

Plastic sinks or sources: Characterizing cycling of marine debris in mangrove forests of Biscayne Bay, FL

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Overview

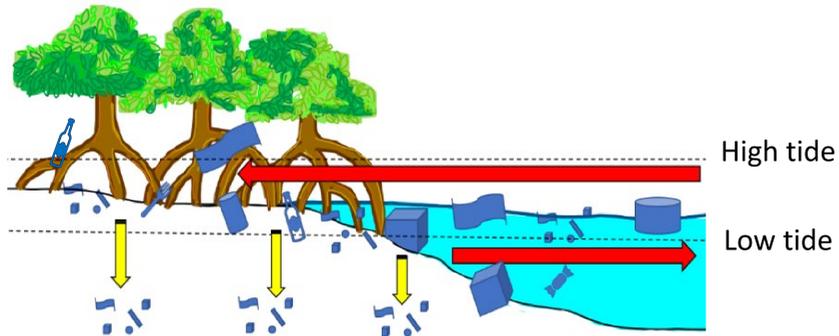


Figure 1. Import, export (red arrows) and settling (yellow arrows) of debris (blue shapes) in coastal mangroves.



Figure 2. Site of surveys in Biscayne Bay.

1. Determine if debris abundance varies with distance inland
2. Identify patterns between debris on the surface and buried in mangrove sediments
3. Explore the potential for citizen science to facilitate long-term marine debris data collection

Methodology

- Survey vegetation and debris on ground surface in 2-m plots along transects perpendicular to coastline
- Debris: by size (meso: 5mm-2.5cm, macro: >2.5cm)
- Vegetation: species, basal area, coverage of prop roots & pneumatophores, seeding count

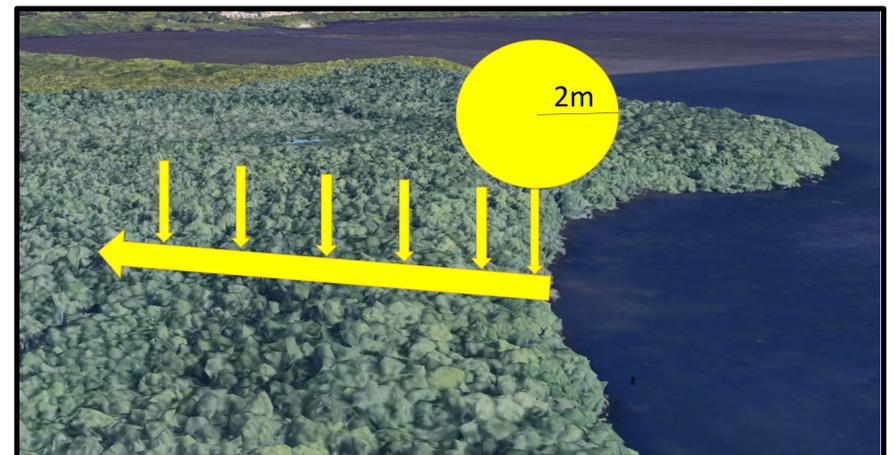


Figure 3. Diagram of surface surveys at each site (not to scale)

- Next phase: extract 15cm deep sediment cores along transects perpendicular to the coastline
- Plastic will be sieved and separated from sediment by density through flotation

Preliminary Survey Results

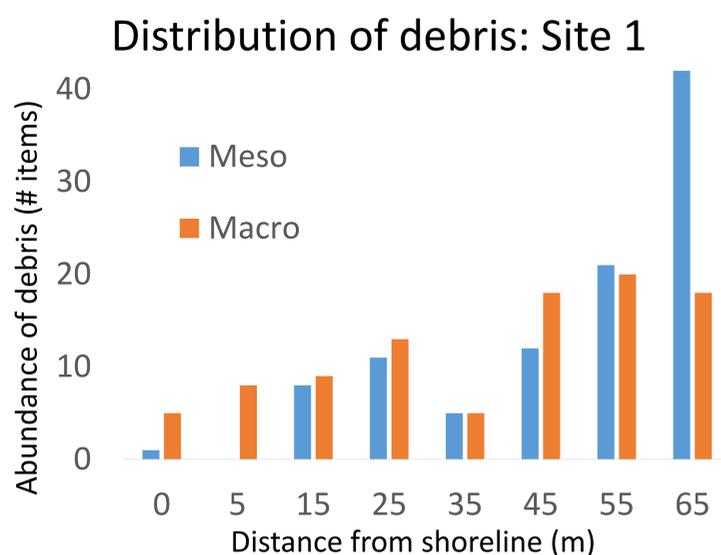


Figure 4. Size distribution of debris with distance from the shoreline.

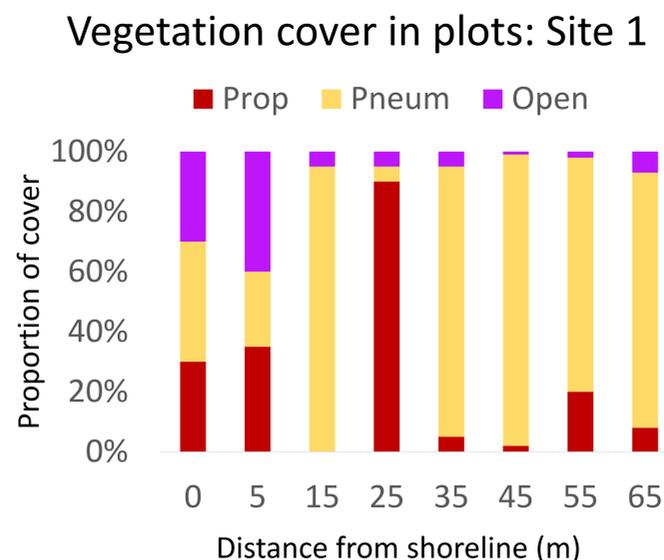


Figure 5. Proportions of prop roots, pneumatophores, and open space.

- Over 96% of debris was plastic.
- Invertebrates were observed on some debris (Fig. 7).
- Abundance of debris increased with distance from shoreline, accumulating behind the plots of higher prop root densities.



Figures 6-7. Debris entangled in vegetation and interactions with fauna.



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