

Big Lagoon & Perdido Bay Seagrass Studies

Ken Heck and Dottie Byron

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)

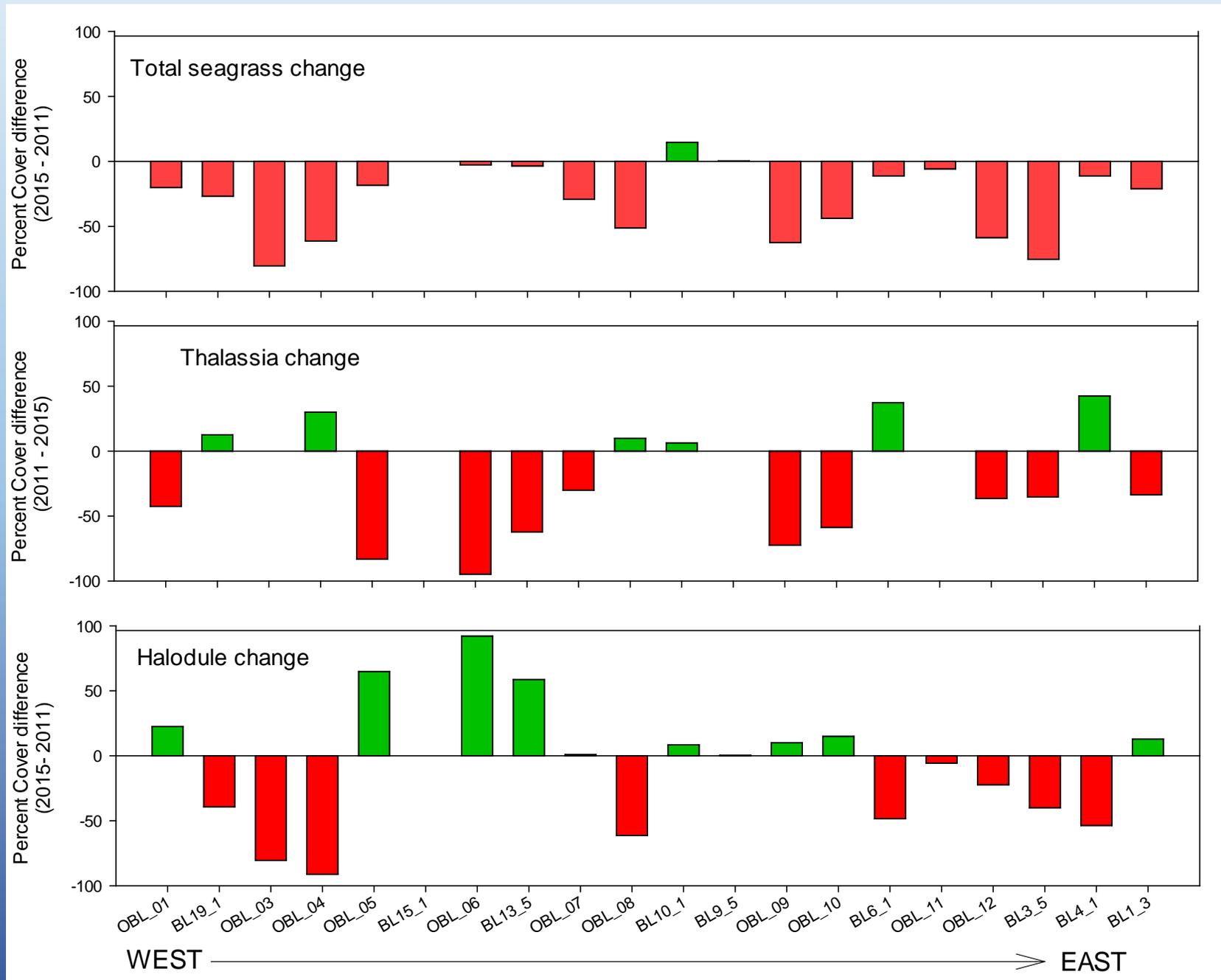


- Objective and Methods
 - Align with other National Park Service seagrass monitoring programs to assess status and trends of seagrass resources within the Gulf Islands Natl. Seashore
 - Rapid assessment at randomly selected stations within a 750m wide tessellated hexagon
 - Visual survey of Seagrass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

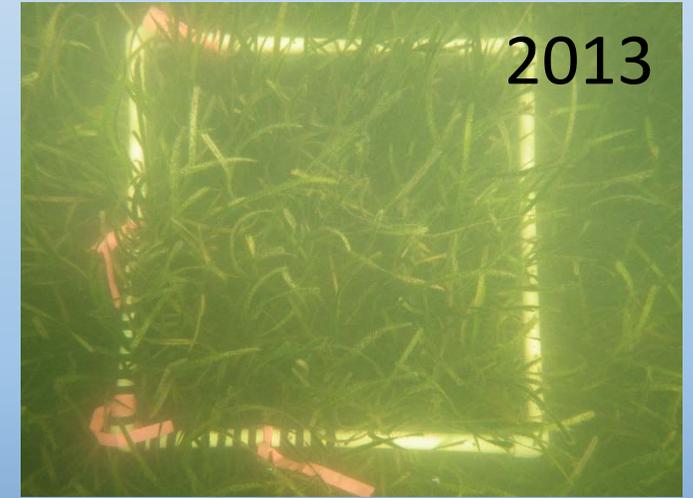
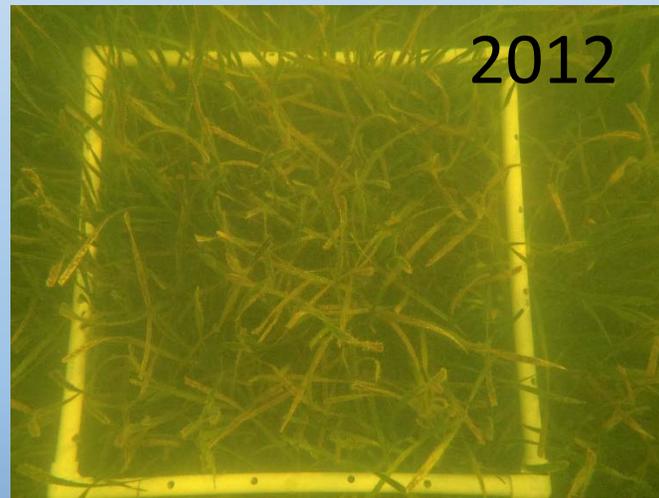
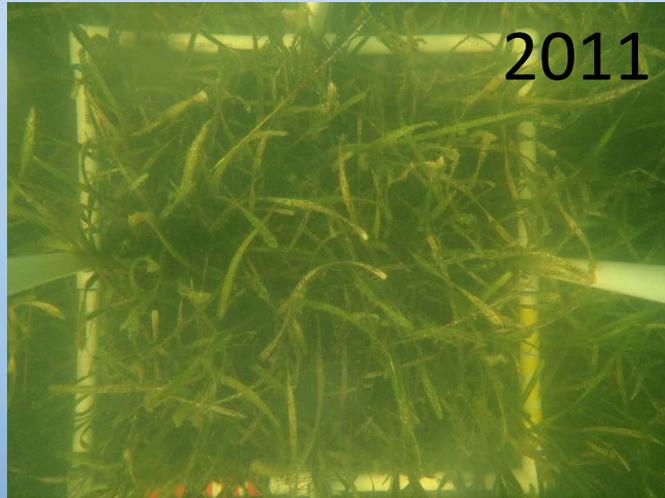
Monitoring Stations



Difference in Percent Cover between 2011 and 2015

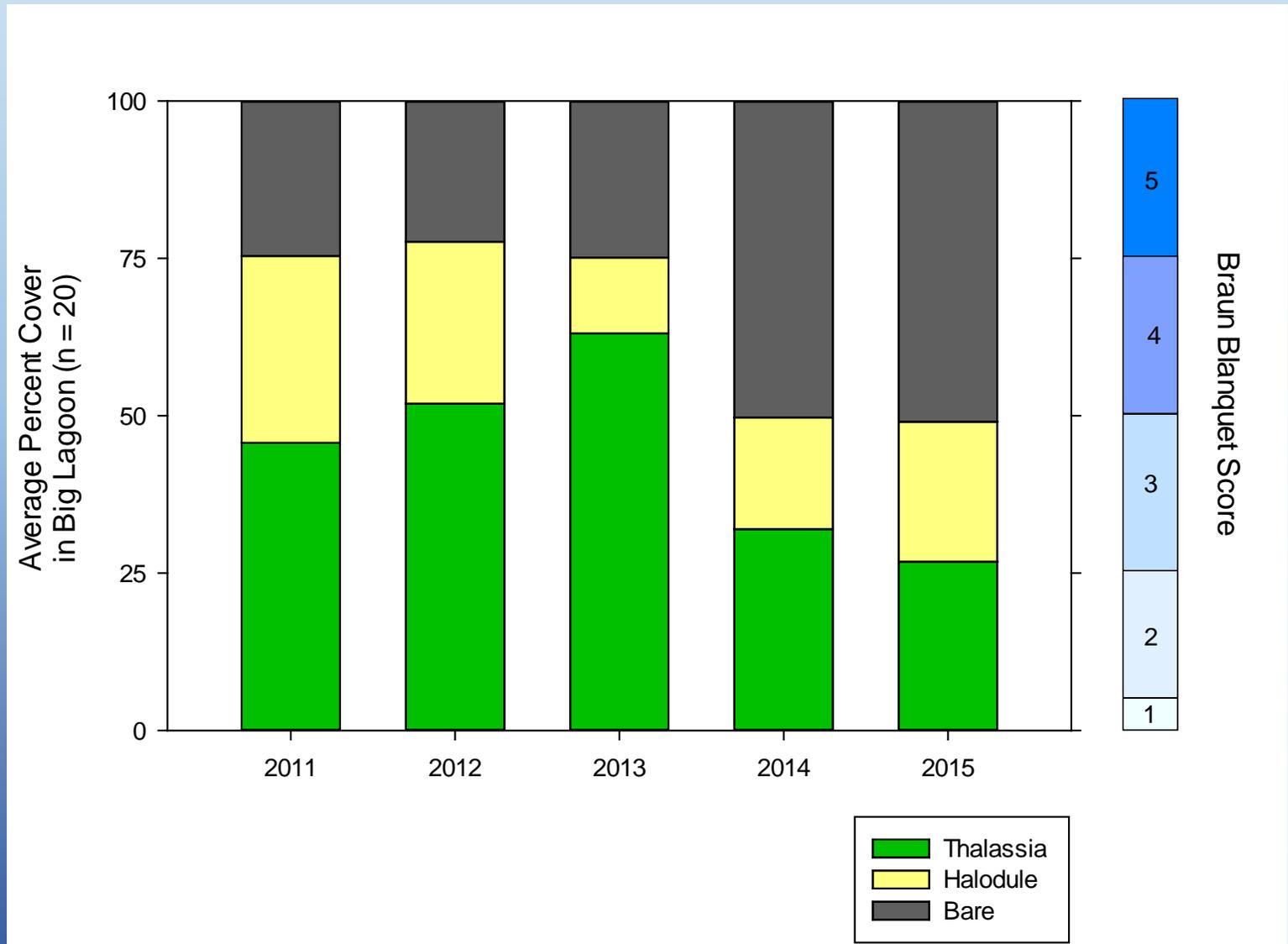


BL4-1: Entrance to Spanish Cove near No-Motor buoys

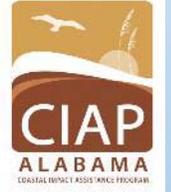


Basin-wide Average Percent Cover

- 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



Prop Scars

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

SEAGRASSES Coastal Nursery Habitat

Seagrasses are flowering plants that live in the shallow waters of every continent except Antarctica.



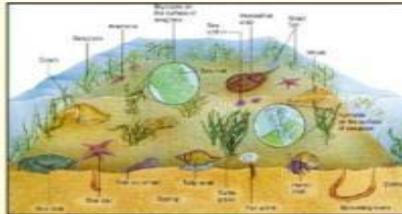
Shoal Grass (*Halodule wrightii*)
©2003 Florida Geographic Society



Turtle Grass (*Thalassia*)
©2003 Florida Geographic Society

Like terrestrial plants, seagrasses have leaves, roots, conducting tissue, flowers and seeds, and manufacture their own food via photosynthesis.

90% of the seagrasses in the United States are found in the Gulf of Mexico.



Seagrasses provide habitat for a multitude of species.

Seagrasses are important because they stabilize bottom sediments and act as a buffer during storm surges. In addition, the beds provide habitat, food, and protection for juvenile fish, crabs, shrimp and waterfowl. Recreational catches of Redfish, Speckled Trout, Blue Crabs and Shrimp are all enhanced by the presence of healthy grassbeds.



One of the most serious impacts to the grassbeds are boaters that attempt to cut across these shallow water environments. Their props produce deep scars in the grassbed that take years to recover and can cause further erosion within the grassbeds.



Grassbeds are found in the calm waters of Mobile Bay, Grand Bay, Mississippi Sound, Weeks Bay, Little Lagoon, Perdido Bay and Wolf Bay.



In an attempt to re-grow grasses in local prop scars the Dauphin Island Sea Lab has initiated a project in which signs are placed around the grassbeds to help boaters identify these sites. Additionally, scientists are utilizing a method of fertilizing the propeller scars by the use of bird stakes, in which the birds' guano help fertilize the scars and stimulate growth of the grasses.

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)

Seagrasses: COASTAL NURSERY HABITATS

WHAT ARE SEAGRASSES?

- Seagrasses are flowering plants that live in the shallow waters of every continent except Antarctica.
- Seagrass beds containing shoal grass and turtle grass are found all along the northern Gulf of Mexico's calm and shallow coastal waters.



Turtle Grass (*Thalassia testudinum*)



Shoal Grass (*Halodule wrightii*)

WHY ARE SEAGRASSES IMPORTANT?

- Seagrass beds provide food and protection for juvenile fish and shellfish, including many commercially and recreationally important species, such as speckled trout, redfish, blue crabs and shrimp.





WHAT YOU CAN DO

- Many types of waterfowl feed on seagrasses, as do threatened and endangered species, such as manatees and green sea turtles.
- Seagrasses help stabilize bottom sediments, filter runoff and take up nutrients from surrounding landscapes.

SAVING AND RESTORING OUR Seagrasses:

THREATS TO SEAGRASS

MORE THAN HALF OF ALL SEAGRASSES ALONG THE NORTHERN GULF OF MEXICO HAVE BEEN LOST SINCE THE 1950's

- A constant threat to seagrass beds is scarring created by boat propellers and anchors. When boaters navigate across shallow areas or anchor in seagrass beds, deep scars are created that can lead to erosion and further loss of seagrass. These scars can take years to recover.
- Poor water quality is also a major factor that poses a serious threat to the health of seagrass beds. For example, excessive sediments in the water column limit the amount of light available for seagrass survival.

HOW CAN WE PROTECT OUR SEAGRASSES

WHAT ARE WE DOING?

- To help propeller scars heal and protect seagrass beds from further scarring, local partners are implementing protection and restoration projects throughout the Northern Gulf of Mexico, including lower Perdido Bay and Big Lagoon.
- *No-Motor* and *Sensitive Seagrass Area* signs will identify seagrass beds to help boaters navigate through, or around, shallow water sites containing seagrass.
- Scientists are using bird stakes to attract local aquatic birds whose guano deposits will provide natural fertilizer to the propeller scars, promoting growth and expansion of the surrounding seagrass into the scars.

WHAT YOU CAN DO

- Be Aware – Idle or raise motors and pole when navigating through shallow areas.
- Set anchors in sandy areas, avoiding seagrass beds.
- Obey *No Motor Zone* or *Sensitive Seagrass Area* signs: wade, troll, pole or kayak when navigating through these areas to your favorite fishing or beach spot.



Perdido Bay, Ono Island, Big Lagoon, Pensacola Pass

0 1.25 2.5 5 7.5 10 Kilometers



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

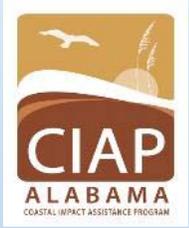


Available data

- 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