Lessons learned from employing living shorelines at private waterfront properties

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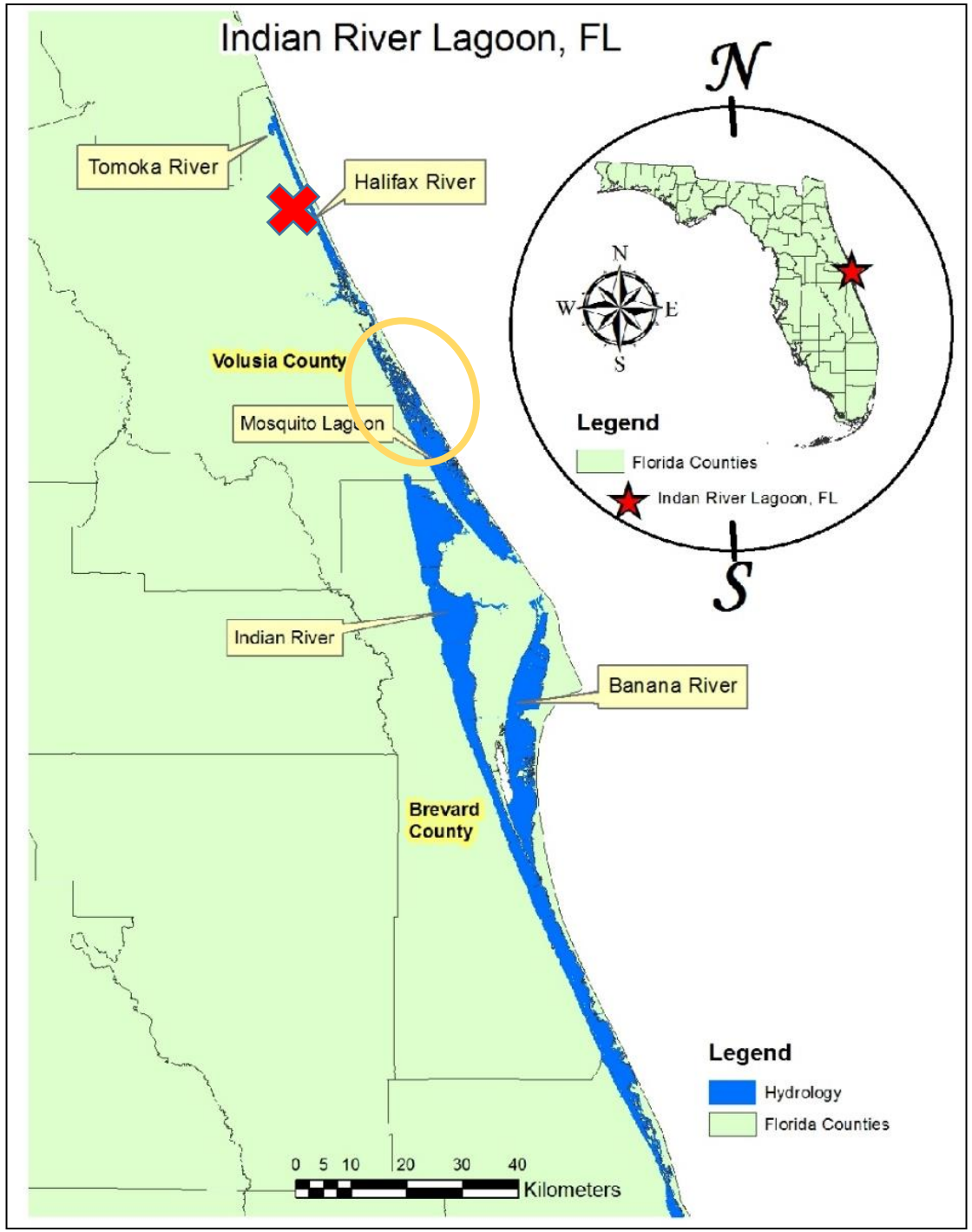
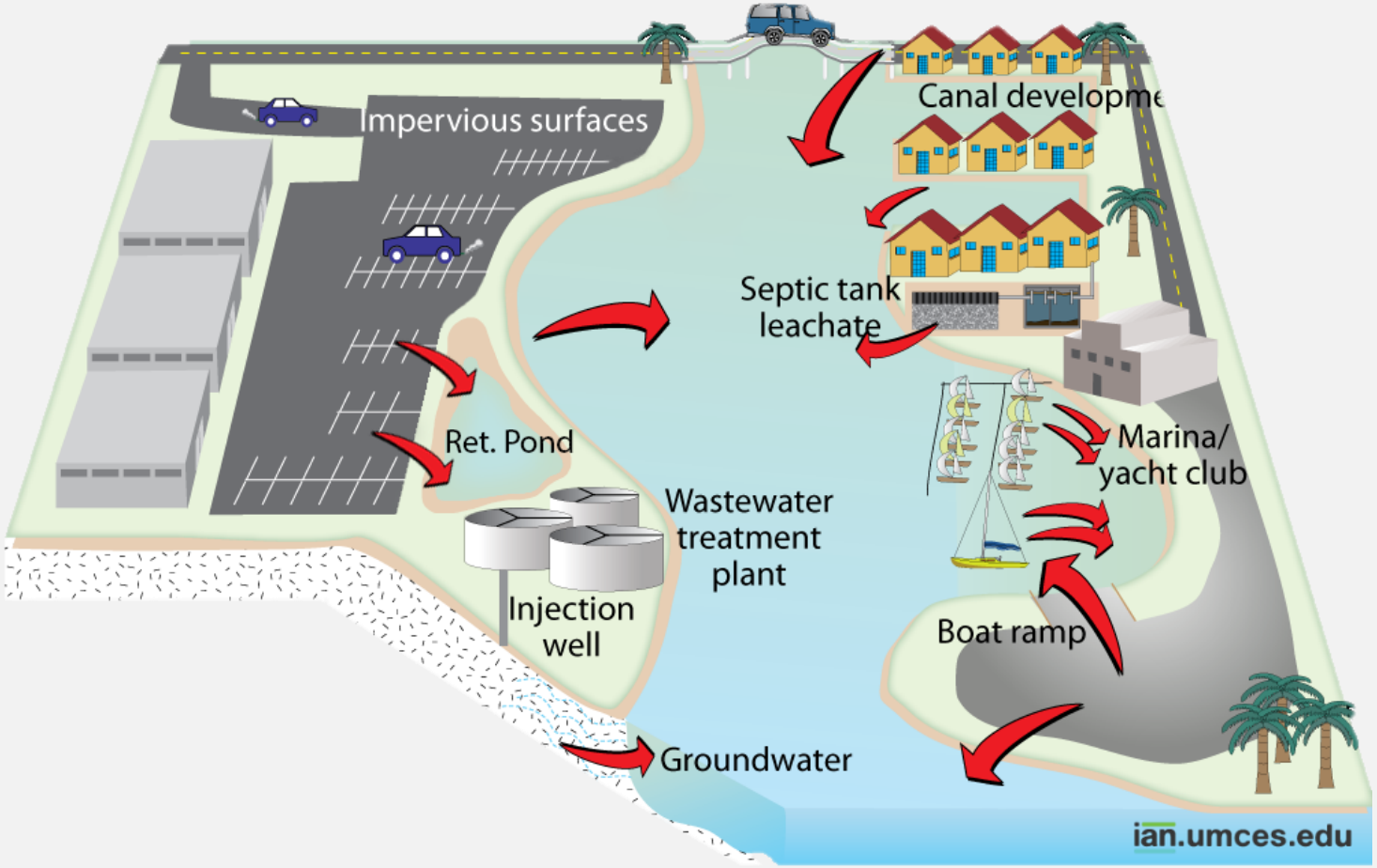
The Indian River Lagoon System

- An estuarine system with interconnected sub-lagoons
  - Mosquito Lagoon,
  - Indian River, and
  - Banana River
- 156 mile-long
  - from Ponce De Leon inlet in Volusia County to the north to Jupiter Inlet in Palm Beach County
- The average water depth is approximately four feet.




https://www.floridatoday.com


N
0 2.5 5 10 Miles
scene edge
2016.02.16
Landsat 8
Path 16, Row: 40



IRL nutrient pollution

- Various sources.
- Varies geographically.
- Complex issue to resolve simultaneously.
- **Our focus: Nonpoint source.**

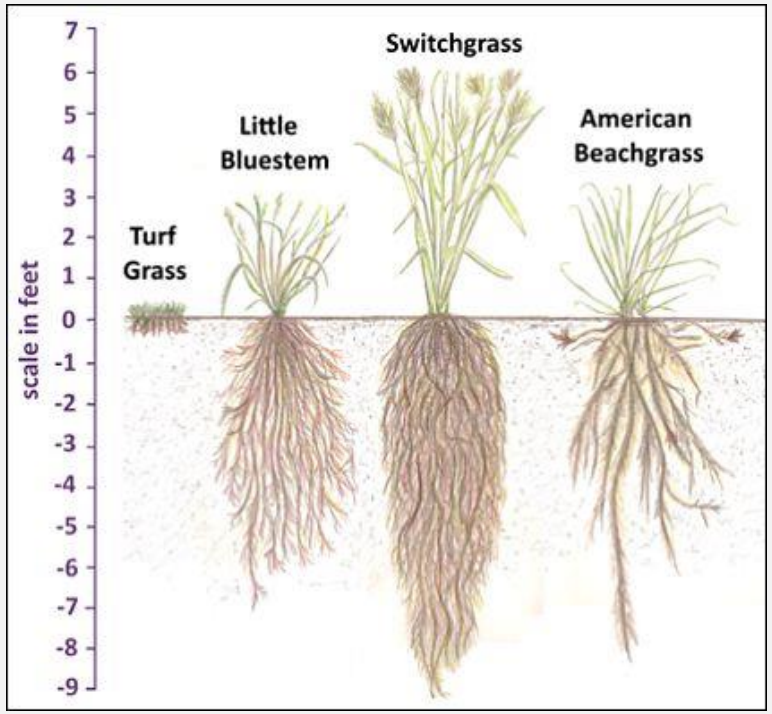
Study Goals

- Assess the efficacy of “residential” Living Shorelines (LSs).
- Assess the use of *in situ* LSs to aid public education.

1. Scientific assessment of living shorelines in reducing non-point source pollution
2. Use of and work with privately-owned waterfront properties (i.e. someone’s backyards)


Mosquito Lagoon
N
Legend
Culverts
Canals
0
30
60
120 Meters

Native Grasses vs. Turf Grasses

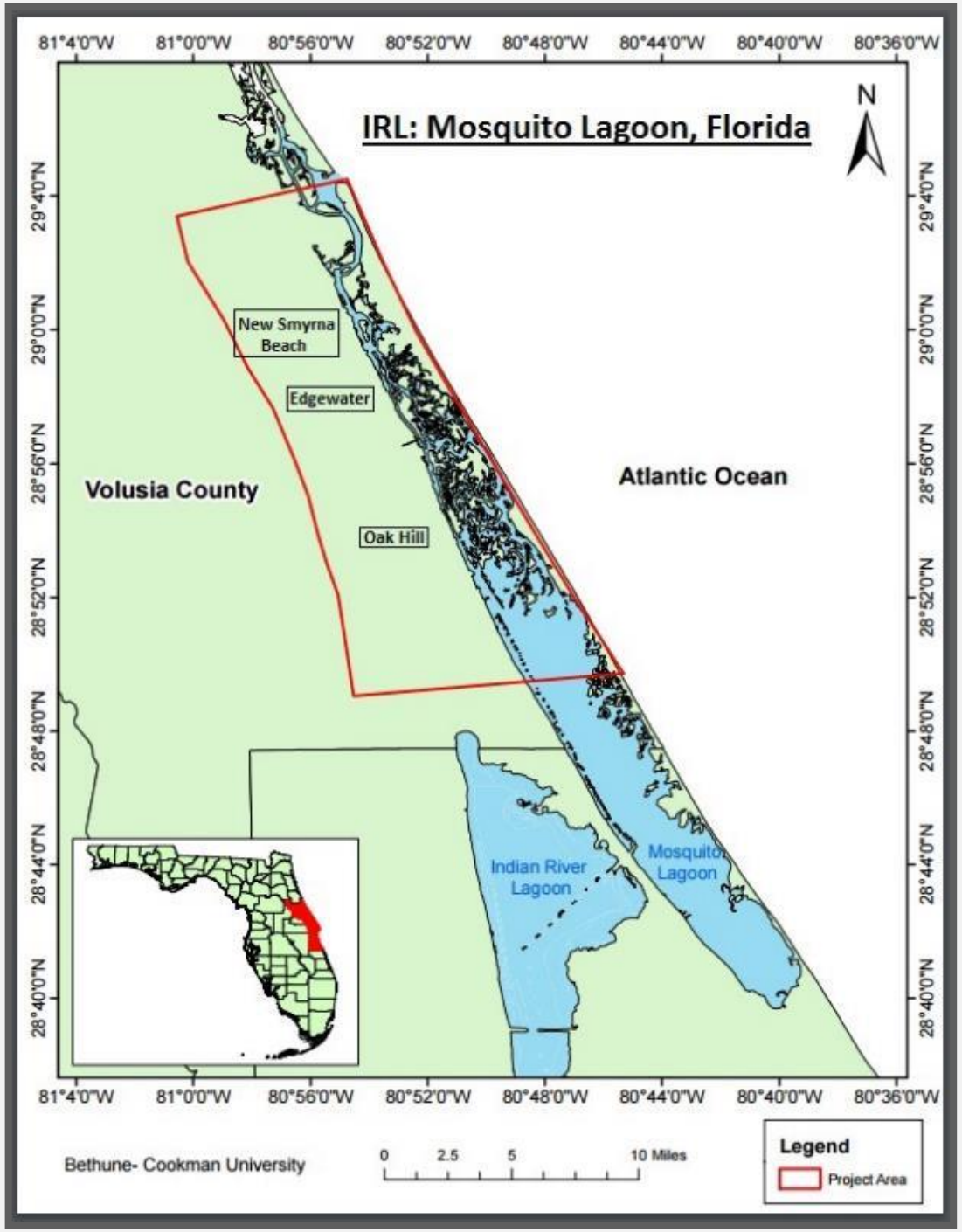


https://www.mass.gov/service-details/stormsmart-properties-fact-sheet-3-planting-vegetation-to-reduce-erosion-and-storm

Study Area

- The northern Mosquito Lagoon (ML) watershed.

- Identify 30 waterfront properties (primarily with turf grass shorelines) to construct LSs or use as controls.
  - 20 Mosquito Lagoon Shorelines (MLSs)
  - 10 Coastal Retention Ponds (CRPs)



Study Site Selection

~80% of shoreline dwellings did not meet criteria

Site Selection and Recruitment

- Suitable ML shoreline sites we identified
  - **Letters + brochures sent to all home-owners**
    - Very low response rate
  - **Door to door visits**
    - Slightly better response

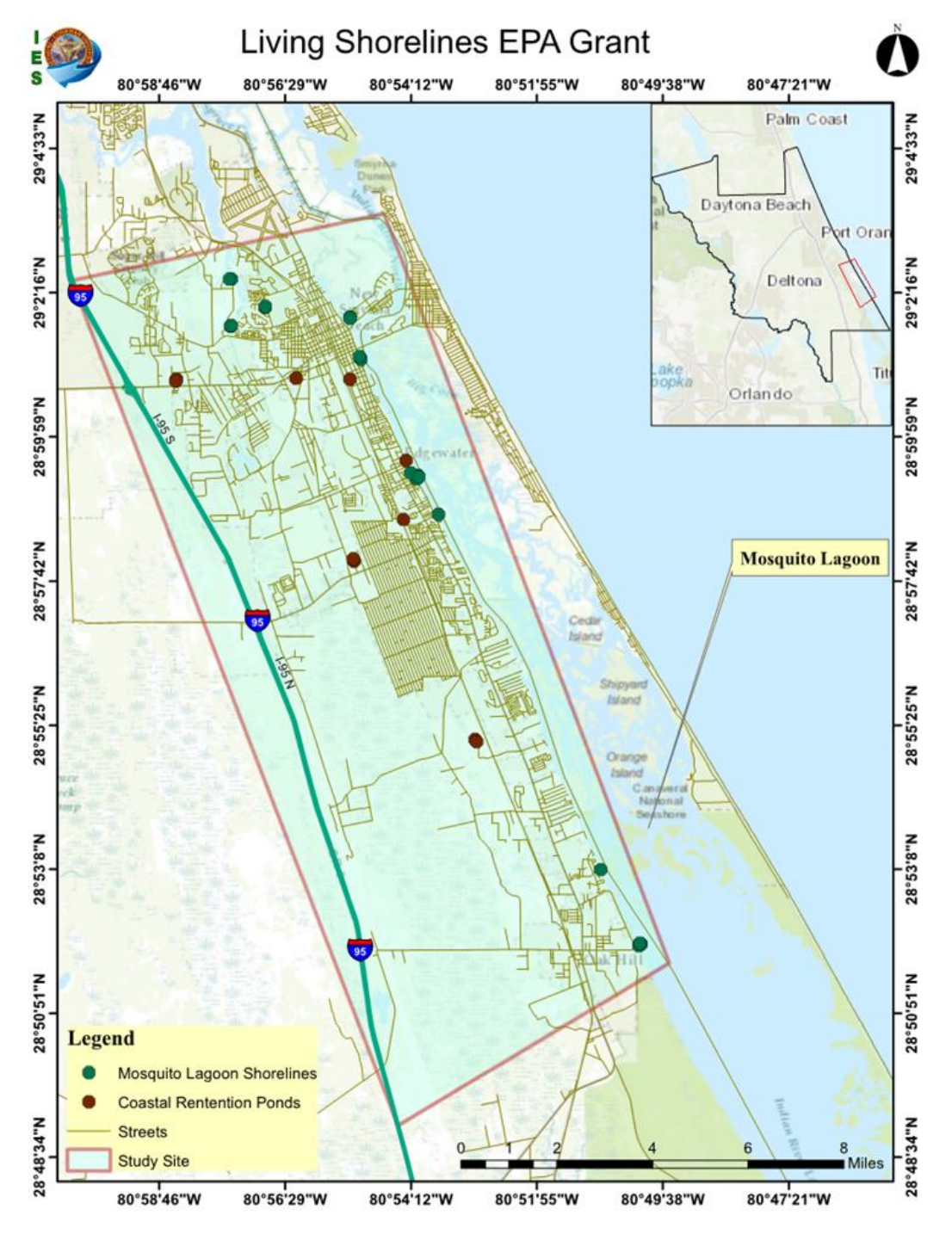
Newspaper articles

Workshops

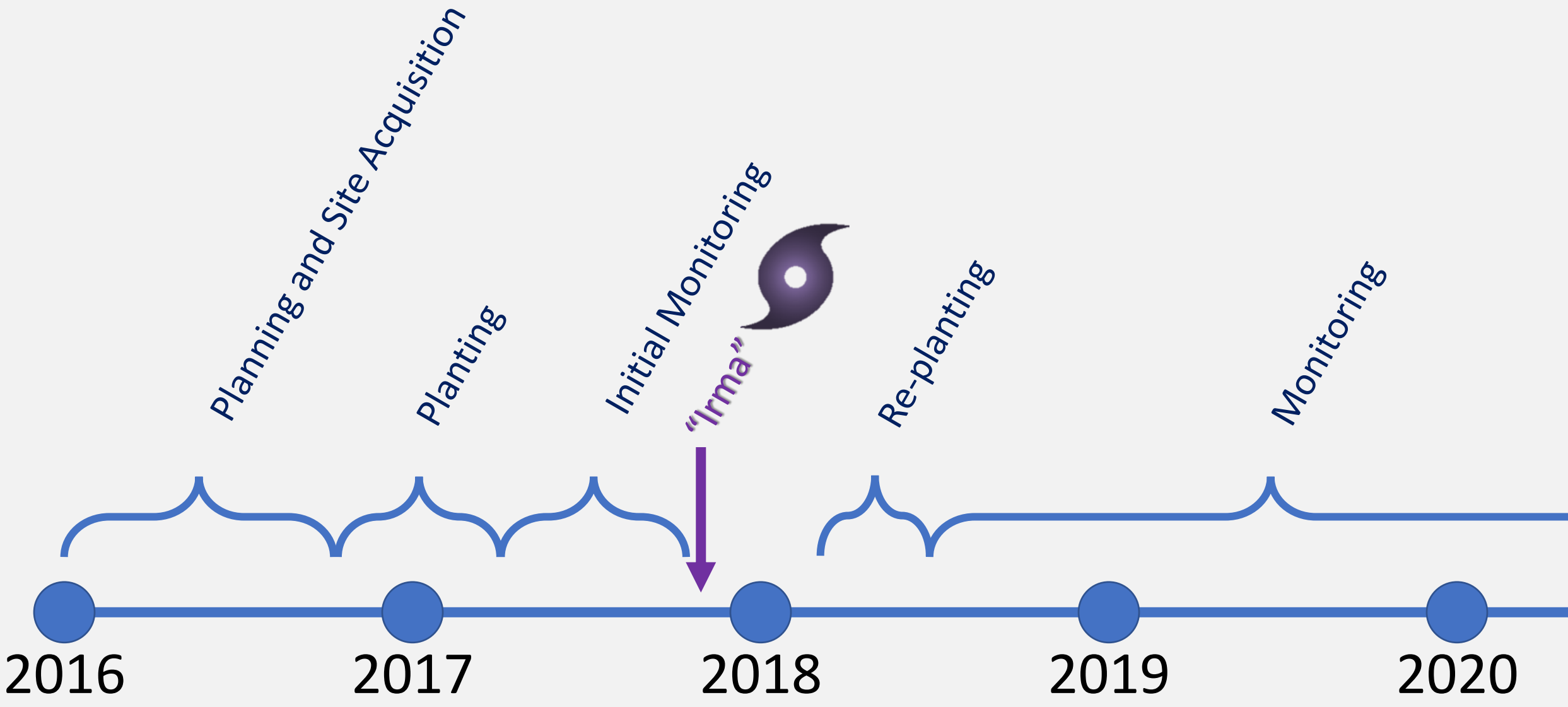
Acquired Sites

- 20 lagoon sites
  - 10 planted/ 10 control
- 10 pond sites
  - 5 planted/ 5 control

3 sites City of Edgewater
4 sites City of NSB

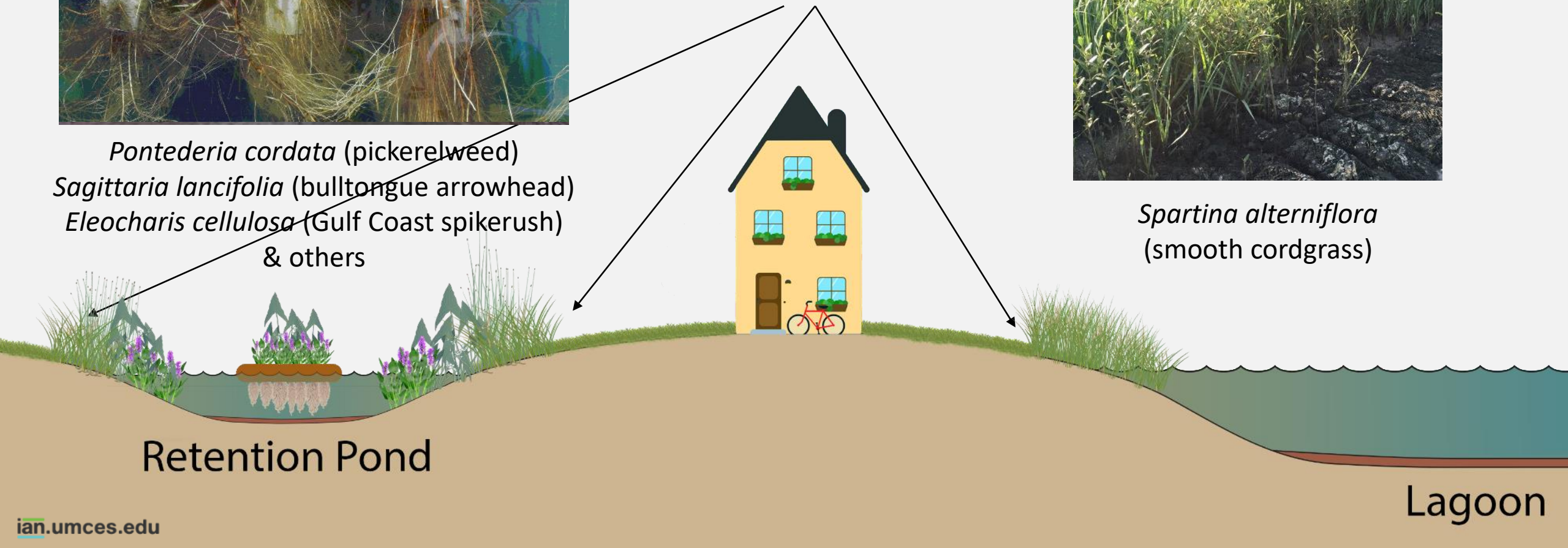


Timeline


Planning and Site Acquisition
Planting
Initial Monitoring
"Irma"
Re-planting
Monitoring
2016
2017
2018
2019
2020

Replace with Living Shorelines of Native Vegetation

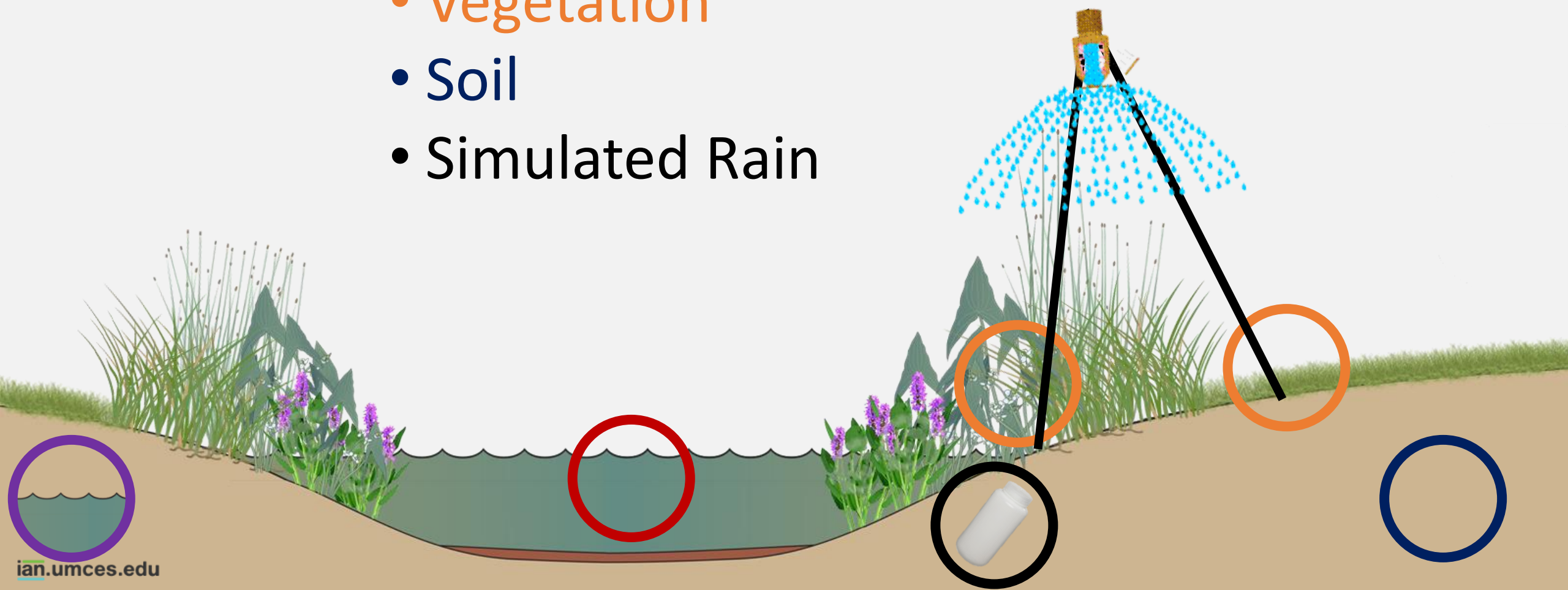
Pontederia cordata (pickerelweed)
Sagittaria lancifolia (bulltongue arrowhead)
Eleocharis cellulosa (Gulf Coast spikerush)
& others



Spartina alterniflora
(smooth cordgrass)

Sample:

- Surface water
- Ground Water
- Vegetation
- Soil
- Simulated Rain



Public Education Goal and Objectives

Goal: To assess and educate the waterfront communities' <u>perception and knowledge on their roles</u> in contributing and controlling non-point source pollution in estuarine ecosystems.

1) Assess **<u>current</u>** knowledge and behavior.
2) Assess public education effect on knowledge and behavior **<u>change</u>**.
3) Assess knowledge against the regional environmental aims pursued by '**Be Floridian Now**'.

Public Education

Workshops

Pre-Survey

Guided
Living Shoreline
Exhibit Tour

Post-Survey

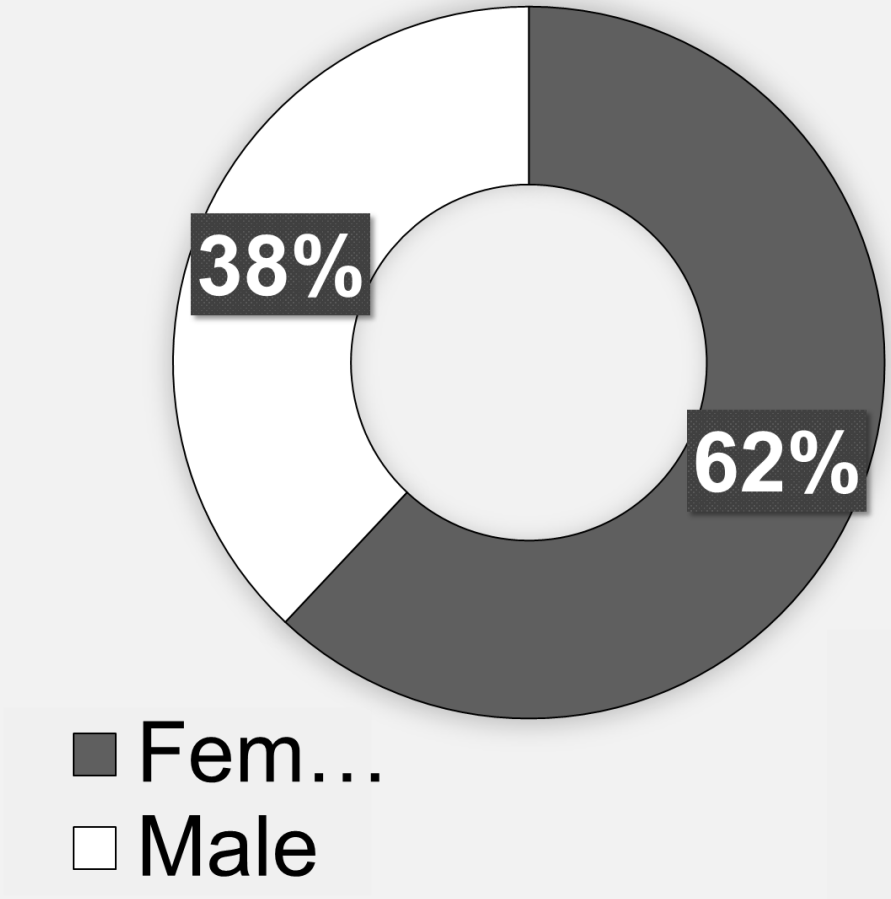
Knowledge and
behavior change

Lagoon Front Home
Owners

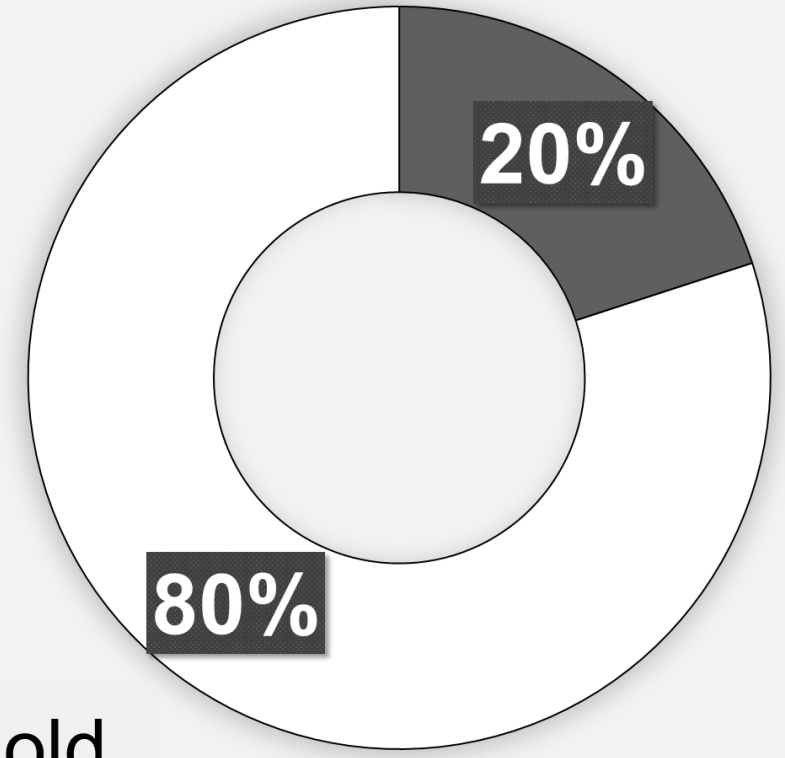
Retention Pond
Community Users

Study Demographics

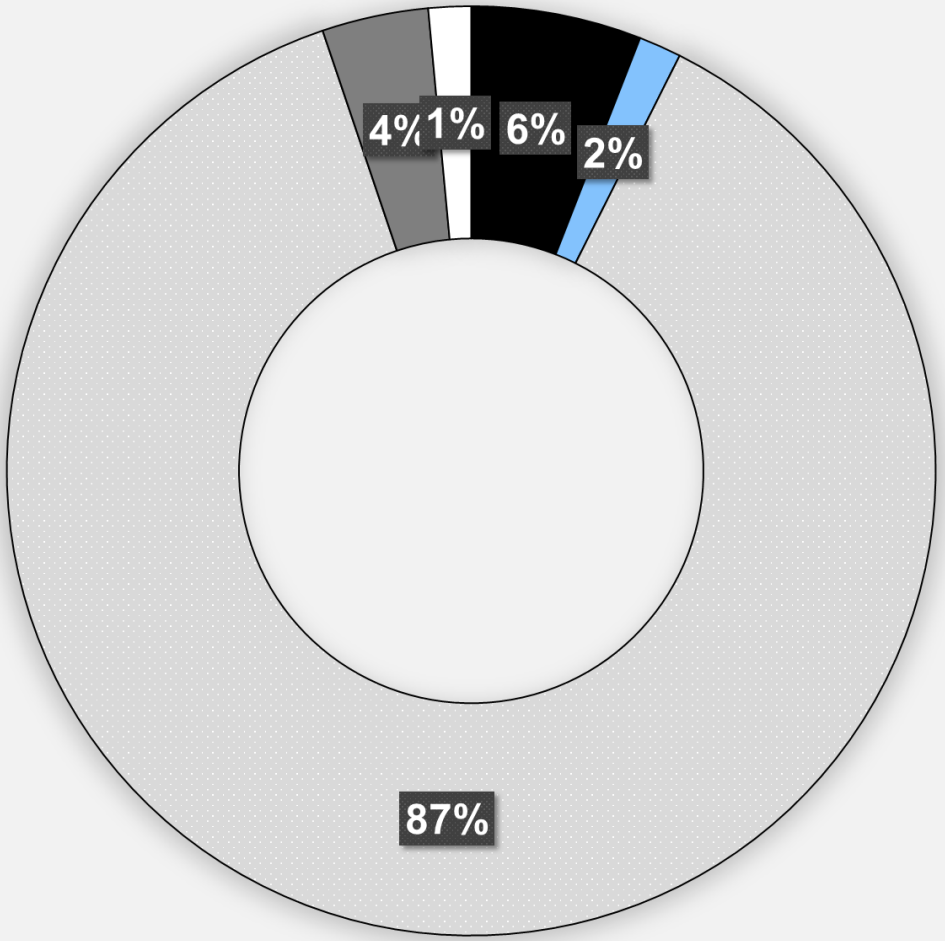
Gender



Age

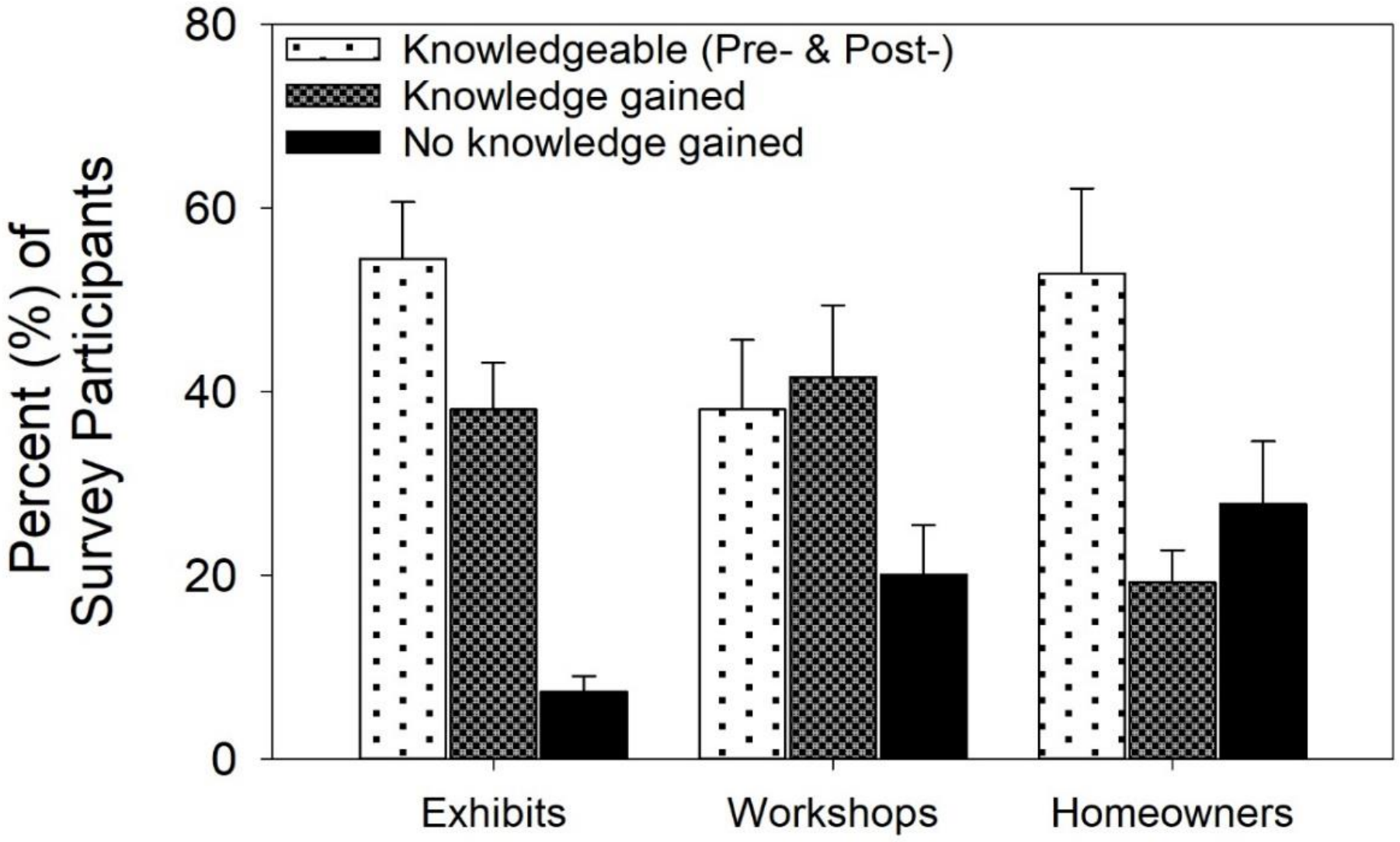


Study Demographics

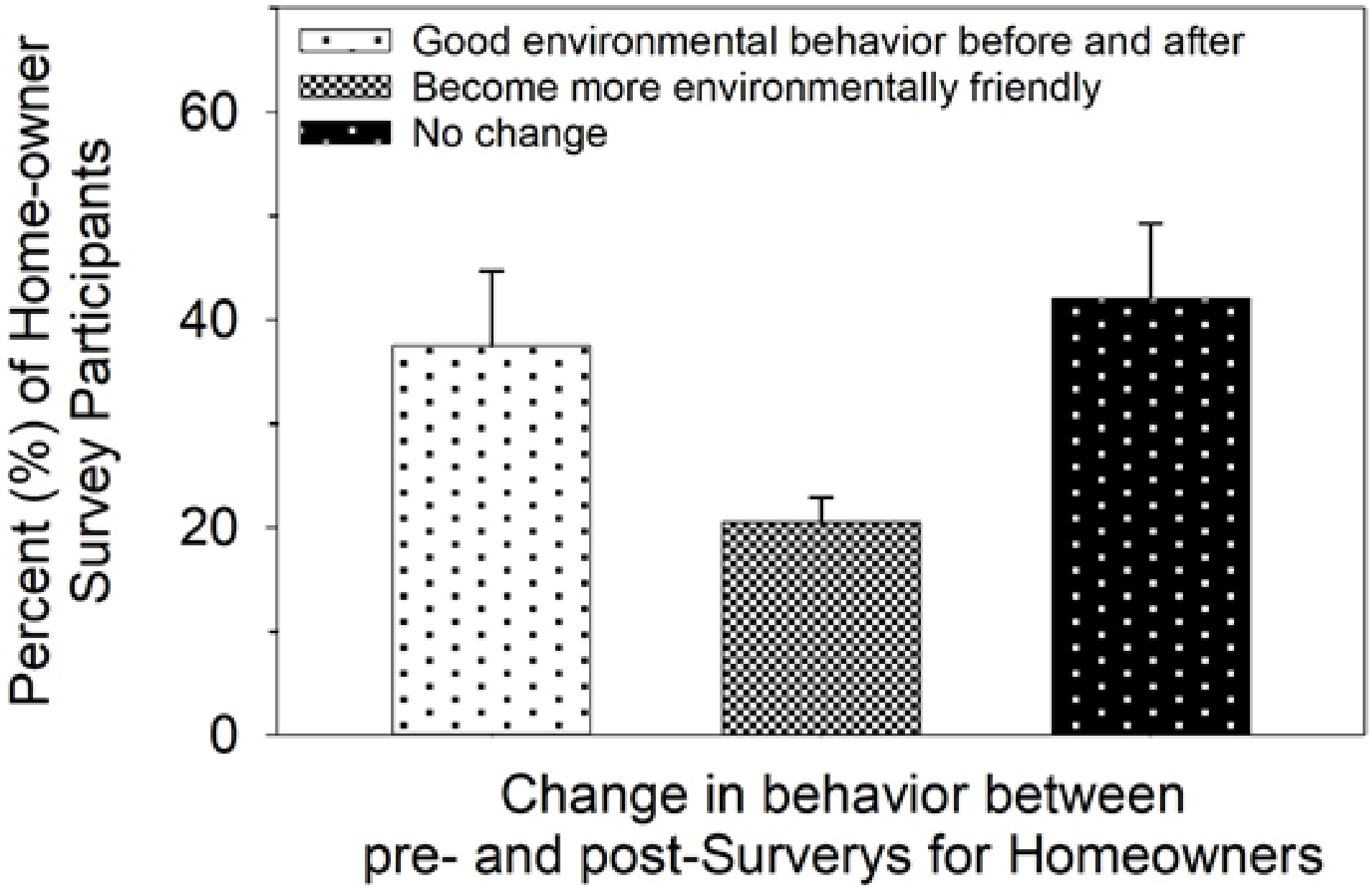


Race

- African American
- Asian
- Caucasian
- Hispanic/Latino
- Native American



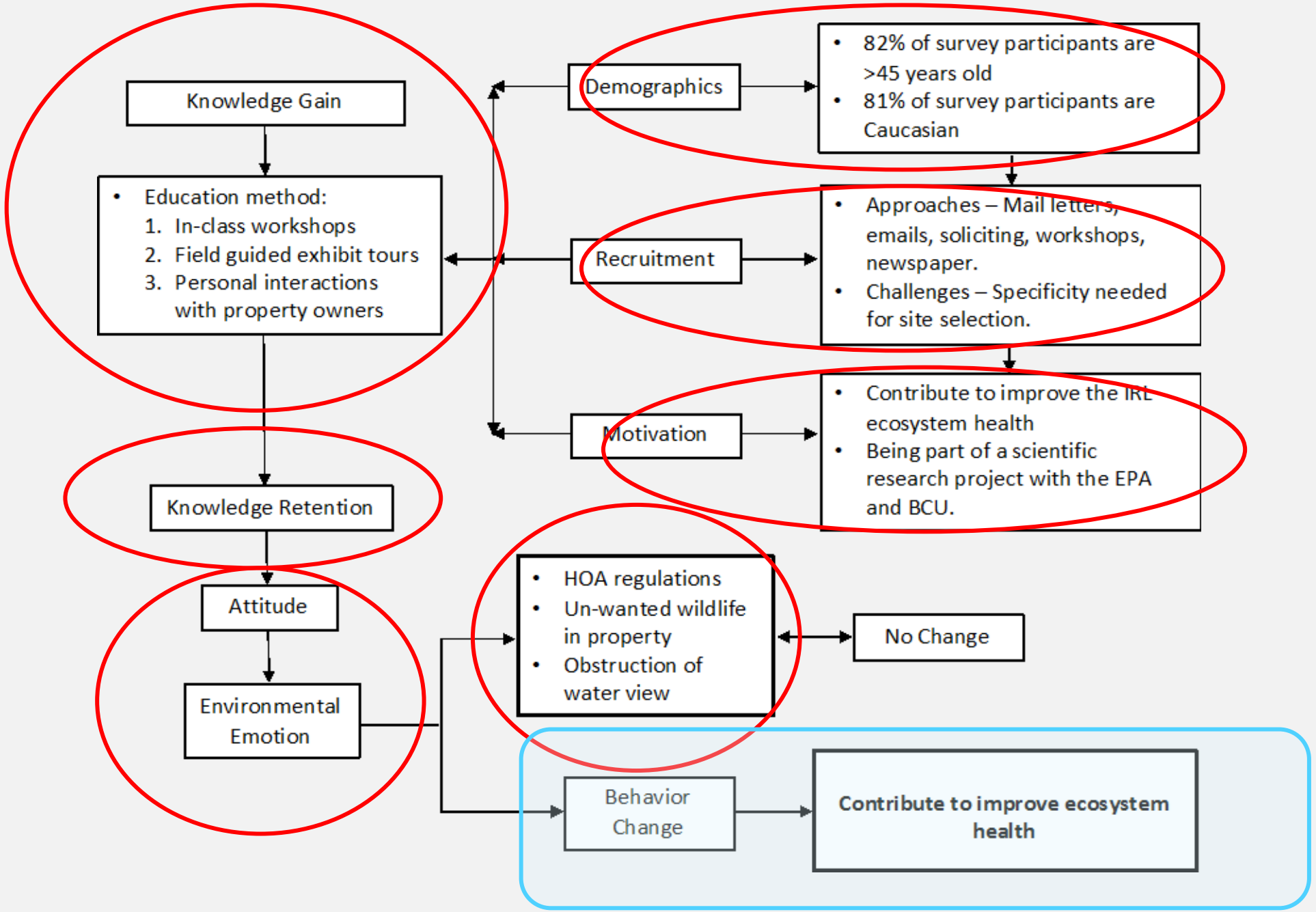
Change in knowledge between pre- and post-surverys across education types


Good environmental behavior before and after
Become more environmentally friendly
No change
Percent (%) of Home-owner Survey Participants
0
20
40
60
Change in behavior between pre- and post-Surverys for Homeowners

Participations by the Public (who own properties) into Living shoreline Projects

- **Home Owners Associations** (**HOA's)**:
  - often times require certain standards and to always have a green turf grass which requires a lot of maintenance (fertilizer, water, mowing).
  - One of the biggest factors that impede homeowners to change their behavior towards a more environmentally friendly yard management practices

- Concerns about changes in their backyard and **plants blocking their waterfront views**.


Knowledge Gain
Education method:
1. In-class workshops
2. Field guided exhibit tours
3. Personal interactions with property owners
Knowledge Retention
Attitude
Environmental Emotion
Demographics
82% of survey participants are >45 years old
81% of survey participants are Caucasian
Recruitment
Approaches – Mail letters, emails, soliciting, workshops, newspaper.
Challenges – Specificity needed for site selection.
Motivation
Contribute to improve the IRL ecosystem health
Being part of a scientific research project with the EPA and BCU.
HOA regulations
Un-wanted wildlife in property
Obstruction of water view
No Change
Behavior Change
Contribute to improve ecosystem health

Take home

- **Working w/ public induces large variation in trends**
  - They are subject to change their minds and alter the experiment
- **Stochastic Events**
- **Majority of population “seemingly unreachable”**
  - + “eco friendly” individuals are attracted and willing to participate
  - - lack of interest in subject leads to exclusion of that part of the population

IMPLICATIONS

- Large-scale use of native plants as opposed to turf grasses
- Increased usage and acceptance of living shorelines by homeowners and cities
- **Engaging the local community in place-based conservation activities**
- **Creating more resilient coastal communities in Florida**

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