

# The Interplay Between Human Habitation Impacts and Barrier Island Development

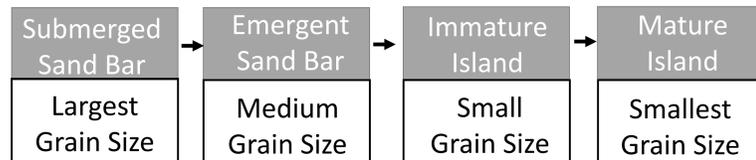
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## 1. Barrier Island Geology

- Barrier islands develop from emergent sand bars, flooded dunes, and spits cutoff from land
- As barrier islands develop from sand bars the grain size reduces



- Natural structures such as beach rock can stabilize barrier islands as is the case in Siesta Key (Spurgeon et al, 2003),
- Barrier islands appear, move, and disappear in response to changes in wind, waves, and ocean currents
- This study seeks to determine if pre-Columbian habitations on barrier islands in Florida increased barrier island development and stability through grain size measurements
- I need your help to build a database of grain sizes at archaeological sites!

## 2. Sediment Sampling of Archaeology Sites

- After excavation of a 1x1x1 m unit ~600 g of sediment was sampled from the most intact unit wall in 10 cm intervals
- Sediment was dried and sieved to attain moisture content and grain size (Lecher & Watson, 2021).
- Sampling of multiple sites across the state of Florida in coastal environments will provide insight into the impact humans have on barrier island development.



Figure 1: Sediment sampling the wall of an excavated unit at South Inlet Park in Boca Raton.

## Get Involved!

Conducting an excavation? Let me sample your sediment! I'll provide you with the grain size data, which will also be added to my database. Use a push pin to put the approximate location of your site with your contact info.



## 3. Human Modification of Barrier Islands

- Modern ways humans increase barrier island stability and development include:
  - Condos and other buildings
  - Erosion-prevention structures
  - A1A was built up as an artificial dune
  - Beach renourishment
- Pre-Columbian Native Americans may have inadvertently increased barrier islands stability by
  - Building shell middens (akin to the beach rock of Siesta Key)
  - Reducing the grain size of the local environment through remnants of their activities (e.g. shell dust or ash from fires)
- Akin to the Everglades Tree island question: Did humans move to barrier islands after they were mature or did humans help develop and stabilize barrier islands?

## 4. Preliminary Results

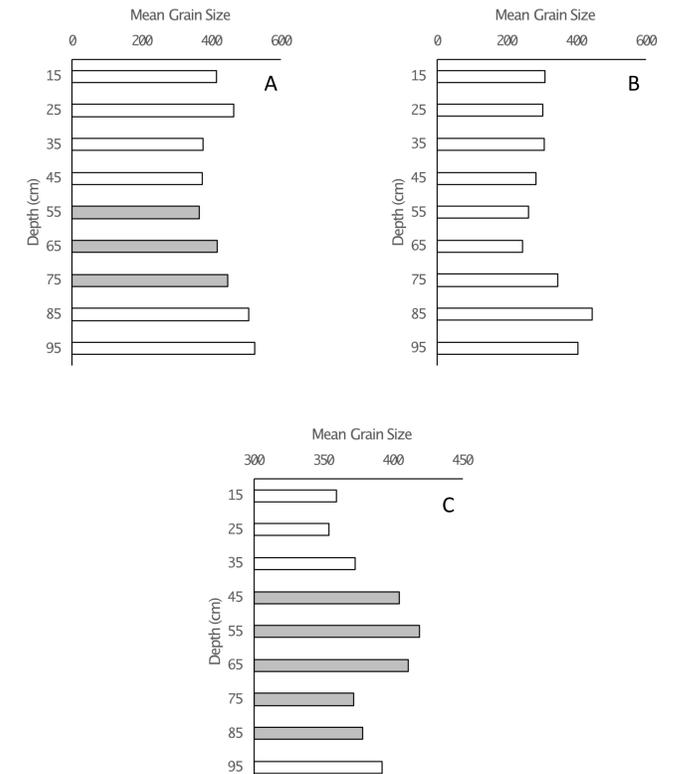


Figure 2: Mean grain size in um for a buried bone midden (A), dirt mound (B), and shell midden (C) in South Inlet Park Boca Raton. Midden layers are shaded. For the bone midden grain size seems to decrease during inhabitation (in the midden layer). Conversely in the shell midden grain size seems to increase with inhabitation. There is no distinct trend in the dirt mound. More samples of coastal archaeological sites are needed to determine if these trends are representative.

### References

- Spurgeon, D., Davis Jr, R. A., & Shinnu, E. A. (2003). Formation of 'Beach Rock' at Siesta Key, Florida and its influence on barrier island development. *Marine Geology*, 200(1-4), 19-29.
- Lecher, A. L., & Watson, A. (2021). Danger from beneath: groundwater-sea-level interactions and implications for coastal archaeological sites in the southeast US. *Southeastern Archaeology*, 40(1), 20-32.