Identifying the Base: Second Year Baseline Study of Subtidal Macrofauna

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U N I V E R S I T Y

Introduction

  Management of our coastal ecosystems is essential for the health of all marine ecosystems that touch it. It is important for us to deepen our understanding of the significance of this community locally and help us identify potential threats to it. This could affect legislation, environmental actions, and public perception of the environment. One threat to benthic subtidal macrofauna would be beach nourishment projects (Bolam, 2010). The bulk movement of sand caused by these projects alters macrofaunal environments. Benthic macrofauna such as polychaetes, mollusks, amphipods, isopods live within the sand. Macrofauna are crucial to the food web as they are a food source to many larger animals such as bottom feeding fishes (Manning et al., 2013).

  This study examined richness and abundance of macrofauna living in the subtidal zone off Palm Beach Island, Florida. Grain size data was also collected and correlated to the macrofauna data. Our intent was to analyze the distribution and abundance of subtidal macrofauna. This baseline data will assist in understanding the impacts of disturbances such as beach nourishment projects, hurricanes, red tide, etc.

Methods

- Sampling conducted off Palm Beach, FL, June 2019 (Fig.1)
- 60 - 10 x10 cm cores were taken along four transects: 50m (depth 1.8m), 100m (depth 2.7m), 150m (depth 5.2m), and 200m (depth 4.3m) from low tide line.
- Macrofauna cores were sieved on site using 1mm mesh bags, preserved with 3.5% formalin with rose bengal (Fig. 2).
- 3 sediment cores were taken at each transect for grain size analysis using Meinzer II Sieve Shaker for 20 min. Mean grain size was determined by the Folk and Ward Method.
- Kruskal-Wallace with Mann-Whitney test post hoc were used to analyze the macrofauna. ANOVA with a T-test post hoc was used to analyze sediment core data.
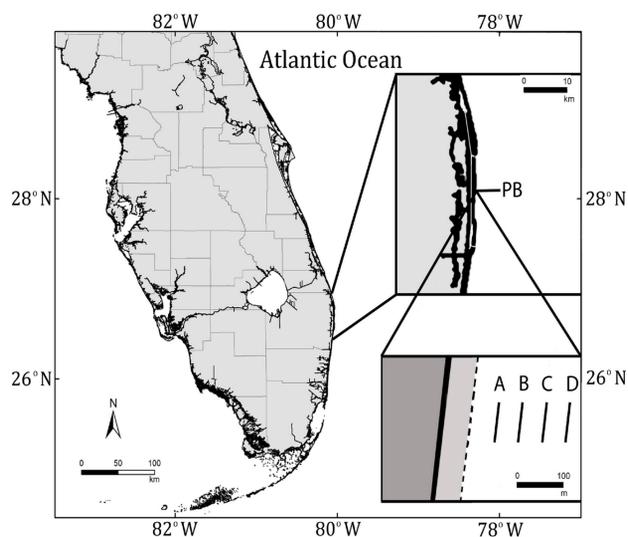

Figure 1. Location of study within the town of Palm Beach in Palm Beach County, Florida, USA . Inset identifies 4 transects: A= 50m, B= 100m, C= 150m, D=200m.

Figure 2. Top) sieving sand samples. Bottom) sand samples preserved in 3.5% formalin with rose bengal.

Results

- 176 benthic organisms were identified from 27 invertebrate taxa.
- Most common organisms making up 65% of the identified community included: *Ancinus depressus* (21.0%), Aricidea (16.5%); *Scoloplos fragilis* (11.4%), Sipuncula (8.5%), *Scolelepsis squamata* (8.0%). (Figs 3,4)
- Grain size was not found to be different between transects, although finest at 100m transect, coarsest at 50m (Fig. 5)
- *S. fragilis* significantly preferred to be closer to the shore
- *Aricidia* sp. significantly preferred to be further from shore
- *A. depressus* was significantly scarce at 150m from shore, this transect was deepest under water: 5.2m
- Species accumulation curve demonstrates that leveling is occurring at 15 samples (Fig. 6)

Figure 3. Common macrofauna found at site a) *Ancinus depressus*, b) Sipuncula, c) *Scolepsis squamata*, d) *Arcidea* sp., e) *Scoloplos fragilis*. Scale bars = 1mm
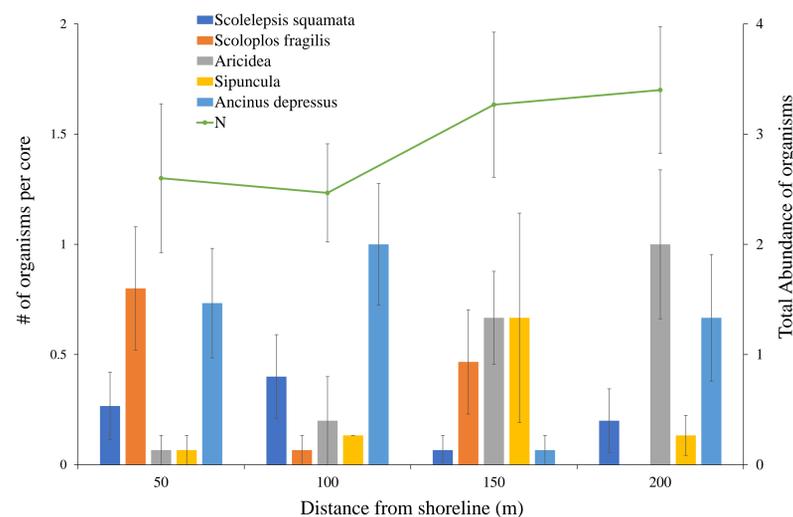

Figure 4. Mean abundance (± SE) of macrofauna found at site per core by taxa and transect and overall abundance of site (2nd Y axis). n=15
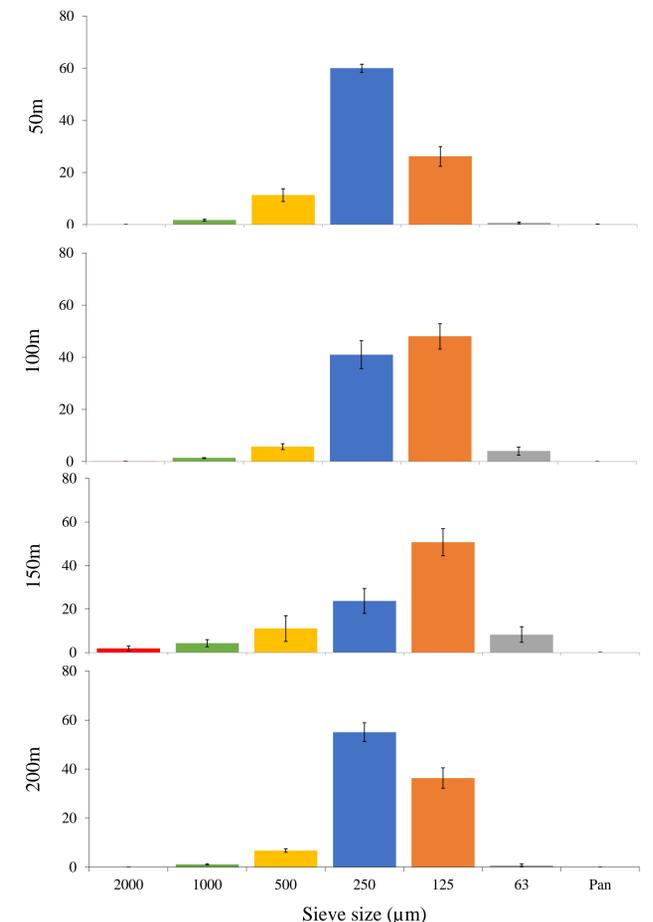

Figure 5. Grain size analysis demonstrated no significant differences in mean although histogram differences can be observed. n=3
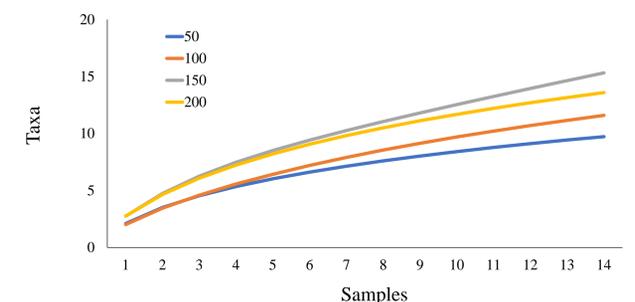

Figure 6. Species accumulation curve demonstrating leveling at 15 samples. 50m transect least level, but has the fewest taxa.

Discussion

- *Ancinus depressus*, an isopod species known to be found in shelly sand, is least abundant in the deepest water and the finest sand.
- The greatest species richness and total abundance was furthest from shore which correlates to finer sediment and less perturbations from nearshore wave swell.
- Findings from this baseline data will provide comparisons for future disturbances along the shoreline and greater understanding of recovery and resilience of communities

Acknowledgements

References
Bolam, S. G. (2010). Burial survival of benthic macrofauna following deposition of simulated dredged material. *Environmental Monitoring and Assessment, 181*(1–4), 13–27. doi: 10.1007/s10661-010-1809-5
Manning, L. M., Peterson, C. H., & Fegley, S. R. (2013). Degradation of Surf-Fish Foraging Habitat Driven by Persistent Sedimentological Modifications Caused by Beach Nourishment. *Bulletin of Marine Science, 89*(1), 83–106. doi: 10.5343/bms.2012.1005