# Big Lagoon & Perdido Bay Seagrass Studies

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Dauphin Island Sea Lab


# The Dauphin Island Sea Lab: Alabama's Higher Education Marine Science Center

# Outline for Today

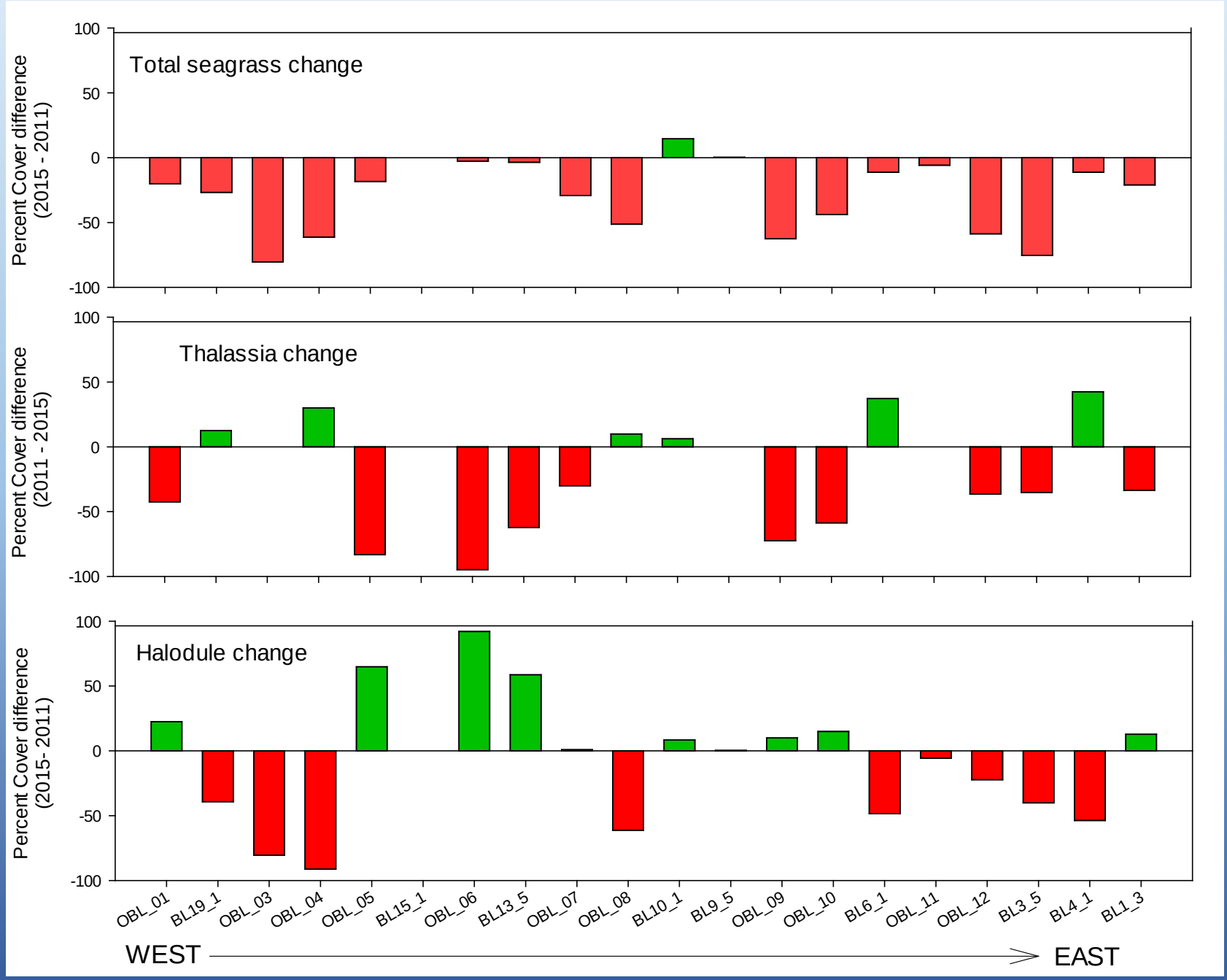
- NPS-sponsored Big Lagoon Seagrass Monitoring Program (2011-2015)
- Prop Scar Restoration in Perdido Bay and Big Lagoon using Birdstakes
- Seagrass Light Model Development in lower Perdido Bay

# Big Lagoon Seagrass Monitoring Program (2011-2015)

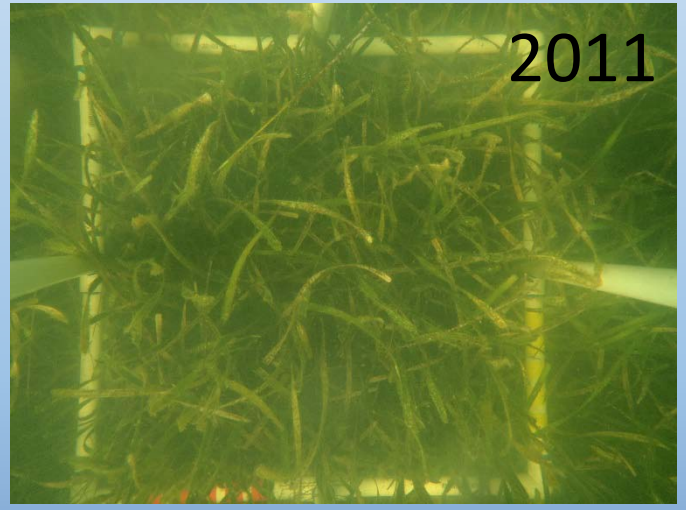
- Objective and Methods
  - Align with other National Park Service seagrass monitoring programs to assess status and trends of seagrass resources within the Gulf Islands Natl. Seashore
    - Rapid assessment at randomly selected stations within a 750m wide tessellated hexagon
      - Visual survey of Seagrass cover and canopy height in late summer (Aug/Sept)

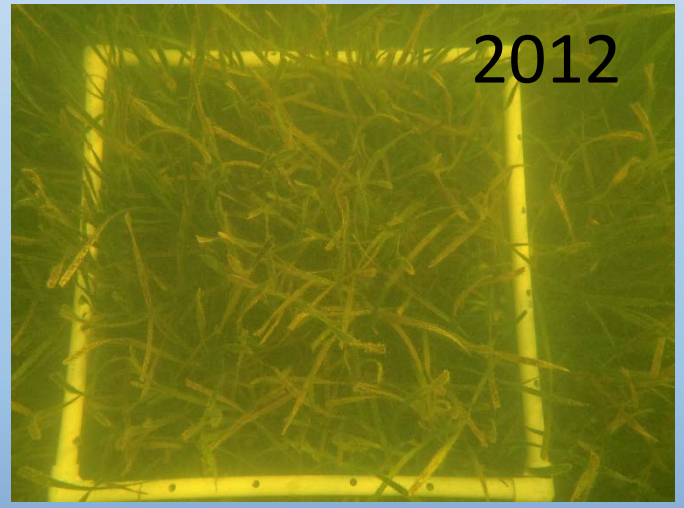
# Monitoring Stations

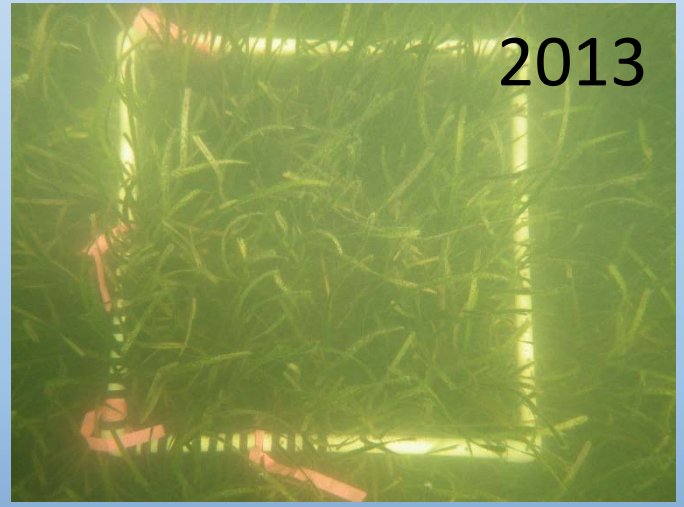
# Difference in Percent Cover between 2011 and 2015

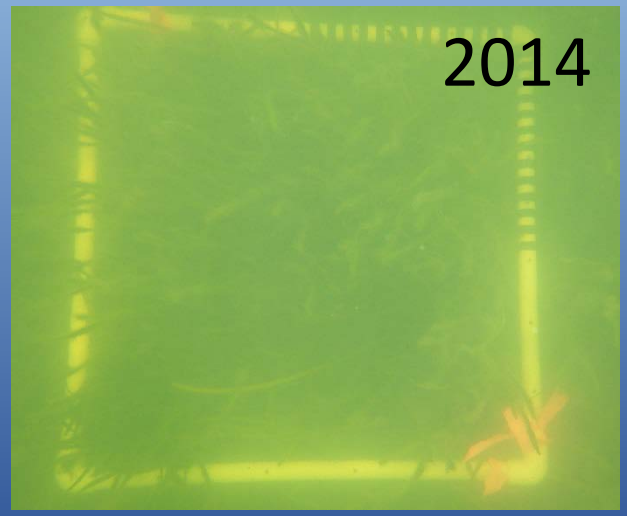


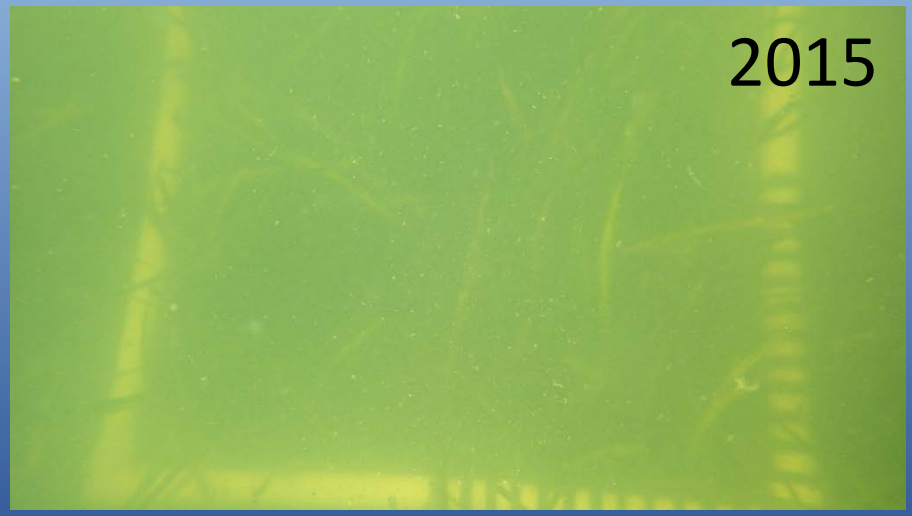
# BL4-1: Entrance to Spanish Cove near No-Motor buoys



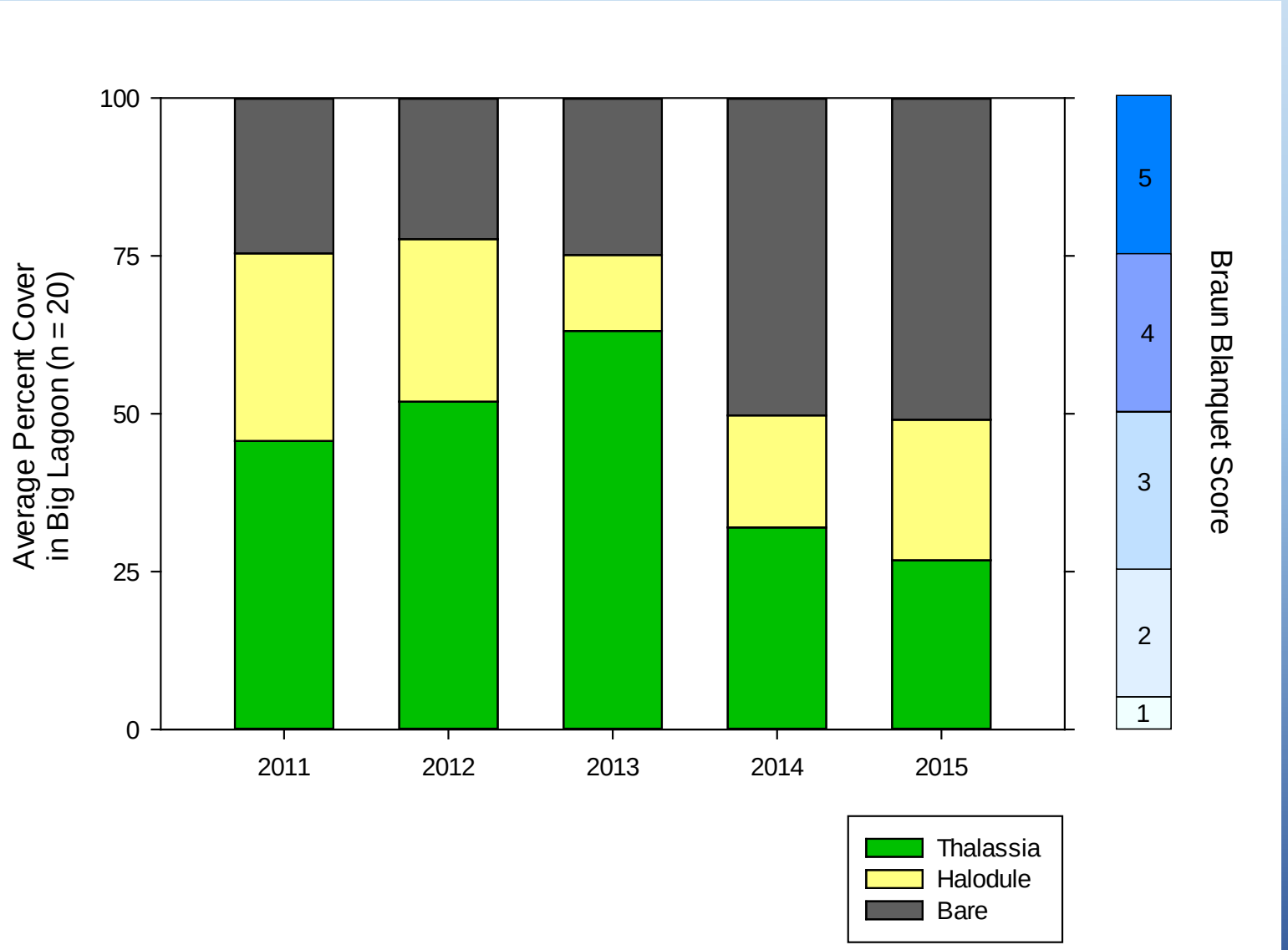



# Basin-wide Average Percent Cover

- Decline in average % cover in 2014
  - Potentially from large freshwater event that occurred in the spring



# Prop Scar Restoration in Perdido Bay and Big Lagoon using Birdstakes

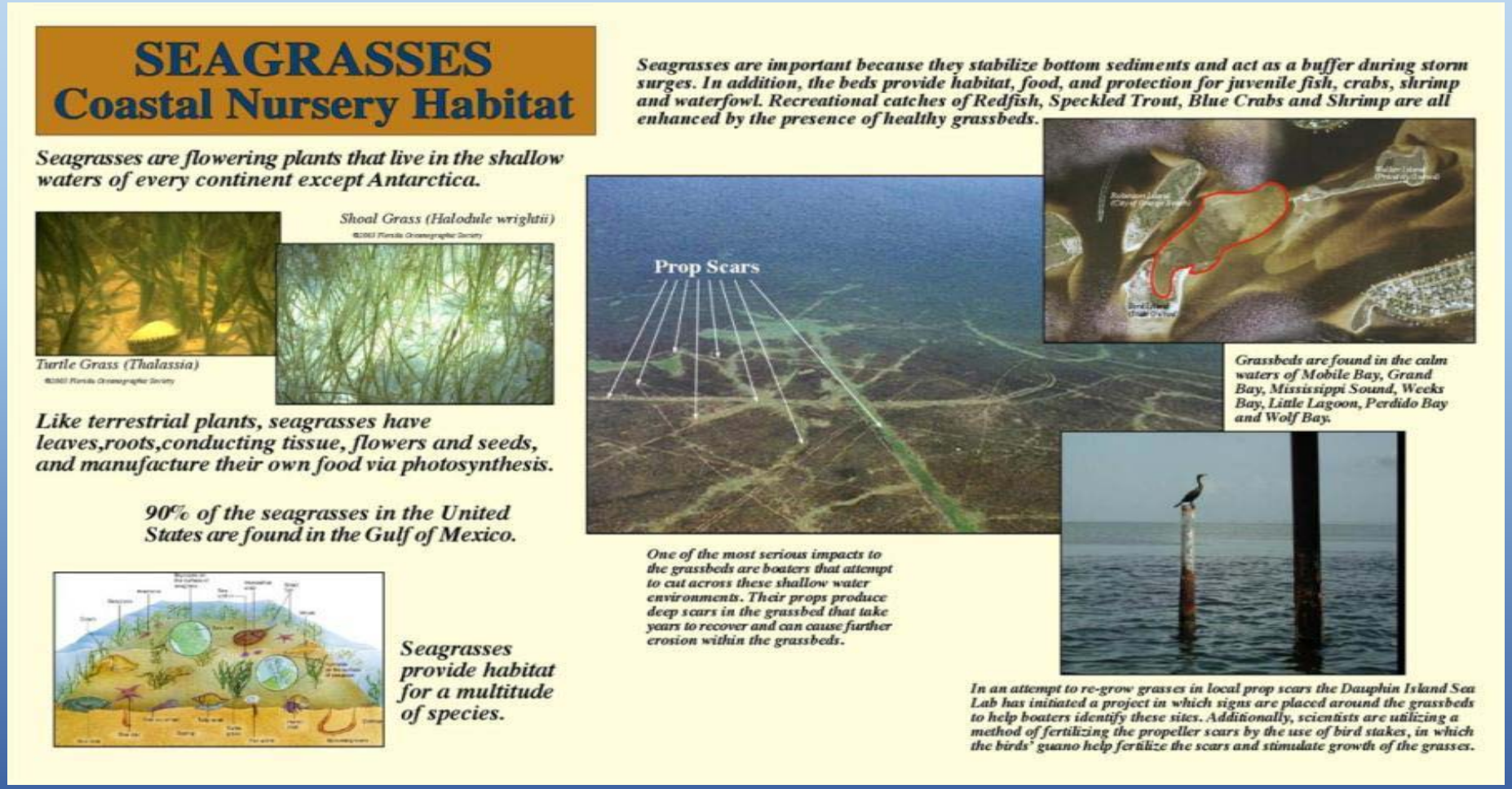
# Mechanical Damage by Boaters

# What have we done?

1. Erected information kiosks at local boat launches and on Robinson and Bird Islands
2. Established “No Motor Zones” around the prop-scarred seagrass beds adjacent to Robinson Island and Ono Island near Perdido Pass
3. Examined the effectiveness of a passive fertilizer delivery technique (bird droppings) to help restore prop-scarred seagrass (*Thalassia*-dominated and *Halodule*-dominated) in lower Perdido Bay and Big Lagoon

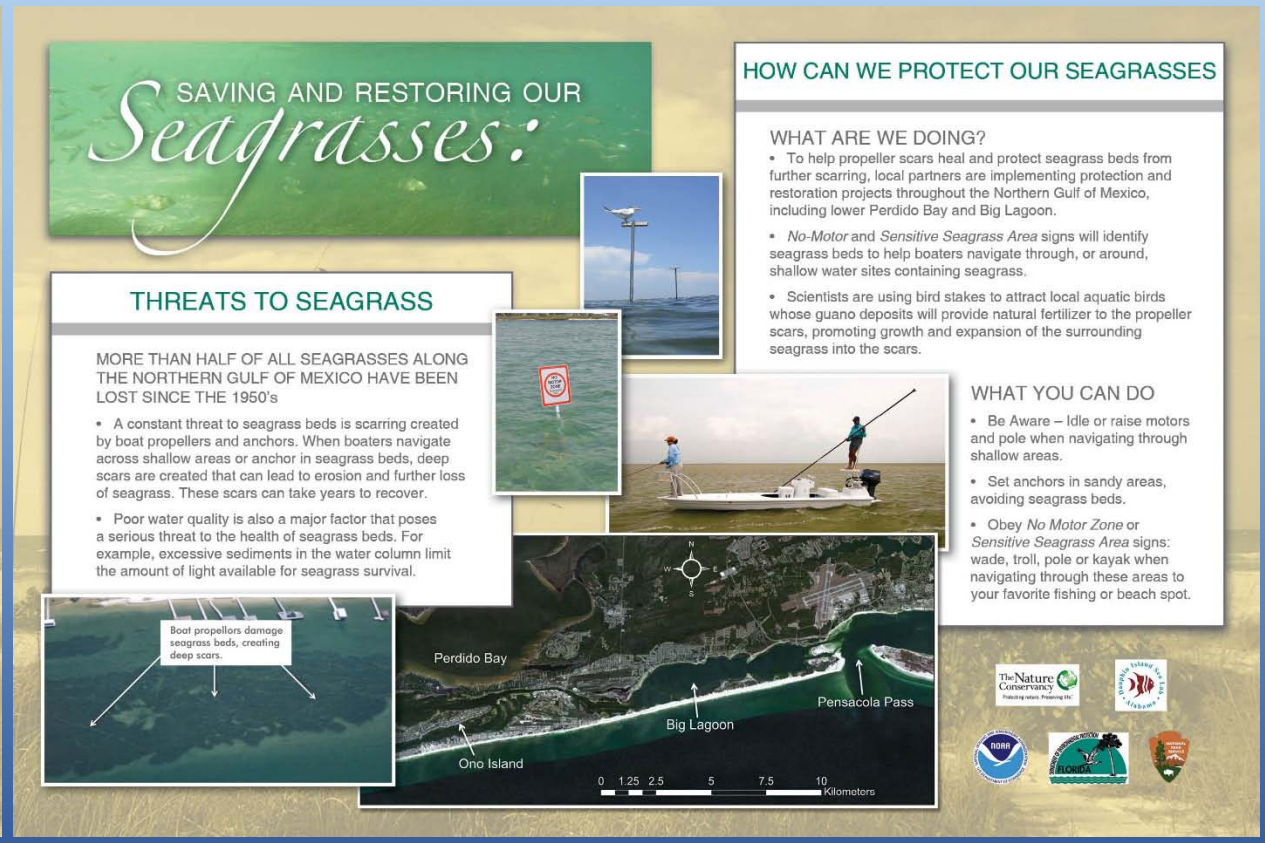
# Informational Kiosks

Placed at Boggy Point Boat Launch (AL) and on Robinson and Bird Islands



# Informational Kiosks- Round 2

- Placed at public boat launches in FL & AL
  - Big Lagoon State Park, Innerarity Point, Ono Island, Holiday Harbor, Little Lagoon (AL)

# Protection

- Worked with AL Marine Police to establish a “No Motor Zone” around prop-scarred seagrass beds in Perdido Bay

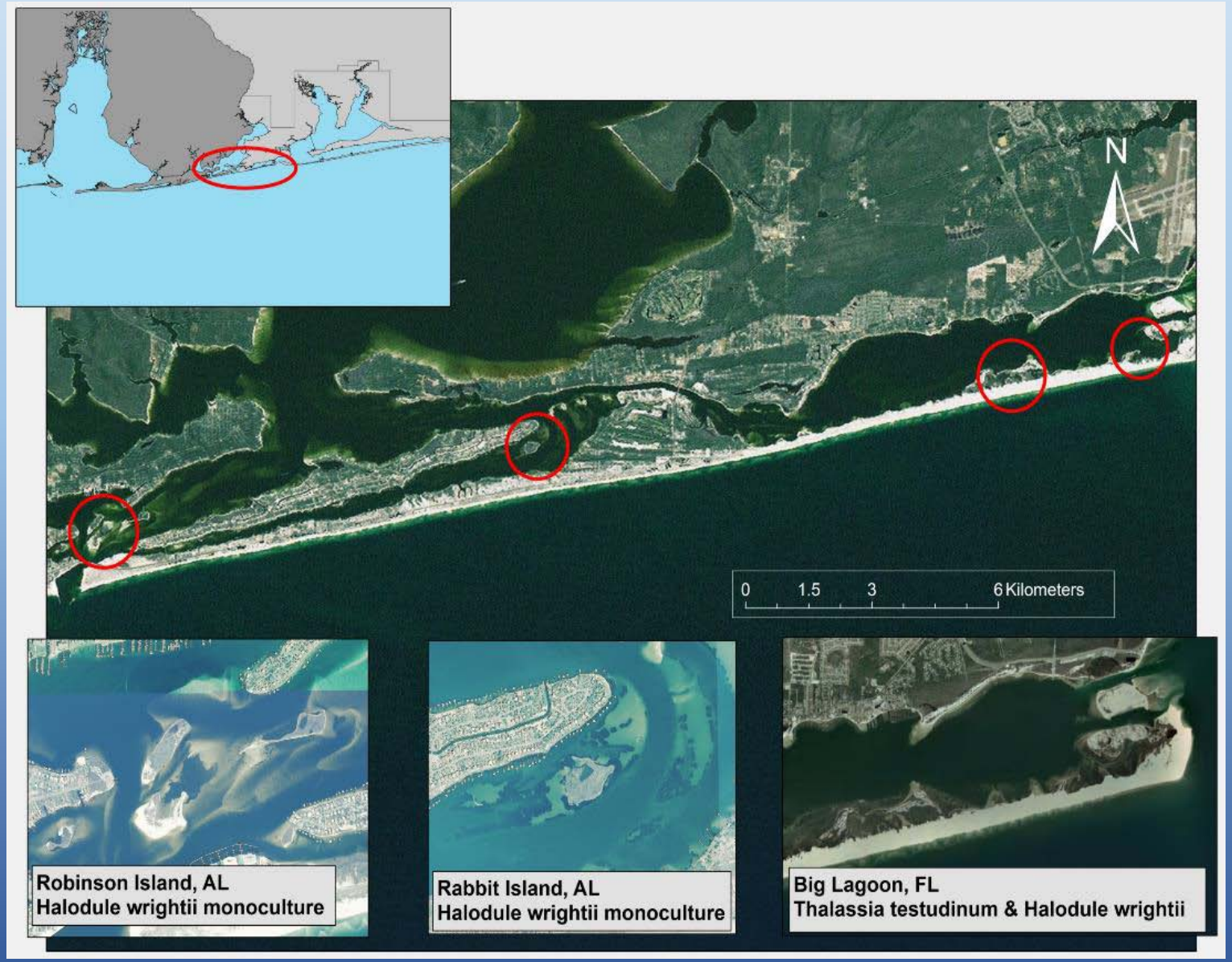

# Prop Scar Restoration

- Restoring damaged seagrass beds using the bird stake method. This was first used in the Florida Keys and works best where phosphorus is limiting seagrass growth. It has helped “kick start” recovery at our sites.

# Bird at Work

# Available data

- Visual cover estimates at prop scar restoration sites
- Some nutrient data
- Some biomass data



# Seagrass Light Model – Perdido Bay

# Objective

- Working with the model published by Dennison et. al (1993, *Bioscience)* and Kemp et al. (2004, *Estuaries and Coasts*) we are calibrating a simple model to determine the main factors influencing light attenuation with depth (= light available to seagrasses) in lower Perdido Bay.

- This model will allow us to predict where seagrass restoration will be successful, based on water quality information.

# Available data

- **14 sites across Lower Perdido Bay**
  - Target species *Halodule wrightii*
  - Sampling from May 2012 – 2014 (n=23)
- **Measured PAR**
  - every 0.5m in depth at the deep edge of the bed between ~0900-1300
- **Collected 1 L water samples for:**
  - Colored Dissolved Organic Material (CDOM)
  - Total Suspended Solids & Particulate Organic Material (TSS & POM)
  - Chlorophyll a (as a proxy for phytoplankton abundance)
- **Collected triplicate core samples of seagrass from the deep edge of bed at beginning, middle and end of growing season (during 2014 only) for above-ground and below-ground biomass**

# Less Seagrass, Less Fisheries Harvest

# Objective

- Examined the effectiveness of a passive fertilizer delivery technique (bird droppings) to help restore prop-scarred seagrass habitats (*Thalassia*-dominated and *Halodule*-dominated) in lower Perdido Bay and Big Lagoon

# The Dauphin Island Sea Lab Campus


The DISL campus covers approximately 42 acres or 17 hectares

# Big Lagoon Anecdotal Observations

- Sites containing seagrass in the 1990's still contain seagrass, although it is likely the deep end of the beds has shallowed
- Prop scarring has been common since the 1990's but seems to be increasing in the recent past
- Scallop numbers have remained very low to non-existent in the past decade or more
- Turtlegrass leaves are narrow and low salinity is a likely cause and a stressor for turtlegrass in Big Lagoon