Shell Abundance and Diversity of Considine Beach

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Introduction

- Prompted by our beach walk!
- Eyes selectively scan for certain types of shells
  - In reality, there is BIG diversity and abundance of molluscs on Considine Beach
  - Mollusca is a greatly diverse phylum
- Stream that runs from mangroves and empties into the beach
  - Input of nutrients
- **Our question: How does diversity of molluscs differ with increasing distance from the stream?**

Hypothesis

The shells will be more abundant and diverse closest to the mouth of the stream.

- 2 reasons:
  - A) Physical properties of water (current, possible gyres, etc.)
  - B) Nutrient input from stream

Null: Shell abundance and diversity will be consistent with increasing distance from the stream.

Methods

- **Considine Beach**
- **Sampled following the high tide line**
  - **Started closest to the stream**
  - **Sampled in ½ x ½ meter quadrats, spaced about 20 meters apart**
  - **Counted species and abundance of all whole shells**
    - **Only counted the macro fauna species (visible to naked eye)**
    - **Brought some samples back for species identification**
- **Calculated Simpson Index for each quadrat**

What did we collect?

- We recorded 175 total molluscs and found over 30 species
- Some of the most abundant:
  - Bleeding Tooth (*Nerita polita*)
  - Strawberry Cockle (*Fragum unedo*)
  - Light-ribbed Nerite (*Nerita albicilla*)

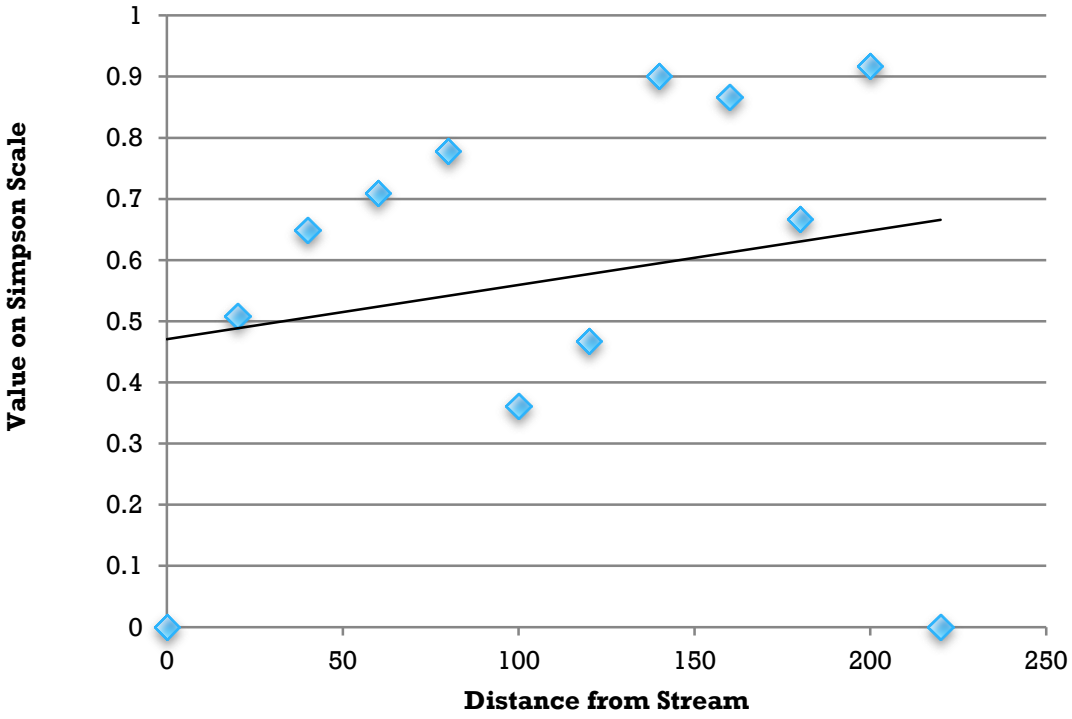
http://www.manandmollusc.net/lesson_plan_files/nerita_peloronta.jpg

http://shellmuseum.org/shells/shellspic.cfm?sr=241

http://www.mineralslamacla.com/VARIOS_GASTEROPODOS/neritidae/Nerita_albicilla12554.jpg

Results

Simpson Index for each quadrat vs. distance from stream



$y = 0.0009x + 0.4708$
$R^2 = 0.0408$

Simpson Index: Measures the probability that 2 individuals (randomly selected) from a sample will belong to the same species

- Between 0 and 1
- higher = more diverse

R = 0.20, p>0.10
Referring to Pearson Correlation Table:
Not significant

Discussion

- Chose high tide line because it was the clearest benchmark of shell abundance
  - Saw shells closer to the water that we never saw at high tide line

- Diversity
  - Generalization is that biodiversity is higher as you get closer to the tropics
  - Previous studies in the tropical indo-Pacific have grossly under represented the richness of macro fauna, as a result of insufficient collecting and sorting effort (Bouchet 2002)

- Sources of Error
  - Identification! – even the shell master couldn't identify some ☺
  - Broken shells
  - Missing a shell in the quadrat

Why did we find greater diversity further from stream?

- The BIG question
- We observed that further from stream, the shells were less abundant
  - There's a higher chance of having a higher biodiversity with a fewer abundance of shells
- Human impact

Literature Cited

- Bouchet, P., Lozouet, P., Maestrati, P. and Heros, V. (2002). Assessing the magnitude of species richness in tropica l marine environment: exceptionally high numbers of molluscs at a New Caledonia site. *Biological Journal of the Linnean Society*, 75(4), pp.421-436.