Influences of Boating Activity on Abundance, Biodiversity and Behaviors of Wading Bird Species on Oyster Reef Habitats

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Introduction

- The Indian River Lagoon and adjacent St. John's River account for 25% of Florida's wading bird population.
- Boating activities occur close to intertidal oyster reefs, causing wakes that may disrupt wading bird behaviors.
- Our research used wildlife trail cameras to observe birds and passing boats on restored, living, and dead oyster reefs in Mosquito Lagoon, FL.

Objectives

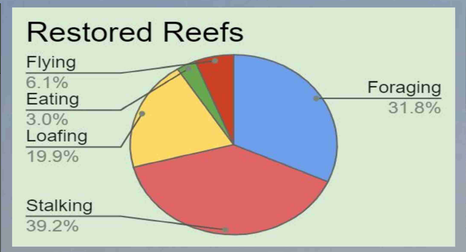
- Observe abundance, diversity and behaviors of birds on intertidal oyster reefs during day and night hours continuously for 13 weeks.
- Determine if birds on reefs were negatively impacted by boating activities.

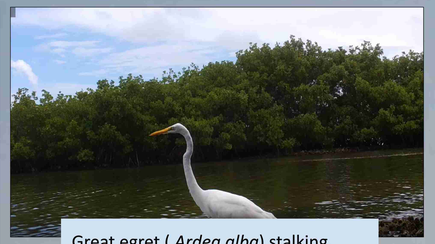
Methods

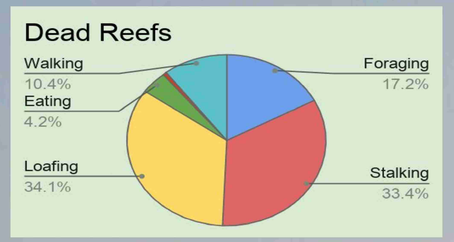
- In Spring 2020,10 wildlife trail cameras were deployed on reefs (4 restored, 3 live, 3 dead) for 7 weeks.
- Cameras took 10-second video clips when motion was detected.
- Camera SIM cards and batteries were changed weekly.
- In Summer 2020, 12 cameras were deployed on reefs (6 restored, 3 live, 3 dead) for six weeks.
- Collection process for SIM cards and batteries was repeated.
- Data was analyzed and categorized based on boat numbers, species of birds and behaviors exhibited.

Behaviors Observed

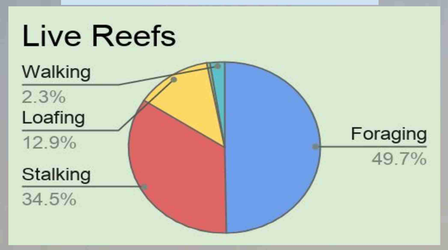
Walking	Foraging	Stalking	Consuming	Flying	Loafing
Movement while exhibiting no other obvious behaviors.	Actively attempting to catch prey that is already found.	Actively looking for prey - mobile or stationary.	Actively eating prey.	Flying past, to, or from the reef.	Resting, no movement .




Great egret (*Ardea alba*) stalking.



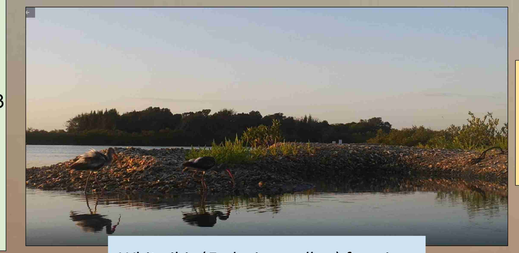
Great blue heron (*Ardea herodias*) eating catfish.



Black-crowned night heron (*Nycticorax nycticorax*) stalking.

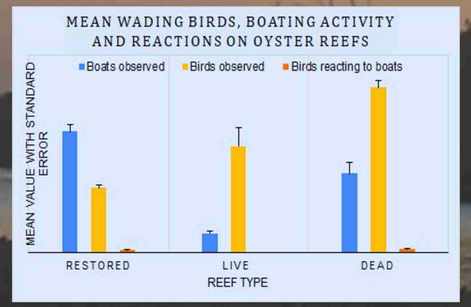
Wading bird species were observed to be consuming: mud crab, stone crab, Asian tiger shrimp, worm eel, and catfish.

844 wading bird observations were recorded: 339 observations at restored reefs, 333 observations on dead reefs, and 172 observations on live reefs.


White ibis (*Eudocimus albus*) foraging.

Other species observed using these reefs were raccoons, brown pelicans, black headed gulls, and a species of beach mouse.

Raccoon walking across reef.



Great blue heron (*Ardea herodias*) loafing.

Statistical Analysis

	P-Value	Hypothesis Test
Number of Boats Per Reef	0.0950	No difference in treatments
Number of Birds Per Reef	0.0014	Dead reefs > live reefs > restored reefs
Number of bird reactions per reef	0.2106	No difference between treatments

Results

- 10 bird species were observed on reefs in spring and 11 in summer.
- Eight species were only observed during daylight hours, while 3 were observed during day and night hours.
- Great blue heron, black-crowned night heron, and white ibis were the only species observed at night hours.
- 531 boats passed within 5 meters of restored reefs,160 boats passed near dead reefs and 31 boats passed near live reefs.
- Stalking was the dominant behavior exhibited on all three reef types, accounting for 32.9% of all observations recorded.
- Great blue heron reactions to boating activities included departing the reef, while willet and white ibis walked away from waves but stayed on the reefs.
- Restored and dead reefs were most commonly used for stalking while live natural reefs recorded the most data for foraging.

Little blue heron (*Egretta caerulea*) stalking.

Discussion

- This research is important to observing how wading bird species interact and rely on the three types of oyster reefs for varying behaviors.
- The American oystercatcher, little blue heron, and tricolored heron are all state threatened species. Observing the behaviors of these species could be beneficial toward emphasizing the importance of the restoration and preservation of oyster reefs as a conservation effort for these species.
- A future study should examine the maximum wave energy that wading bird species can withstand before departing a reef.