A COMPARISON OF MICROFIBERS WITHIN THE FILTER FEEDING MUSSEL, *MYTILUS* FROM ENCLOSED HARBORS AND COASTAL EXPOSED JETTIES OF SOUTHERN CALIFORNIA

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MICROFIBERS AND PLASTIC POLLUTION

- Out of **335 million tones** of plastic in the ocean
- Estimated that up to 90% of marine plastic pollution could be microplastics and microfibers
- Microfibers are a subset of microplastics smaller than 5 mm
- Polyesters and Polypropylenes
- Textiles; clothing, carpets, and fishing equipment
- Found in water columns, marine sediments, and accumulate in marine animals

Retlaw Industries (2020)

Patogonia (2021)

Maredith (2019)

MICROFIBER POLLUTION

- Microfibers are ingested by organisms across all marine phyla, especially filter feeders.
- Annelids, Sponges, Cnidarians, as well as Mollusks
- Studies have shown that the ingestion of these fibers cause degradation of feeding structures
- Bioaccumulation
- Absorb Persistent Organic Pollutants

WHY MUSSELS?

- Viable bioindicator of marine pollution, including microfiber pollution
- Common in many marine habitats.
- Filter feeders, which increases their exposure to microfiber pollution while feeding.
- Used to understand how microfibers are transferred across marine trophic levels.

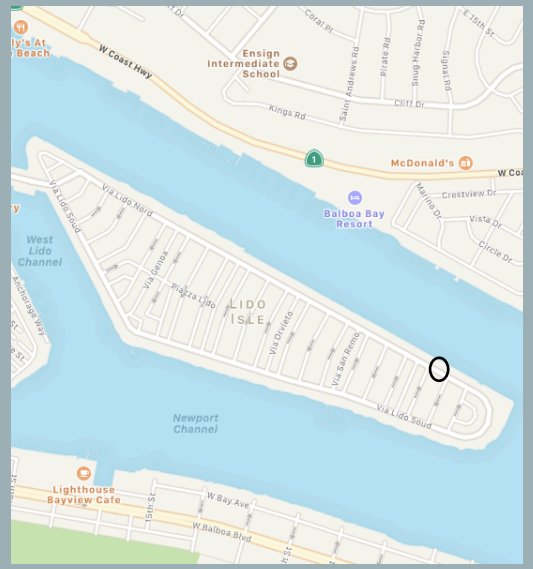
HYPOTHESIS #1

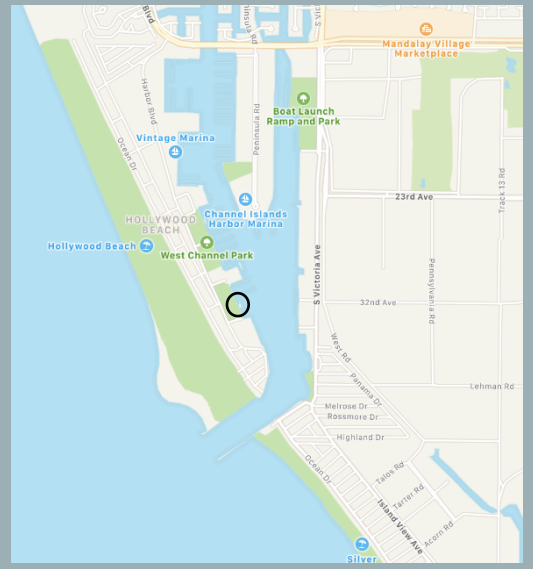
- To determine if there is a measurable difference in the **number of microfibers** between **closed water** and **open water systems**

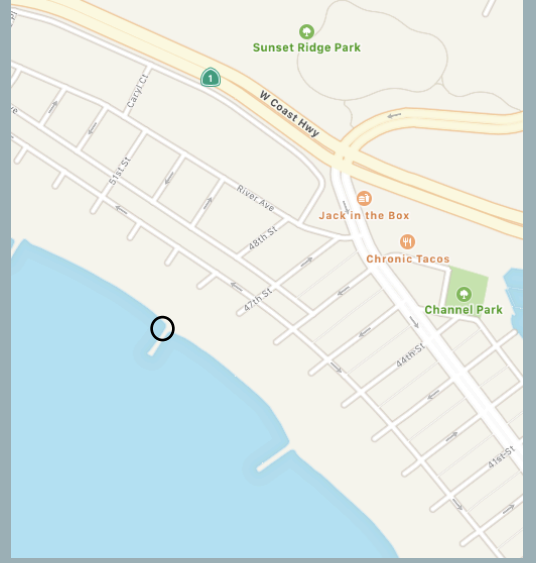
HYPOTHESIS #2

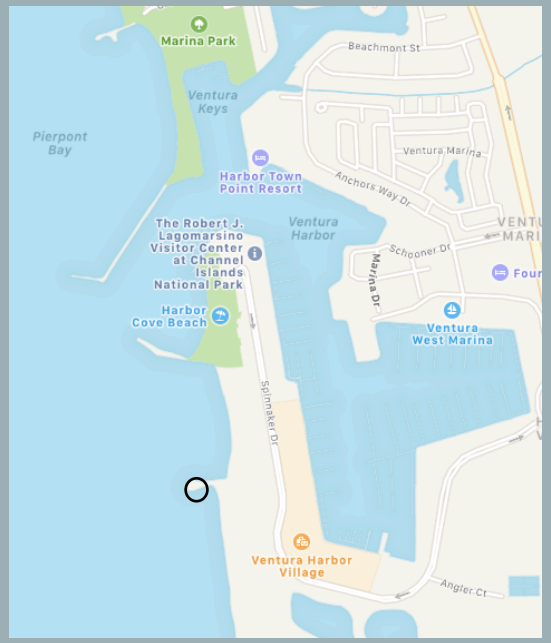
- Is there a **positive correlation** between **mussel size** and **microfiber abundance**

MATERIALS AND METHODS

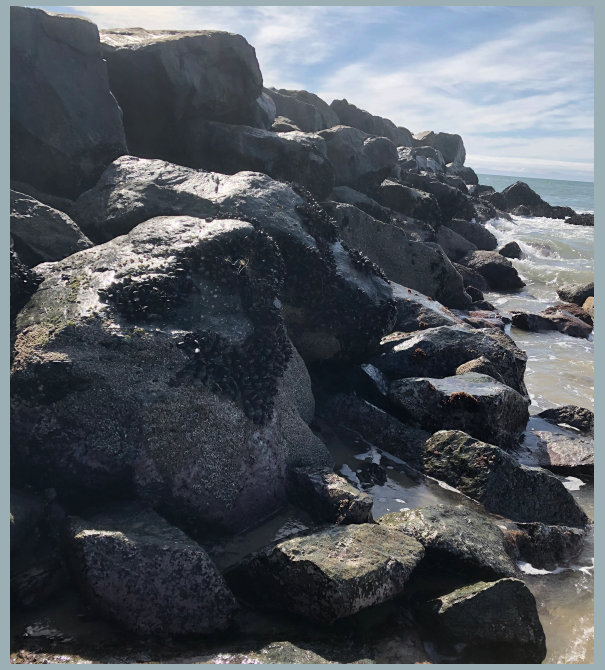




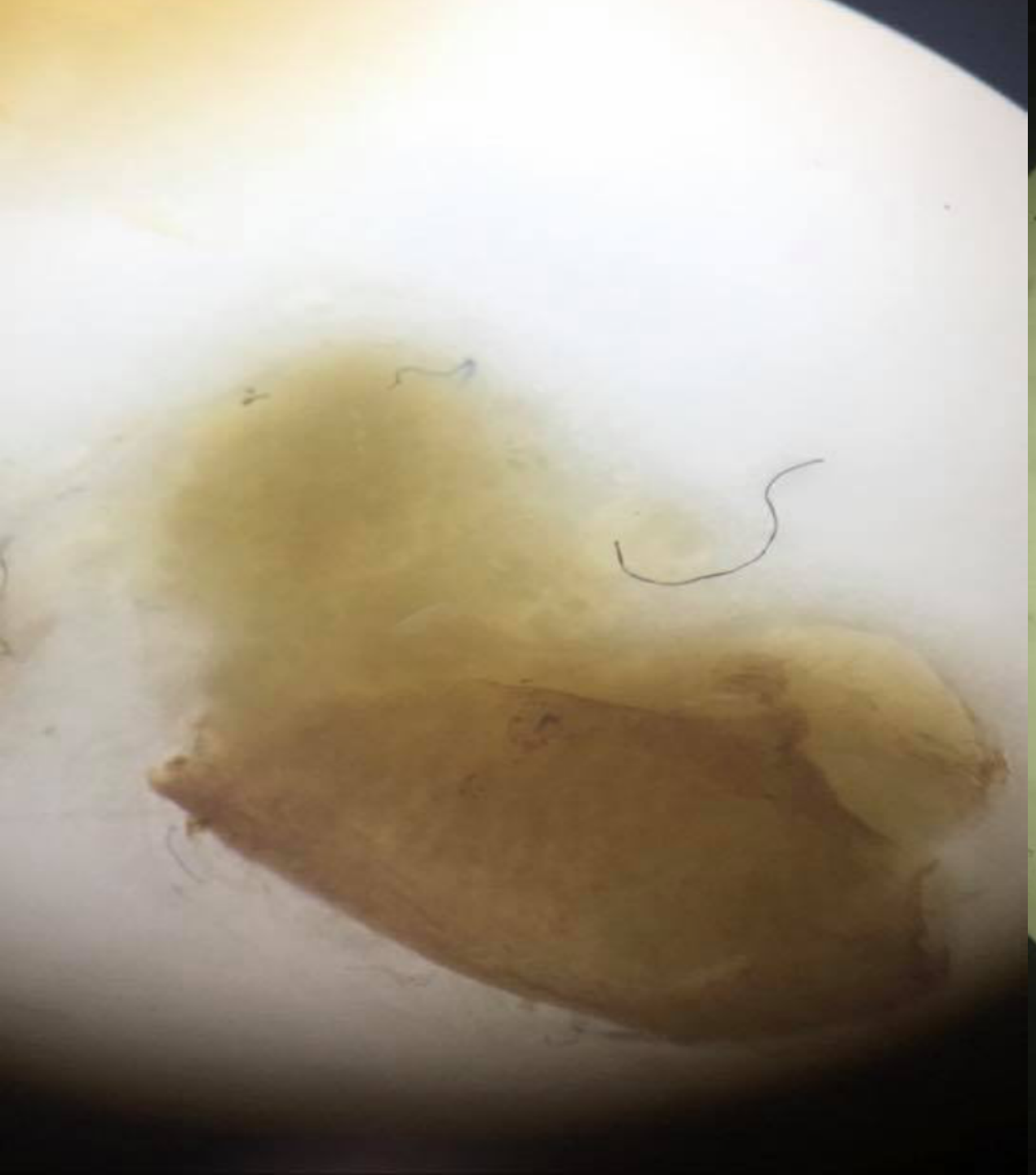




COLLECTION SITES



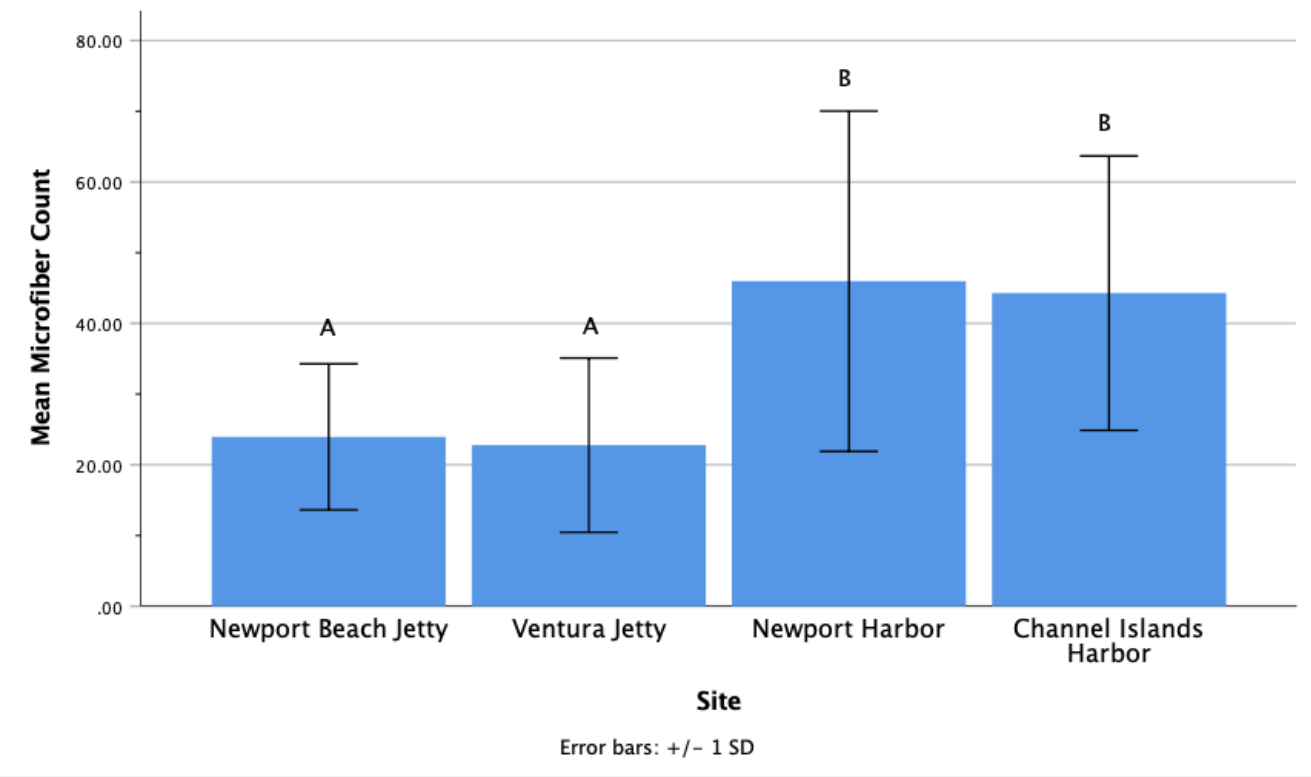
DISSECTION TECHNIQUES



RESULTS

HYPOTHESIS #1

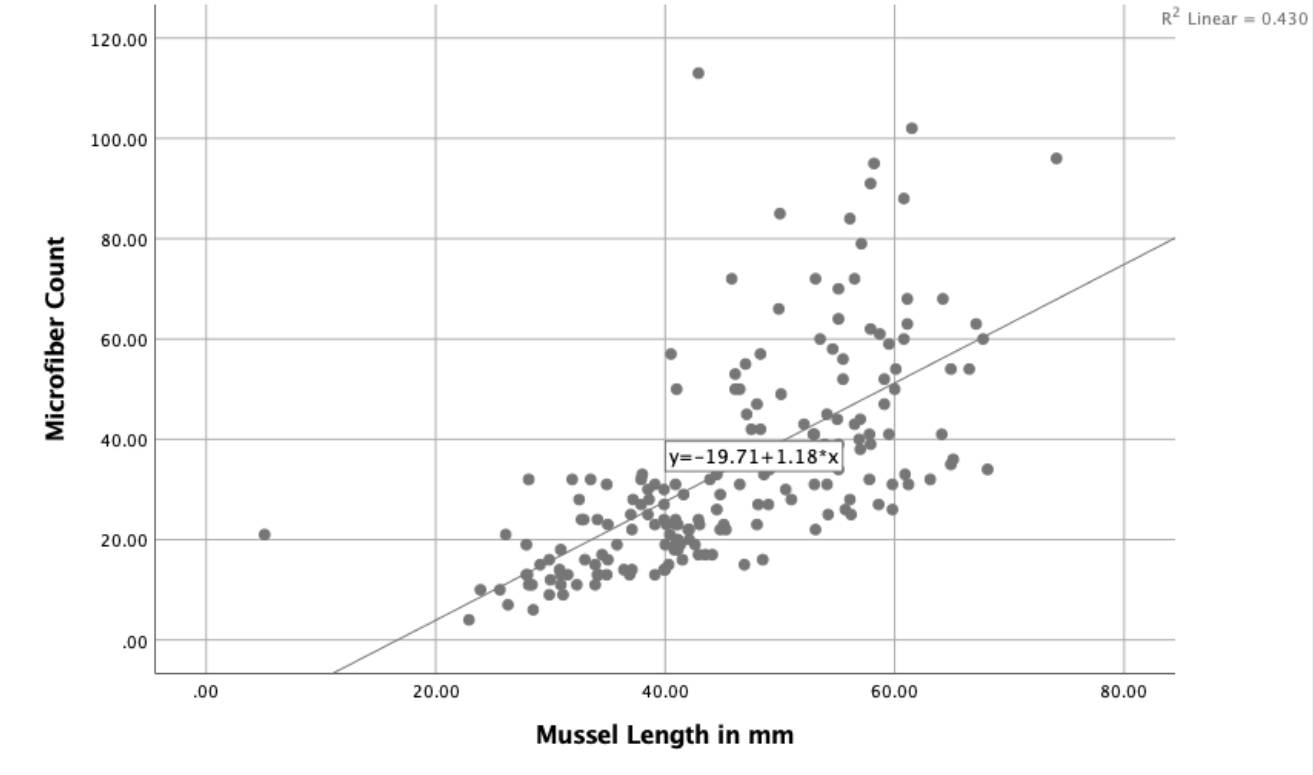
- Was there a measurable difference in the **number of microfibers** between **closed water** and **open water systems?**



- **Figure 1.** Bar chart comparing the mean number of microfibers found between populations based upon sample site ($f= 25.051$, $df= 3,188$, $p<0.001$). Error bars represent 1±SD of the mean, and letters indicate homogenous subsets as determined by a Tukey test ($p<0.05$).

HYPOTHESIS #2

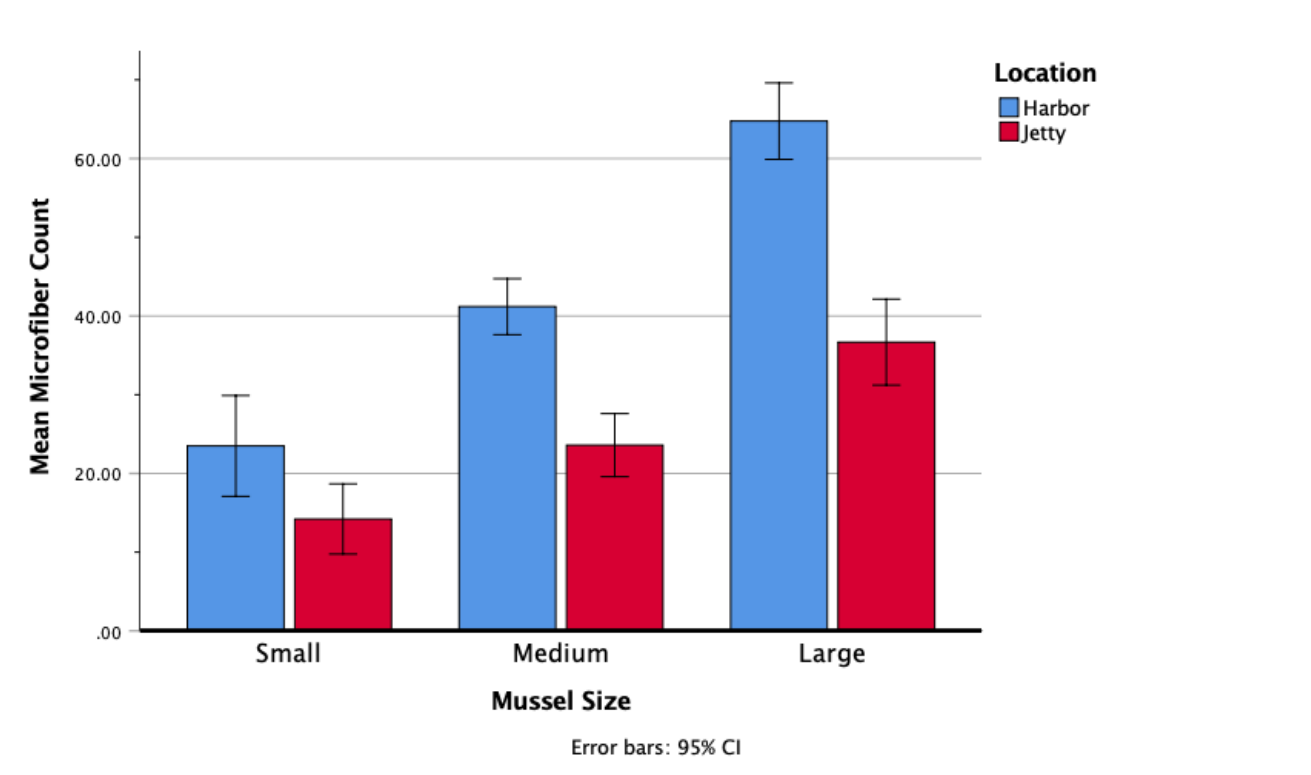
- Is there a **positive correlation** between **mussel size** and **microfiber abundance?**



- **Figure 2.** Scatter plot showing the linear relationship between mussel length in mm and microfiber abundance.

HYPOTHESIS 1&2

- **Figure 3.** Bar chart comparing the mean number of microfibers 95% CI of mussels based on size class.



CONCLUSIONS

- This study suggests that:
- Mussels from closed water systems contain more microfibers than mussels collected from exposed water systems.
- Large mussels contain more microfibers than small mussels.
- No measured difference between geographical regions.
- Linear relationship.

FUTURE RESEARCH

- Samples will have pseudo-feces and visceral mass separated and measured independently.
- Samples will be collected over a broader geographic range.
- Water column and sediment samples will be taken from each location.

ACKNOWLEDGEMENTS

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IMAGES CITED

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