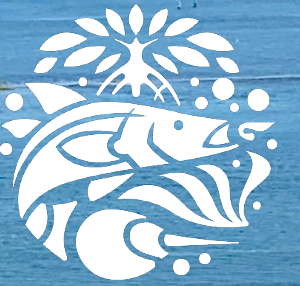


Indian River Lagoon – an Estuary of National Significance



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IRL Council and Indian River Lagoon National Estuary Program
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772-216-7148



Outline for Today

1. History of the IRL
2. Concerns that impact fisheries
3. The Indian River Lagoon National Estuary Program and what we do
4. Lagoon restoration progress
5. Challenges ahead
6. Innovative solutions and transformational opportunities



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History of the IRL

The IRL system is large, complex and vulnerable

Spatial - Temporal Complexity

- 3 Waterbodies
Mosquito River/Banana River/Indian River
- 156 mi long; Watershed (2,284 sq. miles)
- Surface waters (353 sq. miles)
- IRL-Halifax River boundary amendment extended project boundary 25 miles north (310 sq. miles of watershed)

Diverse Socio-Economics

- 7 counties in watershed/38 incorporated cities
- 1.6 million residents and growing fast
- 26 “Priority Communities” identified by the IRLNEP

Indian River Lagoon National Estuary Program Watershed Boundary with “26 “identified “Priority Communities”



IRL suffers from two levels of stressors

Highly Vulnerable

Narrow, shallow, micro-tidal, compartmentalized

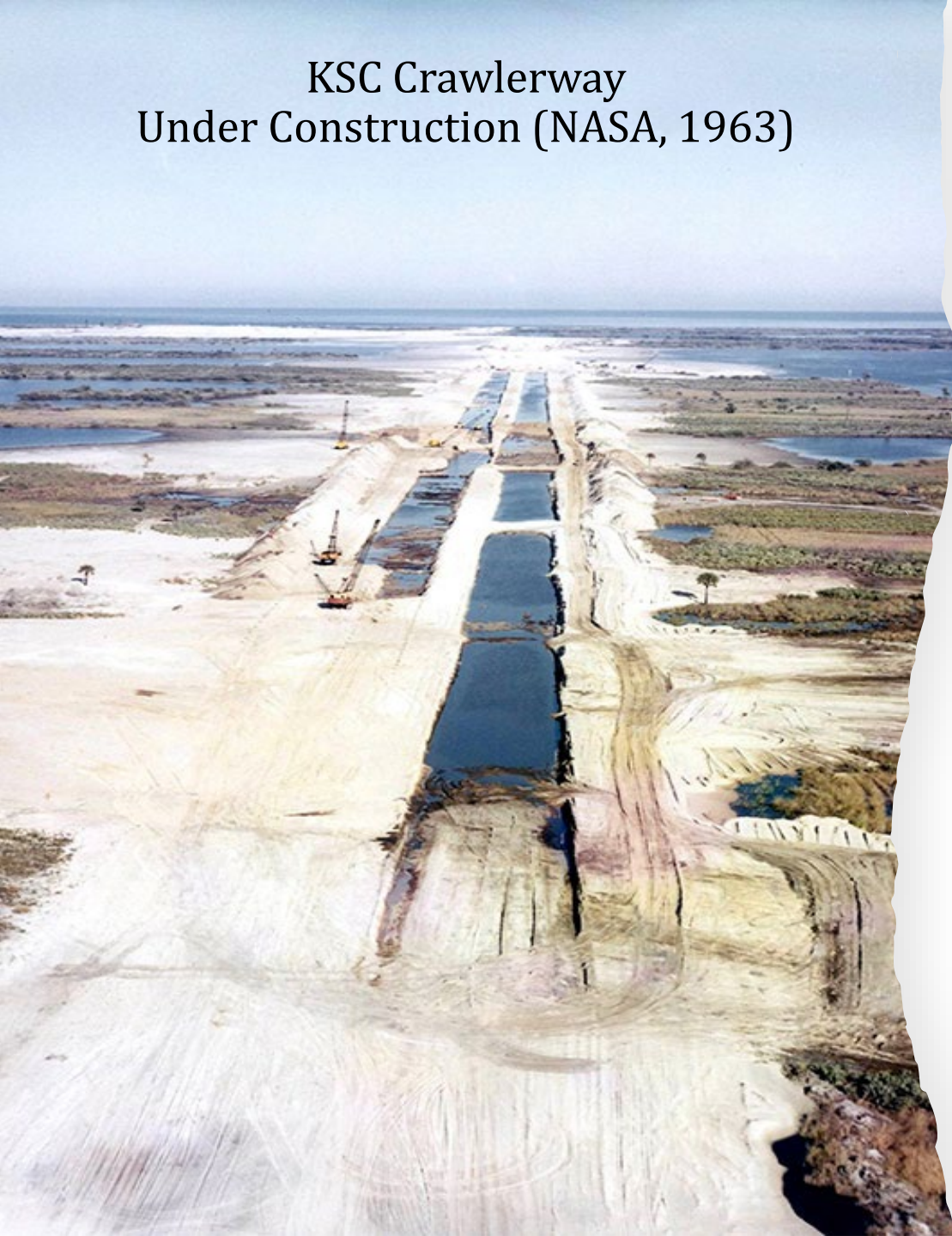
Shocks (Event Stressors)

- Tropical Storms and Hurricanes
- Other Extreme Weather (floods and drought)
- Lake Okeechobee Discharges to SIRL
- WWTP Failures

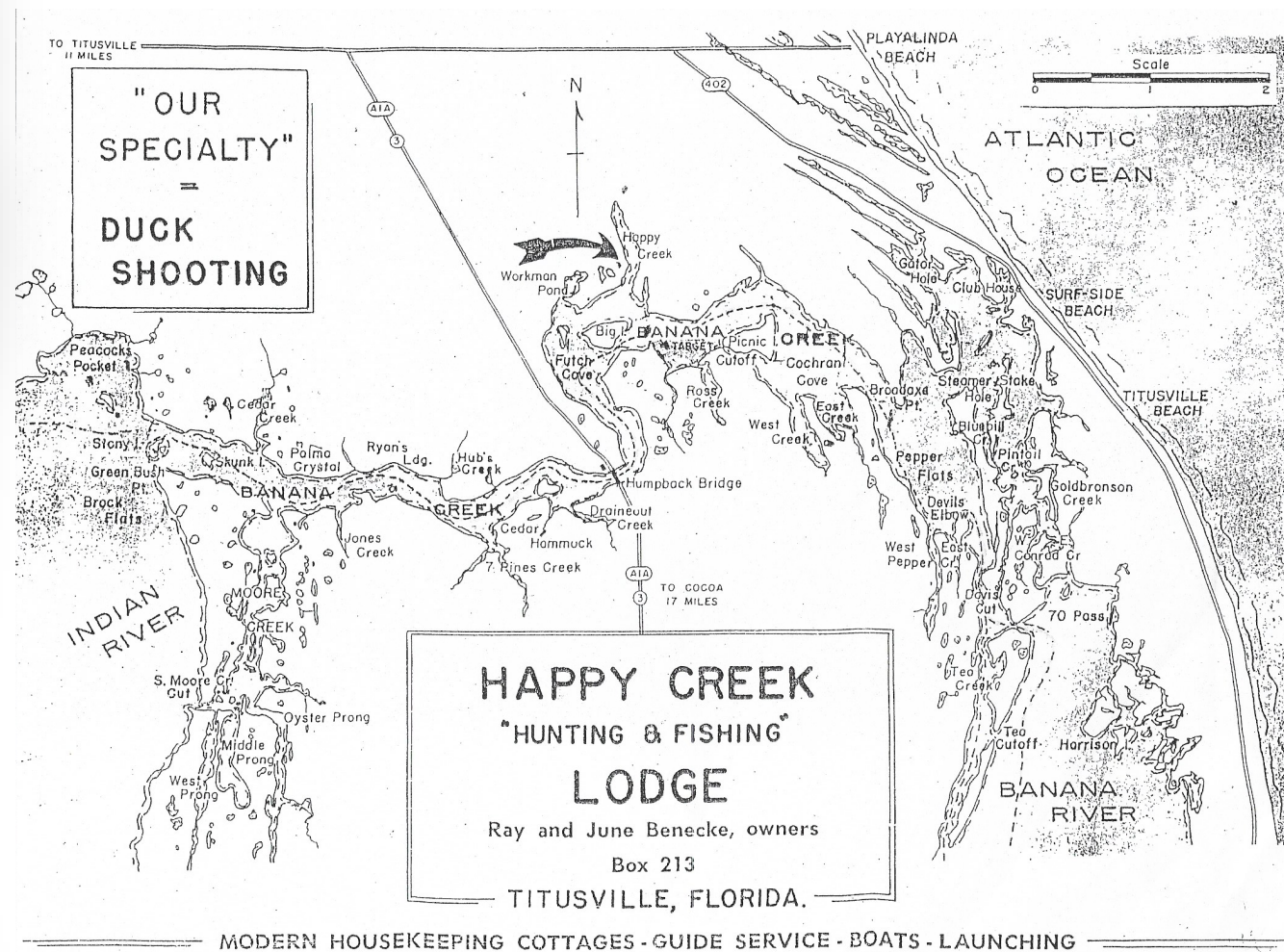
Chronic Stressors

- Litter & Debris
- Invasive Exotic Species
- Habitat loss/alteration
- Nutrient pollution (multiple sources/ pathways)
- Toxicants (multiple sources/pathways)
- Internal nutrient and pollutant loads (muck)
- Global Climate Change
 - Coastal/Ocean Acidification
 - Sea-level Rise
 - Shoreline erosion
- Wetland loss/ Watershed alteration*

KSC Crawlerway
Under Construction (NASA, 1963)

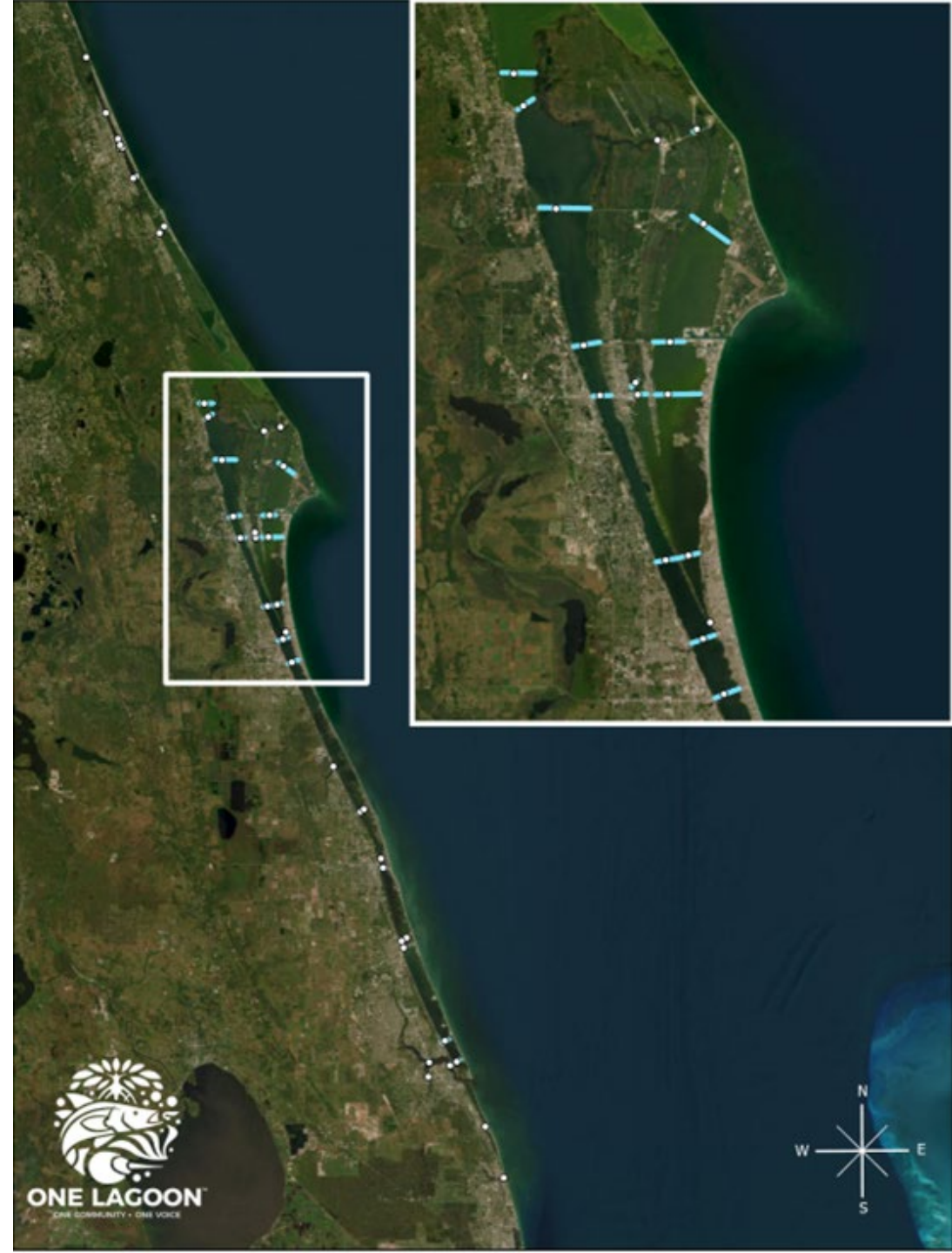


What is used to look like...back in the 1940s and 50s.



Flow alterations

- 45 bridge - causeway or bridge corridors
- Most of the earthen causeways in Brevard county



Shoreline alterations



IRL shoreline 1888

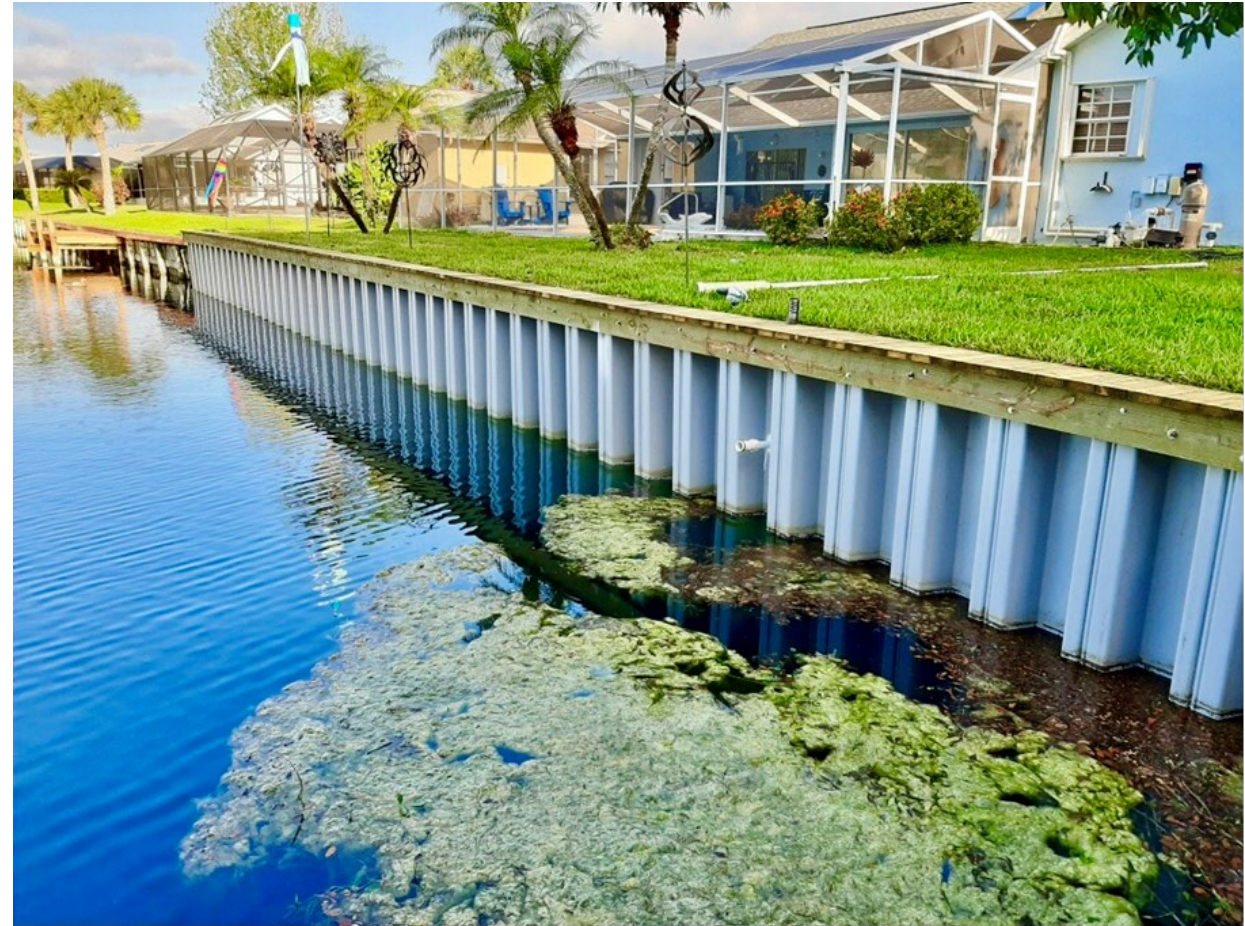


Photo credit: Integrity Marine Construction

2-14-42

CYS - IC -54

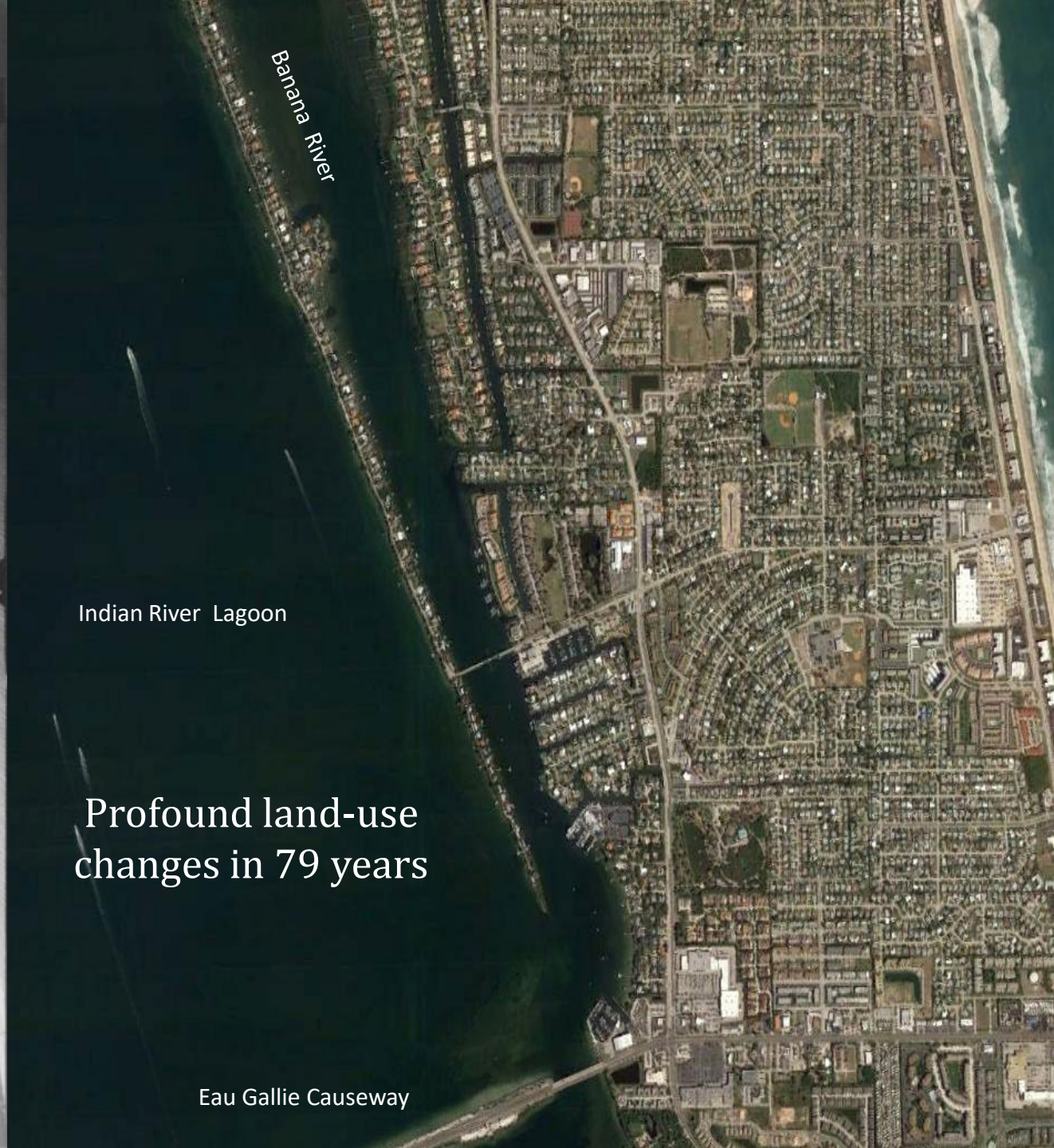
CONFIDENTIAL

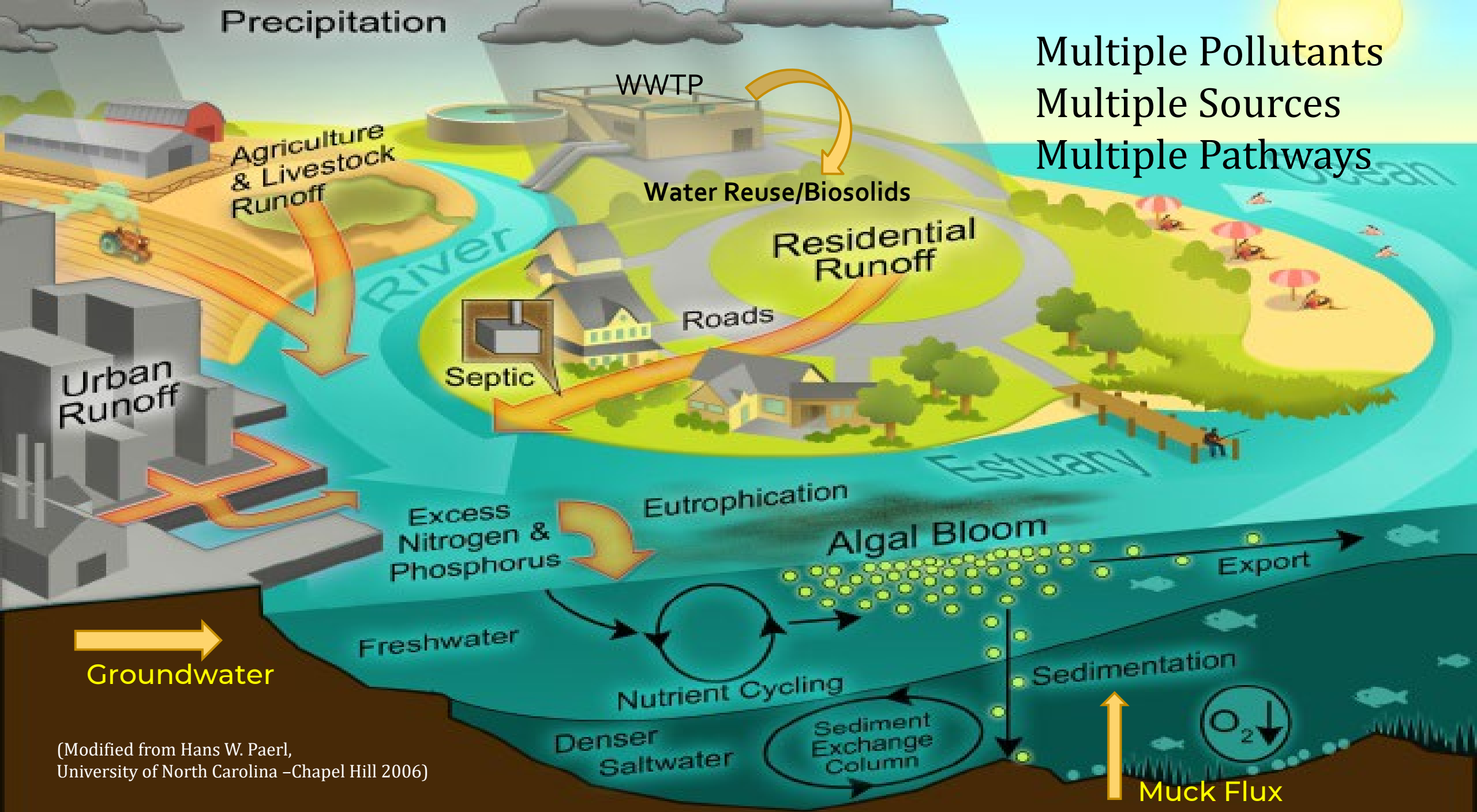


Indian River Lagoon

Profound land-use
changes in 79 years

Eau Gallie Causeway





(Modified from Hans W. Paerl,
University of North Carolina -Chapel Hill 2006)

Long-term stressors for the IRL – Nutrient pollution is a primary driver for Harmful Algal Blooms (2011-2020)



Photo: Duane De Freese, 2016



Photo by Captain Alex Gorichky, Local Lines Charters, 2016



2016 & 2018 IRL and Banana River
Aureoumbra Brown Tide Bloom
(Photo: FL Today, C. Rubadoux,)



Photo: Dylan Hansen Indian River, 2020 cyanobacteria bloom



Photo: Bob Day Banana River, 2020



2018 Cocoa Beach, FL
Photo: Robert Kane, - *Fibrocapsa japonica*,



Southern Lagoon

Lake Okeechobee Seasonal Discharges and Cyanobacterial Blooms



Photo: Duane De Freese, 2016

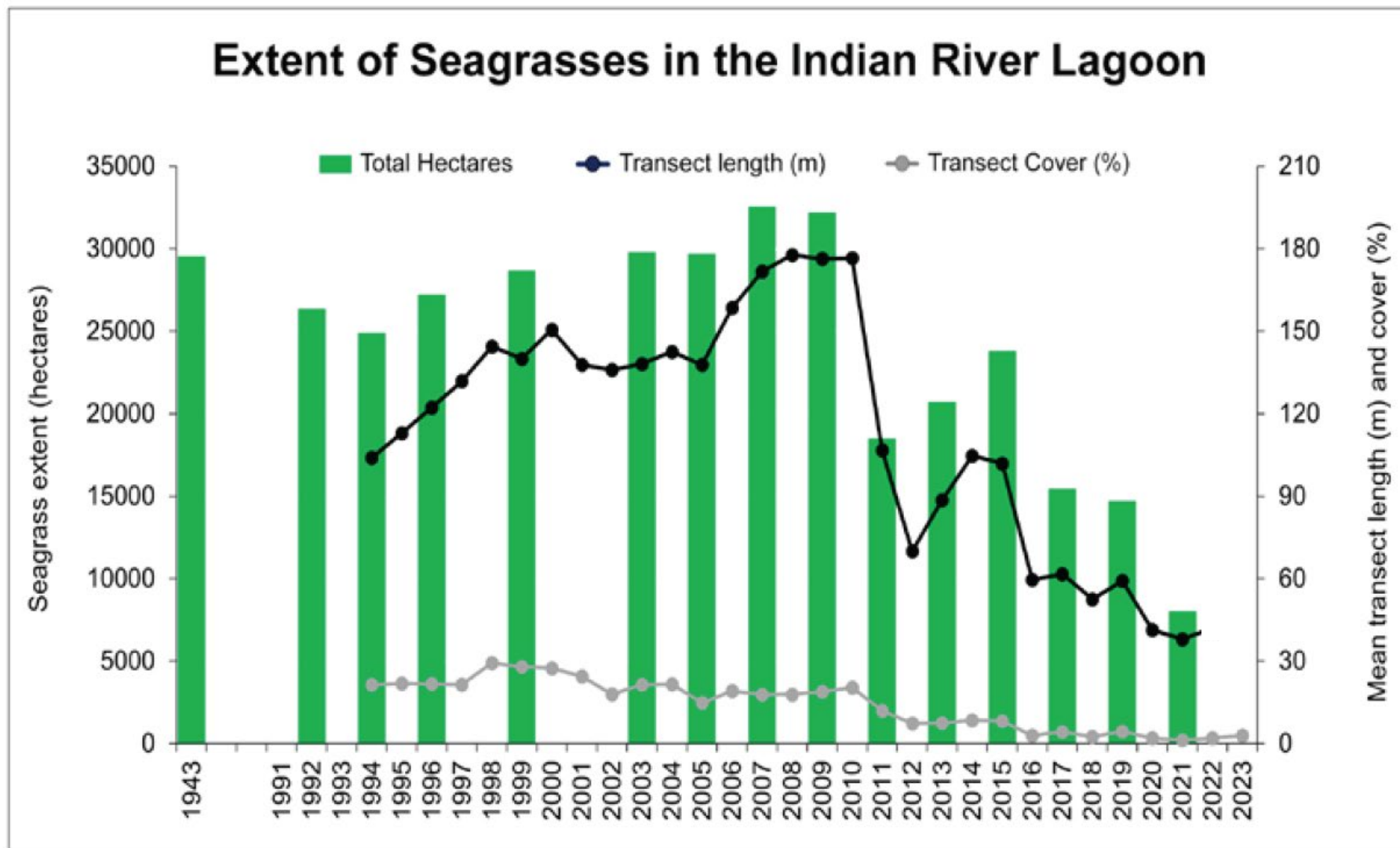
Concerns that impact fisheries



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Loss of critical habitat (2011-2021)



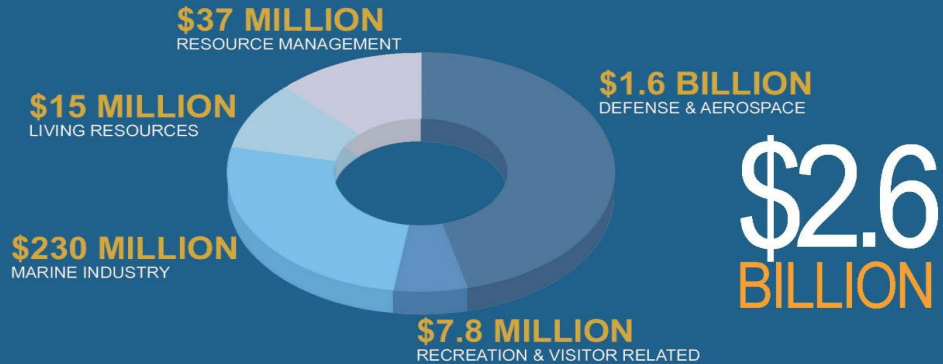


33:1 RETURN ON INVESTMENT

\$230 MILLION
IRL Annual Investment

\$7.6 BILLION
IRL Annual Economic Output

TOTAL ANNUAL INCOME: *IRL-Related Industry*



\$934 MILLION
ANNUALIZED REAL ESTATE VALUE ADDED FROM IRL



LIVING RESOURCES **\$48,230,566**



RESOURCE MANAGEMENT **\$101,410,945**



MARINE INDUSTRY **\$767,440,497**



DEFENSE & AEROSPACE **\$5,149,151,378**



RECREATION & VISITOR RELATED **\$1,574,078,178**

HOW MUCH
\$7,640,311,564

TOTAL ANNUAL ECONOMIC VALUE



IRL-DEPENDENT INDUSTRY

SHELLFISH



HARVEST VALUE

-80%

POUNDS HARVESTED

-72%



FINFISH

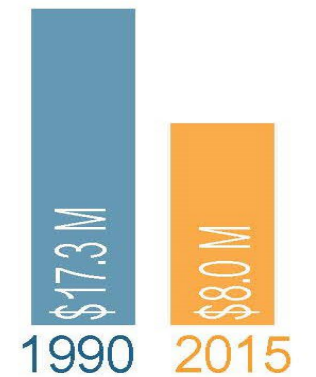


HARVEST VALUE

-37%

POUNDS HARVESTED

-54%



Loss of Shellfish

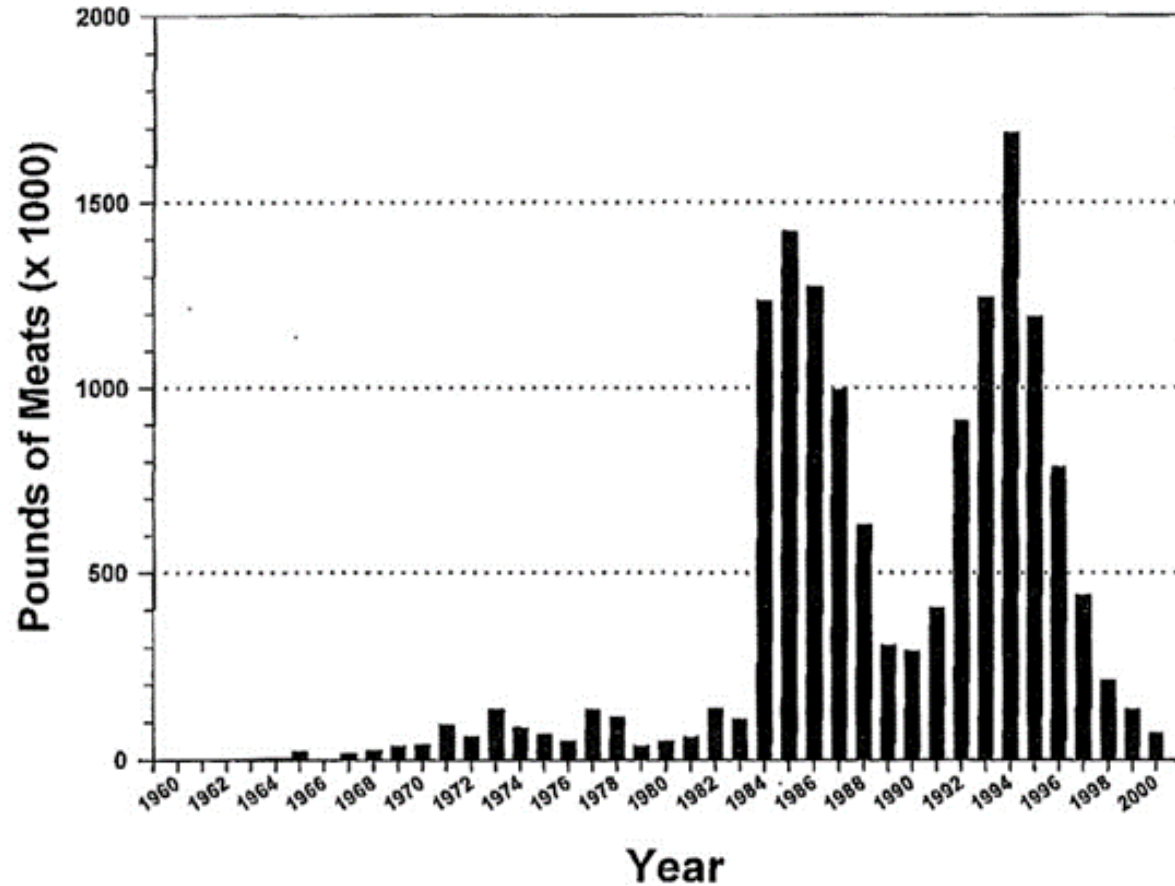


Fig 1. Clam harvest landings from IRL from 1960-2000 in lbs of meat only (x1000). From Arnold et al. 2002

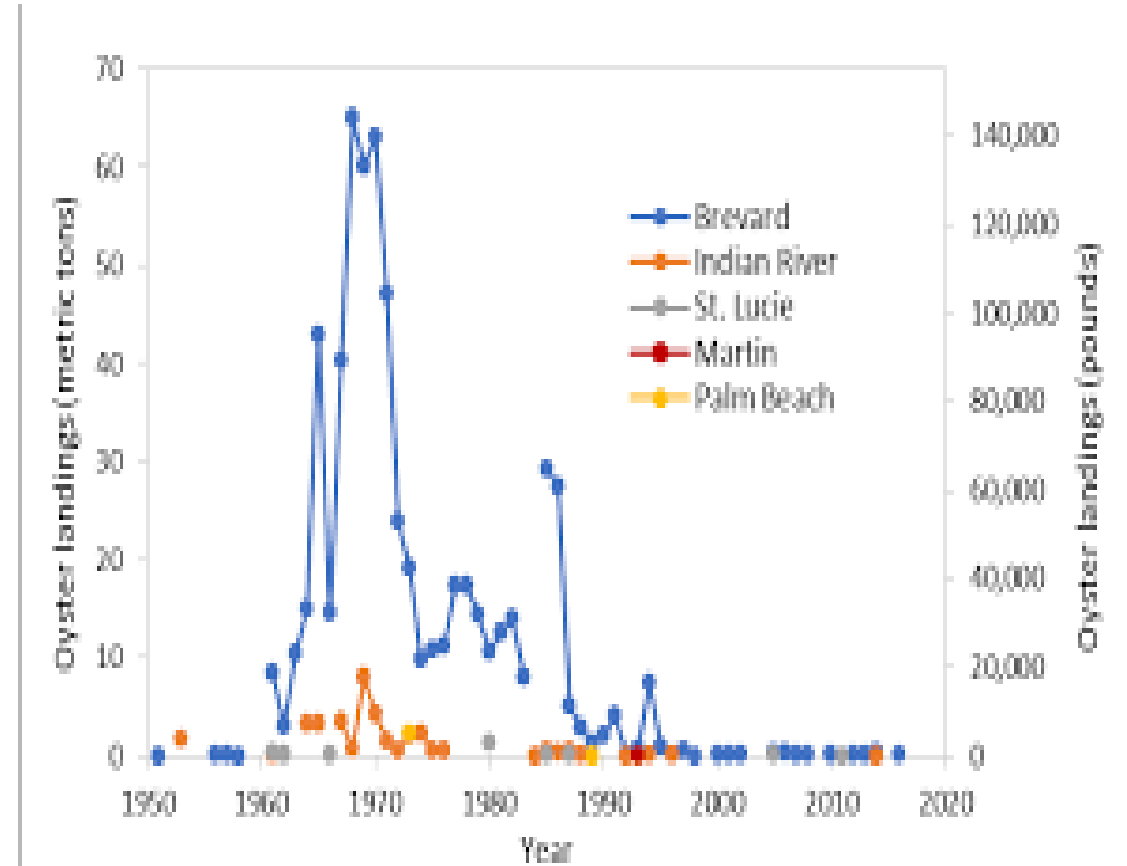


Fig. 2 Oyster harvest landings from the Indian River Lagoon. From OIMMP and FWC



Fisheries Independent Monitoring Trends

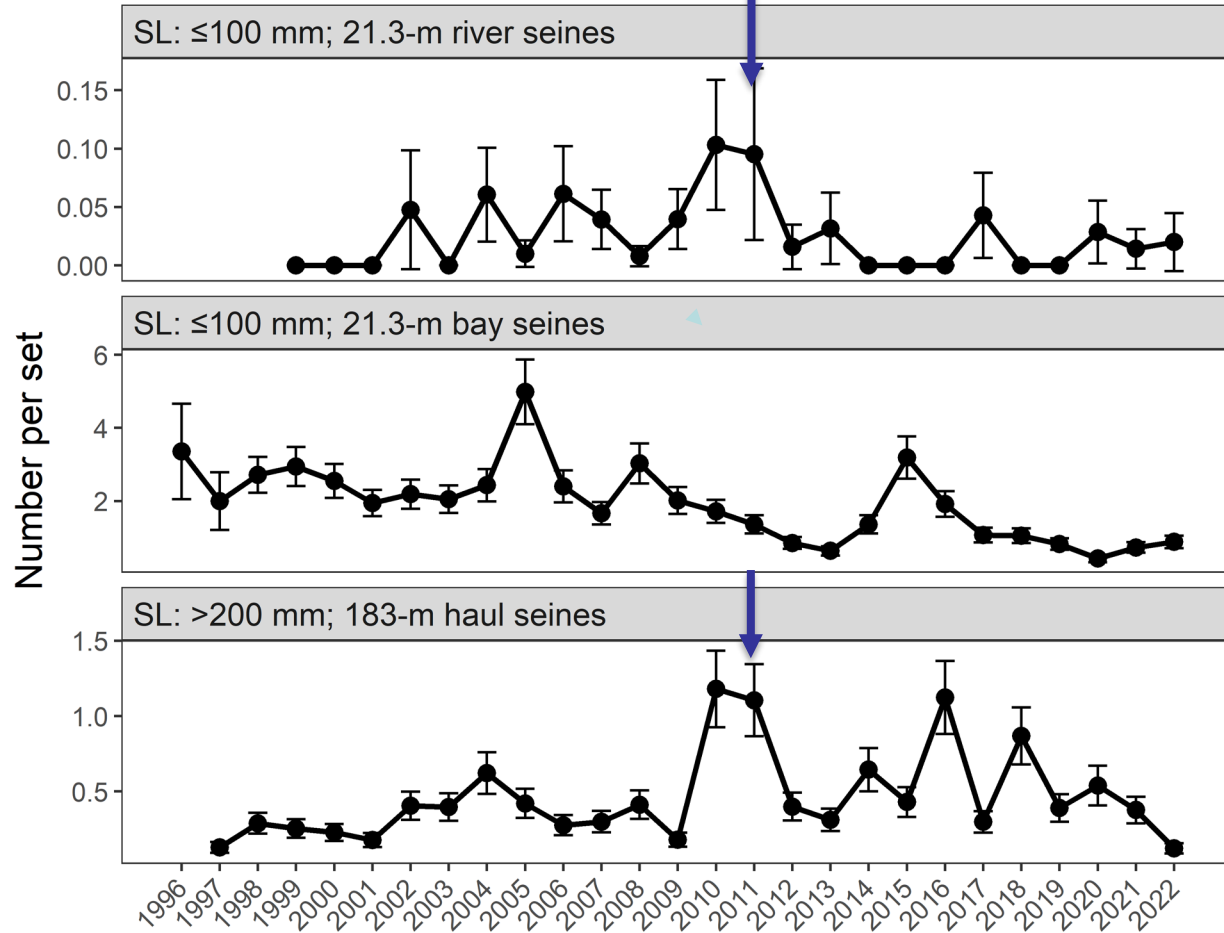


Figure 1. Relative abundance of subadult and adult Spotted Seatrout collected between 1997 and 2022 during stratified-random sampling in the northern Indian River Lagoon. Data from FFWCC.

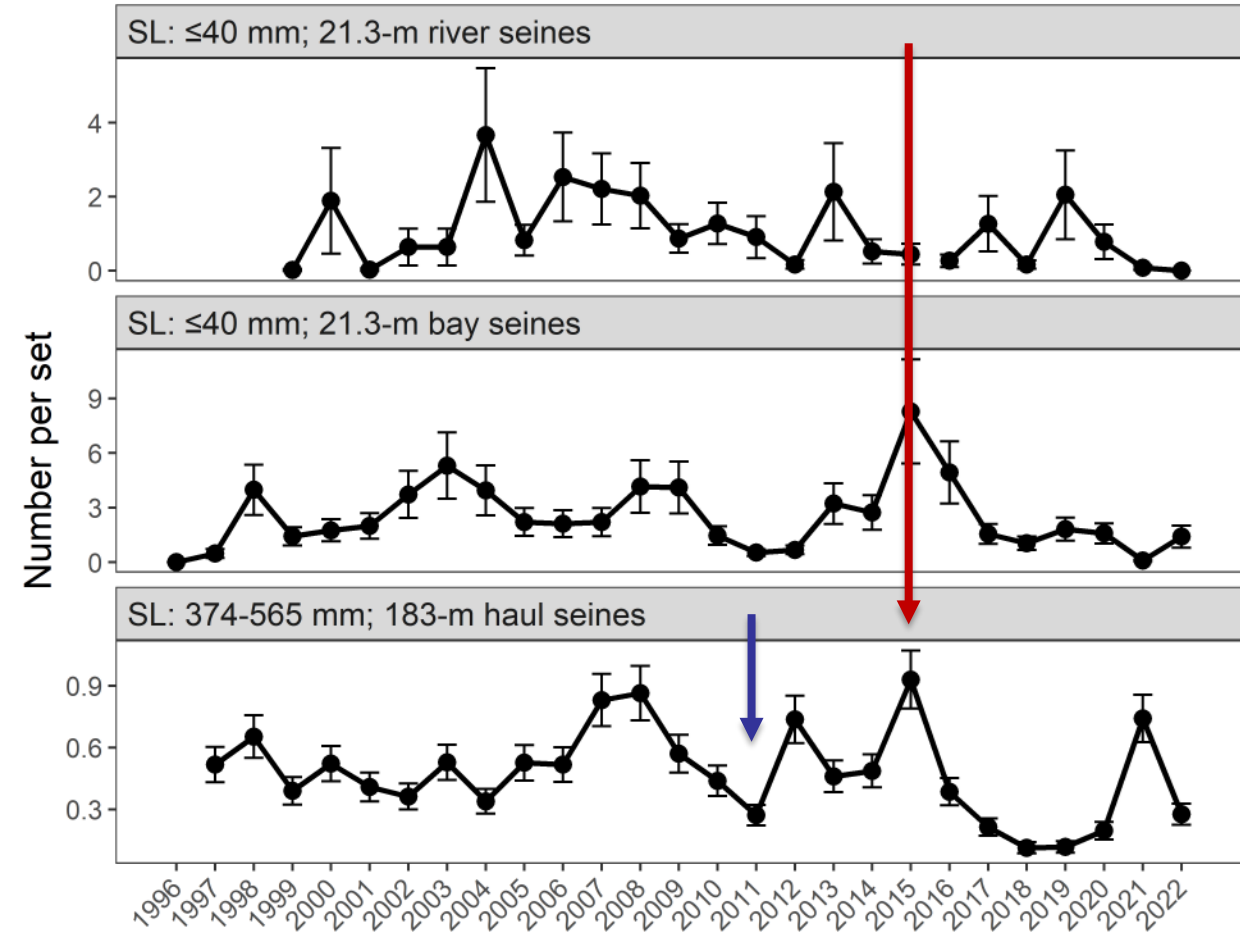


Figure 2. Relative abundance (\pm SE) of subadult and adult Red Drum collected between 1997 and 2022 during FWC stratified-random sampling in the northern Indian River Lagoon. Data from FFWCC.



Fisheries Independent Monitoring Trends

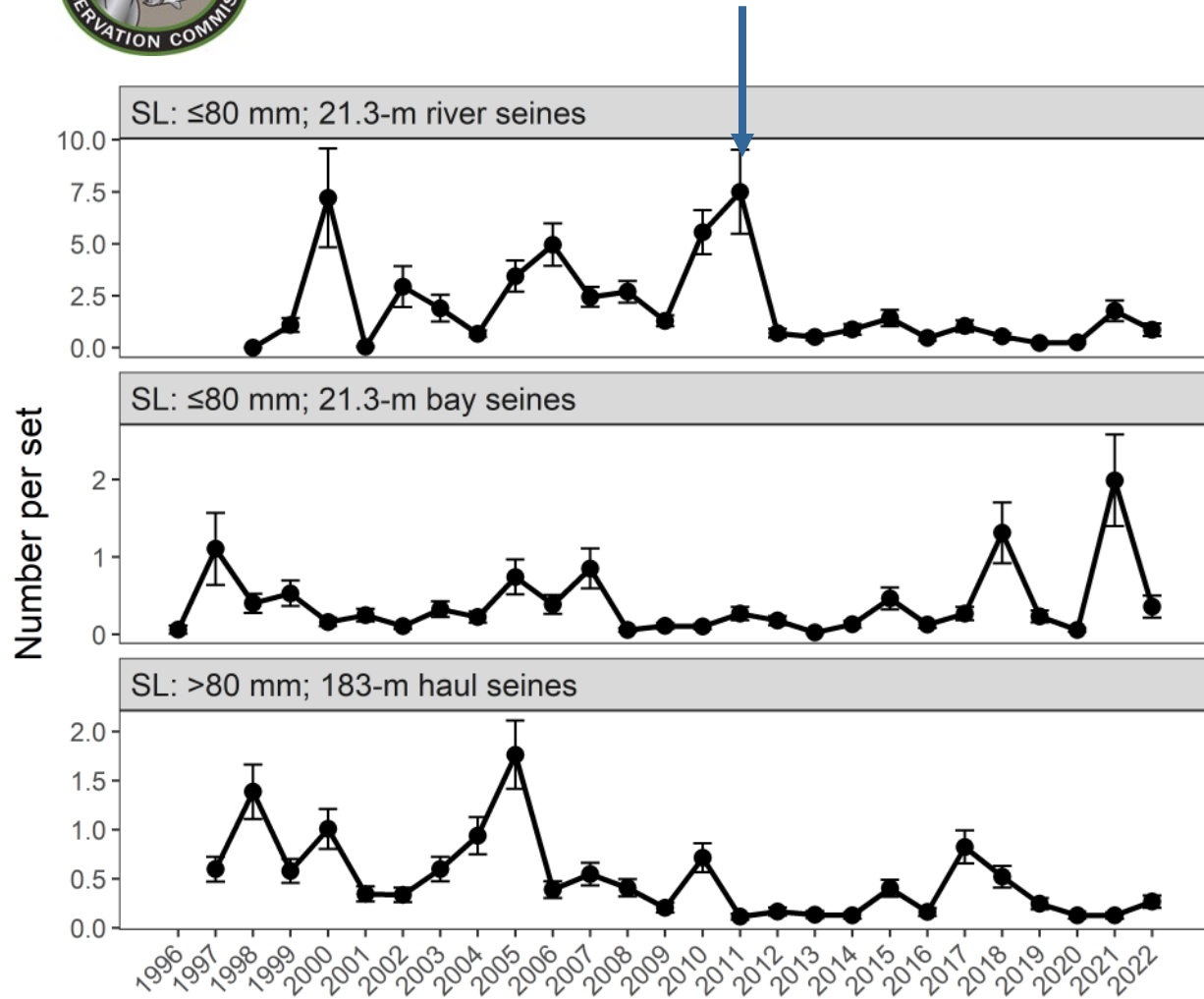


Figure 3. Relative abundance (± SE) of subadult and adult Blue Crab collected between 1997 and 2022 during FWC stratified-random sampling in the northern Indian River Lagoon.

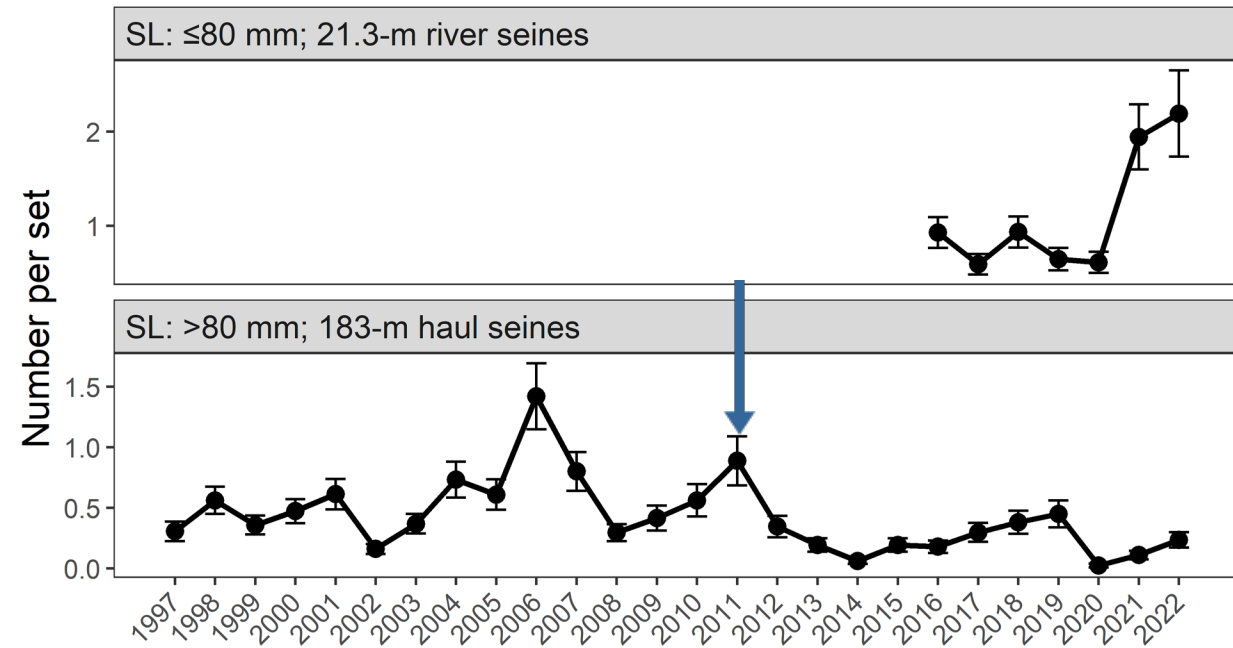
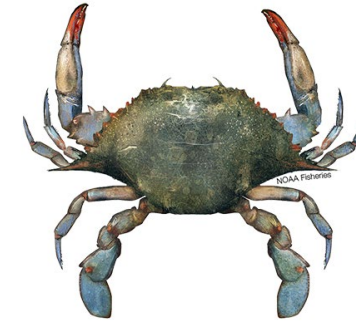


Figure 4. Relative abundance (± SE) of subadult and adult Blue Crab collected between 1997 and 2022 during FWC stratified-random sampling in the southern Indian River Lagoon.



Fisheries Independent Monitoring Trends

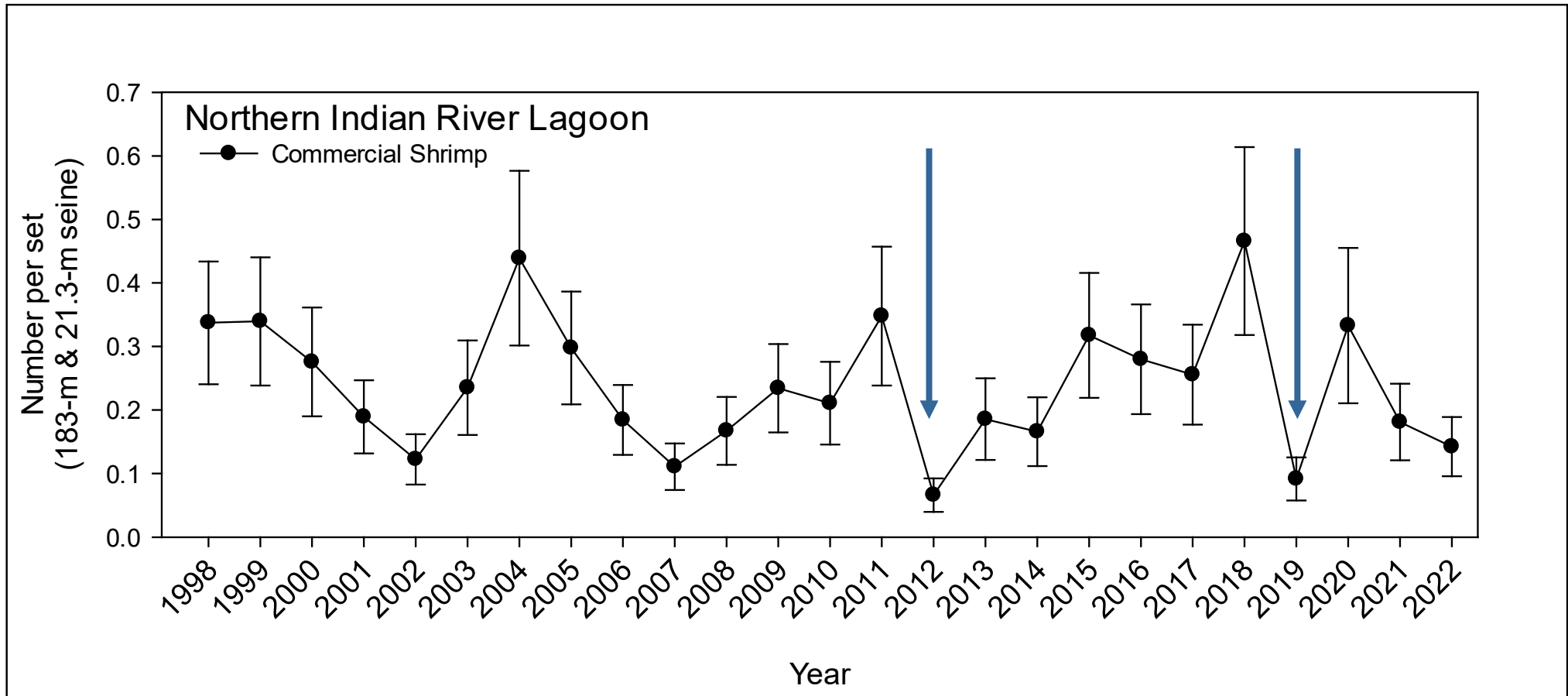


Figure 5. Relative abundance (\pm SE) of commercially-important shrimp (includes Brown, Pink, and White Shrimp) collected between 1998 and 2022 during FWC stratified-random sampling in the northern Indian River Lagoon.



Fisheries Independent Monitoring Trends

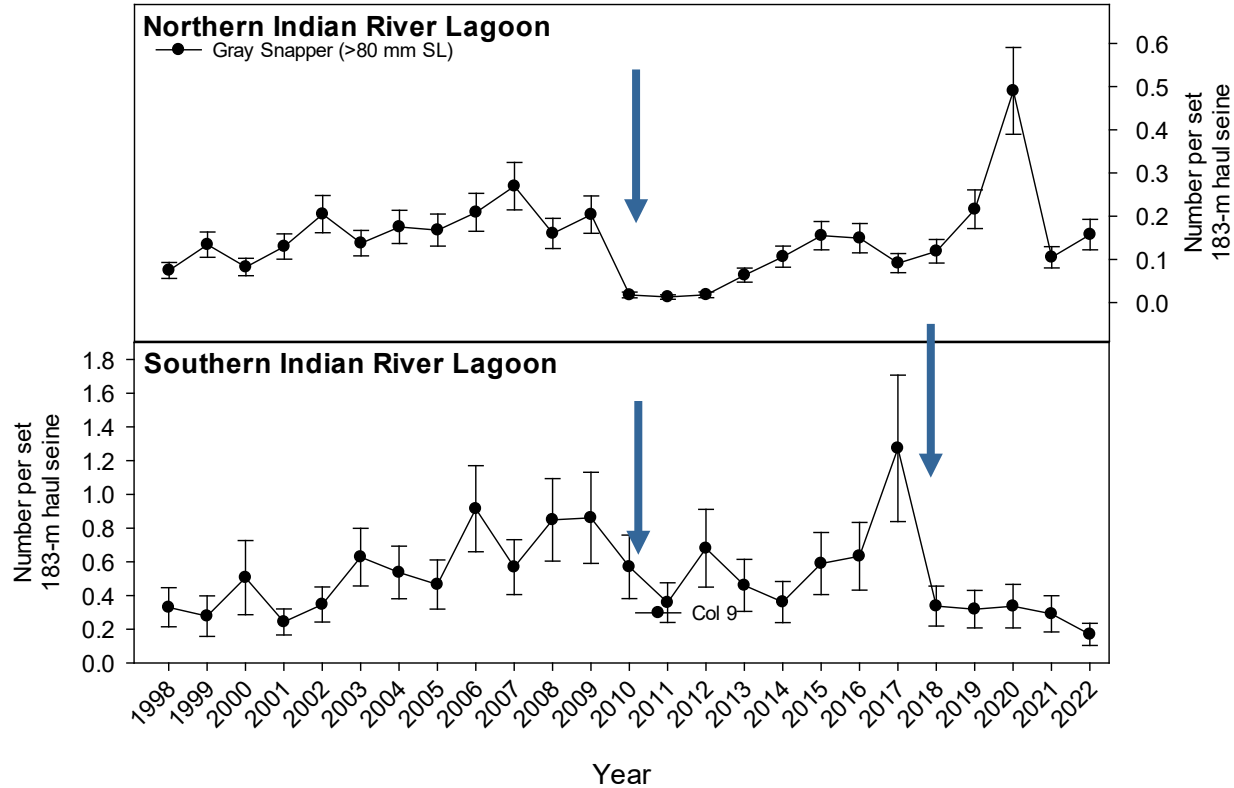
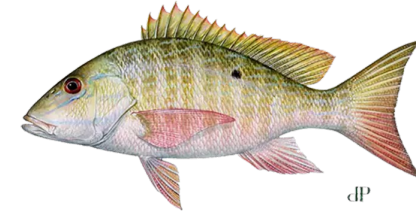
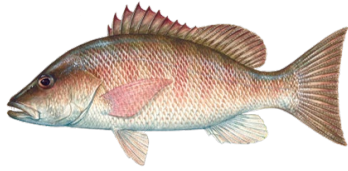
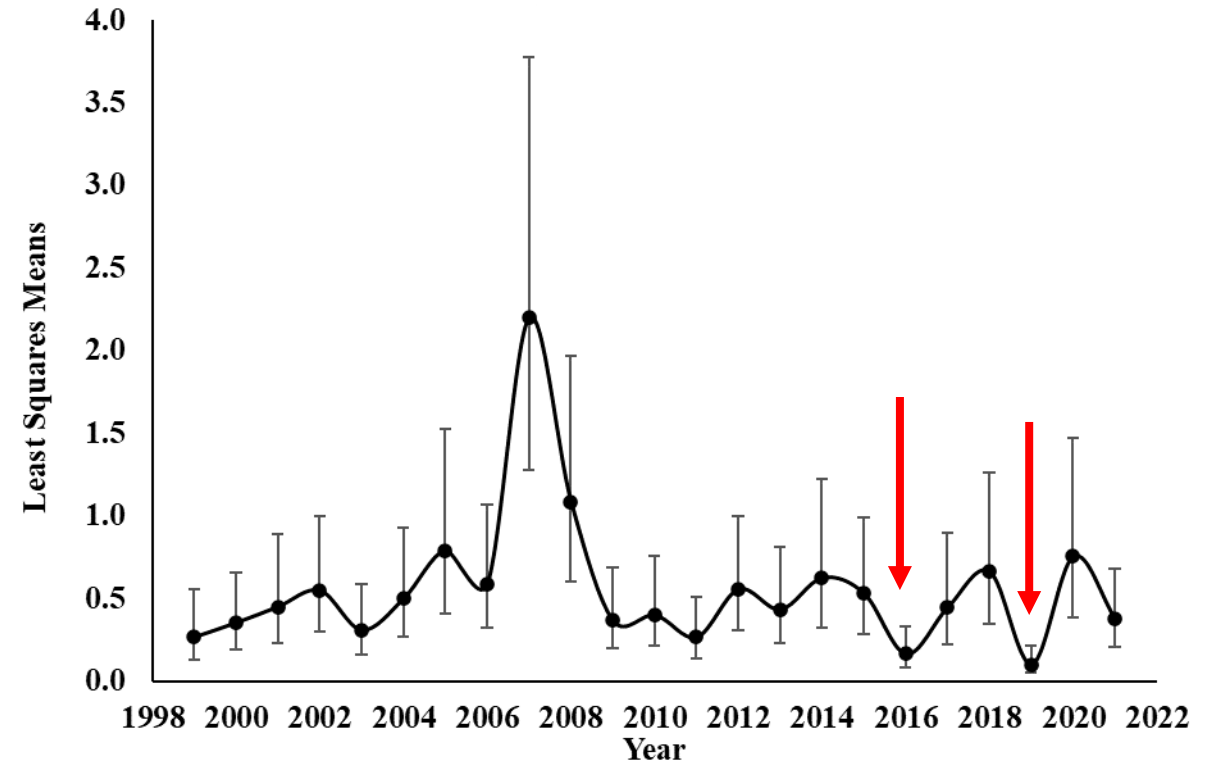


Figure 6. Relative abundance (\pm SE) of subadult and adult Gray Snapper (> 80 mm SL) collected between 1998 and 2022 during FWC stratified-random sampling in the northern and southern Indian River Lagoon. Data from FFWCC.



**Figure 7. Relative abundance (\pm SE) of Age-0 Mutton Snapper collected between 1999 and 2022 during FWC stratified-random sampling in the Indian River Lagoon. Data from FFWCC.

** Klimek, B., Christiansen, H., Allen, S., and Switzer, T. 2023. Age-0 Mutton Snapper Abundance Index from Inshore Surveys of Indian River Lagoon on Florida's Atlantic Coast. SEDAR79-DW-16. SEDAR, North Charleston, SC. 19 pp.

Indian River Lagoon
National Estuary Program

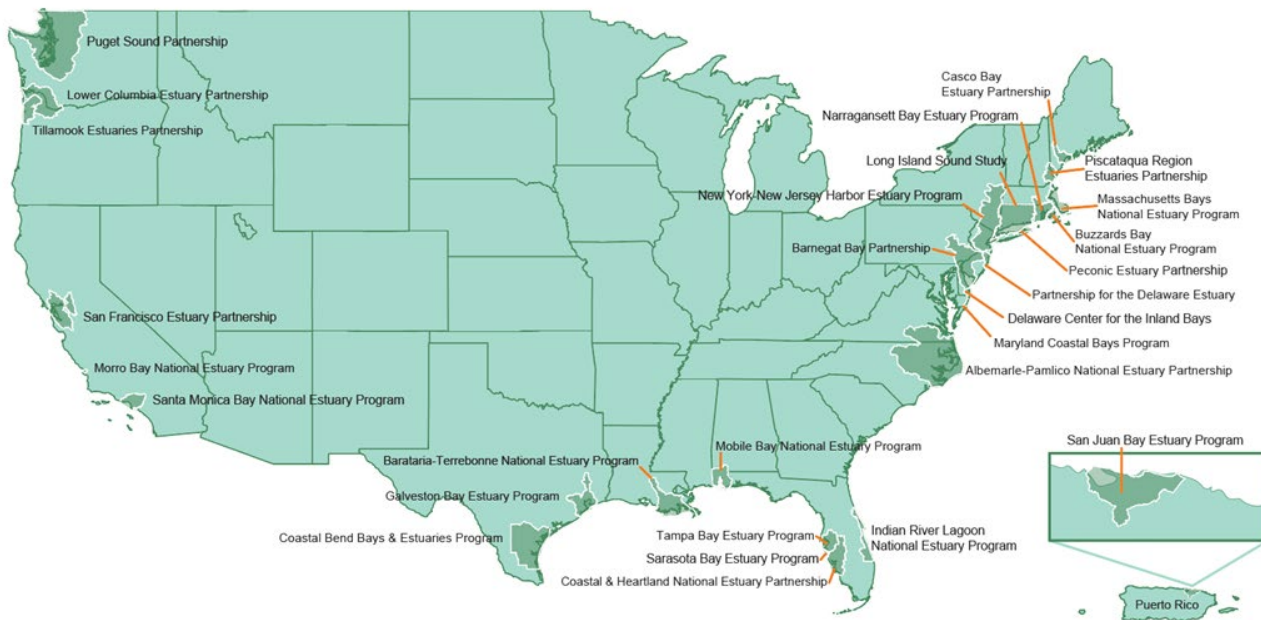


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Responding to the Crisis Evolution of the IRLNEP

28 estuaries dedicated by the U.S. Congress as “Estuaries of National Significance”



**Authorized as a core water program of
the Clean Water Act (Section 320)**

Congressional reauthorization in 2026

**NEP “*Management Conference*” Network
governance model**

- *Science-Based*
- *Inclusive*
- *Innovative*
- *Community-Driven*
- *Non-Regulatory*
- *Consensus-Building*
- *Collaborative*
- *Coordinated Action*



THE ASSOCIATION OF
**NATIONAL
ESTUARY
PROGRAMS**



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NATIONAL ESTUARY PROGRAM



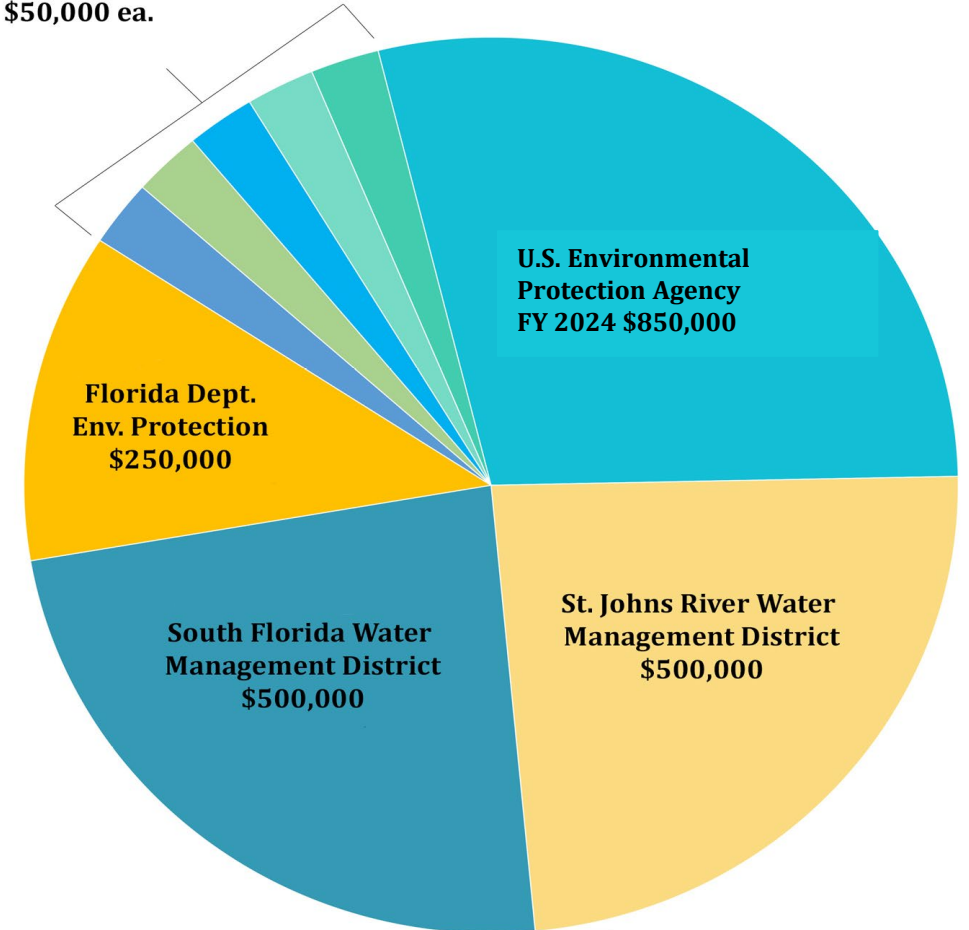
Responding to the crisis

***2015 Creation of the IRL
Council by interlocal
agreement***

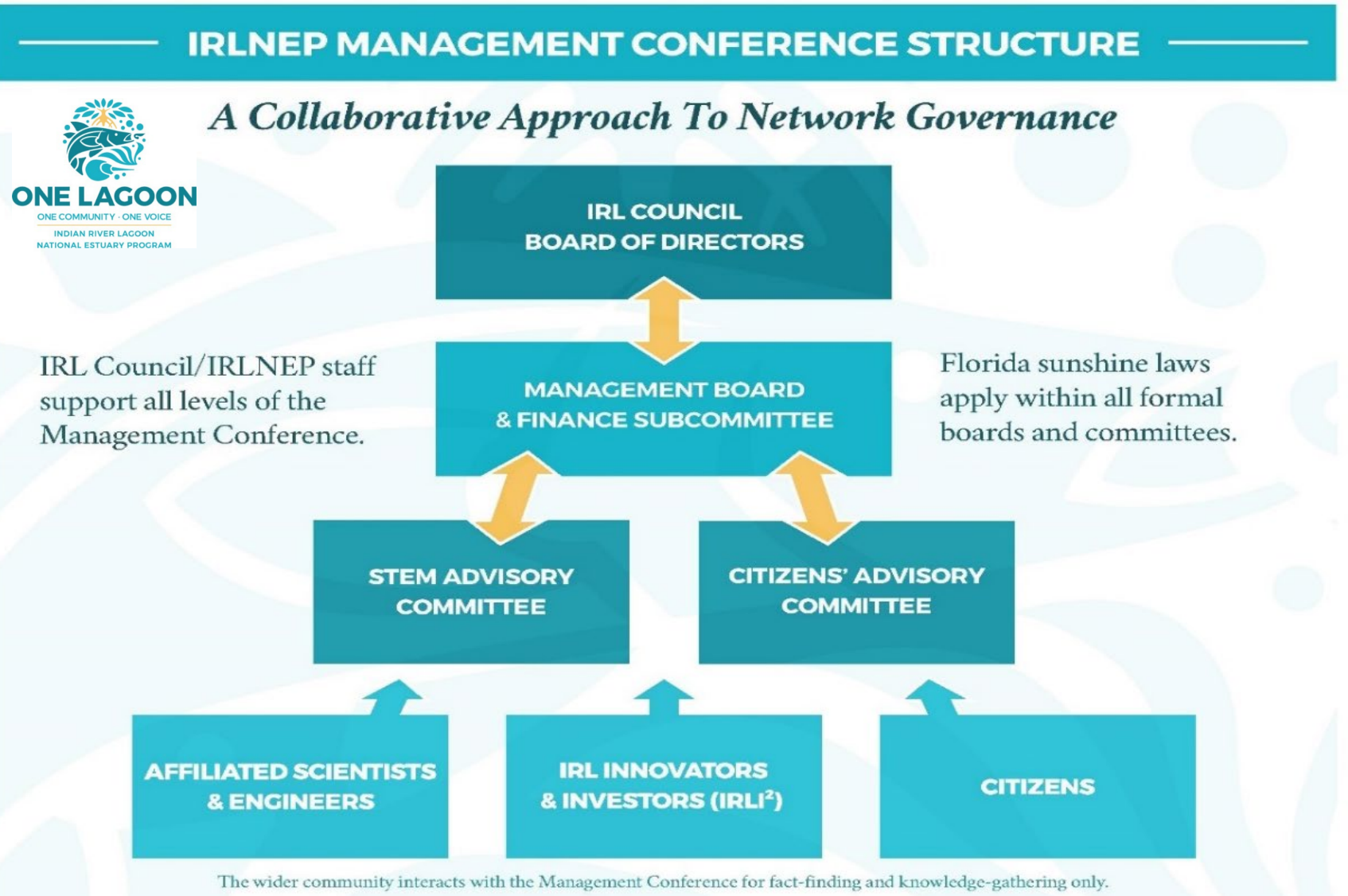
***Restructure the IRLNEP
business model and brand***

Annual IRLNEP Funding From IRL Council Partners

Volusia, Brevard, Indian
River, St. Lucie and
Martin Counties
\$50,000 ea.



The IRLNEP Management Conference



FY 2024

~ 100 Volunteers

**IRL Council Staff
8 FTE's**

*Shared Expertise
Shared Experience
Shared Perspectives
Recommend Actions*



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Our Role:

- Develop and Implement a 10-year Comprehensive Conservation and Management Plan (CCMP).
- Assist stakeholders to implement the plan and track progress.
- Update CCMP in 2025

www.onelagoon.org

LOOKING AHEAD TO 2030

A Ten Year Comprehensive
Conservation & Management Plan
for the Indian River Lagoon, Florida



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Heart of the CCMP

32 Lagoon Vital Signs for Lagoon Health



Success requires communication, coordination, collaboration and a shared vision





What we do:

Annual competitive grants program

2025 IRLNEP RFP Schedule

- Water Quality (Awarded 3 projects/9 proposals submitted)
- Habitat Restoration (Awarded 2 projects/3 proposals submitted)
- Community Engagement in Restoration (Awarded 4 projects/4 proposals submitted)
- Science & Innovation (Awarded 4 projects/9 proposals submitted)
- **Small Grants Program** (24 proposals received, currently evaluating)
- Priority Communities (IIJA – TBD/Fall 2024)

What We Do: *Invest in Projects*

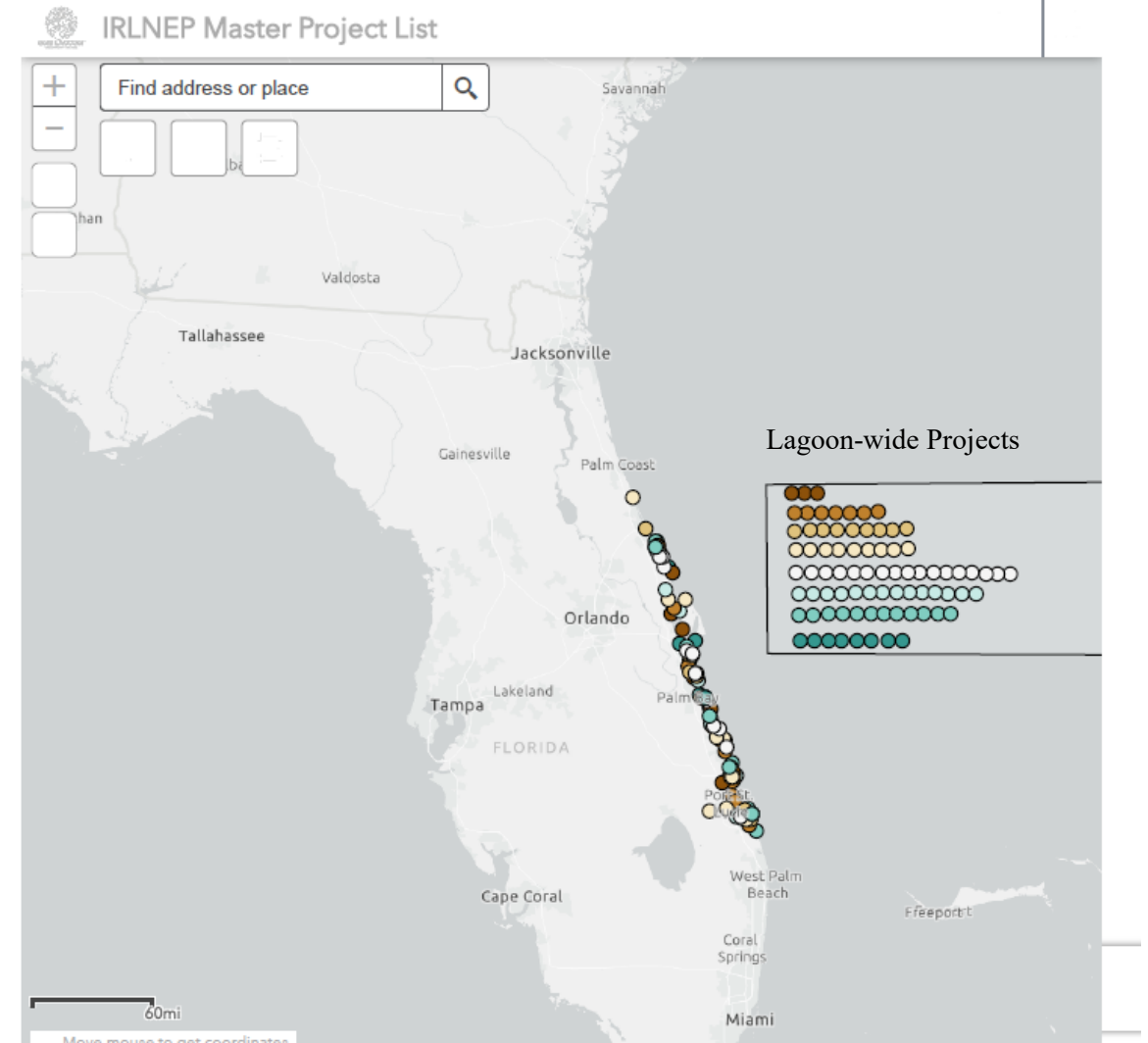
IRLNEP PROJECT FUNDING BY COUNTY (Fiscal Years 2015-2023)		
Project Location	Funding Amount (All Sources)	Number of Projects
Volusia County	\$1,668,025	21
Brevard County	\$1,862,539	29
Indian River County	\$1,349,035	18
St. Lucie County	\$1,685,731	20
Martin County	\$2,774,223	22
Lagoon-wide	\$5,249,155	85
Total:	\$14,588,708	195

NEW: IRLNEP Project Story Map

<https://onelagoon.org/master-project-map-1-0/>

FDEP: Lagoon Shoreline Restoration Project

Fiscal Year	2016
Completion Status	Complete
IRLNEP Funding Amount	50,032
Source	Section 320
Funds Match	57,897
Vital Signs Category	Habitats
Category	Restoration
Other Partner(s)	
Contract Number	2016-012
Name of Project Lead	Irene Arpayoglou
County	Brevard
Folder Path	More info
Contract	More info
One Page Summary	
Final Report	More info
Photo	More info



What We Do: *Support Our Partners*



Angie Brewer, CEO and Owner
9080 58th Drive East, Suite 200
Bradenton FL 34202
<http://angiebrewer.com/>



844-NATUA-ST x700 | 844-628-8278 x700
140 S. BEACH STREET, SUITE 310, DAYTONA BEACH, FL 32114

Kelli McGee, President
www.natuastrategies.com



Teri Pinney, President
1263 SW Cedar Cove
Port Saint Lucie, FL 34986
www.teripinneyawc.com

Grant Writing Support (Examples)

- **Brevard County** - Stan Mayfield Working Waterfront grant (Natua)
 - IRLNEP cost \$6,338
 - Award amount: \$1,493,300
- **Marine Discovery Center, NSB** - ECHO grant (T.Pinney)
 - IRLNEP cost \$2,700.
 - Award amount: \$224,851
- **St. Lucie County** - Federal 319 grant (Angie Brewer)
 - IRLNEP cost \$6,250.
 - Award amount: \$1,000,000
- **City of Sebastian** – SJRWMD cost-share grant
 - IRLNEP cost \$4,500
 - Award amount \$803,874
- **Indian River Land Trust** (Natua)
 - IRLNEP cost \$15,150
 - Award amount \$984,000 (pending)



What We Do:

Seek and secure new funding

Infrastructure Investment and Jobs Act (IIJA)

*a.k.a Bipartisan Infrastructure
Law (BIL)*

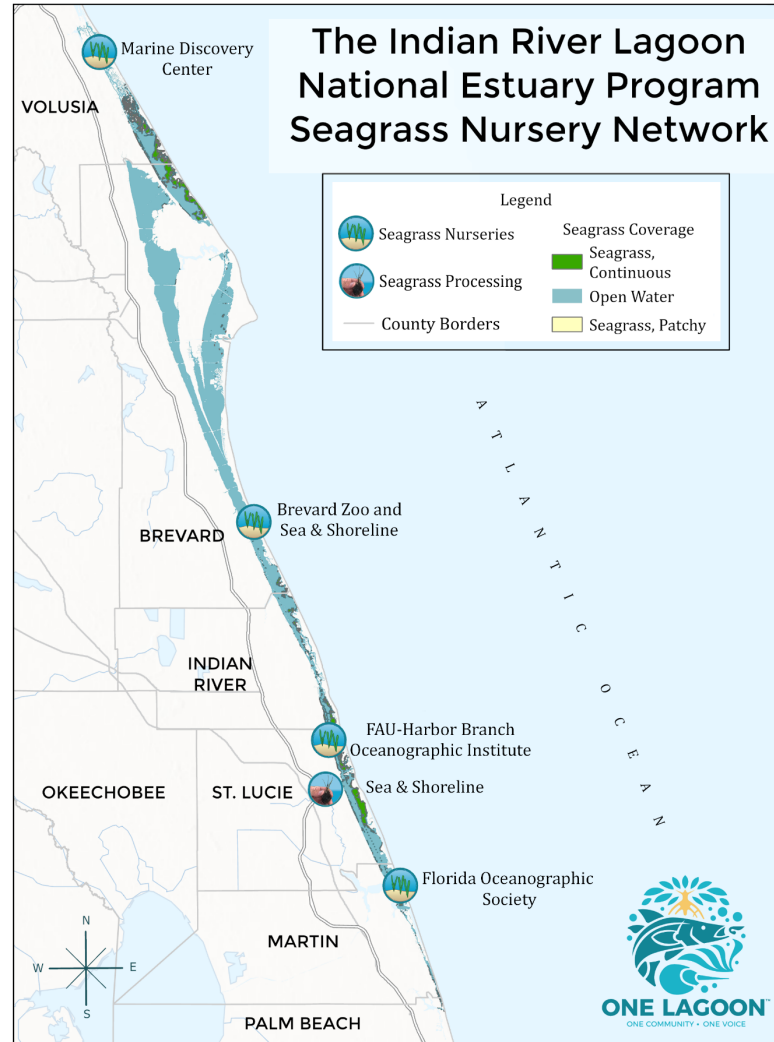
Congress appropriated \$132 million in funding for the 28 National Estuary Programs (NEPs) for fiscal years 2022 through 2026.

Funding evenly distributed to the NEPs annually providing each with \$909,800 in BIL funds.



Building Lagoon-Wide Capacity

Seagrass Nursery Network (~\$2.5 M)



**Supporting
research,
restoration
and recovery**





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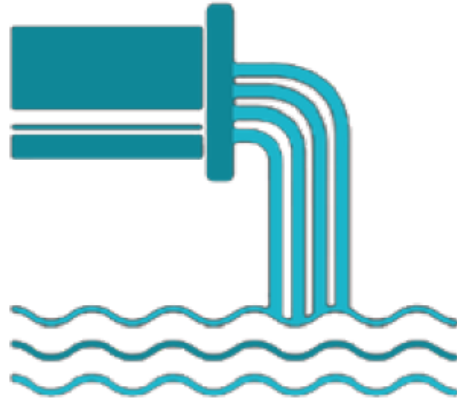
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Lagoon Restoration

Evidence of Progress – Local Investments

Partners At Work

There's More Going on to Help the Lagoon Than You Think



301

Projects accomplished
by IRLNEP partners
in fiscal year 2023

When we asked our federal, state and local partners what IRL-focused projects they were working on, outside of any joint projects with the IRLNEP, we received information on 301 projects that were either completed or in progress during fiscal year 2023.

This brings the total number of reported projects to 870 over the past three years. Congratulations partners!

Evidence of Progress

Transformational Local Leadership and Investment

Brevard County Save Our Indian River
Lagoon Sales Tax revenues now
projected at \$586 million over 10
years.

Tourist spending accounts for over
20% of annual revenue.

2024 Draft Project Plan available for
review at:

<https://www.brevardfl.gov/SaveOurLagoon/ProjectPlan>

Save Our Indian River Lagoon Project Plan 2023 Update for Brevard County, Florida



Prepared by:
Tetra Tech, Inc.



Prepared for:
Brevard County, Natural Resources Management Department



February 7, 2023

Evidence of Progress

Historic Statewide Legislation and Funding

Clean Waterways Act (2020)

Resilient Florida Program (2021)

IRL Protection Program (2023)

**2023 Appropriation: \$100 million FY 23-24
21 water quality improvement projects funded**



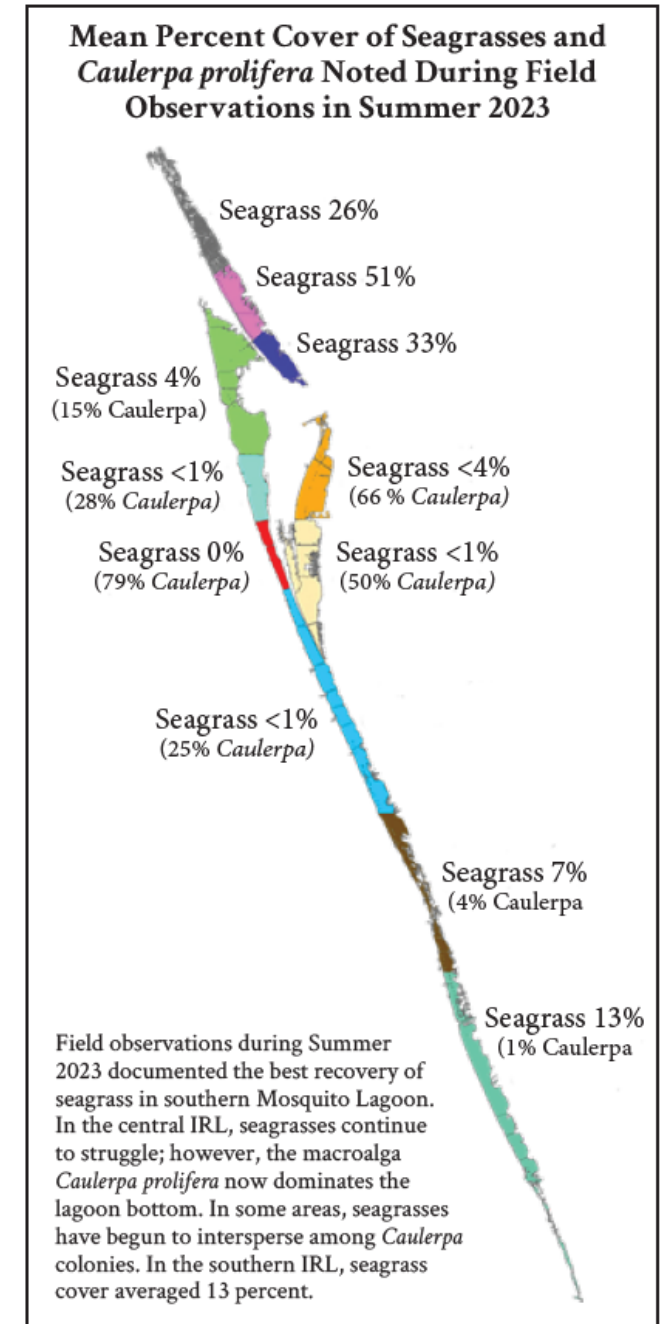
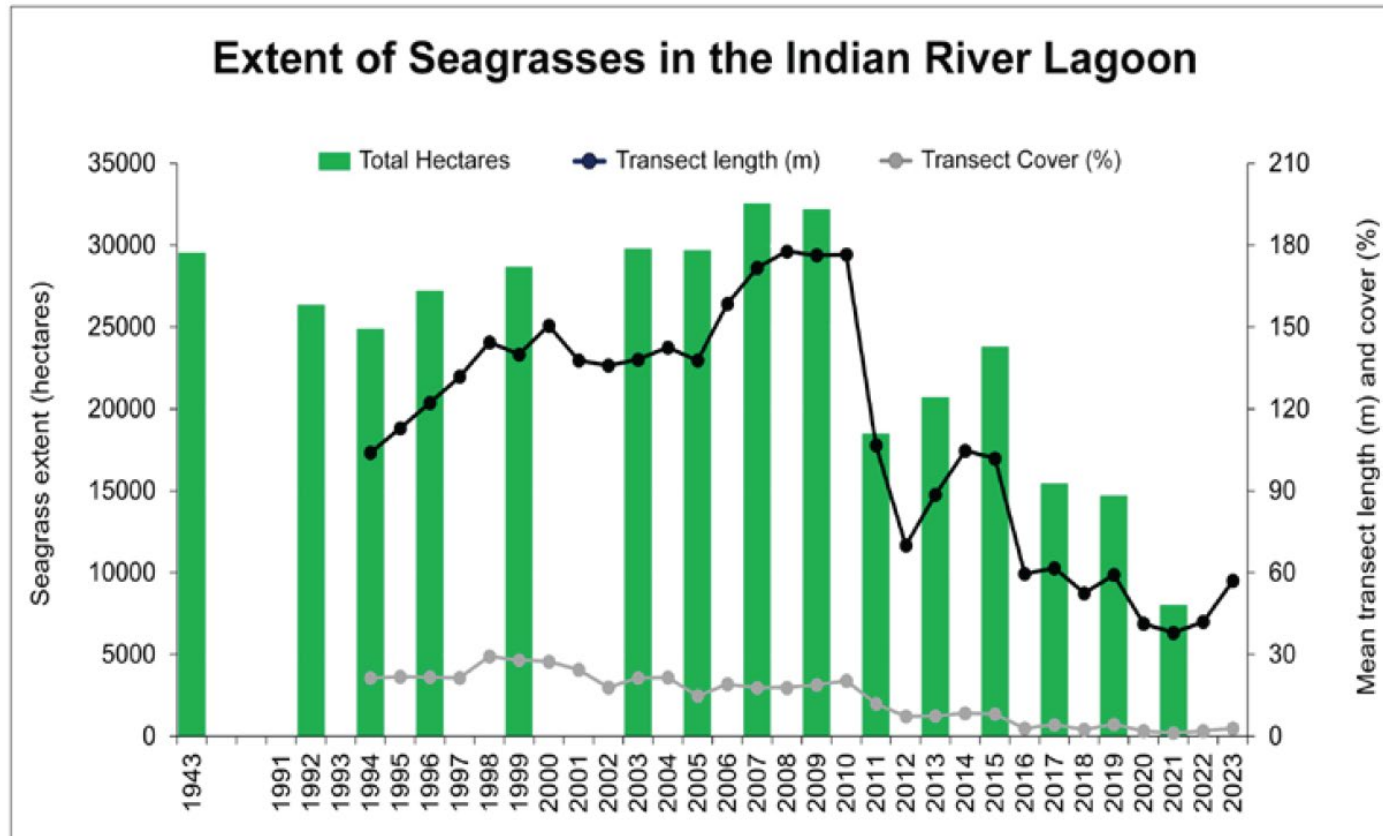
**Governor DeSantis
Executive Order 23-06**



<https://protectingfloridatogether.gov/state-action/grants-submissions>

Evidence of progress (2022-2024)

- *Some WQ improvements*
- *Some seagrass recovery*
- *System remains highly vulnerable*



Evidence of progress (2022-2024)



Water clarity and seagrass recovery in 2023-2024
Encouraging, but we are NOT out of the woods

Challenge: Manage expectations

Restoration Success

SEEMED LIKE
OVERNIGHT SUCCESS TO
EVERYONE NOT
WORKING OR WATCHING

OVERNIGHT SUCCESS

Do the work

Secure funding

Submit a proposal

Identify a project

Have an idea

Read something

Have a need

What people think it looks like

Start - Stop
Fail - Restart

Start the work

Secure funding

Submit a proposal

Revise design

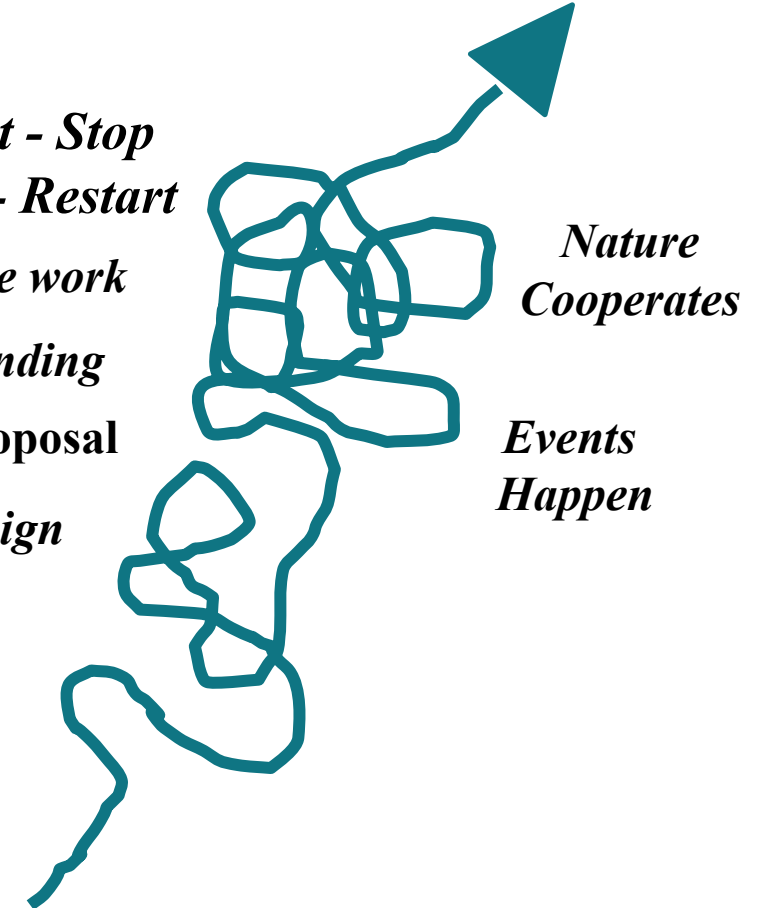
Get Data

Identify a project

Read something

Have an idea

Have a need



What it really looks like



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Innovative Solutions and
Transformational Opportunities

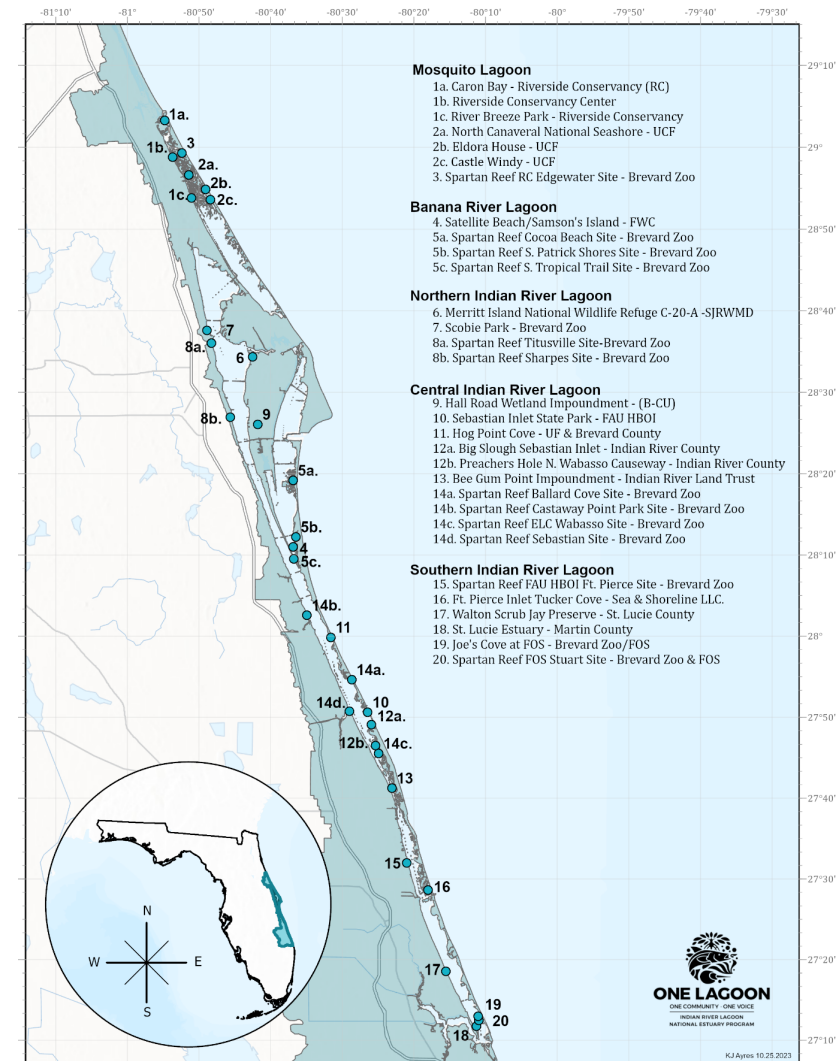


Transformational Habitat Restoration and Coastal Resilience Grant Proposal 2023

\$12.4 million request, NOAA Decision Pending
15 partner organizations

Restoration Targets:

- Seagrasses - 73 acres.
- Oyster Reefs - 7 acres.
- Wetland Restoration/Fish Passage - 2,125 acres.
- Spartan Fish Reefs - 12 sites/1,800 ft² of structure.
- Living Shorelines - 8,450 linear feet with 2,928 Mangrove plants and/or 6,985 Salt Marsh plants.
- Clams - 22 million.
- Community Volunteers – estimated at 2,659.



Transformational Opportunities – investments in sensor technology, monitoring and modeling, and data analytics



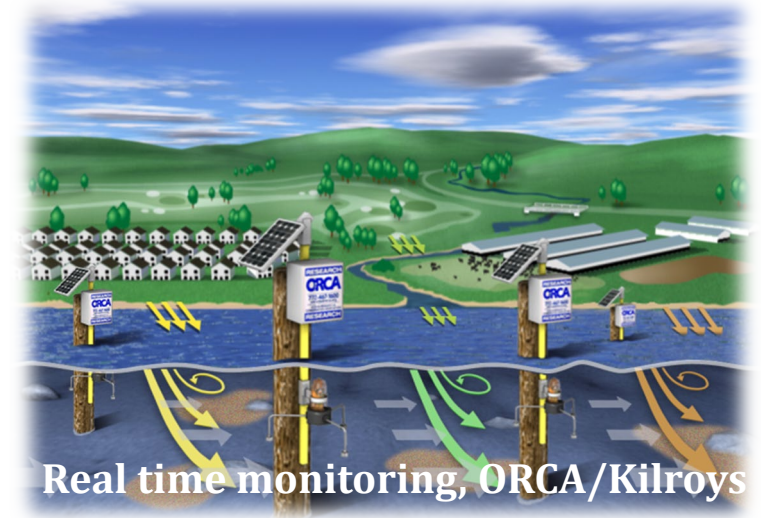
Remote monitoring of HABs by Applied Ecology Inc. and Brevard County (<https://appliedecologyinc.com/>)

<https://www.isensys.com/>



<http://www.fau.edu/hboi/irlo/irlon.php>

Real time monitoring, FAU-HBOI



Real time monitoring, ORCA/Kilroys

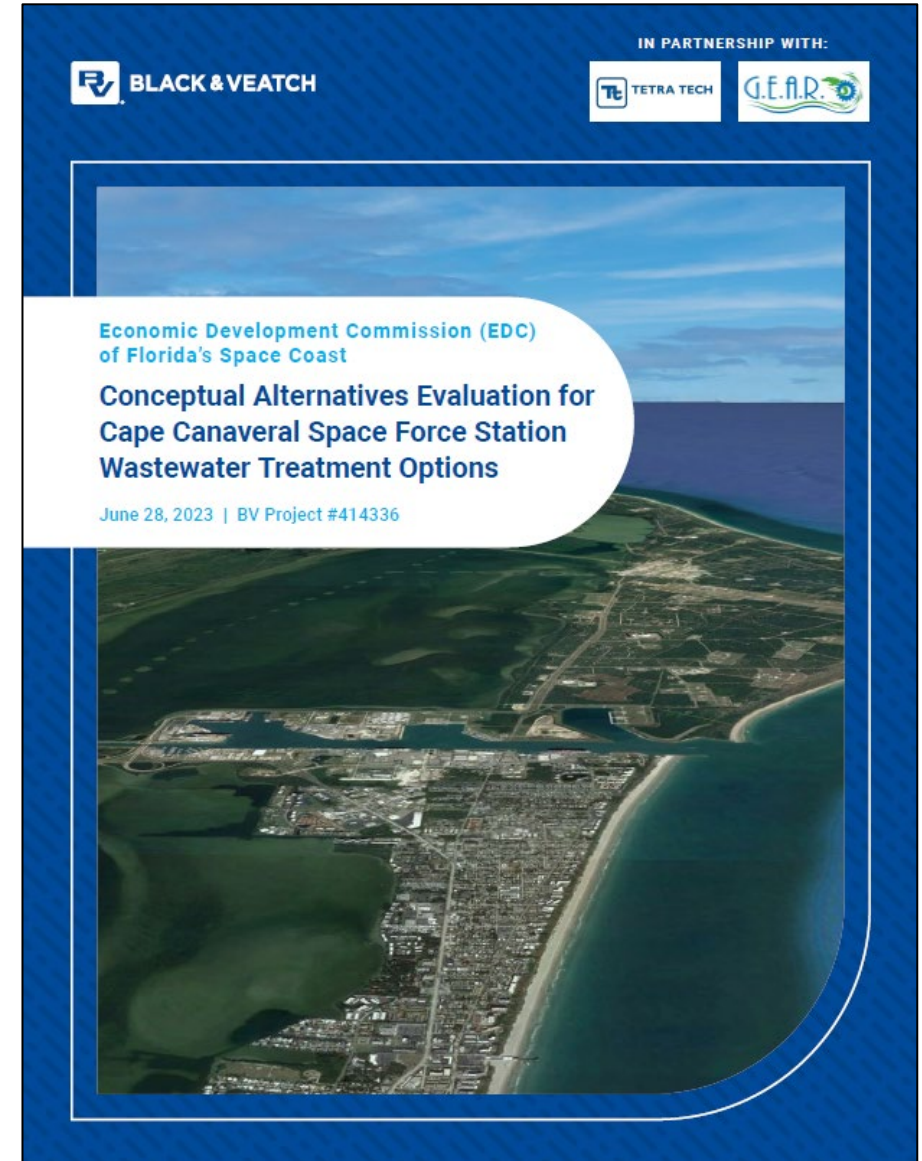
<http://www.teamorca.org/>



Transformational Project

Evaluating options for a new WWTP to serve KSC and central Brevard

The EDC received a \$200,000 grant from the Florida Defense Support Task Force to evaluate WWTP infrastructure needs, improvements and options.



Transformational Project

FPUA wastewater treatment plant relocation

- Resilient location
- Enhanced water reuse
- Expanded capacity
- Mitigates environmental risks
- Applies innovative AquaNereda® secondary treatment process introduced in the Netherlands.



www.sustainablesewer.org

Transformational Project - Brevard Zoo Aquarium



<https://ourlegacycampaign.org/>





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Questions?

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