Evaluating the Role of Seagrass Beds as a Nursery Habitat and Food Source in Port Everglades, Florida

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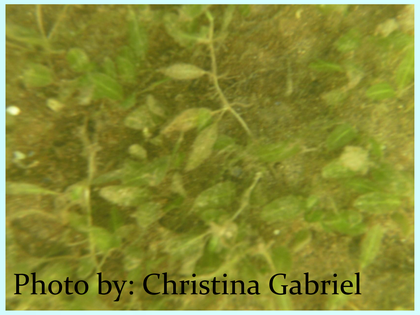
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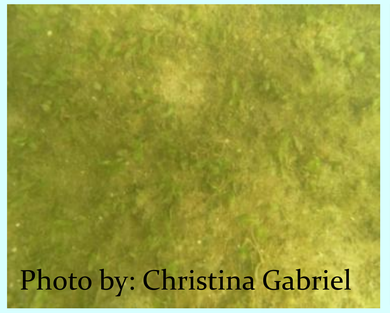
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Abstract

Seagrass beds are considered highly productive ecosystems providing food and carbon sources for a number of marine animals. Seagrasses also provide shelter for juvenile and smaller invertebrate and vertebrate species. Seagrasses can be negatively impacted by activities such as dredging and filling. The proposed plans to dredge, fill, and modify the turning basins, Intracoastal Waterway and the Dania cut-off canal in Port Everglades, Florida (US Army Corps of Engineers contract no. DACW 17-99-d-0043) will directly impact the local seagrass beds. The seagrasses that are found in this area include *Halodule wrightii, Halophila decipiens,* and *Halophila johnsonii.* Stable carbon and nitrogen isotopes ratios are being analyzed from all organisms collected to determine the trophic contribution of seagrass species to the food web. *H. wrightii* had a $\delta^{13}C$ value of -14‰ and a $\delta^{15}N$ value of 8‰. Preliminary data show that most consumers have $\delta^{13}C$ values ranging from -14 to -19‰ and $\delta^{15}N$ values ranging from 5 to 13‰. There is no evidence that the organisms collected are consuming the seagrasses at these sites. Results from this study have been compared with those in Mississippi Sound (Moncreiff and Sullivan, 2001) because like species were identified and analyzed at that location.

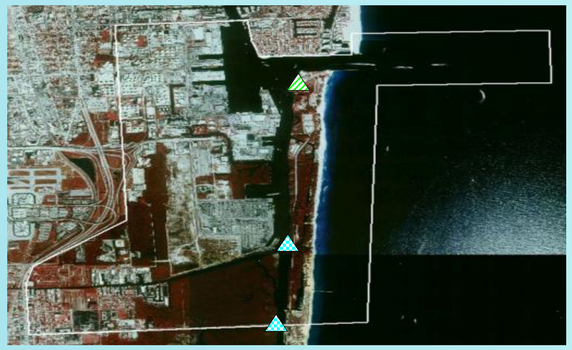


Figure 1. Area of Port Everglades' proposed modifications is outlined in white. Triangles represent this study's seagrass research sites.

Background

The three seagrass species were found at all 3 locations. Sampling took place during the spring and summer months. No samples were collected during the winter months (November through January) because the seagrasses were senescent. A variety of organisms have been identified at all three locations. Many of the organisms identified are reef species, such as Sergeant Majors, Great Barracudas, and Checkered Puffers. Not all species have been collected. However, seagrass, algae, and detritus were collected every sampling day.

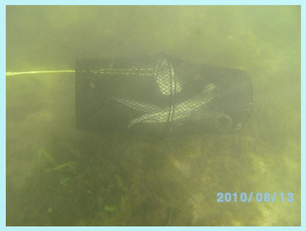
Materials and Methods

Specimen collection

- Minnow traps were used to collect organisms less than 5cm long. Purse seine net was used to collect small schooling fish and small inverts in the sand. Seagrass, algae, and detritus were collected by hand
- Samples have been collected April through October of 2009 and 2010

Stable Isotope Analyses

- Samples are frozen after collection, dried, homogenized using a Wig-L. bug, and are weighed before analysis with IRMS
- Stable carbon and nitrogen isotope ratios are used to determine local seagrass food webs
- Stable isotope ratios (R) are reported in the standard delta notation (‰) relative to Pee Dee Belemnite (PDB) (carbon) and atmospheric air (nitrogen) as: δ (‰) = $[(R_{sample} * R_{standard}) - 1] * 1000$



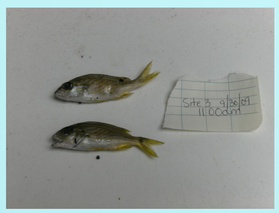


Figure 2. Minnow trap used for collecting fish and smaller invertebrates such as the pinfish and Jenny and tidewater mojarras pictured.

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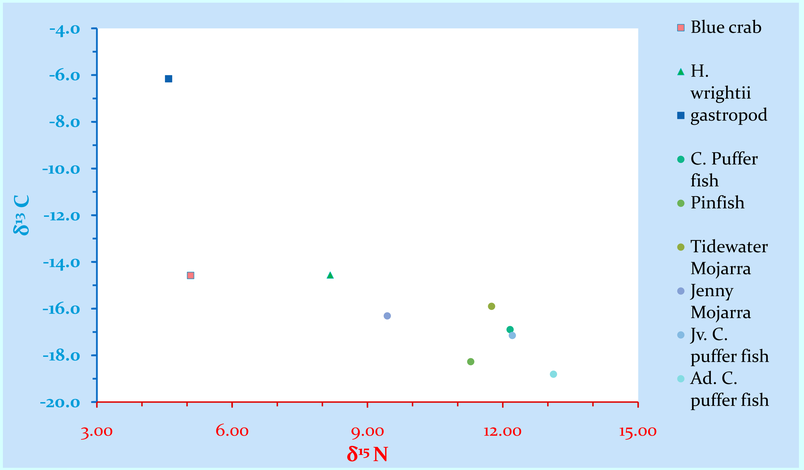

Figure 3. $\delta^{13}C$ and $\delta^{15}N$ values of organisms found in Port Everglades, Florida.

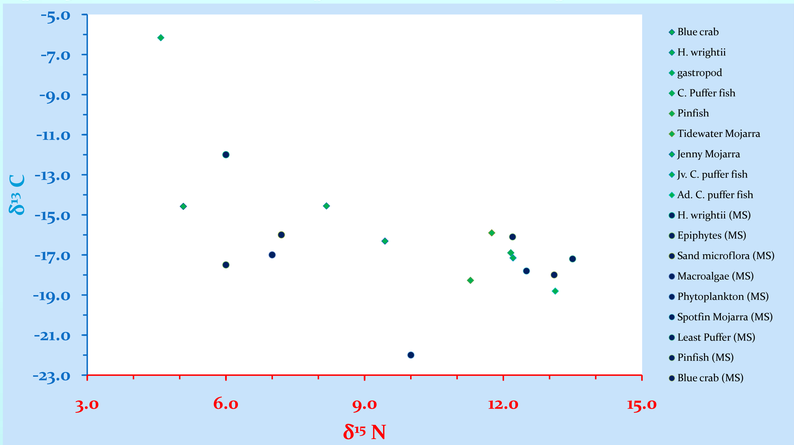

Figure 4. Comparison of $\delta^{13}C$ and $\delta^{15}N$ values in Port Everglades, Florida and Mississippi Sound (MS). Florida values are green diamonds and Mississippi Sound values are blue circles.

Results and Discussion

- *H. wrightii* had a $\delta^{13}C$ value of -14‰ and a $\delta^{15}N$ value of 8‰.
- Preliminary results show that consumers in Port Everglades are not feeding on seagrass, but likely on other primary producers
- Stable carbon and nitrogen isotope ratios are similar to like organisms found in Mississippi Sound, implying similar trophic dynamics between these two locations
- More diverse primary producers, invertebrates and vertebrate occupying the seagrass beds are being collected and analyzed to determine trophic contribution of seagrass in Port Everglades