

Florida International University Institute of Water and Environment (InWE): Research, Education and Engagement that is Relevant

Dr. Todd A. Crowl

Founding Director, Institute of Water and Environment
Director, Southeast Environmental Research Center
Co-Founder, Sea Level Solutions Center

Universita per Stranieri di Perugia
Perugia, Italy
November 9, 2017

Vision statement

Advancing the science needed to address complex water and environmental issues, both locally and globally, through interdisciplinary research, education, and public engagement by linking scientists with local, state, and federal stakeholders to foster environmental sustainability.

Mission Statement

The FIU Institute of Water & Environment brings together existing centers, research programs and scientists and engineers from throughout the university to address regional, national and global water and environmental issues through innovative interdisciplinary research and cutting edge technology.

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Medina Aquarius

Lead: J. Fourqurean

NOAA – FKNMS
(Florida Keys
National
Marine
Sanctuary)

RB-NERR
(Rookery Bay
Estuarine
Research
Reserve)

SLSC

Sea Level Solutions Center

Interim Director: T. Troxler

SERC

Southeast Environmental Research Center

Co-Directors: T. Crowl, P. Gardinali

Facilities:

- Field Operations Center (FOC)
- Analytical Facilities

CREST-CAC_hE

Center for Aquatic Chemistry and Environment

Leads: Gardinali, Teutonico, Graham

Facility:

- CAC_hE Nutrient Analysis Lab

FCE Everglades Program

Lead: Gaiser

Office of
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Restoration
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Cross-Cutting Programs

SBEI (Sustainable Built Environment and Informatics) - Vassigh

SES (Socia-Ecological Systems) - Mozumder

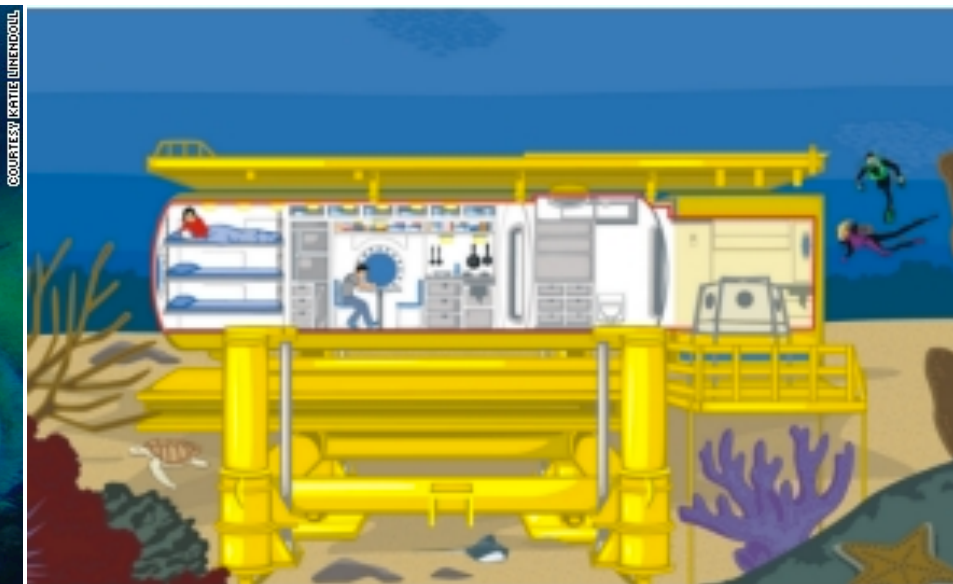
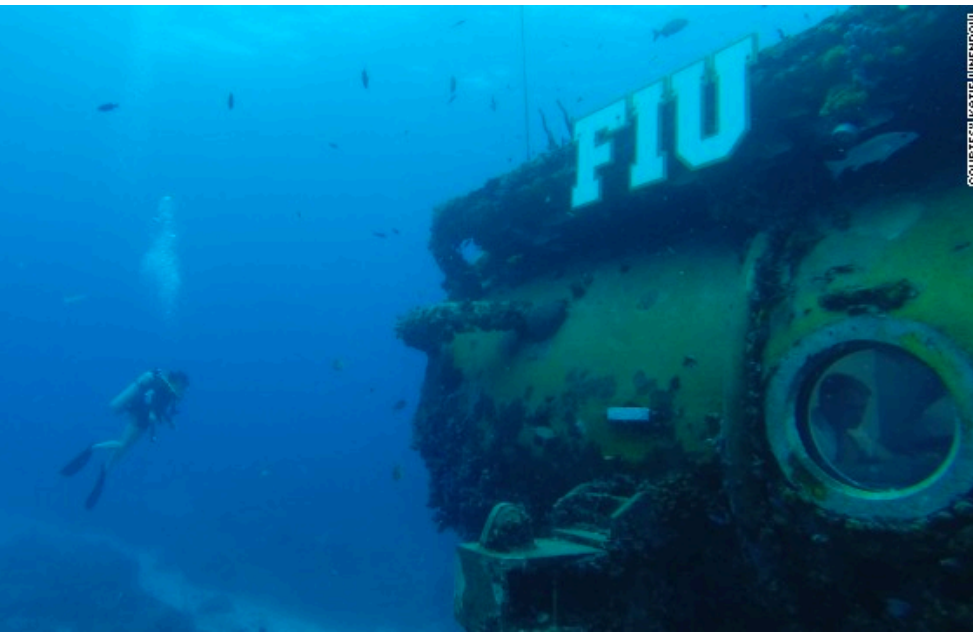
IWG (International Water Programs) – Boukerrou, Donoso



http://www.twitch.tv/boswell_lab3

http://www.twitch.tv/boswell_lab

<https://aquarius.fiu.edu/media/watch-live/>



Art by Simey Tabak, copyright Scholastic Inc., used with permission.

Epigenetic biomarkers of brevetoxin exposure during Florida Red Tides in Eastern Oyster

DINOFLAGELLATES
Karenia brevis

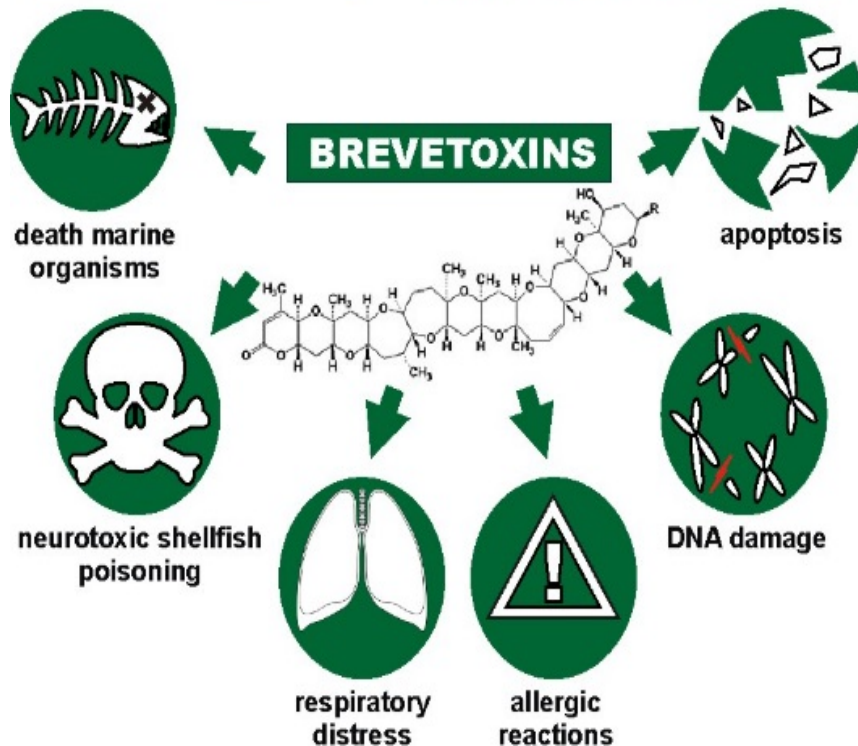


HARMFUL ALGAL BLOOM
Florida Red Tide



Dr. Jose Eirin-Lopez
jeirinlo@fiu.edu

Harmful algal blooms caused by massive proliferations of brevetoxin-producing dinoflagellates and the genotoxic effect of the toxin on the hereditary material



Epigenetic biomarker for
brevetoxin biomonitoring

Characterization of procedures for
rapid and sensible brevetoxin
detection

Chemical and Biological Diversity of Novel Cyanobacteria in Florida with Biomedical Relevance

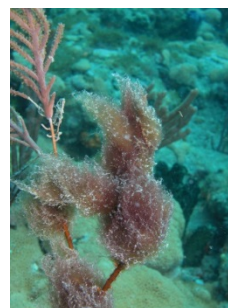
Caldora



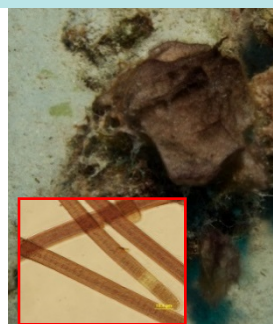
Moorea



Dapis



Okeania



C. penicillata

M. producens

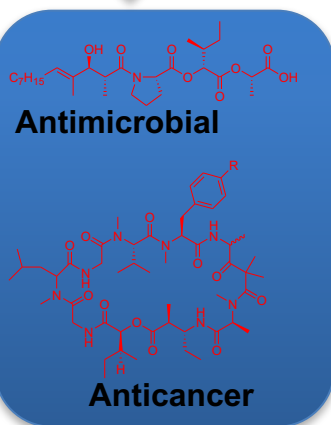
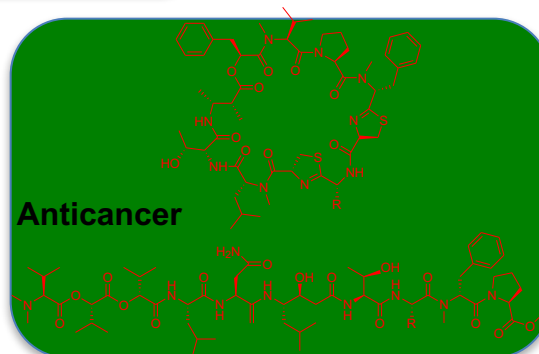
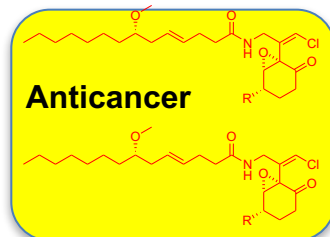
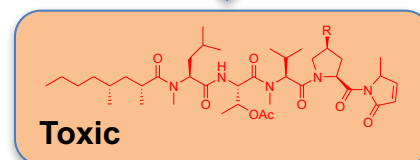
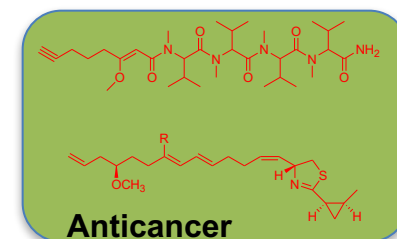
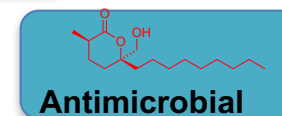
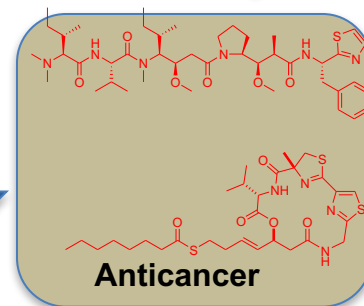
D. pleousa

O. erythroflocculosa

O. lorea

O. hirsuta

O. plumata



Engene et al., *J. Phycol.*
2013, 49: 1095-1106.

Engene et al., *Int. J. Syst. Evol. Microbiol.* 2012, 62: 1172-1179.

Engene et al., *J. Phycol.* 2015, 51: 670-681.

Autonomous Surface Vessel

Kevin Boswell; Kevin.boswell@fiu.edu

Supports:

Fisheries Ecology

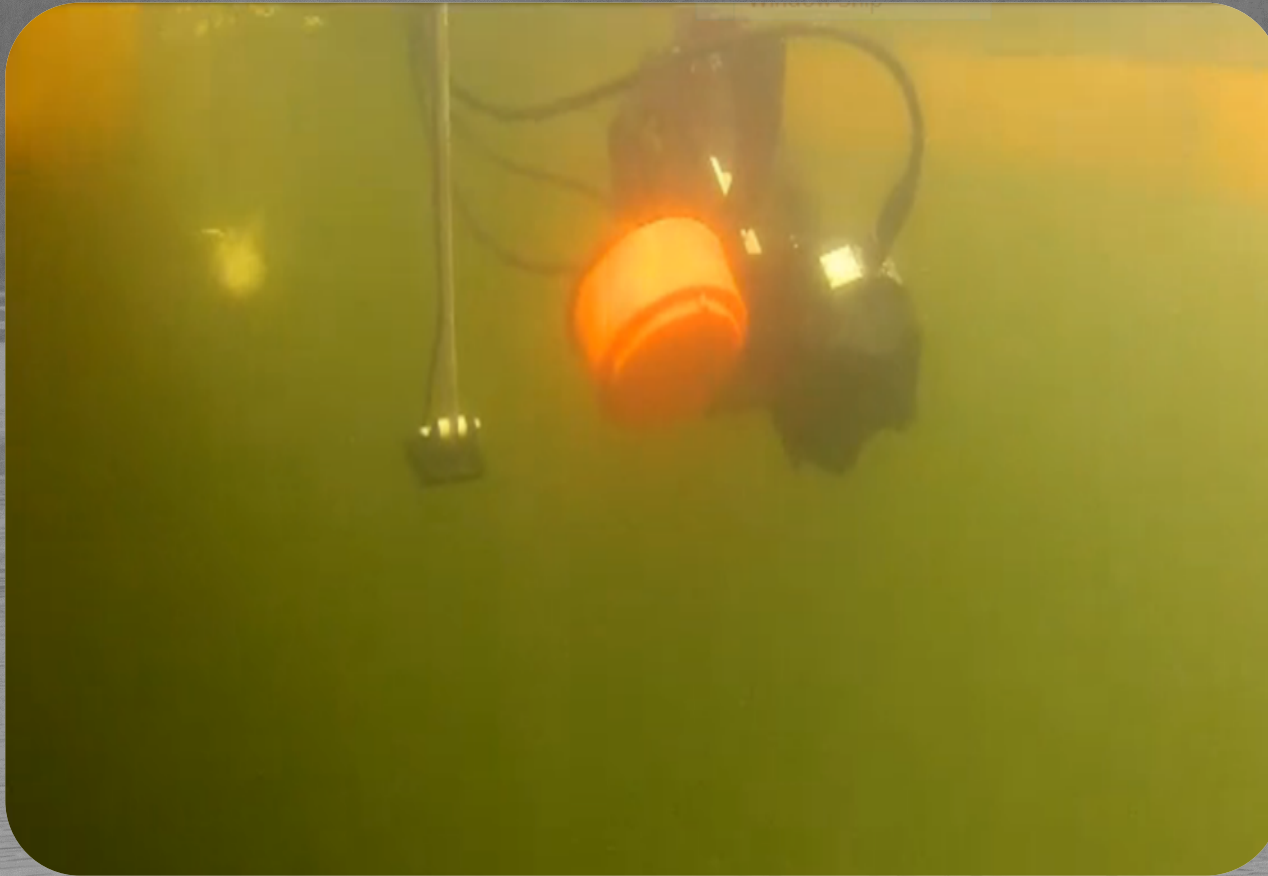
Behavioral Studies

Habitat Classification

Bathymetric profiles



Autonomous Surface Vessel



Supports:

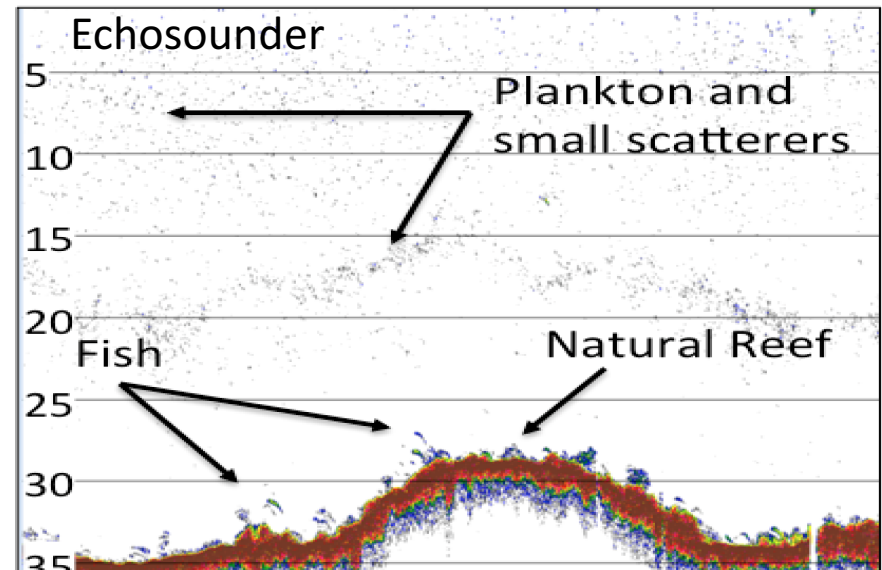
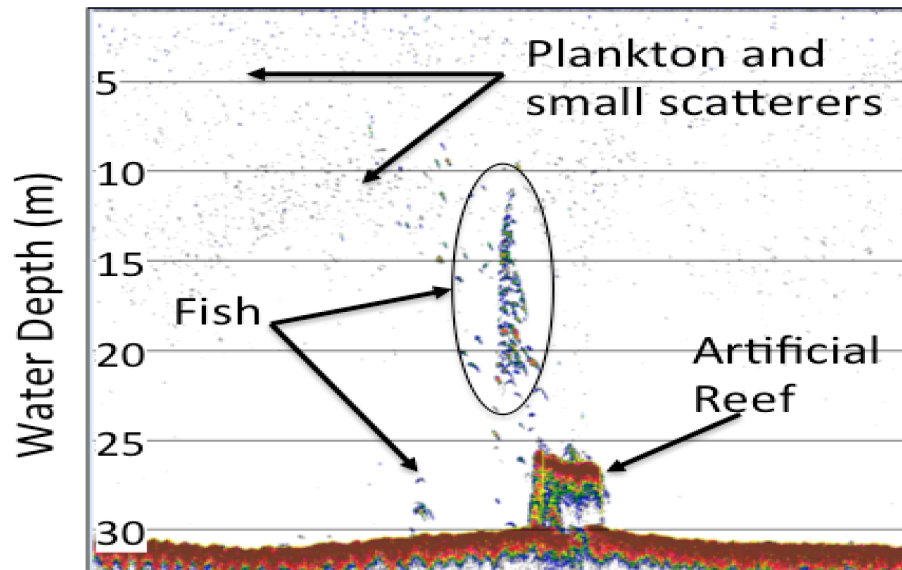
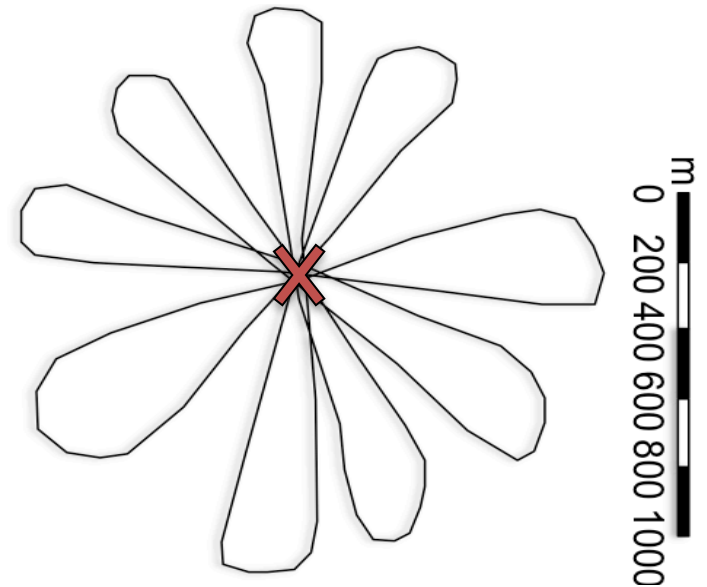
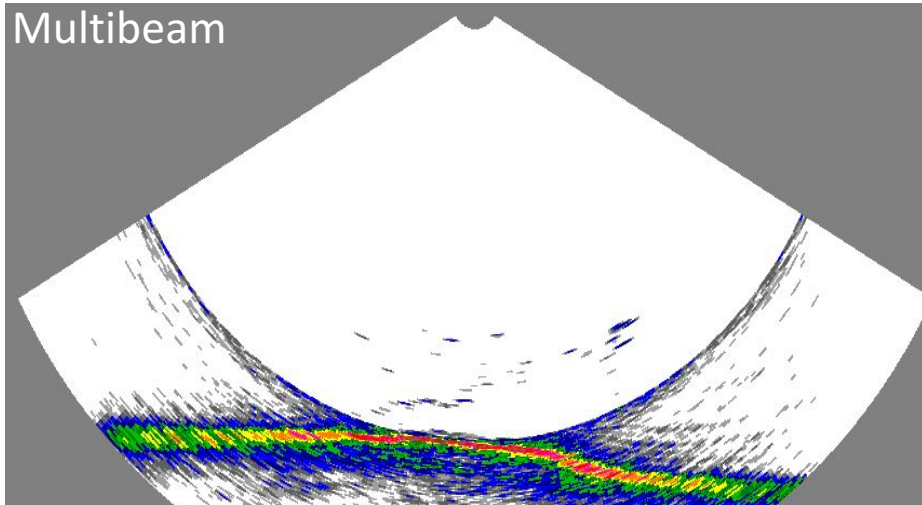
Fisheries Ecology

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Habitat Classification

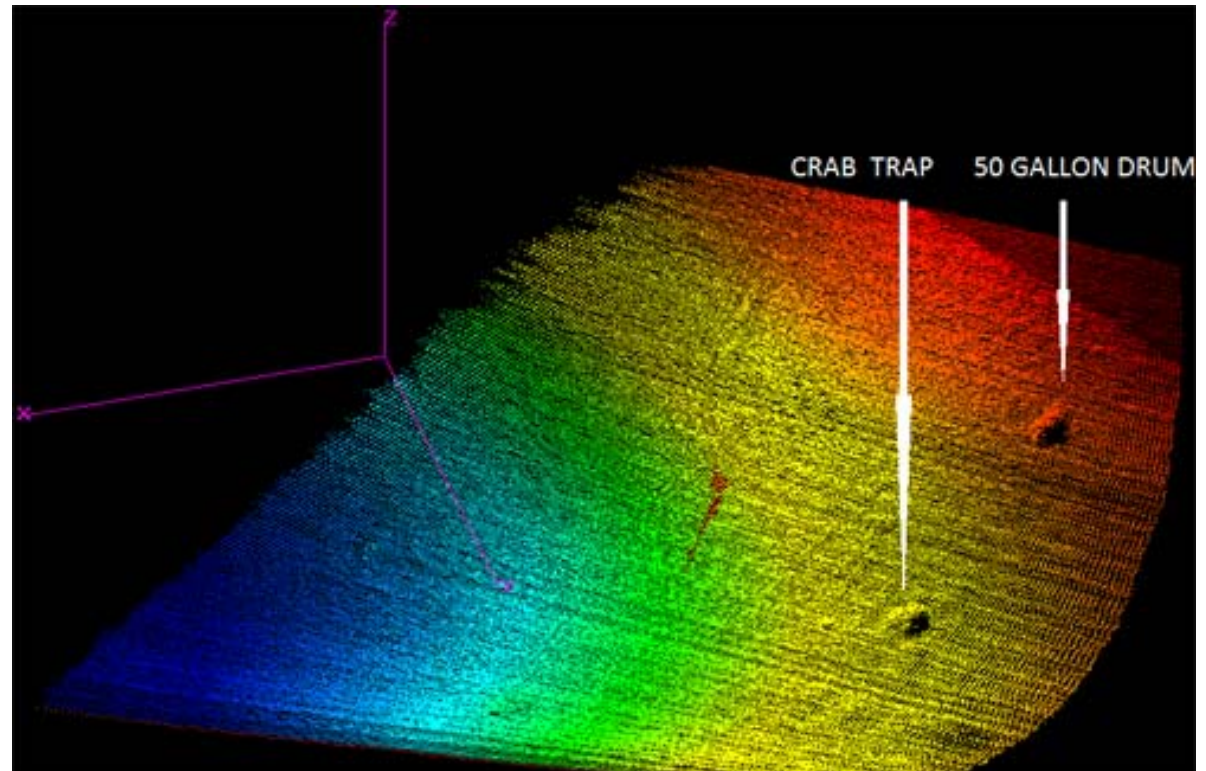
Bathymetric profiles

Multifrequency/Wideband Acoustics



Fine-scale bathymetry in shallow coastal waters

Kongsberg M3 Multibeam sonar



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Sea Level
Solutions Center

FLORIDA INTERNATIONAL UNIVERSITY

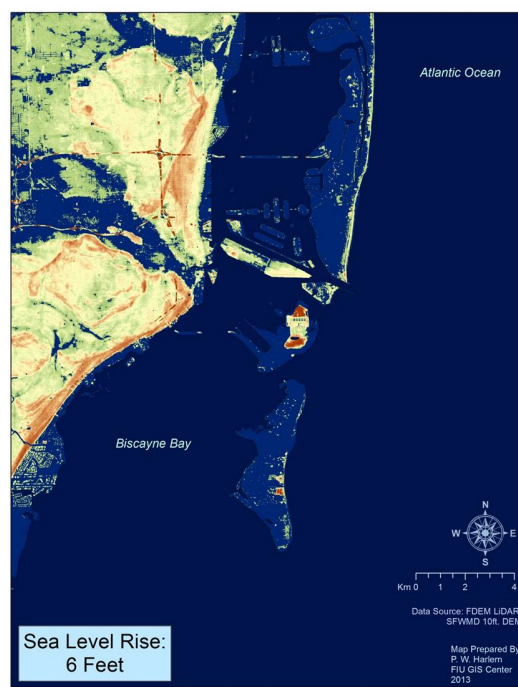
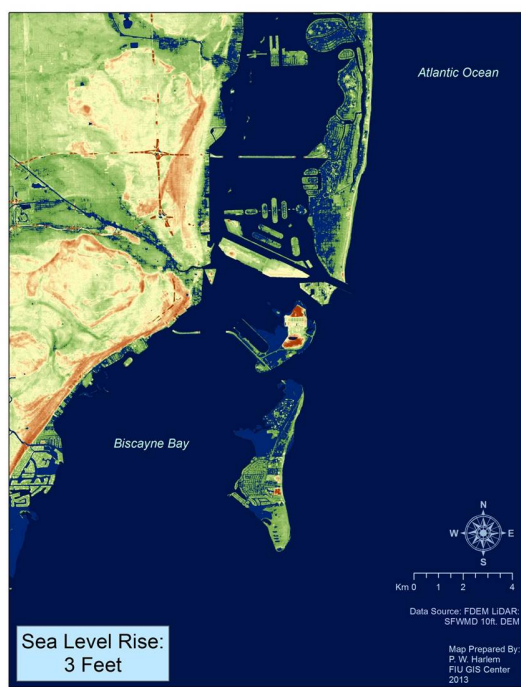


Institute of Water
and Environment

slsc.fiu.edu

The SLSC is a university-wide interdisciplinary center

- *Bringing research and education together, to advance our understanding of the causes and impacts of sea level rise*
- **Our mission is to convert this knowledge into actions for the benefit of society.**



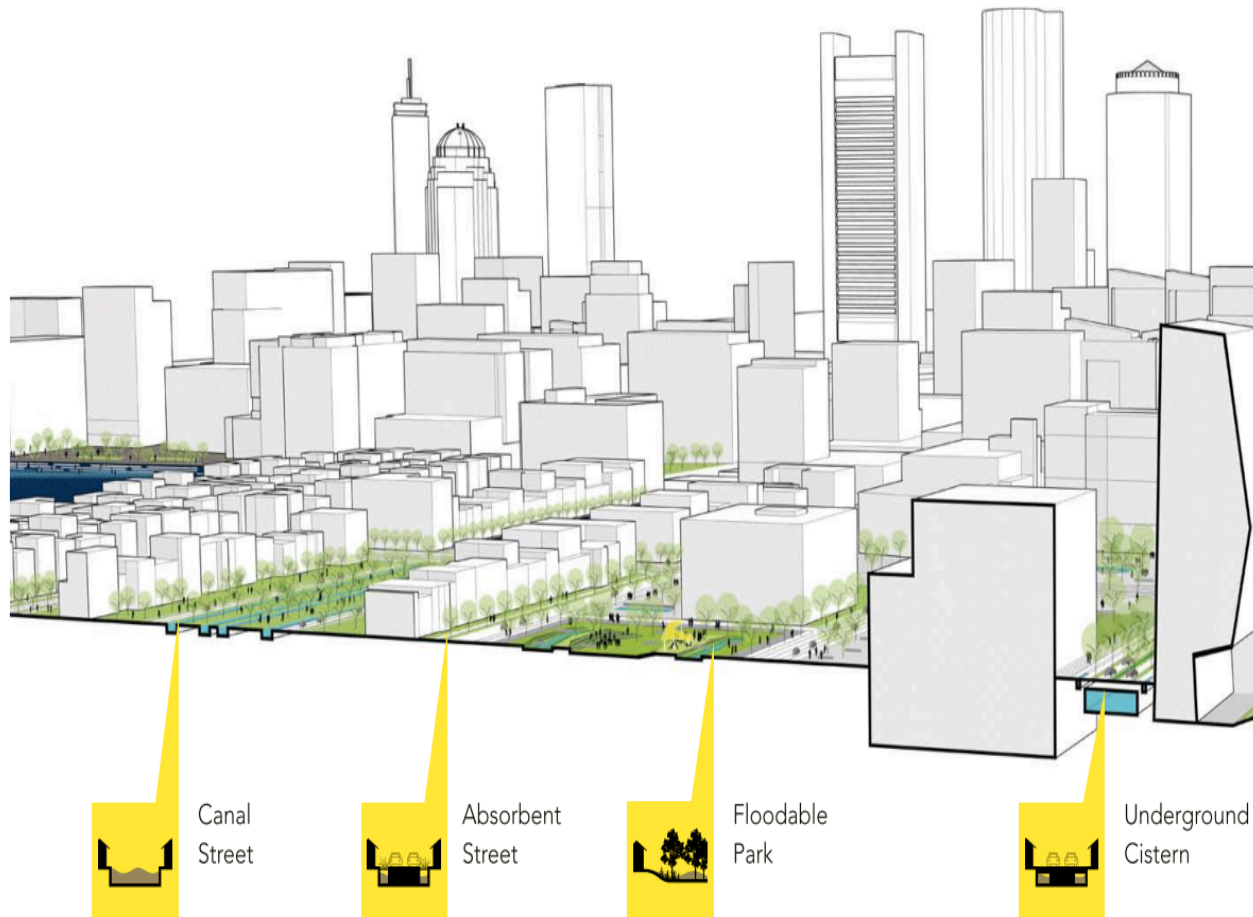
The SLSC collaborates with interdisciplinary organizations, both local and regional

- To design and implement adaptation and mitigation strategies, for a more resilient and prosperous South Florida

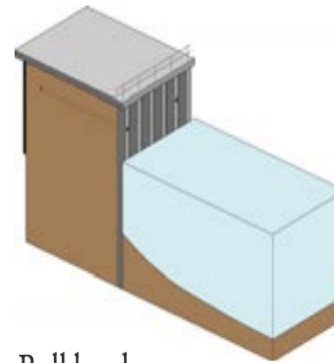
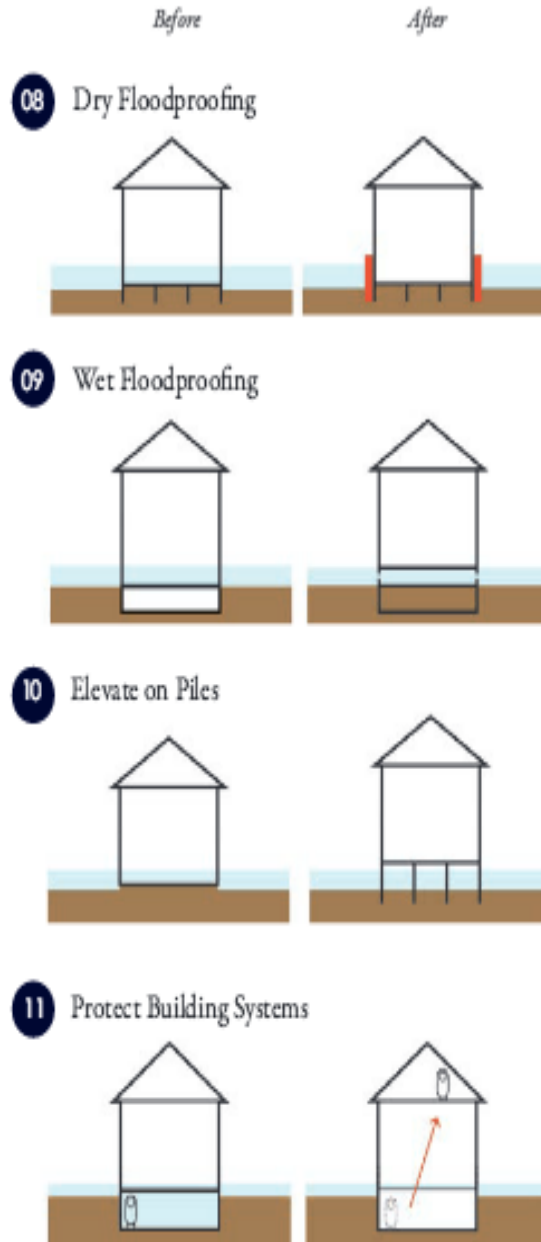


MAKING ROOM FOR WATER IN THE CITY

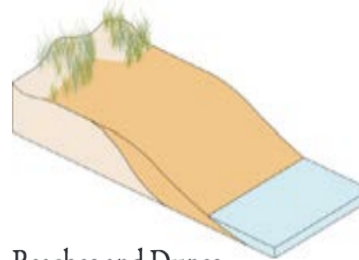
PUBLIC SPACE



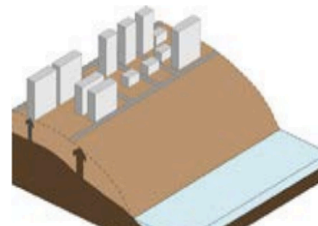
Sustainable Built Environment and Informatics
Dr. Shahin Vassigh - svassigh@fiu.edu



Bulkheads



Beaches and Dunes



A photo contest to enhance the Trasimeno: on the weekend ends the "The magic of the lake" of [Perugia Online Publishing](#) - September 8, 2017



**FIU-SLSC
Holding King
Tide Photo
Challenge To
Document
Rising Sea**

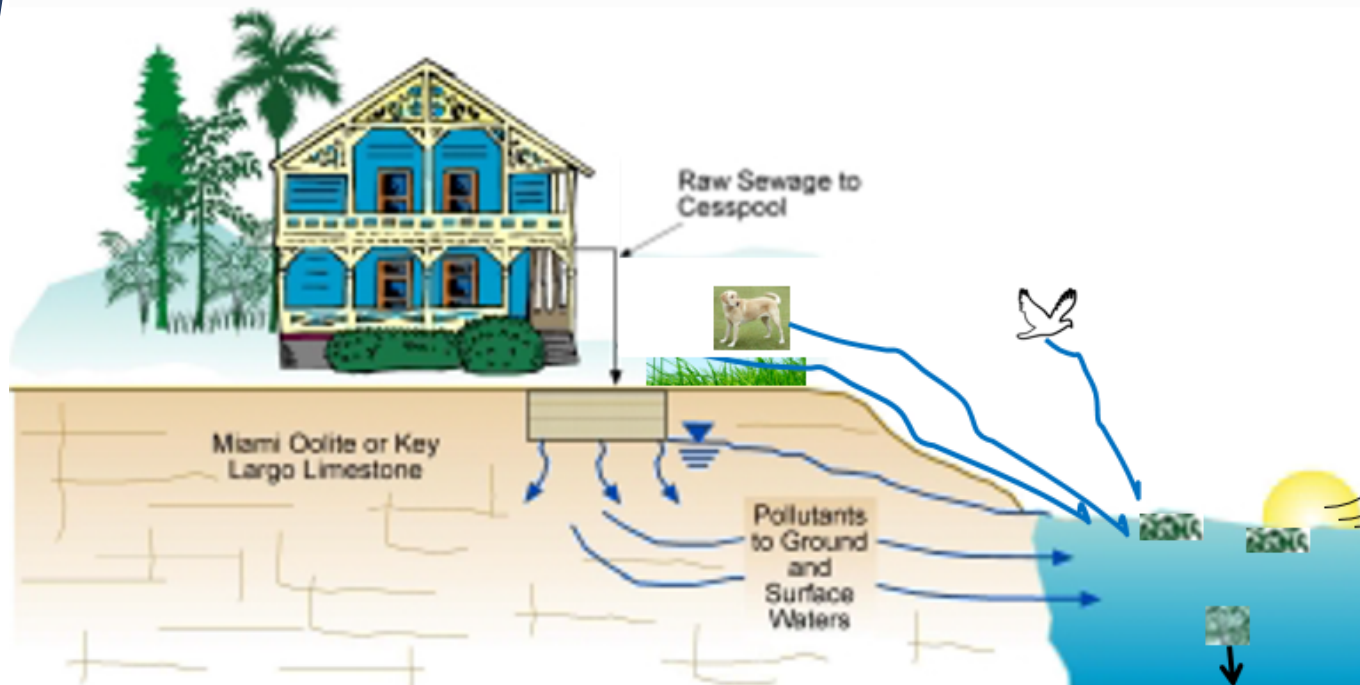
By [NANCY
KLINGENER](#)

OCT 31, 2017

Water Quality Monitoring

Canal Remediation

- Perform a monitoring program to evaluate canal water quality restoration technologies



PI: *Henry O. Briceño*



mouth

middle

head

PARAMETERS

Dissolved Oxygen
%DO Saturation
Light Attenuation
Sulfide

Depth
Turbidity
CDOM

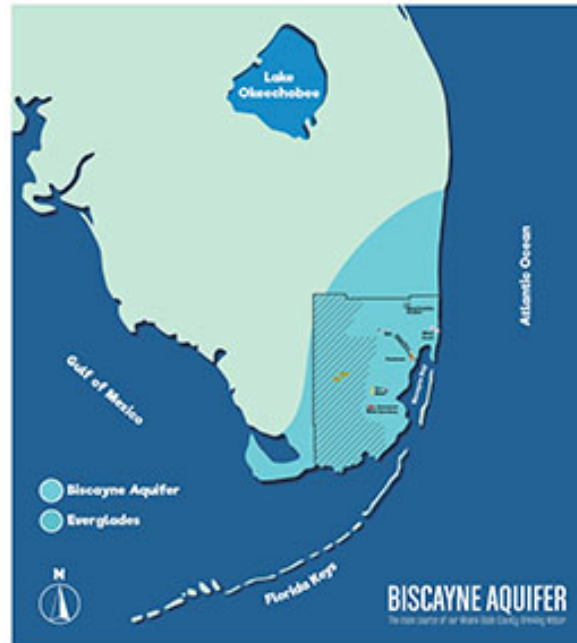
Salinity
Temperature
pH

New partnership with Miami-Dade Water And Sewer Department

- \$32.4 billion needed in drinking and Wastewater infrastructure
- Data for prioritization
- Enhanced monitoring infrastructure
- Data management and access



WASD Chemist **Marjorie Jolly** makes sure your water is not only clean and safe to drink, but blows federal, state and local standards **out of the water!**



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*Funded by National Science Foundation
and agency partners**



FIU | FLORIDA
INTERNATIONAL
UNIVERSITY

FCE LTER by the Numbers



Everglades Foundation Fellow Jessica Lee

65 collaborators

30 institutions

135 datasets

> 500 publications

5 books

88 graduate students

90 graduate degrees

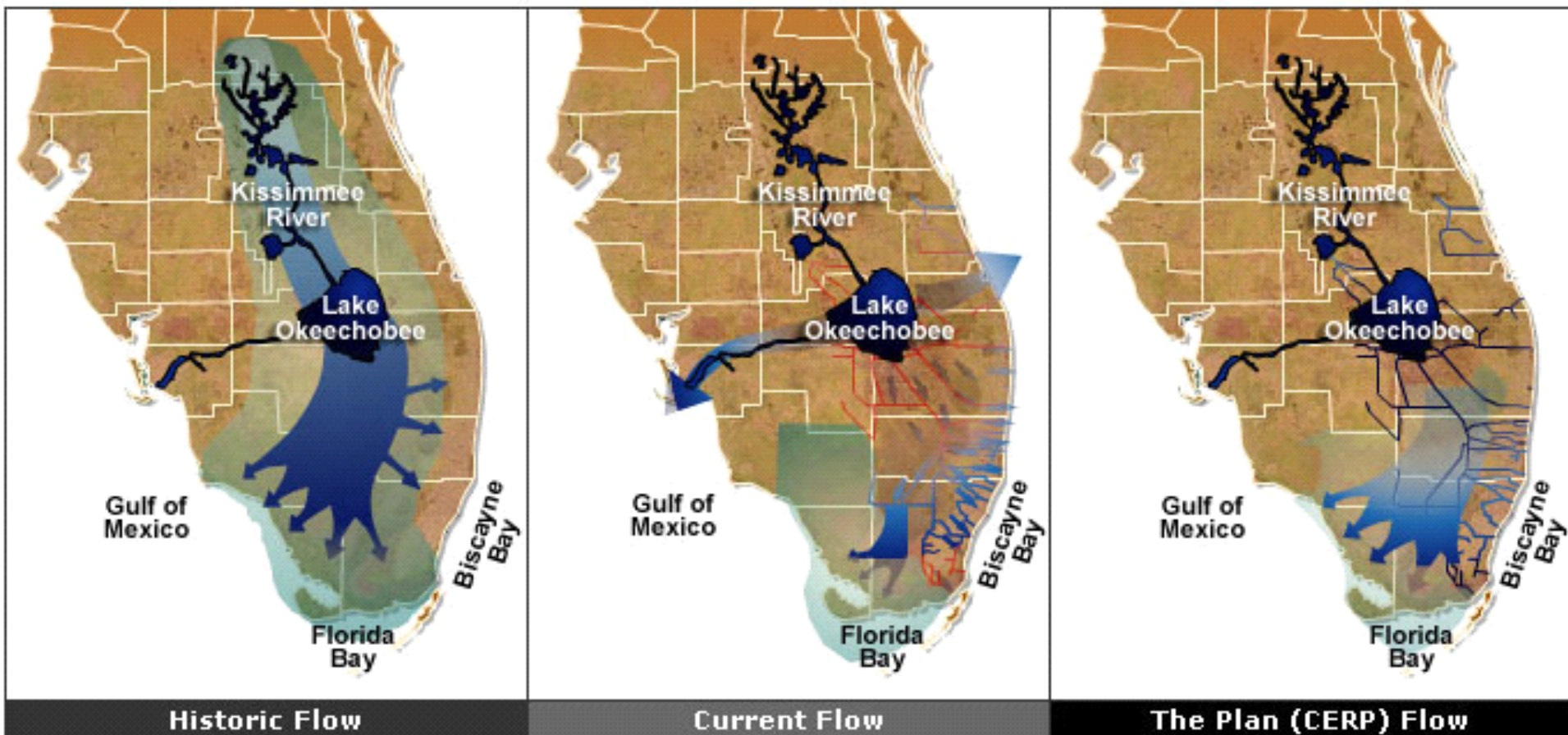
80 undergrads in labs

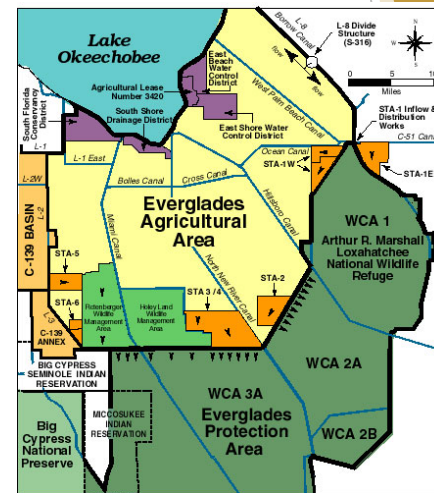
**1,200 K-12 students &
teachers/year**



Restoring CLEAN freshwater flow

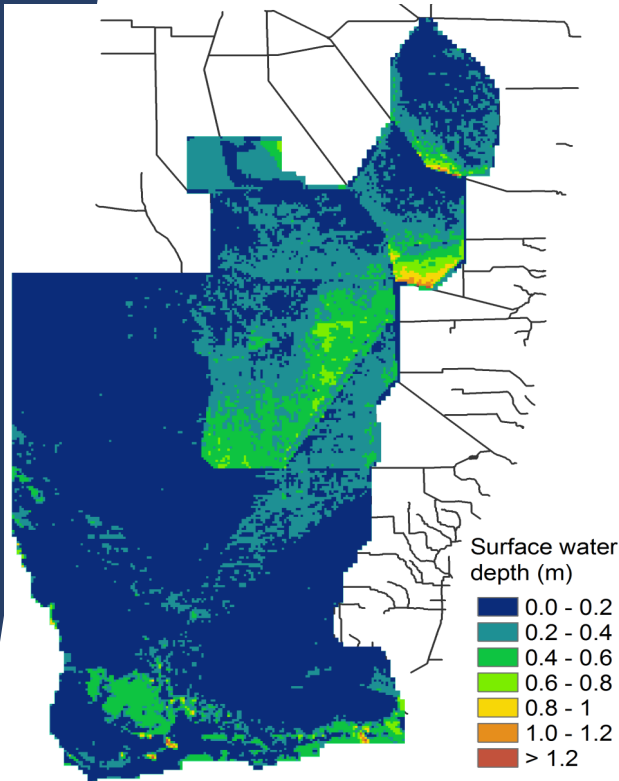
2000 - Central Everglades Restoration Plan



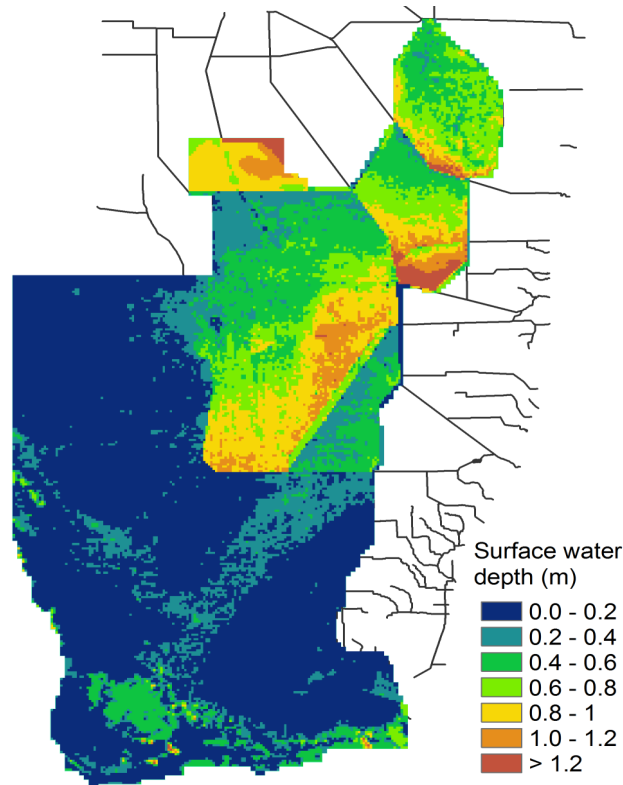


Hydrologic response: historical, near-term, long-term

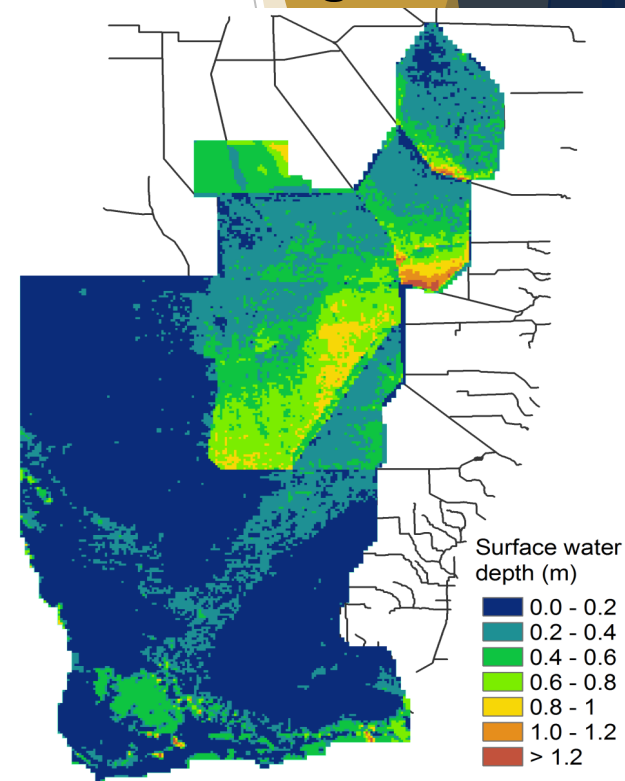
Historical



Near-term



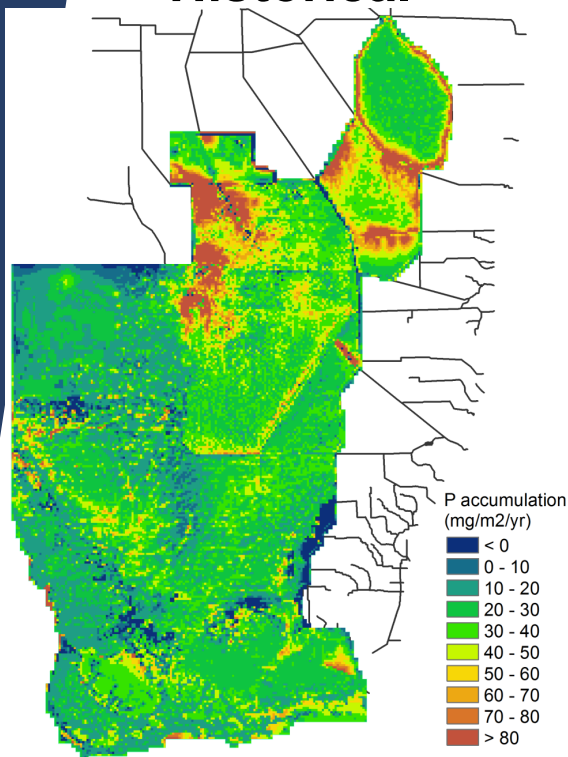
Long-term



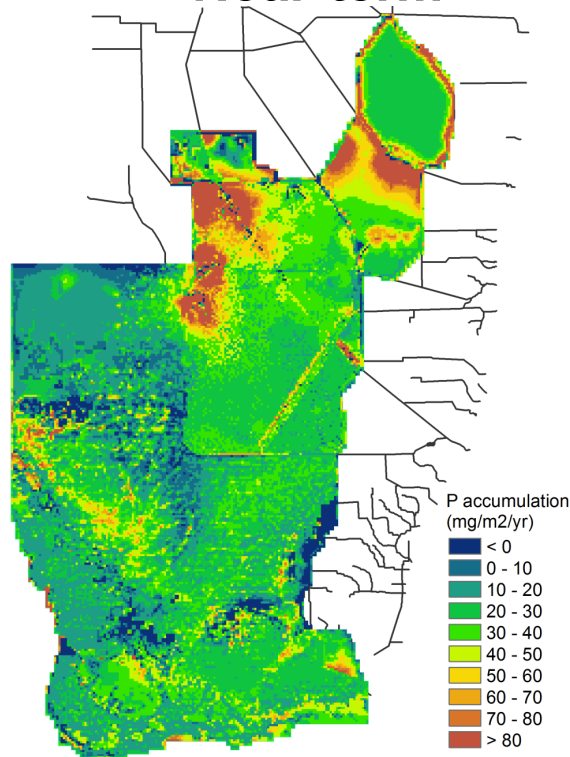
Average surface water depths for the period
of simulation.

Phosphorus accumulation response: historical, near-term, long-term

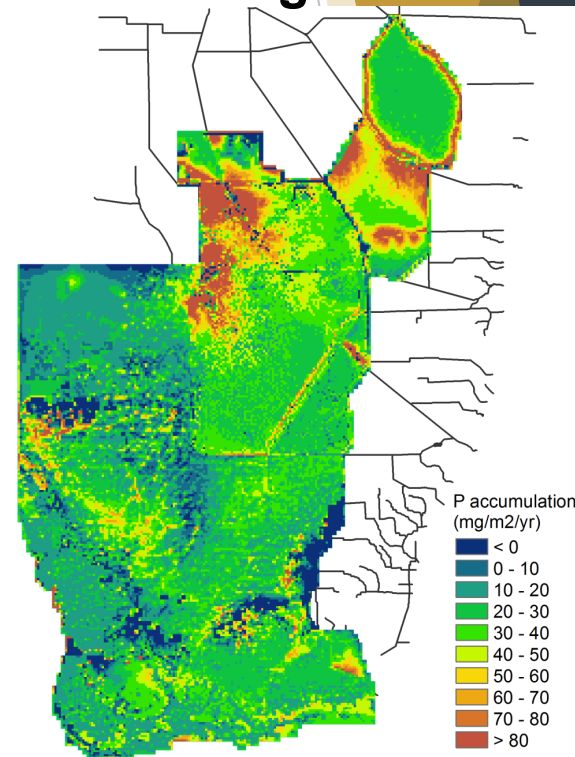
Historical



Near-term



Long-term

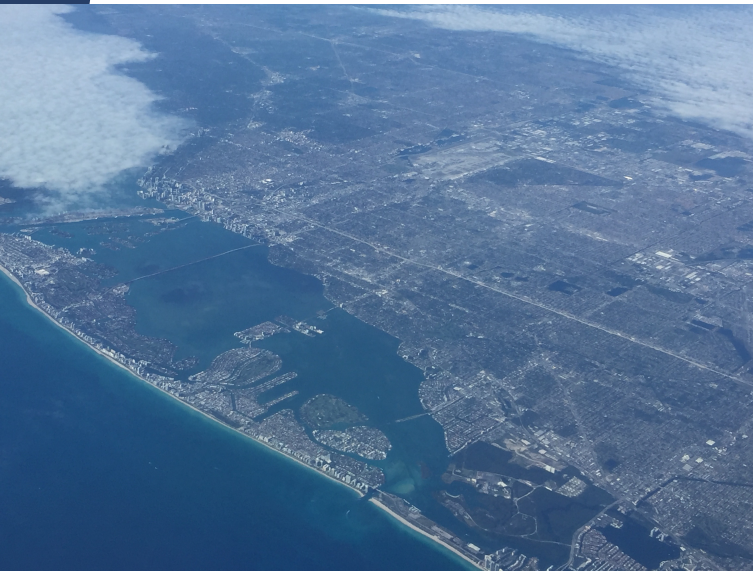


CREST CAChE Research Mission

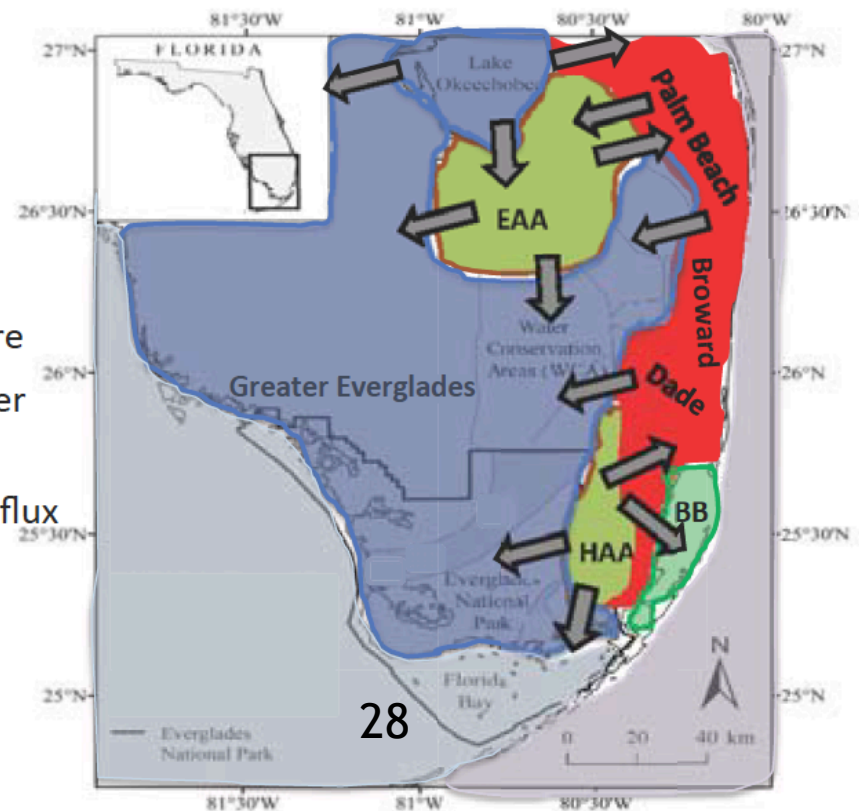
To detect the sources, transport, transformation and ecosystem responses to contaminants, pollutants and other natural stressors, under changing land-use and environmental conditions.

Context:

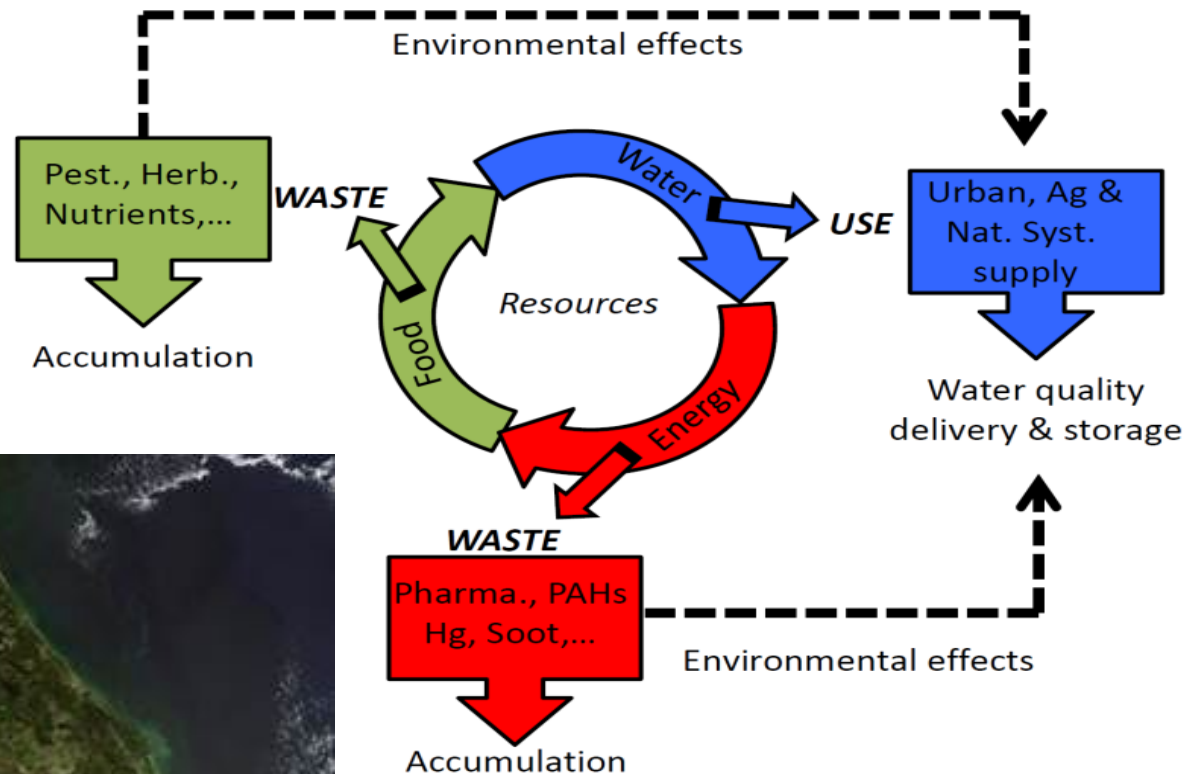
The hydrologic connectivity between the **natural**, **agricultural**, and **urban** landscapes results in a highly complex network of contaminant sources that are transported throughout the landscape



- Urban
- Agriculture
- Freshwater
- Marine
- Pollutant flux



How it's all connected –Food-Water-Energy Nexus



The lives of the ~7 million inhabitants of South Florida are critically tied to the **Greater Everglades**, the area's main **source of freshwater**

Research and Education Focus Areas

Detection and Identification



Fate and Transport



Impacts and Visualization



Everglades



Mangroves



Shallow Marine Habitats

Critical Ecosystems