

# Genetic connectivity of the Spotted Turtle as it faces sea level rise on the Atlantic Coastal Plain

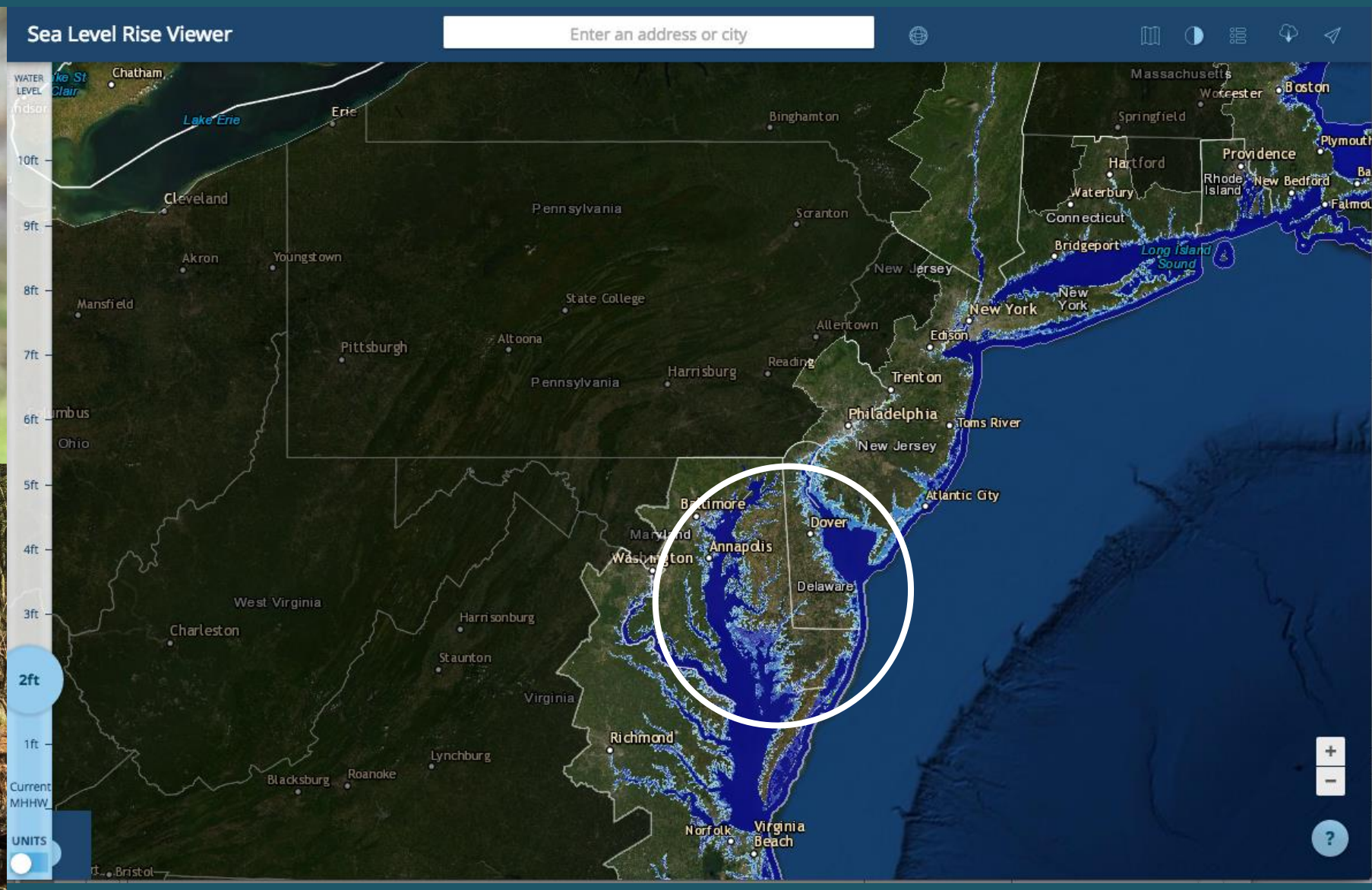


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# Objectives

To determine the genetic connectivity of spotted turtles on the Atlantic Coastal Plain  
...and what limits gene flow





The present...



The future...1 ft by 2050

The future...2 ft by 2100



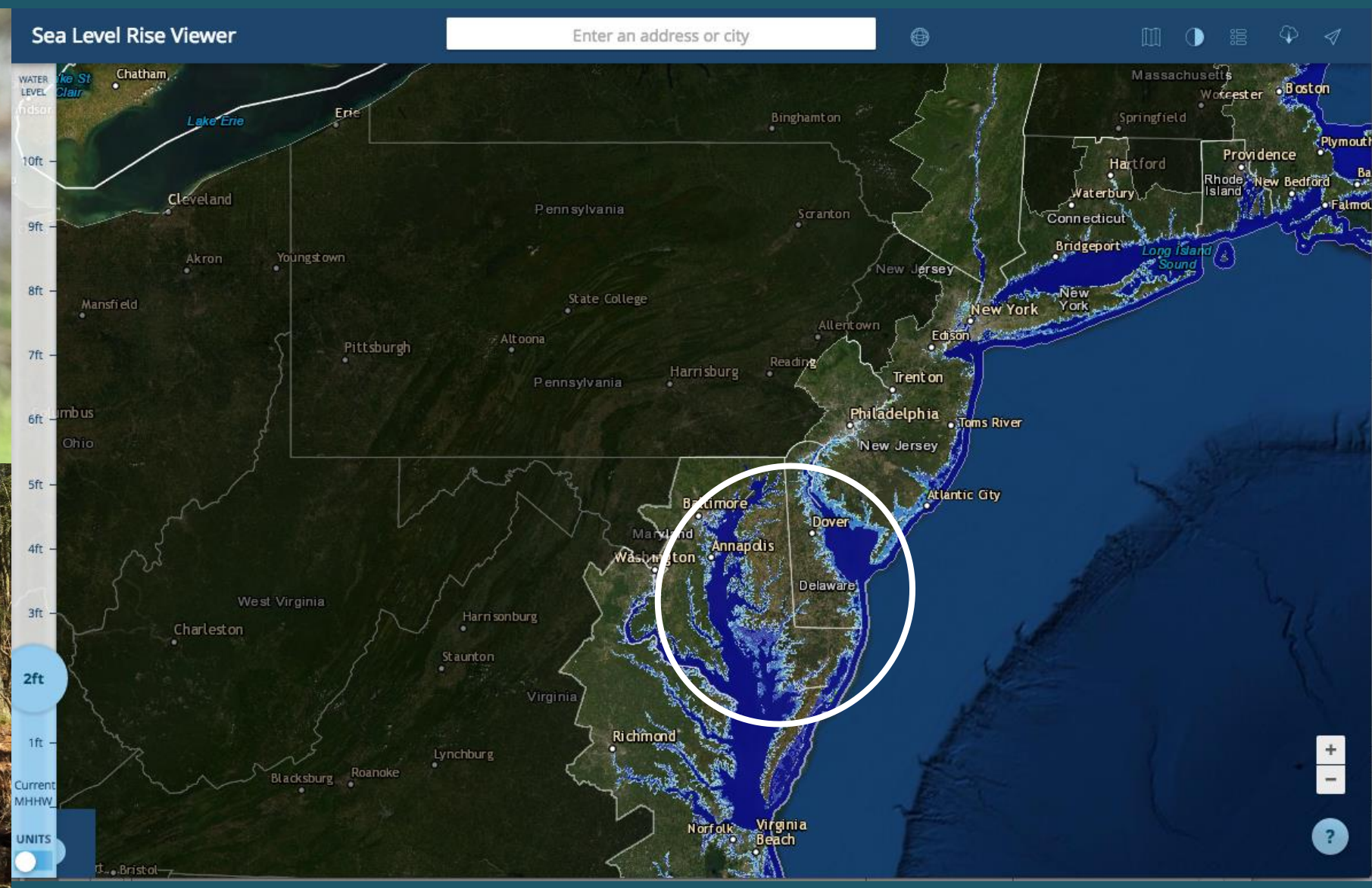


# Objectives

To determine the genetic connectivity of spotted turtles on the Atlantic Coastal Plain

1. Are individuals dispersing? How far?

2. Are populations genetically different? Why?





# Methods: DNA Collection

- 164 individuals in 2016-2017
- **Buccal swabs**

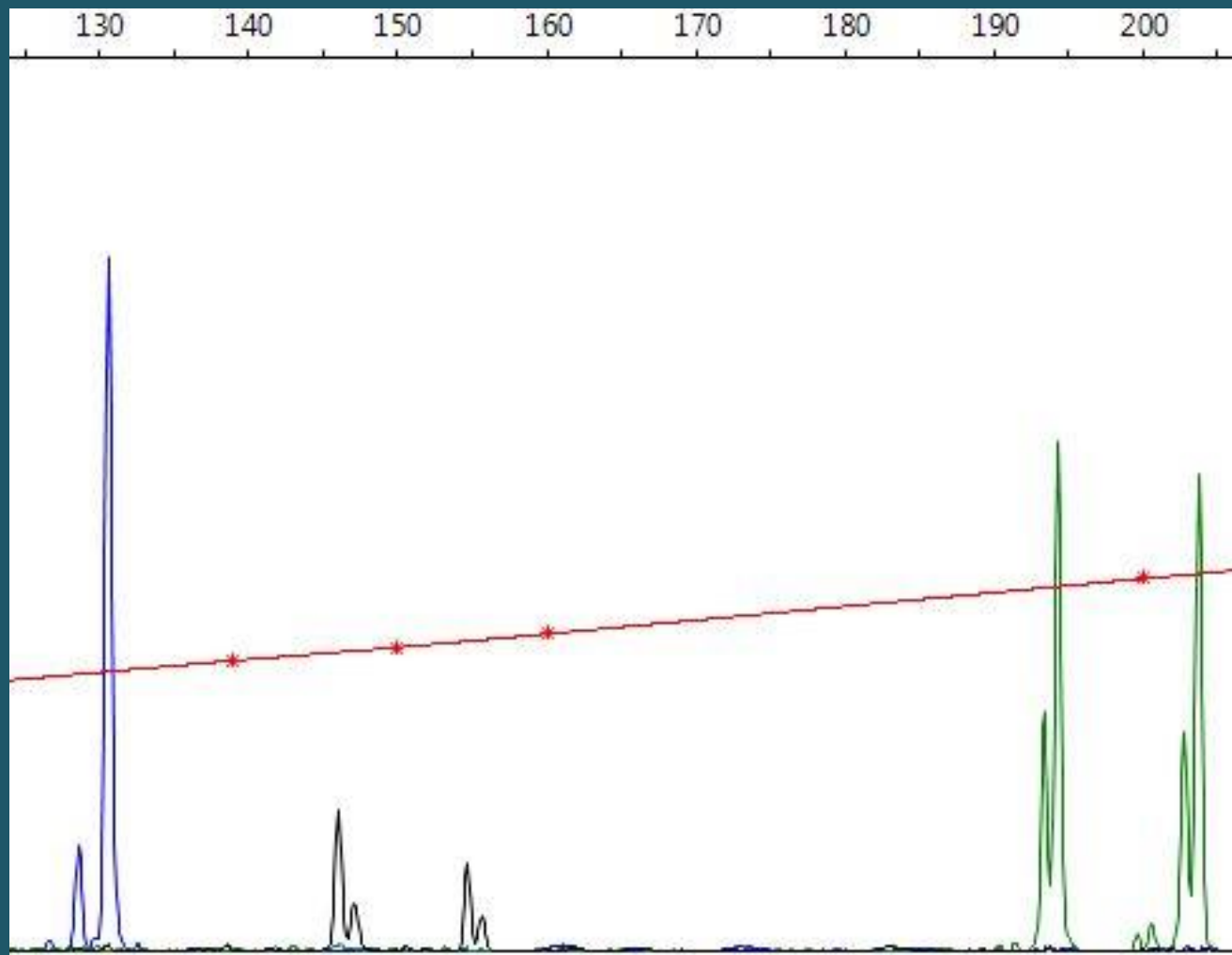


# Methods: Amplifying DNA

PCR of 12 microsatellite loci (10 Bog, 2 Blanding's)

Non-coding neutral repeats

ATAGATAGATAG



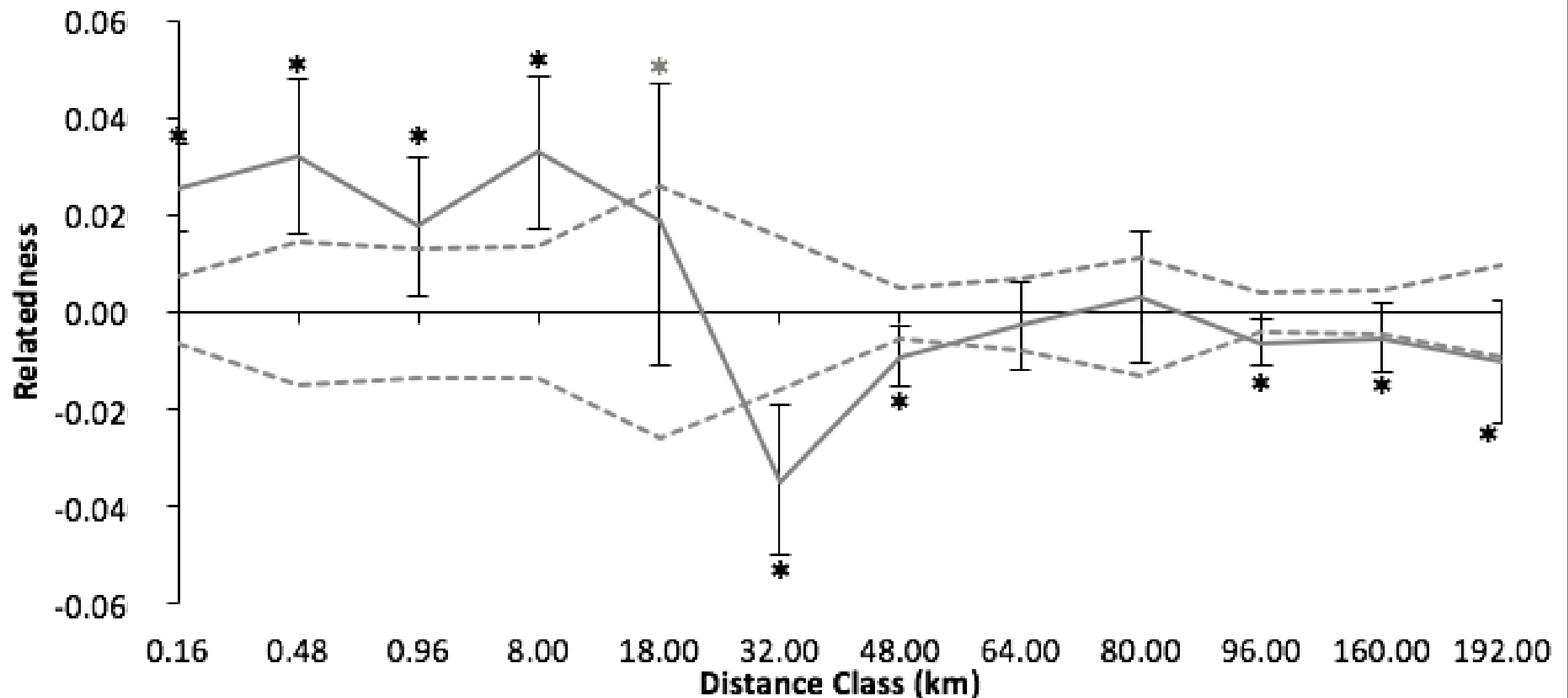
“genetic  
fingerprints”

# Methods: Two Types of Analyses

- Are individuals dispersing?
  - Genetic spatial autocorrelation (relatedness vs distance)
- Are populations differentiated?
  - STRUCTURE to visualize ancestral gene flow
  - $F_{ST}$ : a measure of genetic similarity
    - Compared Linearized  $F_{ST}$  vs different measures of distance (landscape)

# Results: Are individuals dispersing?

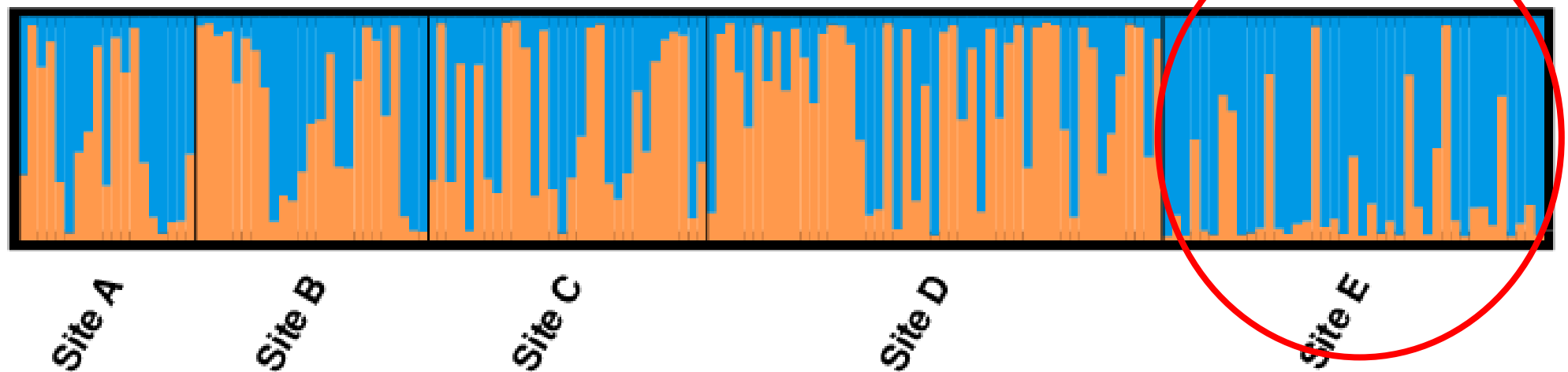
- Significantly philopatric (Genetic Spatial Autocorrelation)
- Limited movements beyond ~18 km (“Patch size”) – But most sites in this area >47 km apart





# Results: Are populations genetically differentiated?

- STRUCTURE
  - $K = 2$  distinct ancestral clusters
- $F_{ST}$ : Site E different from others ( $p < 0.0001$ )



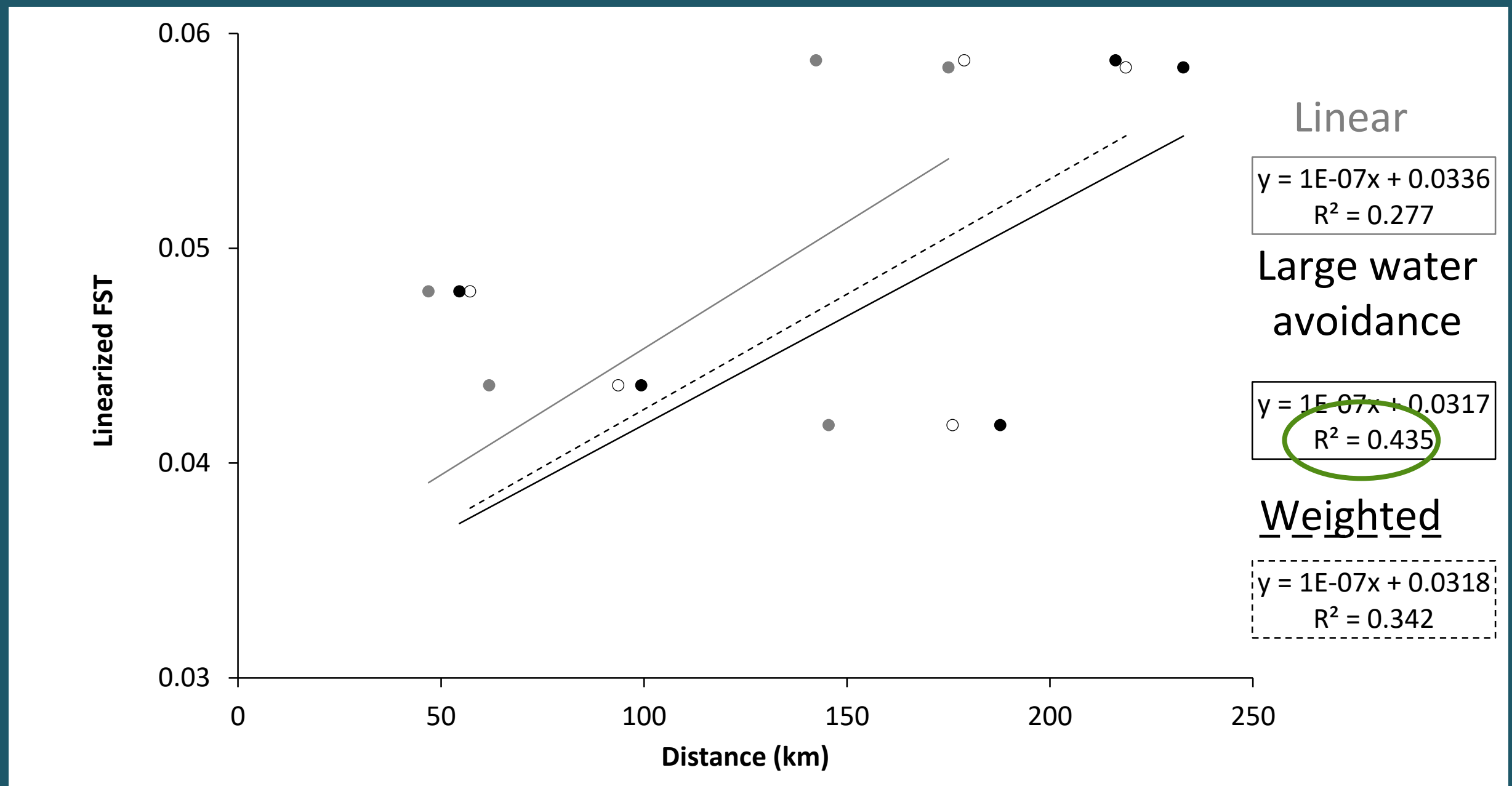
# Methods: Does landscape affect gene flow?

- Pairwise  $F_{ST}$ 
  - between population
- GIS (ARCMAP)
  - Linear distance
  - Linear large water avoidance (> 0.5 km)
  - Weighted resistance analysis



# Results: Does landscape affect gene flow?

(Remember: Lower pairwise  $F_{ST}$  = more genetically similar)



# Conclusions

- Patch size, individuals moving up to ~18 km
  - Our populations mostly further apart
- Genetic connectivity
  - Really measuring past gene flow (up to 100 y?)
  - Distance affects gene flow
    - But, large water bodies may affect gene flow
    - Implications for islands/sea level rise





# Really the work of many people...

So many excited undergrads!

Stephanie Lamb



Tami Ransom



Myra Dickey

