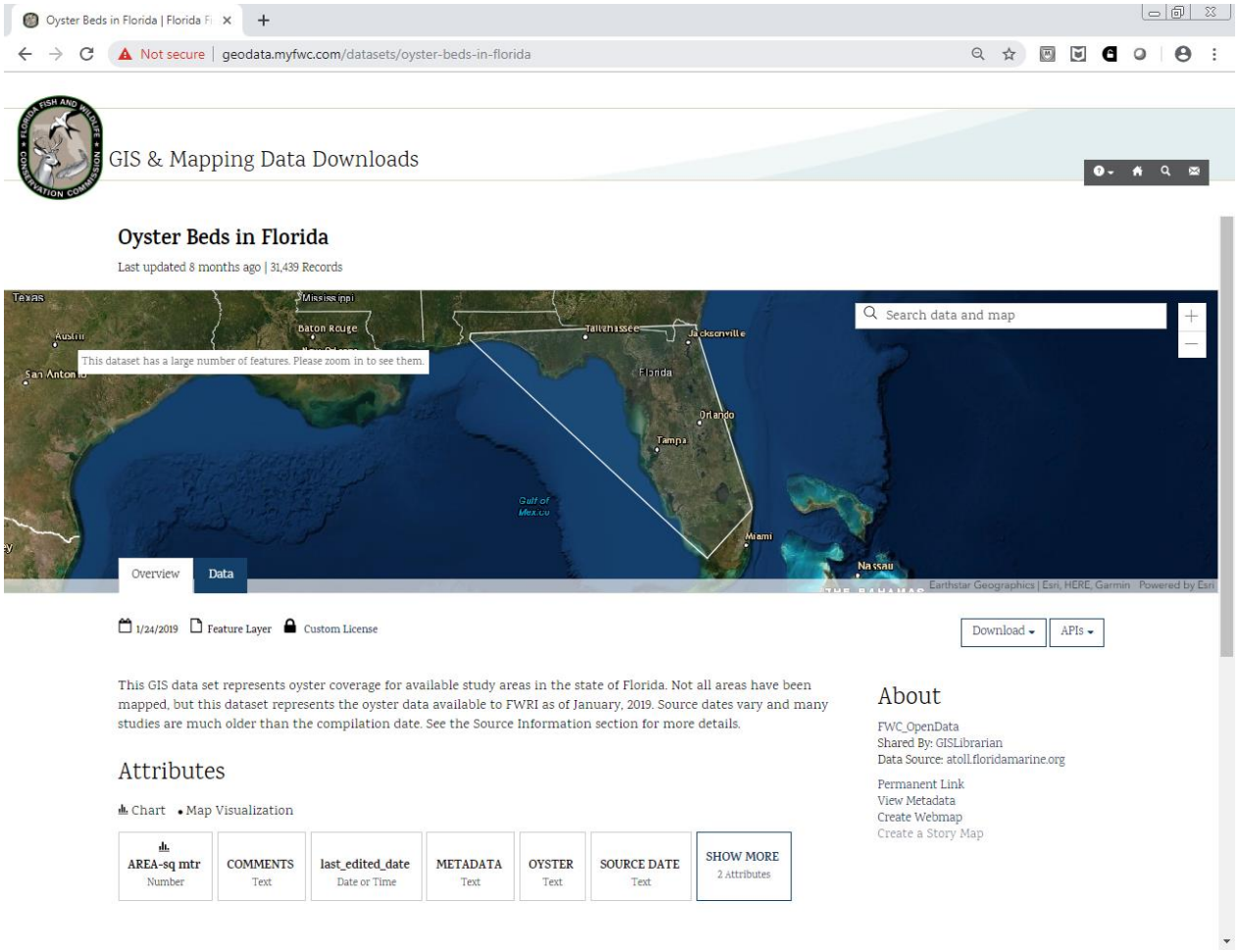
FWC GIS Data



On the FWC geodata website type "Oyster" in the Search Box and select the "Oyster Beds in Florida" link.

http://geodata.myfwc.com/

FWC GIS Data

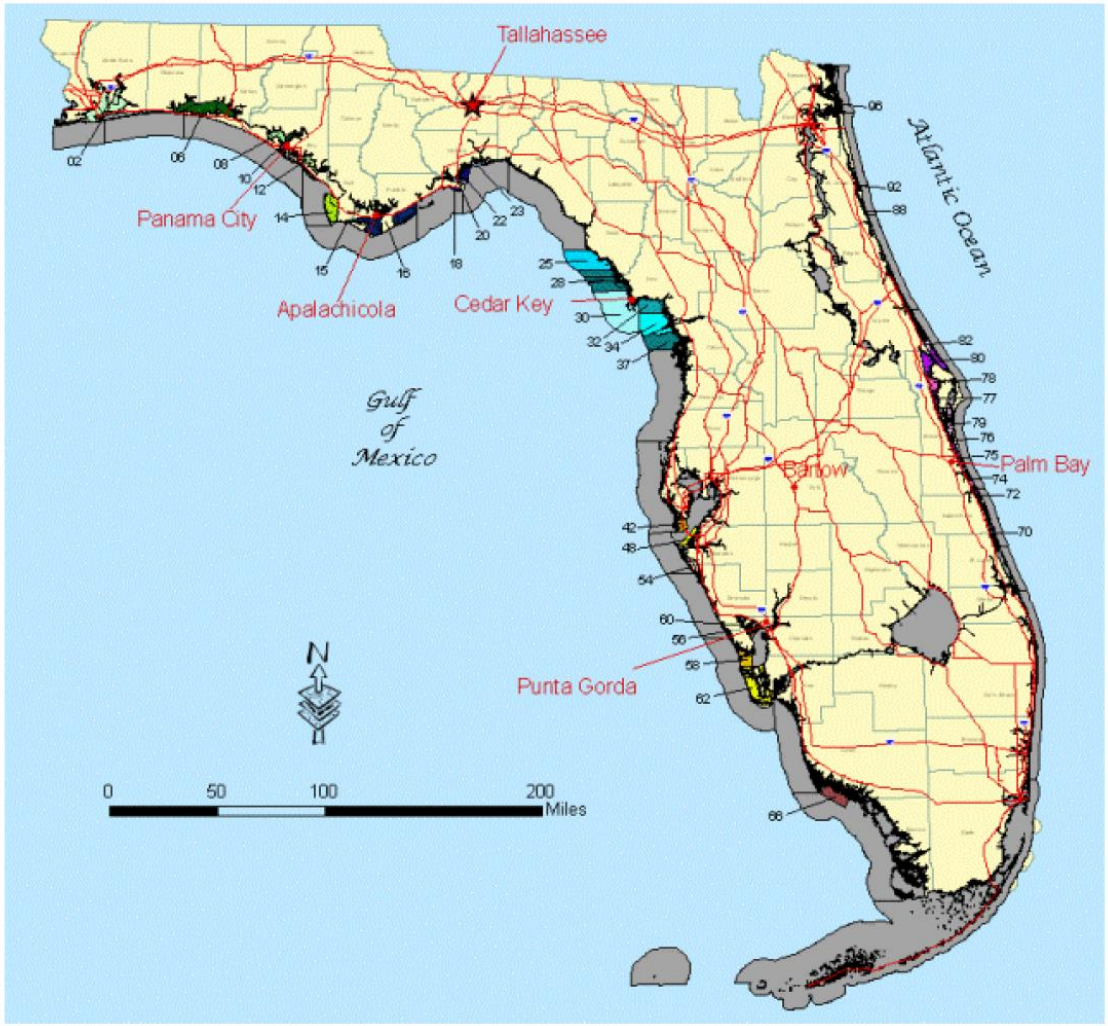


http://geodata.myfwc.com/

Resource links

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

FDACS Shellfish Harvesting Areas



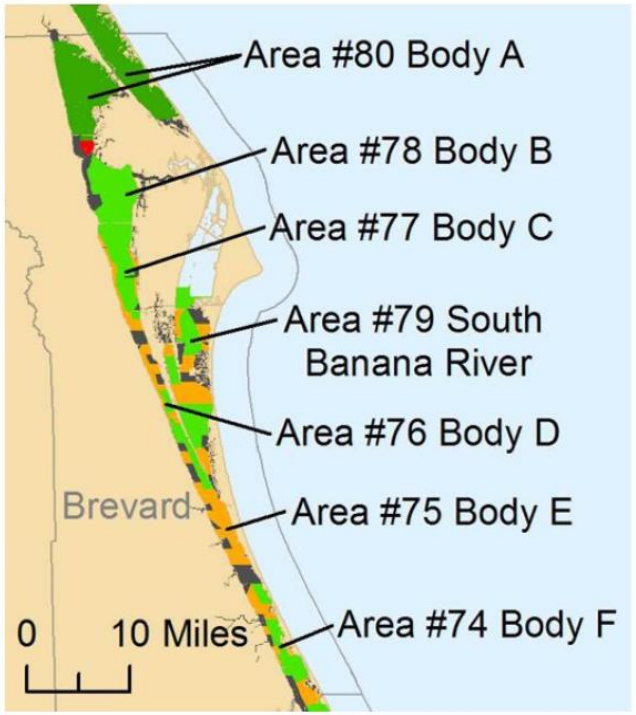
https://www.fdacs.gov/Agriculture-Industry/Aquaculture/Shellfish-Harvesting-Area-Classification/Shellfish-Harvesting-Area-Maps

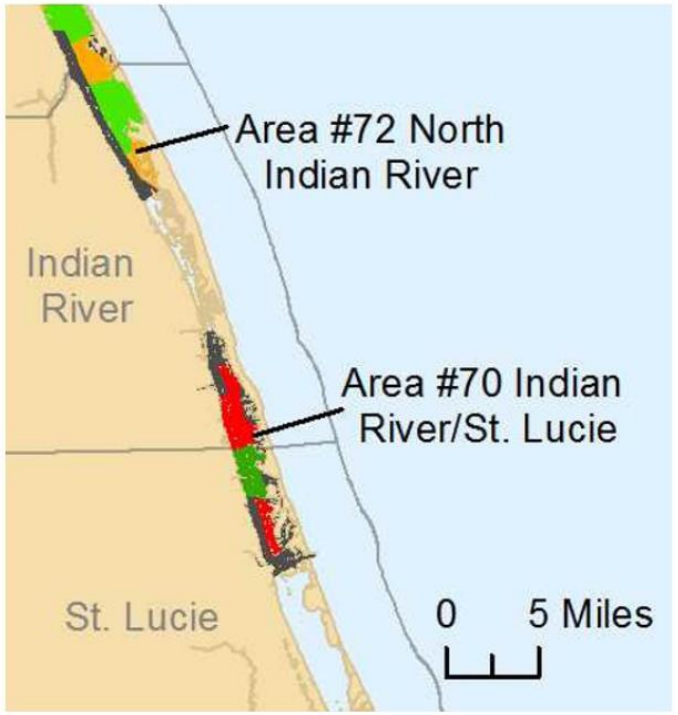
FDACS Shellfish Harvesting Areas

Legend

- Approved
- Conditionally Approved
- Conditionally Restricted
- Restricted
- Prohibited

These data are intended for informational use only and should not be considered authoritative for navigation, engineering, legal, or other site-specific purpose. FWC does not assume any legal liability or responsibility arising from the use of this product in a manner not intended by the author.



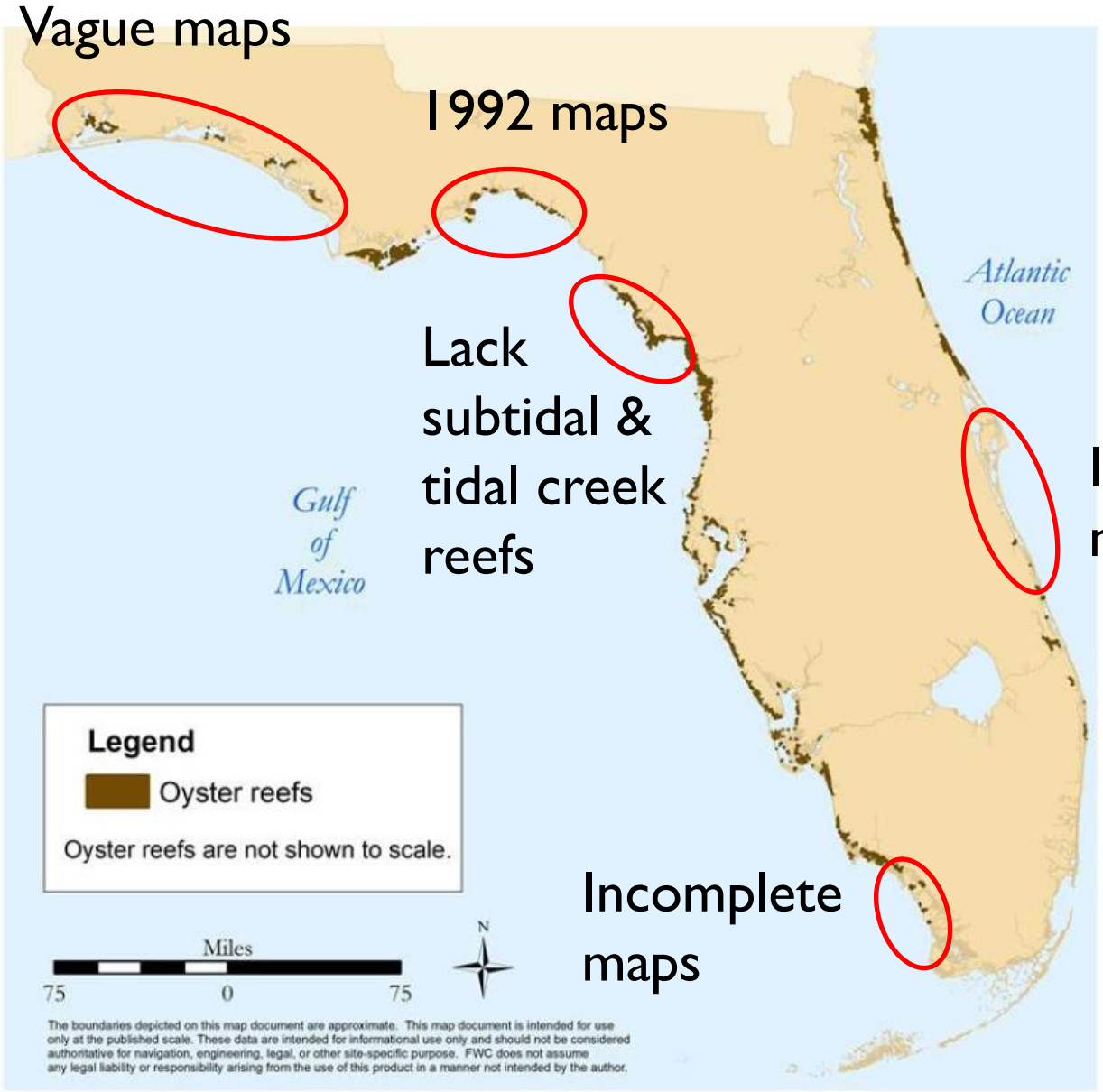


- Maps in each regional chapter
- Shapefiles available for download at https://ocean.floridamarine.org/OIMMP/

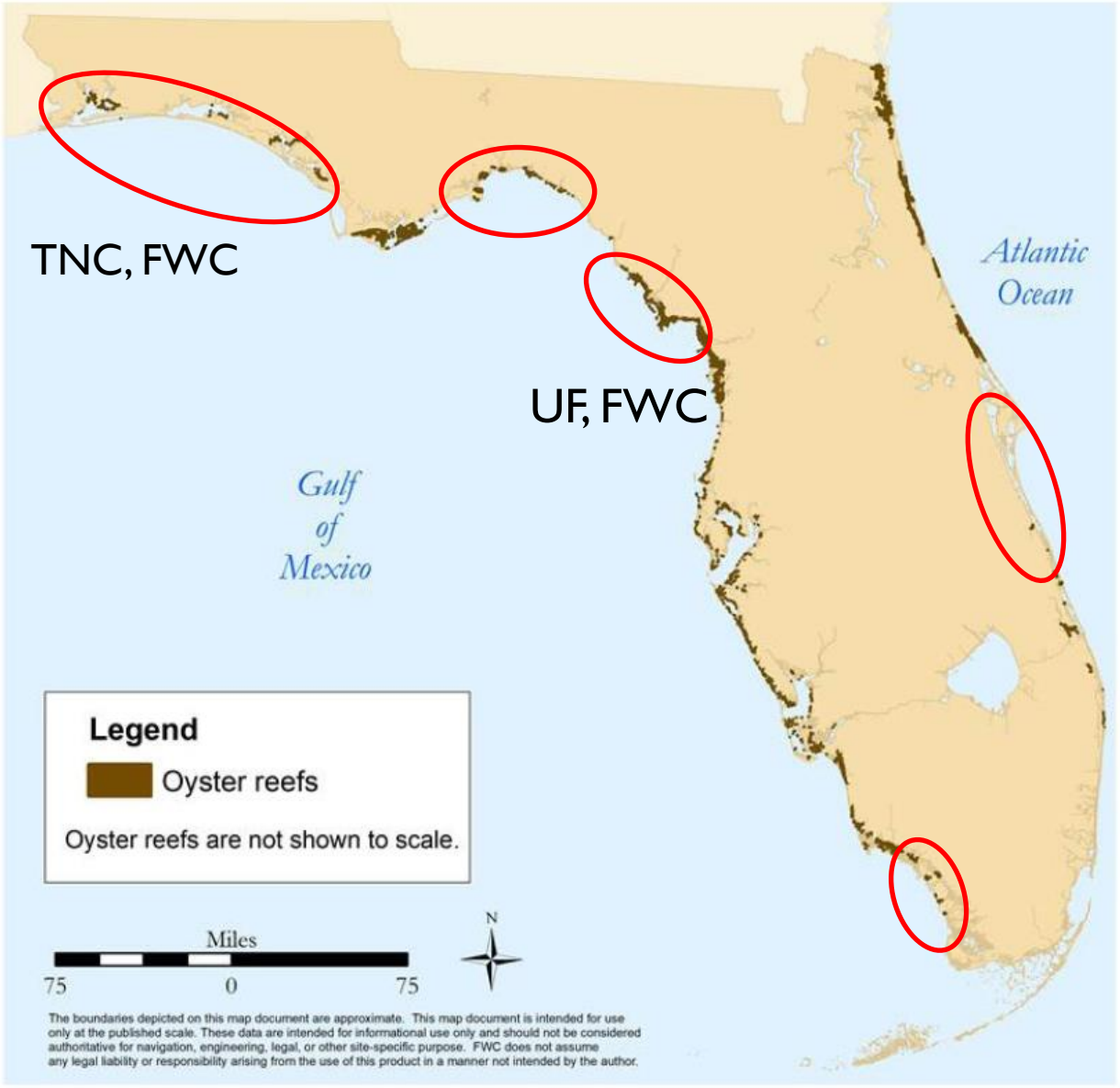
Mapping Needs in Florida

- Fill mapping gaps
- Update old maps
- Map oysters in peripheral habitats
- Complete estimates of historical extent
- Differentiate between live and dead sections of reefs

Florida Mapping Gaps - 2018 Workshop



Filling Florida Mapping Gaps



Mapping Peripheral Oyster Habitats

- Include oysters on mangrove roots, under vegetation, seawalls, pilings, etc.
- Difficult to see in aerial imagery
- In some cases, only type of oyster aggregations present (e.g. SE FL)

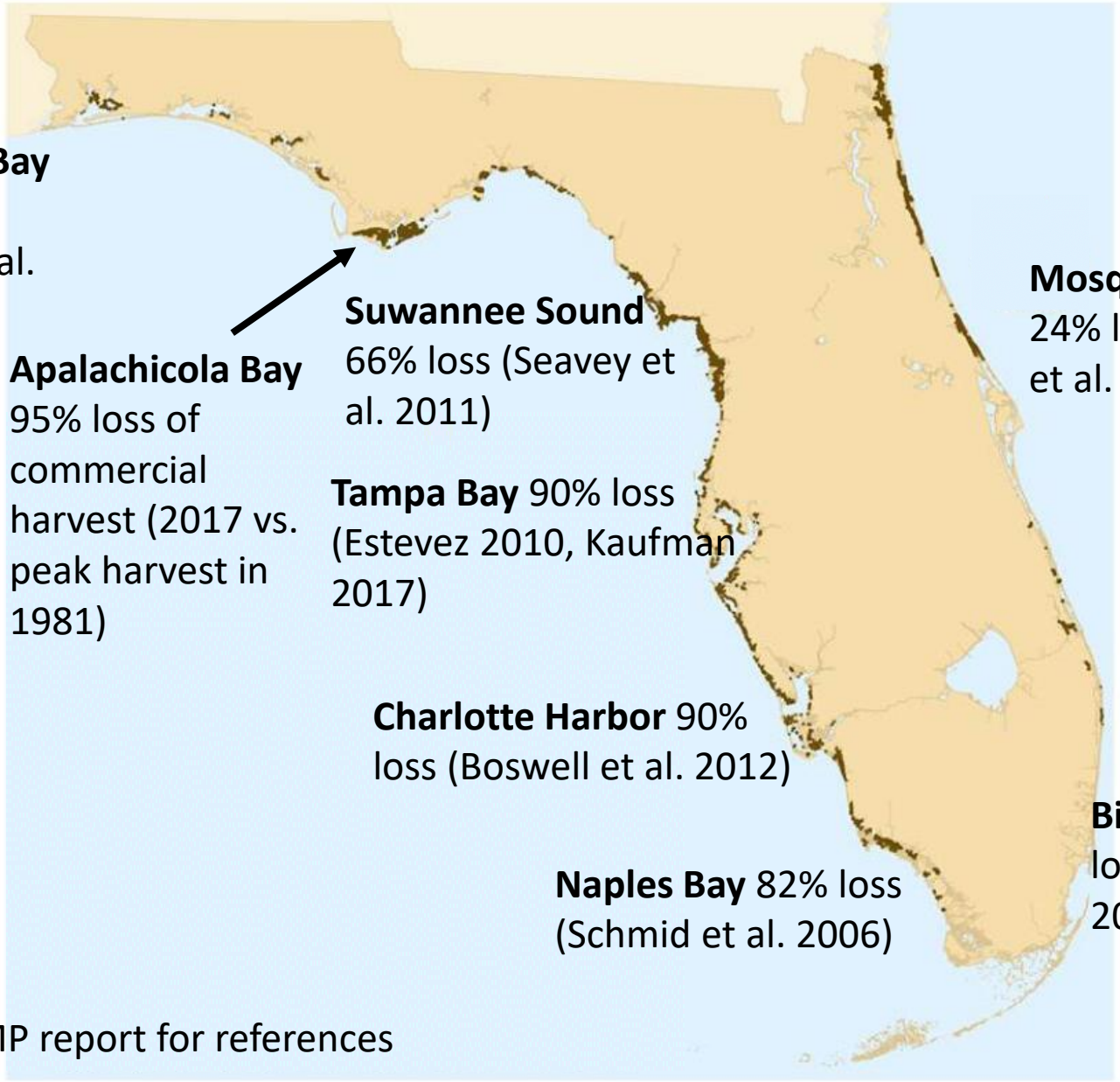
Mapping Peripheral Oyster Habitats

- Sarasota County best example of mapping peripheral oyster habitats

Habitat Characterization Codes	
Habitat	**Code**
Oyster Clumps/Reef	CR
Mangrove Apron	MA
Mangrove Root Oys.	MRO
Seawall	SW
Rip Rap	RR

Figure from Meaux et al. 2016
Methods manual available from https://sarasota.wateratlas.usf.edu/oysters/

Historical losses of oyster reef



Pensacola Bay 72% loss (Schmid et al. 2006)

Apalachicola Bay 95% loss of commercial harvest (2017 vs. peak harvest in 1981)

Suwannee Sound 66% loss (Seavey et al. 2011)

Tampa Bay 90% loss (Estevez 2010, Kaufman 2017)

Charlotte Harbor 90% loss (Boswell et al. 2012)

Naples Bay 82% loss (Schmid et al. 2006)

Mosquito Lagoon 24% loss (Garvis et al. 2015)

Biscayne Bay 100% loss (Meeder et al. 2001)

See OIMMP report for references

Map Reef Quality

- Map dead margins or unconsolidated reefs to track reef migration or change in quality
- Oyster reefs shifting away from boat wakes in Intracoastal Waterway (Grizzle et al. 2002; Wall et al. 2005)

Mosquito Lagoon reef with dead margin. Photo credit: Linda Walters

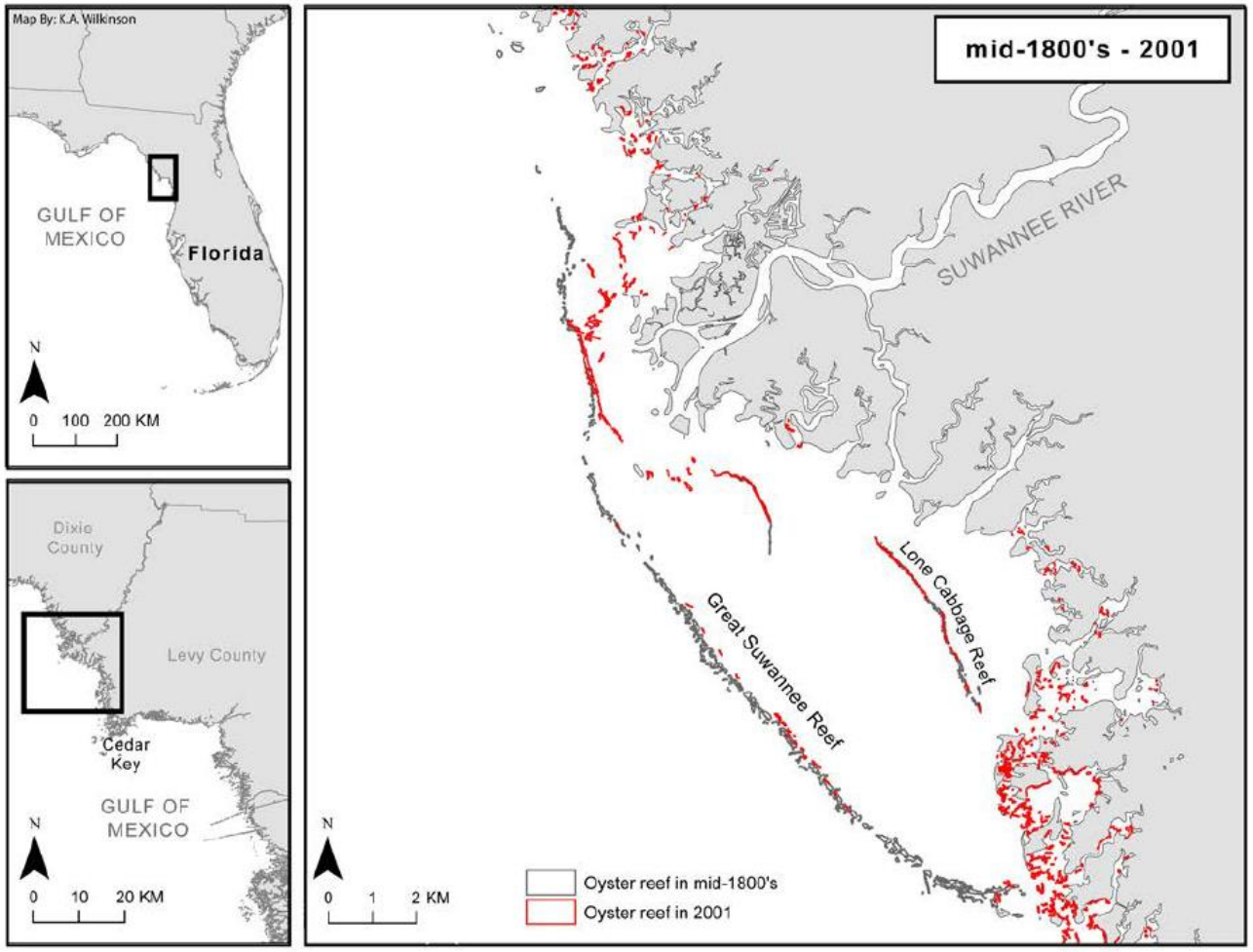
Map Reef Quality

- Shell rakes common in NE FL along Intracoastal Waterway

Photo credits: GTMNERR (Nikki Dix) and UCF (Linda Walters)

Map Reef Quality

- Oyster collapse in Suwannee Sound led to apparent "increase" in reef area as dead shell was spread over a larger area (Seavey et al. 2011)
- Oyster reefs shifting inland following salinity regimes. Seen in Big Bend and Everglades (Volety et al. 2009)



Oyster reef extent in Suwannee Sound in the mid-1800s (gray) and 2001 (red). Map by Krystan A. Wilkinson. Data sources: Raabe et al. 2004 (from 19th century topographic sheets), SRWMD 2001a (from 2001 photographs).

Questions or comments?

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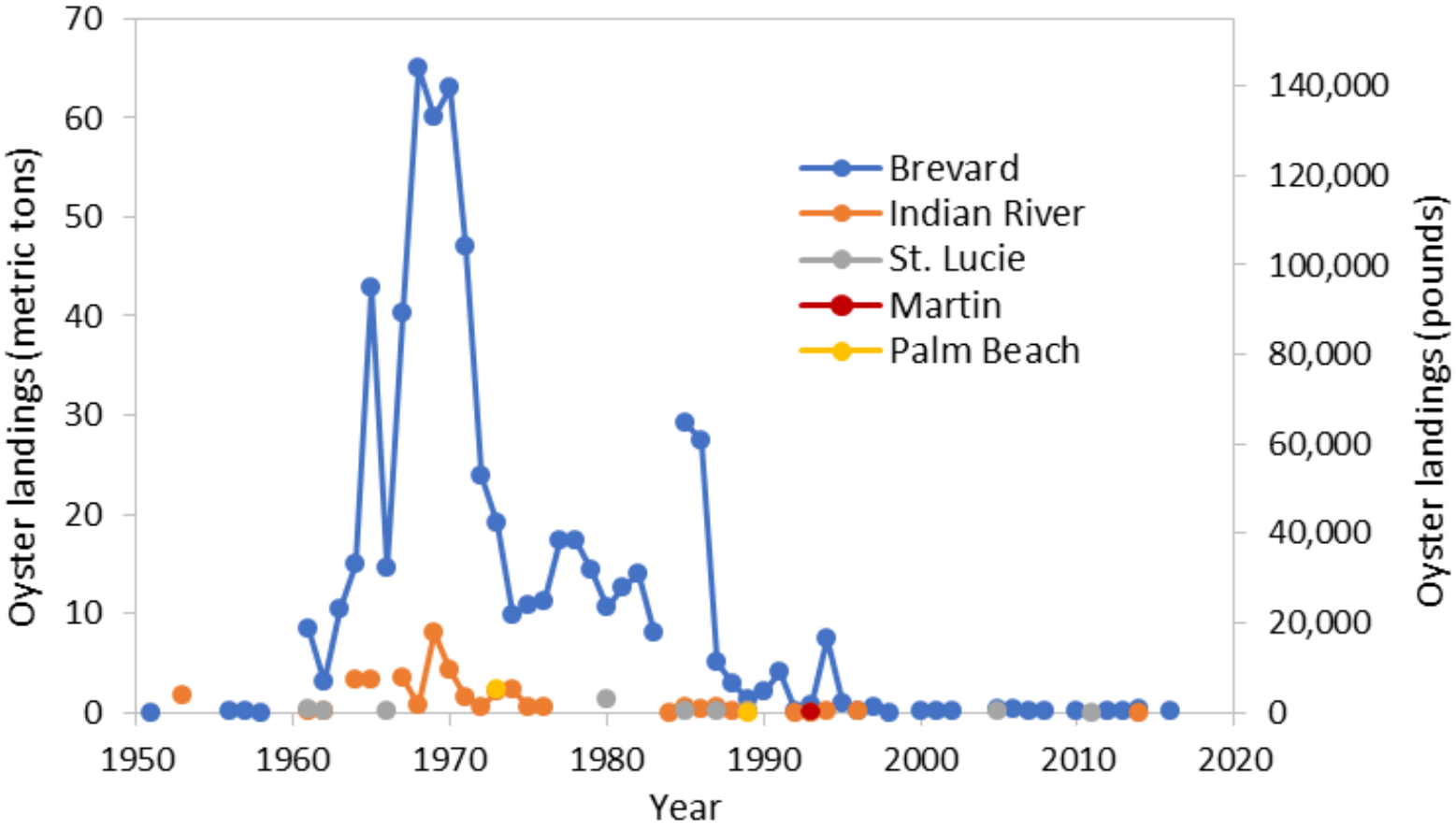
Historical Oyster Data Sources

- Oyster harvesting data
- Historical mapping data and imagery

Commercial Harvest Data



- County harvest data included in each chapter

Commercial Harvest Data

Table A-1. Reported commercial yields of pounds of oyster meats harvested annually 1950–1983.

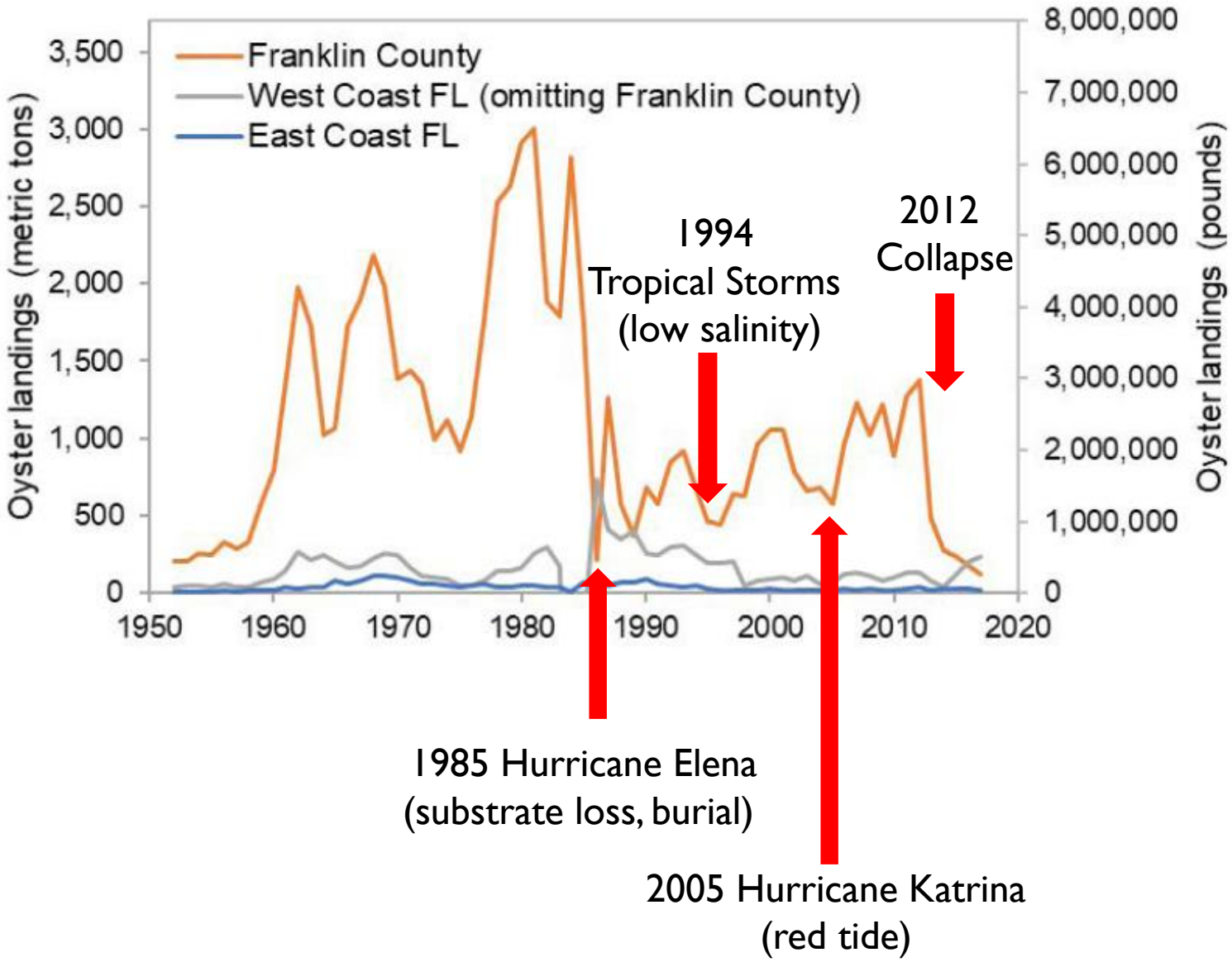
Year	Published east coast total	Published west coast total	Published statewide total	Bay, Gulf, and Washington	Bay and Gulf	Bay	Bay and Washington
1950†	22,715	872,553	895,248				
1951			735,304			42,368	
1952	20,907	542,080	562,987			30,304	
1953*	21,576	563,780	585,356		59,956		
1954	17,907	667,589	685,496		67,992		
1955	19,340	630,241	649,581	48,141			
1956	32,304	856,431	888,735		89,830		
1957	24,754	710,124	734,878		68,961		
1958	29,759	794,970	824,729		60,206		
1959	40,045	1,414,953	1,454,998		93,934		
1960*	44,644	1,930,756	1,975,400		89,458		
1961	72,542	3,254,059	3,326,601		127,367		
1962	67,091	4,952,680	5,019,771		259,664		

1950 – 1983 data from printed copies of summary of Florida commercial marine fish landings. Data are available in OIMMP Report Appendix A and at https://ocean.floridamarine.org/OIMMP/

Commercial Harvest Data

- State assumed control of reporting landings in 1984 and instituted a mandatory trip-ticket program in 1986
- 1984 – present data available from https://public.myfwc.com/FWRI/PFDM/ReportCreator.aspx

1951-2017 Commercial FL Oyster Harvest



2012-2013 Apalachicola Collapse

Camp et al. 2015 (Ecology and Society 20(3):45):

(1) low river flow led to increased salinity in Apalachicola Bay for a multiyear period;

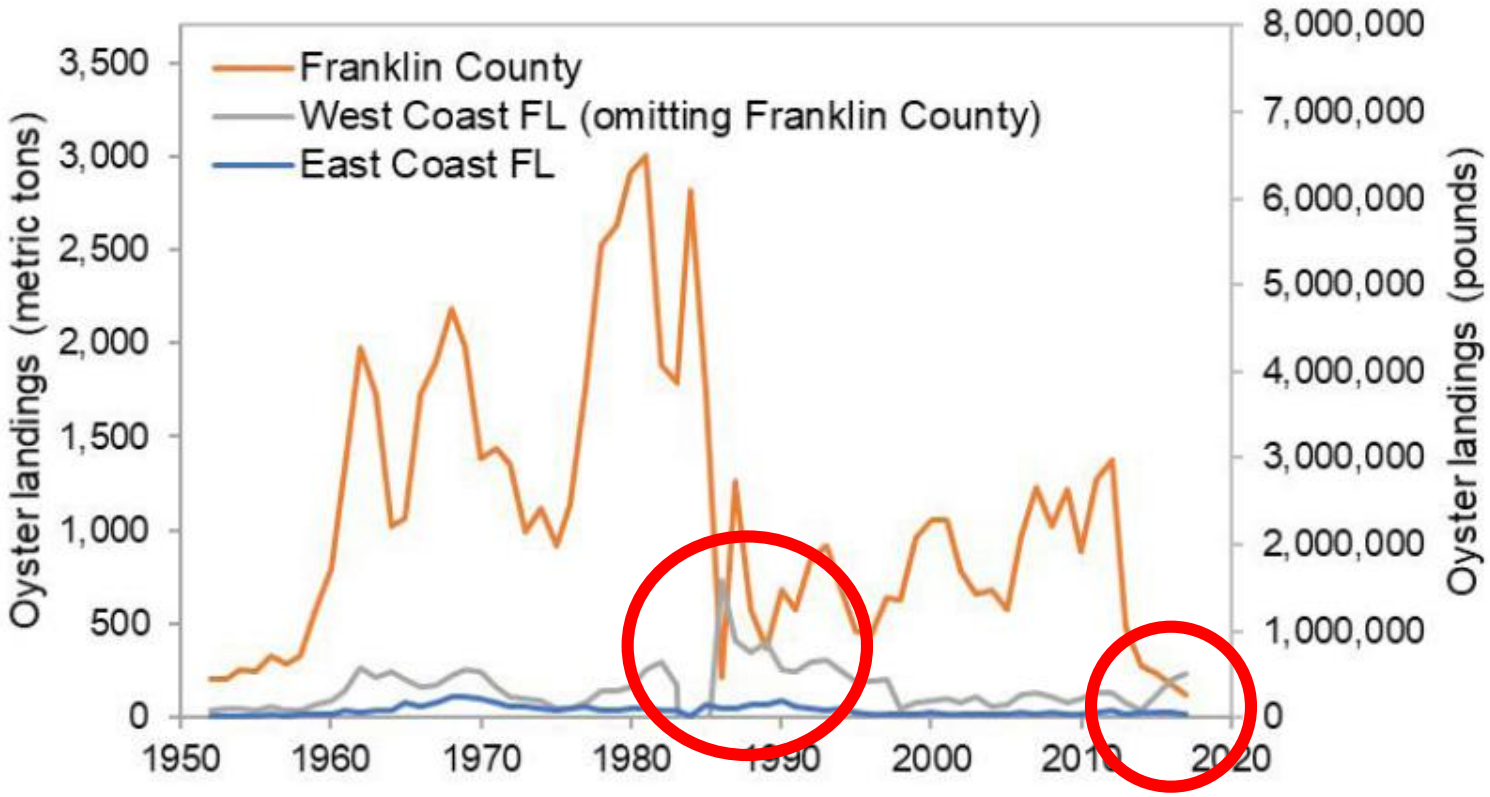
(2) which likely led to increases in oyster parasites, predators, or unknown pathogens;

(3) causing elevated mortality, particularly among juvenile oysters;

(4) which led to recruitment failure, potentially exacerbated by shell removal from fishing or environmental events; and then

(5) population collapse of adult oysters

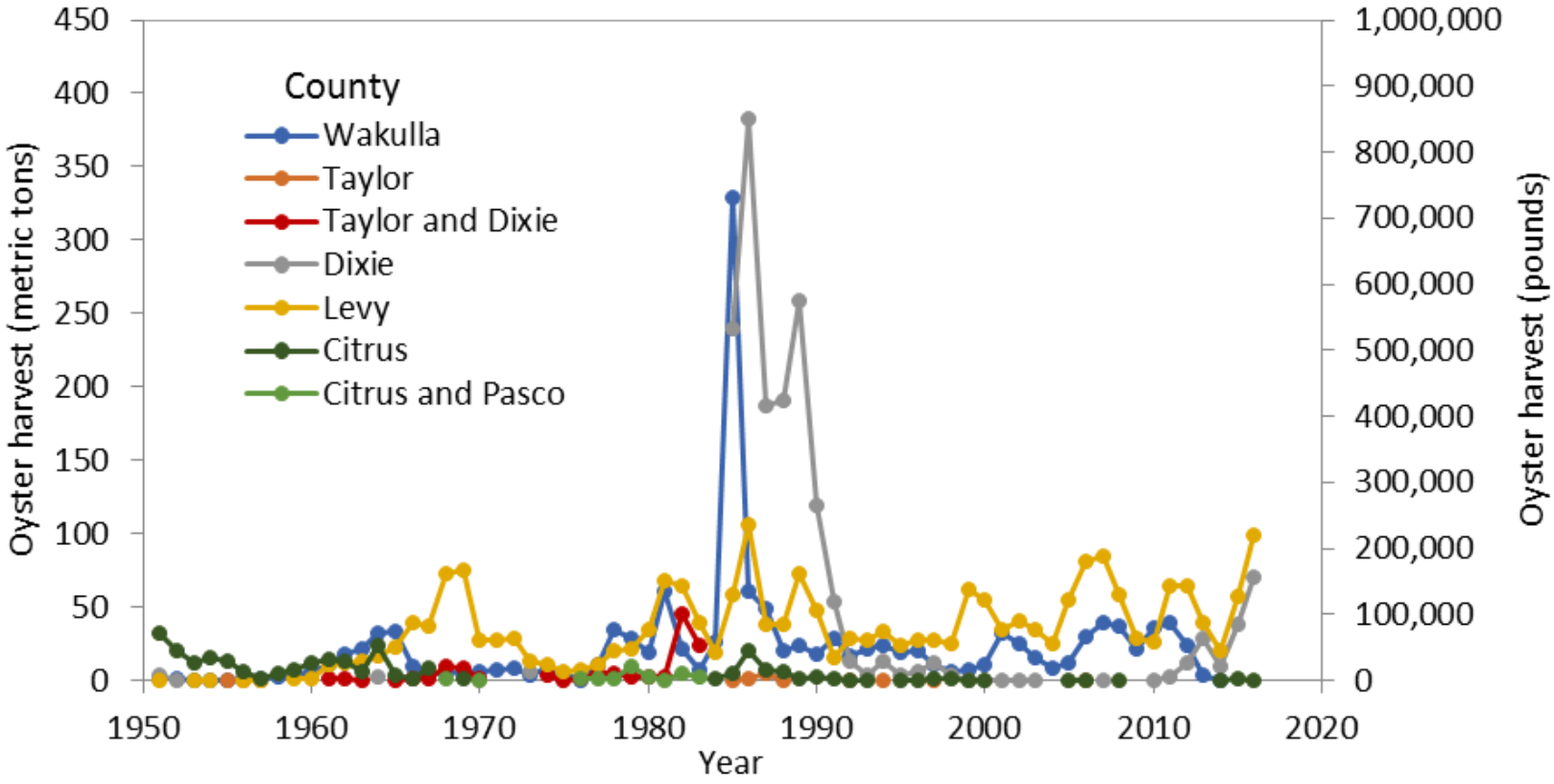
1951-2017 Commercial FL Oyster Harvest



Increased fishing pressure in Apalachee Bay (Wakulla County) and Big Bend

Increased fishing pressure in Big Bend (Levy and Dixie Counties)

1951-2017 Commercial FL Oyster Harvest



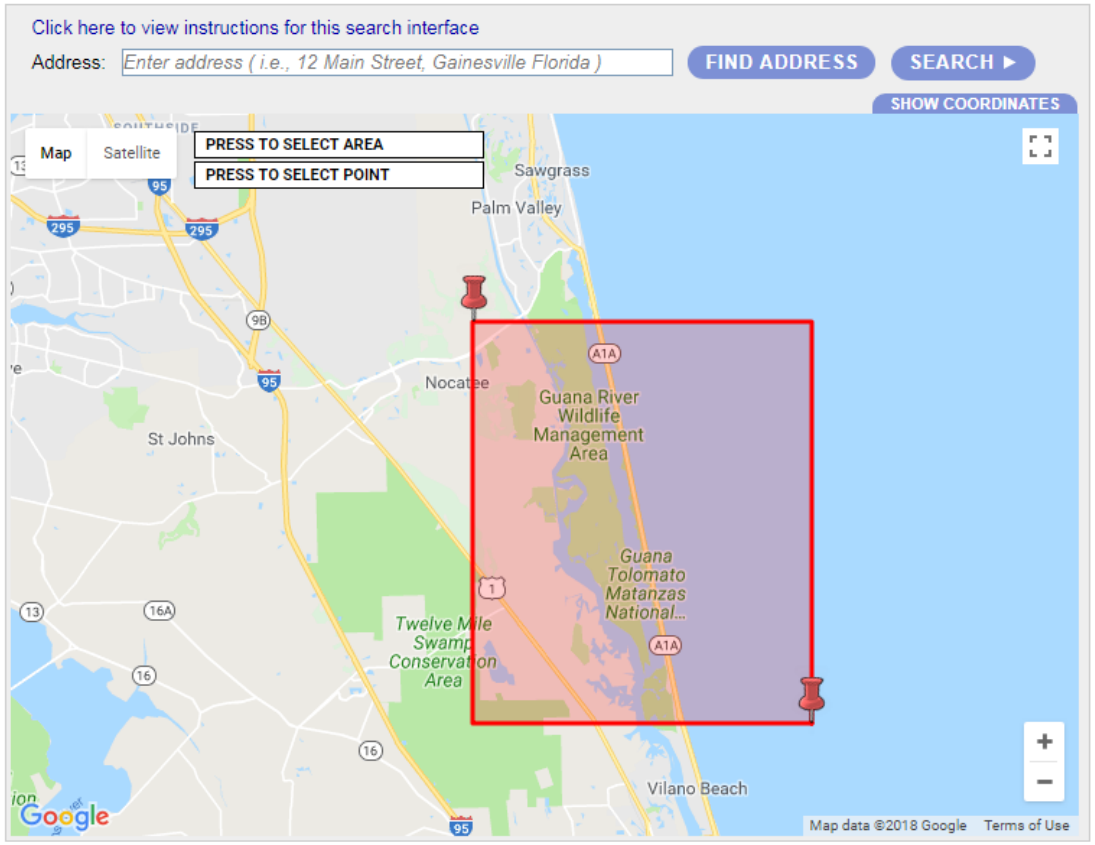
1985 Hurricane Elena

2012-2013 Apalachicola Collapse

Online Resources

- Historical habitat data
- University of Florida Aerial Photo Library

http://ufdc.ufl.edu/aerials



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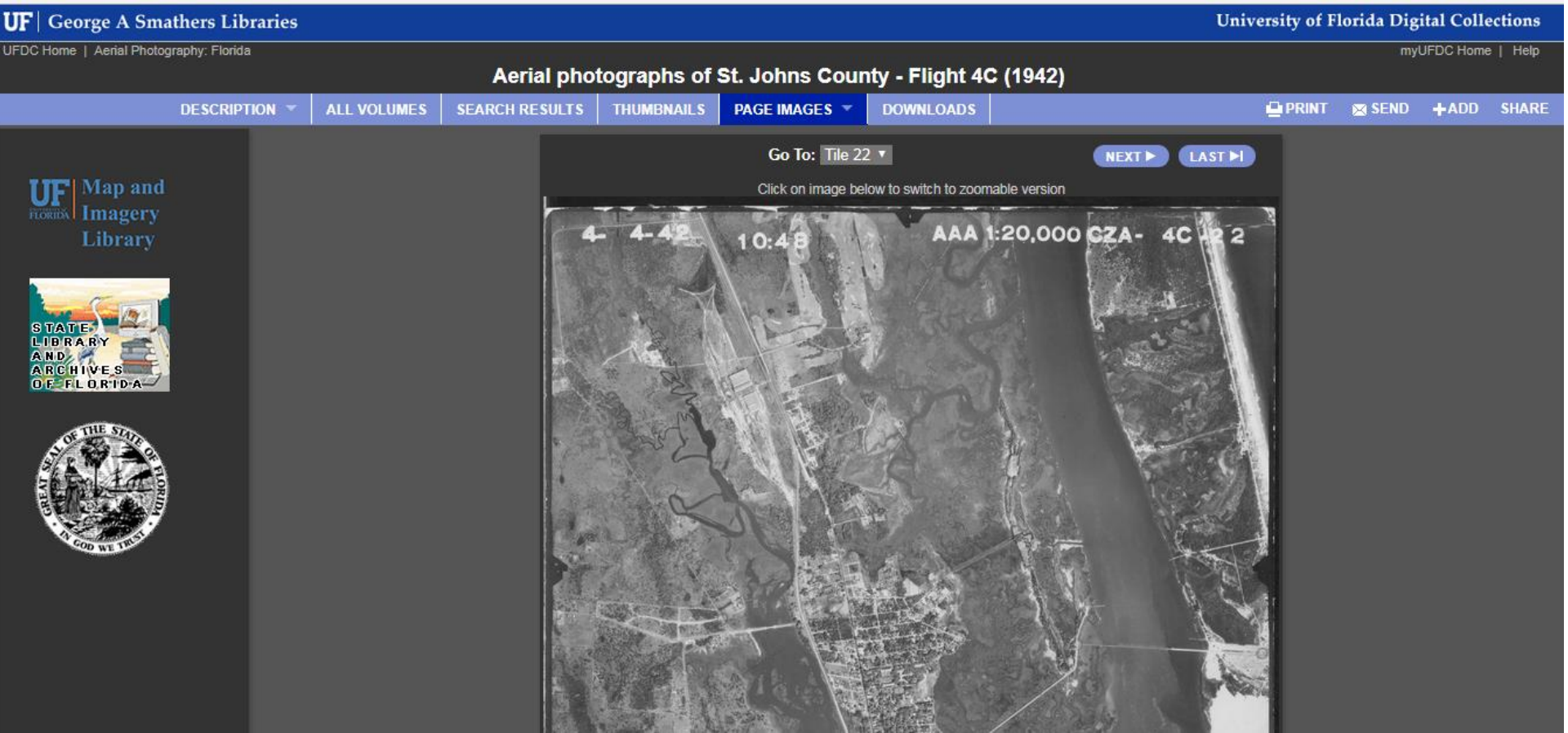
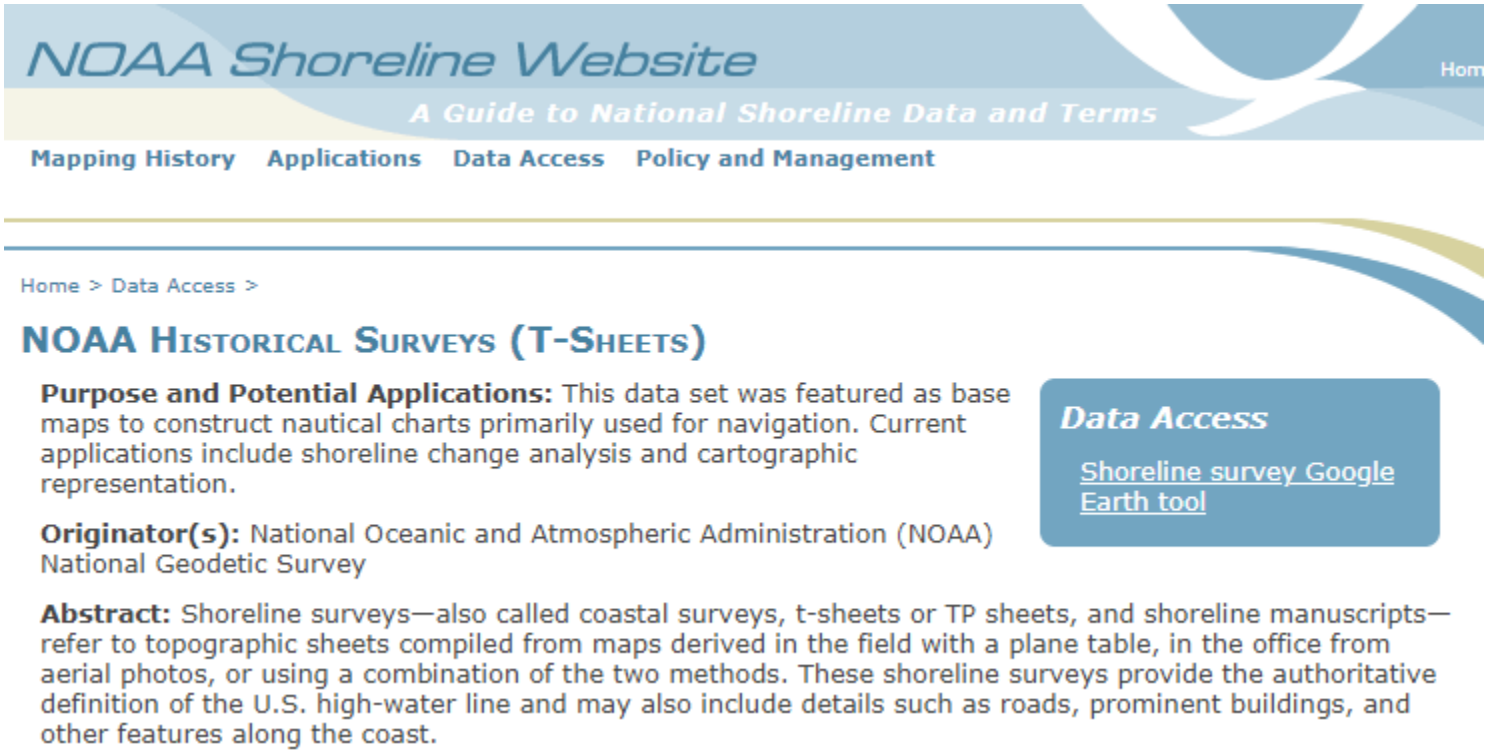


Online Resources

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



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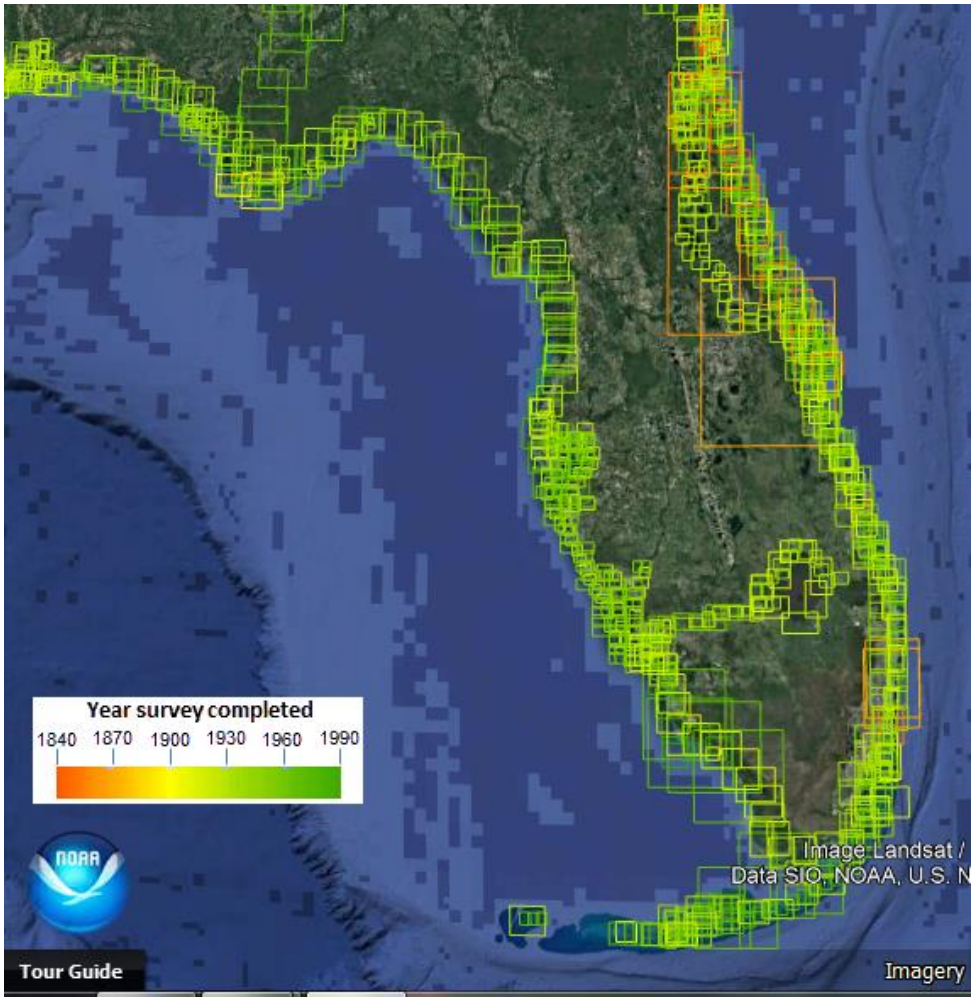

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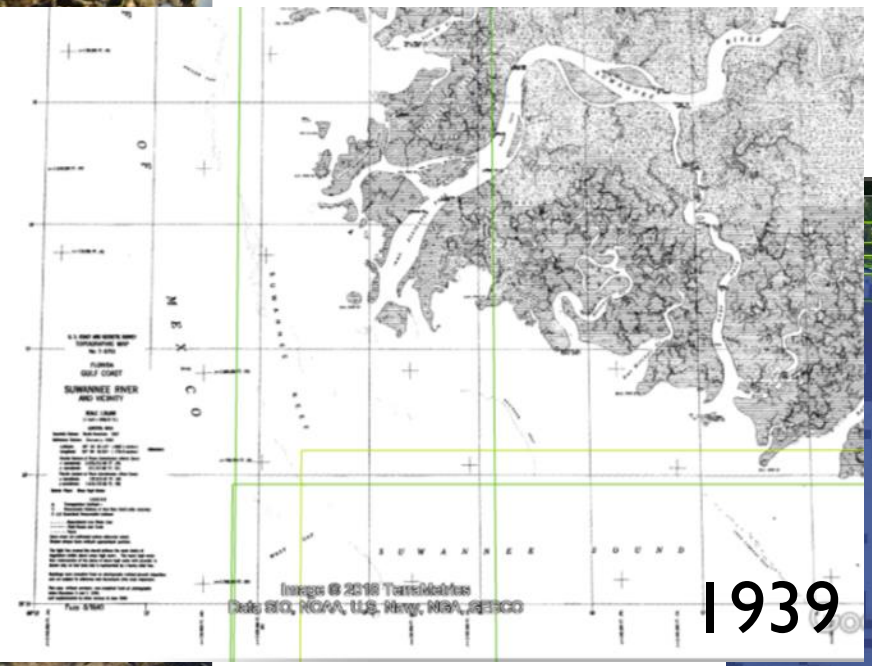
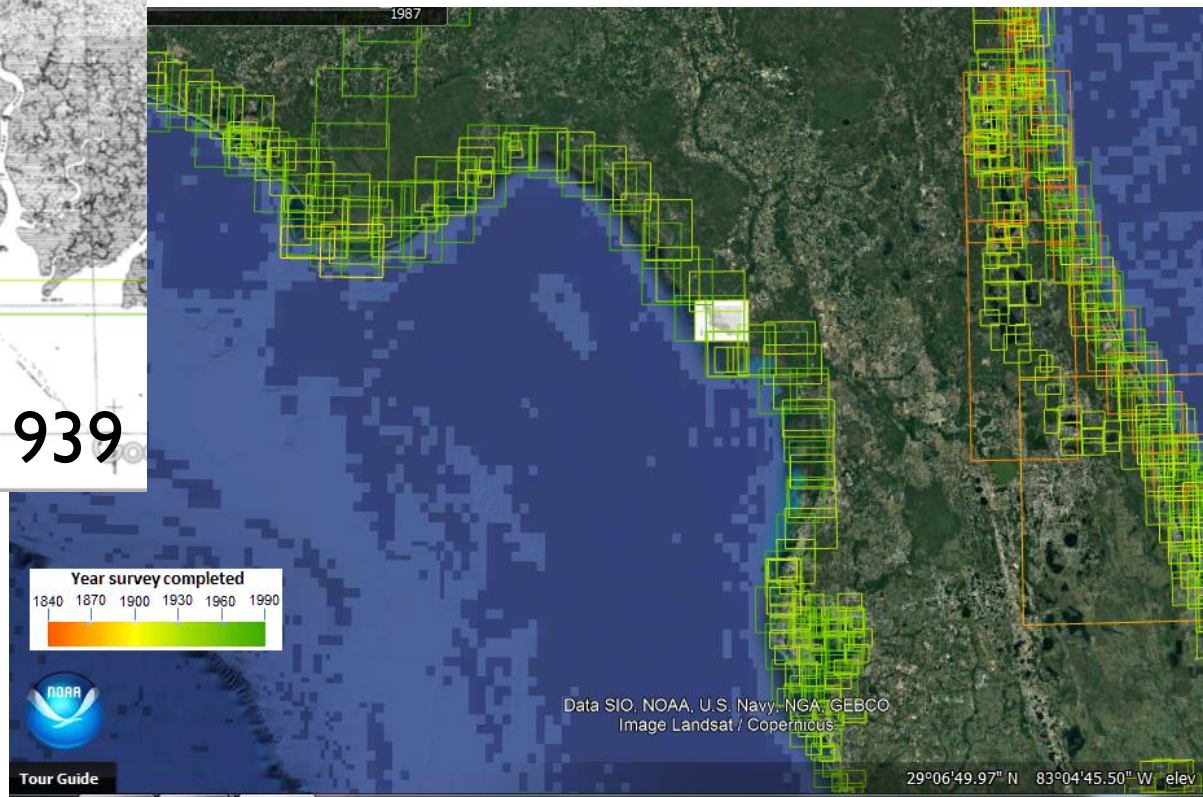
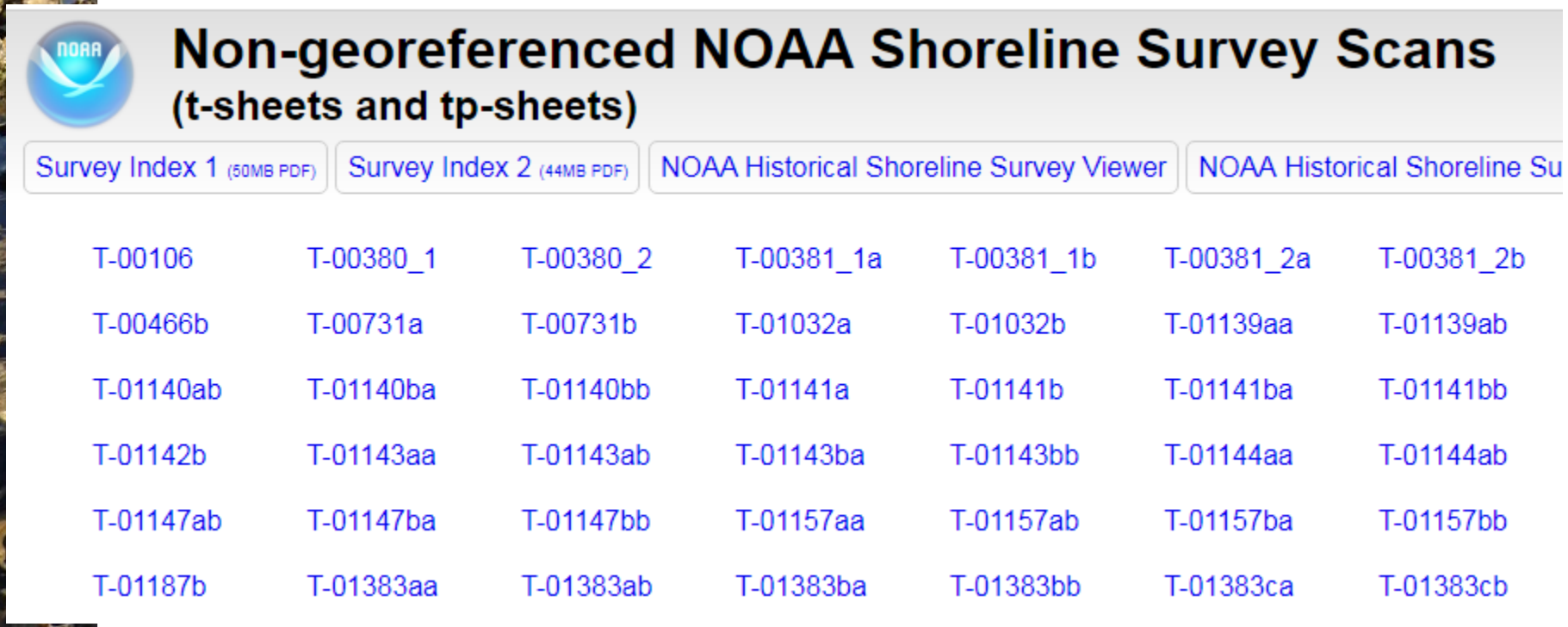




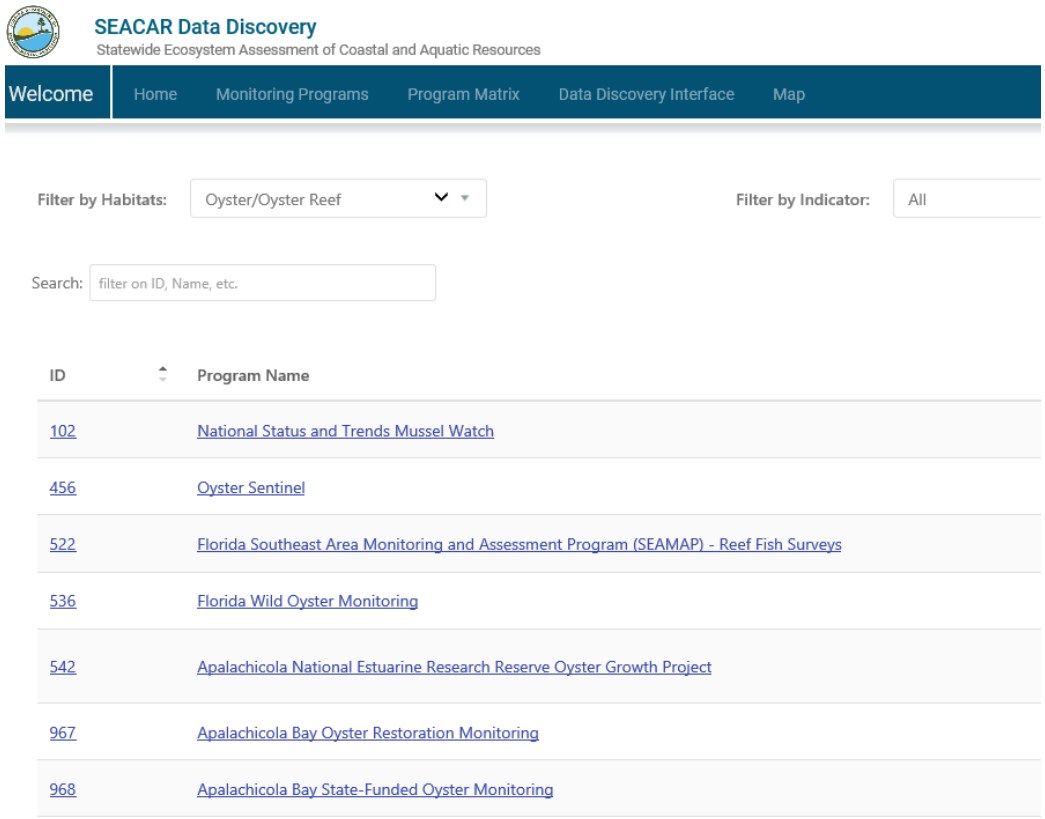
Online Resources

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



SEACAR monitoring database

- FDEP's Statewide Ecosystem Assessment of Coastal and Aquatic Resources (SEACAR)
- Monitoring database now available online:
- https://dev.seacar.waterinstitute.usf.edu/programs



Questions or comments?