The Gulf Coast's Local Star: Exploring the differences between Gulf, Atlantic, and Pacific Coast Starlet Sea Anemones

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Background

- ***Nematostella vectensis*** is a mud-dwelling, **model cnidarian organism** found living in salt marshes and frequently studied due to its high tolerance of temperature, salinity, and starvation.
- Our lab **rediscovered** the presence of *Nematostella vectensis* in the northern **Gulf of Mexico** in a salt marsh on Dauphin Island, AL.
- Before its closure, Florida's prehistoric **Suwannee Canal** connected the Gulf of Mexico to the Atlantic Coast.
- The Suwannee Canal **closed 1.8 mya** disconnecting Gulf Coast salt marsh habitats from those on the Atlantic Coast, disrupting a possible avenue for gene flow.

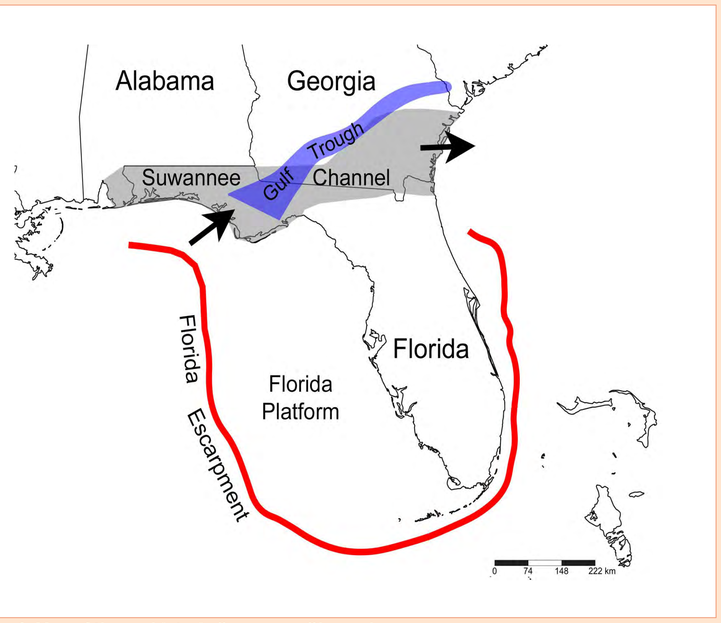


Fig. 1: Map of the prehistoric Suwannee Channel.

Questions

- Are Gulf Coast *Nematostella vectensis* **significantly different** than those along the Pacific and Atlantic coasts?
- How might the **Suwannee Canal** and its closure have impacted **gene flow** between Gulf Coast and Lower Atlantic individuals?

Results

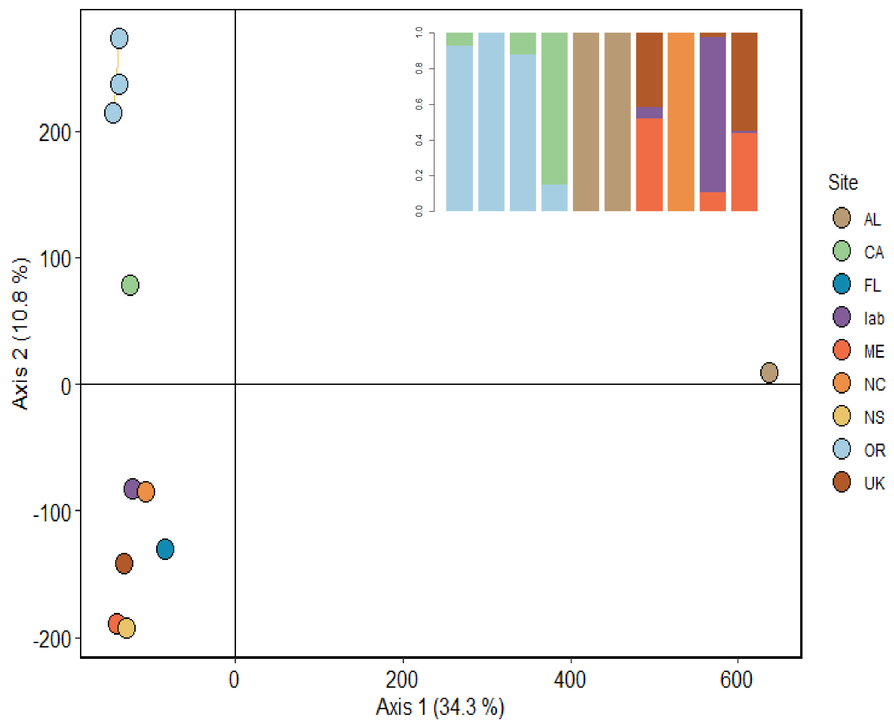


Fig. 2 PCA plot displaying overall pattern of Single Nucleotide Polymorphism (SNP) differences between *Nematostella vectensis* individuals and an integrated membership probability plot.

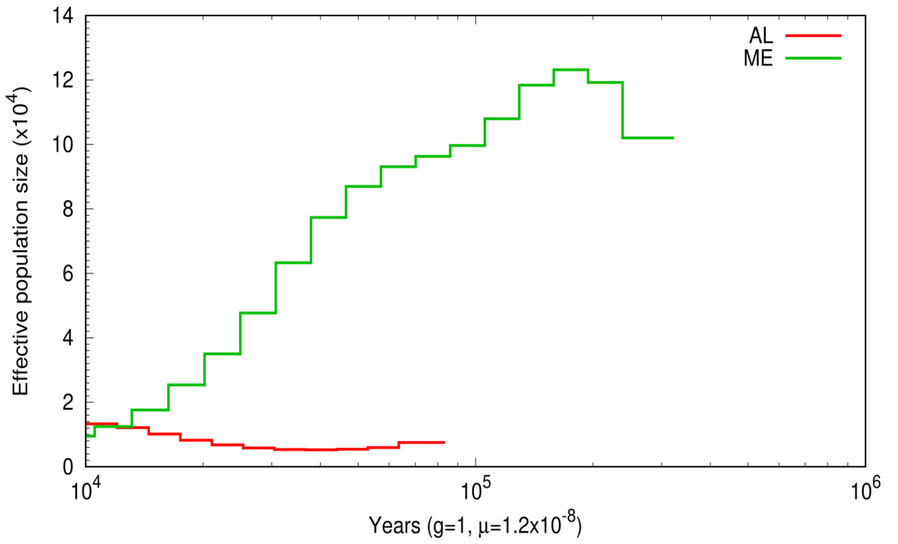
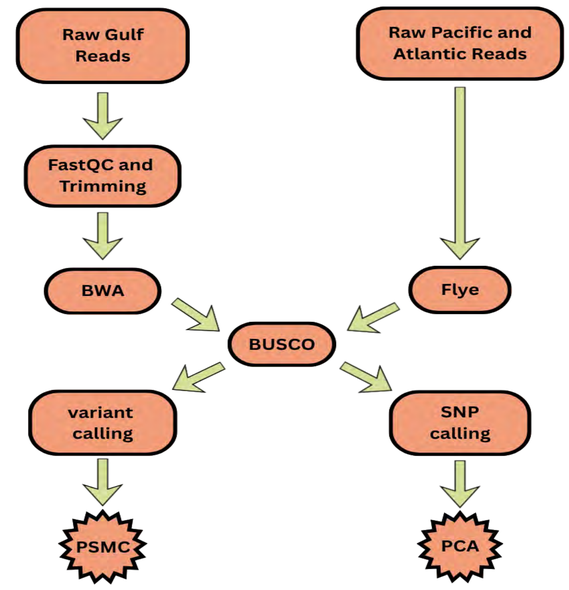


Fig. 3 Pairwise Sequentially Markovian Coalescent (PSMC) plot displaying reconstructed effective population size values of *Nematostella vectensis* individuals.

Methods



Conclusions

- The two Gulf Coast *Nematostella vectensis* are **not** a part of **the same population** as the Pacific or Atlantic individuals and may represent a **native Gulf population**.
- Alabama and Florida individuals are not closely related which suggests the **Suwannee Seaway did not play a role in facilitating gene flow.**
- Results from **PSMC** are **preliminary** but support the conclusion that individuals from the Gulf are from a separate native population disjunct from the Atlantic.
- PSMC will continue to be used to compare Atlantic effective populations and **reconstruct** Atlantic and Gulf **phylogenies**.

Acknowledgements

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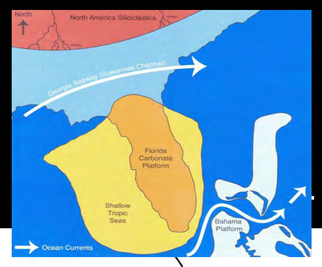
References

Dauphin Island Sea Lab
Alabama Center for Marine Education and Research

THE UNIVERSITY OF ALABAMA



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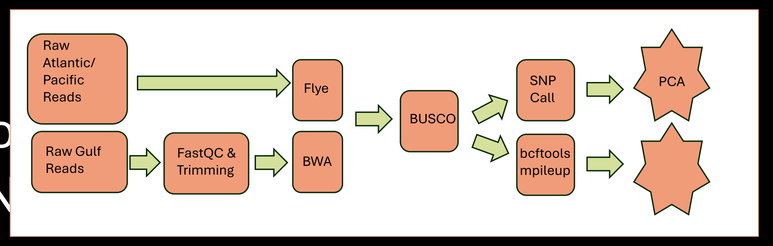
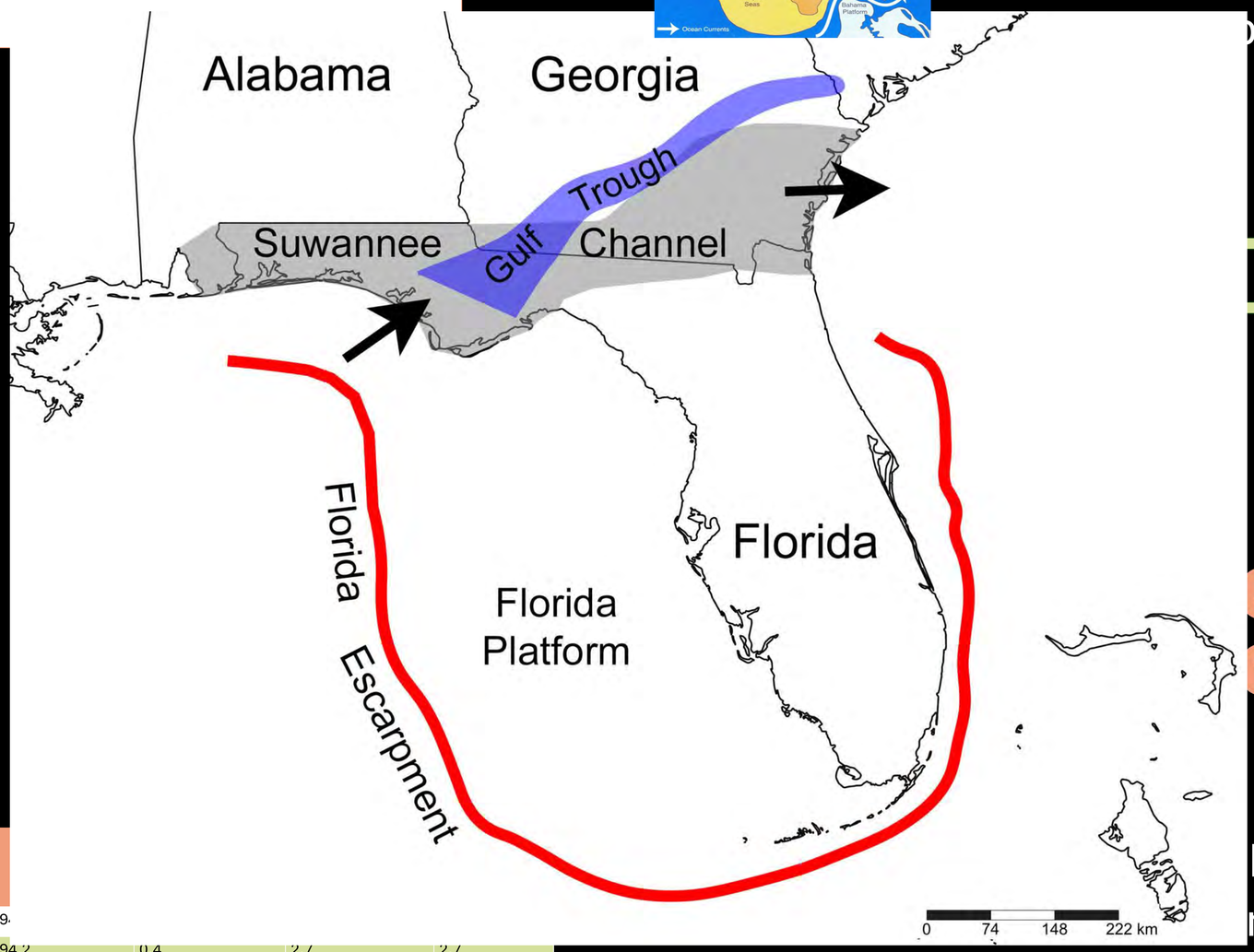
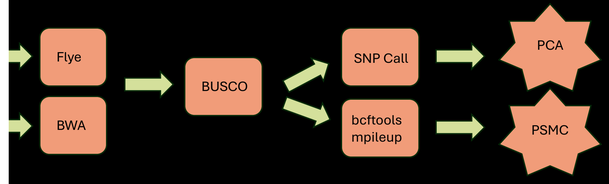
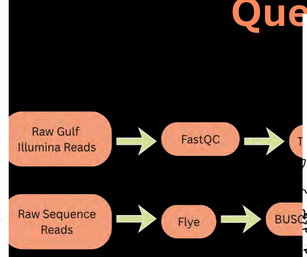
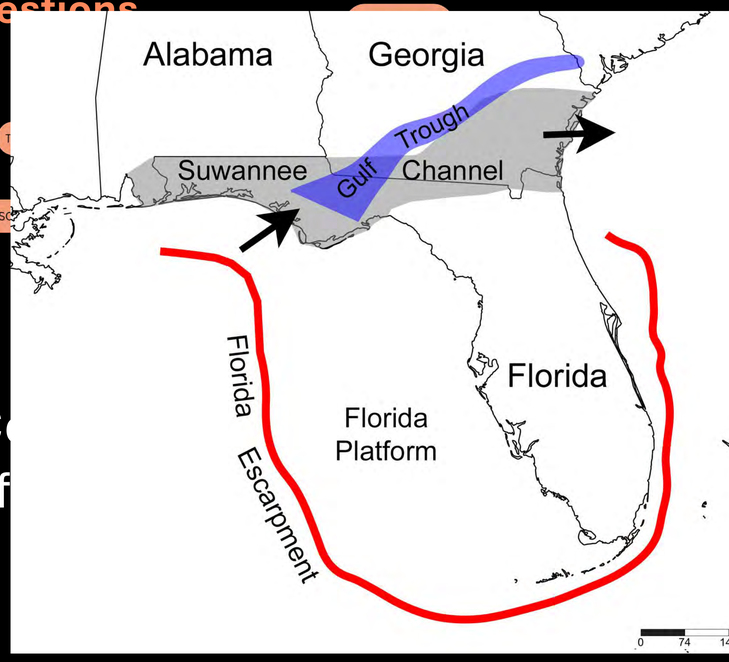






Questions





Markovian C

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population size values

Individual				
AL1	9			
AL2	94.2	0.4	2.7	2.7
ME	92.9	0.9	4.4	2.5
NC	89.5	3.9	4	2.6
FL	91	3.7	3	2.3
NS	93.5	1.5	2.8	2.2