UNDERSTANDING ECOLOGY OF ATLANTIC RANGIA IN GALVESTON BAY:

Deciphering the role of freshwater inflows

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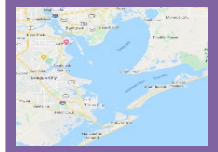
Introduction

Atlantic Rangia, *Rangia cuneata*, is an oligohaline clam that is native to the northern Gulf of Mexico.

It's designated as indicator species for establishing freshwater inflow regimes in Galveston Bay.



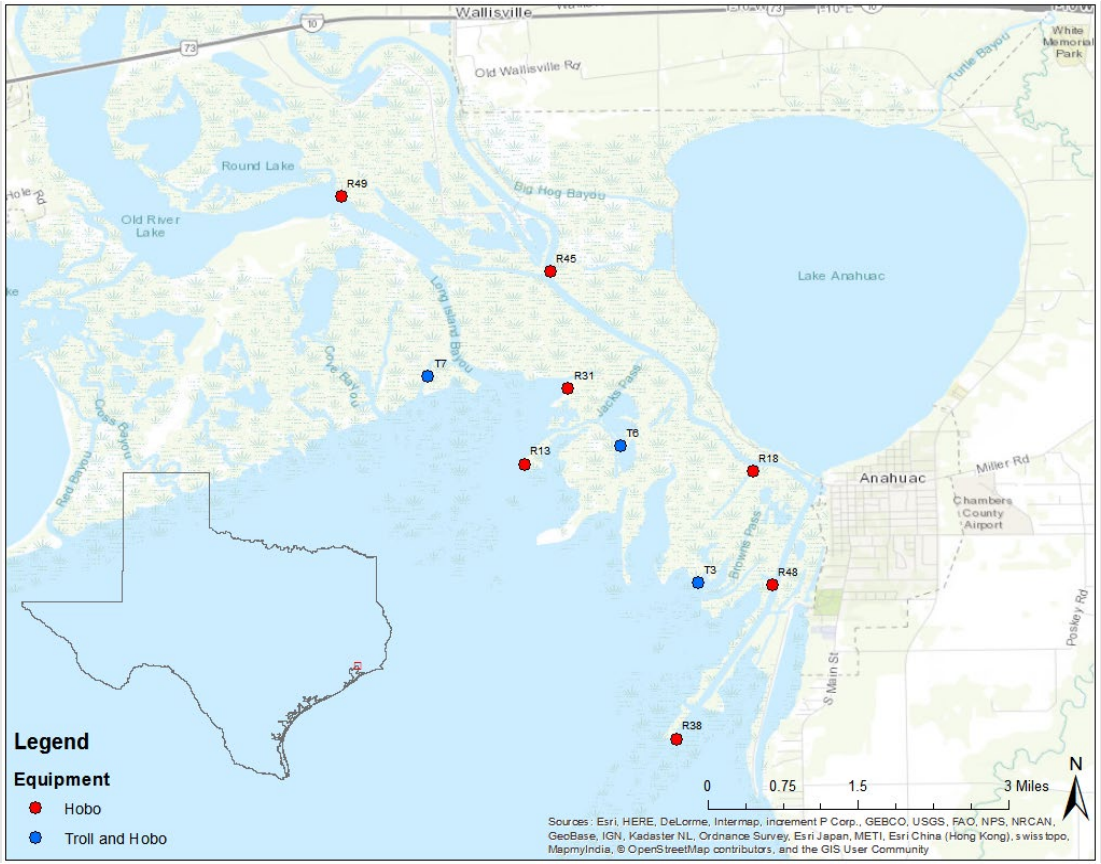
Previous recent surveys of Rangia took place in Trinity River Delta (Guillen et al 2016), North Galveston Bay, Clear Lake and East Bay (Parnell 2011).

To examine the influences of freshwater inflow and salinity on Atlantic Rangia abundance and health.

Help resource managers better establish freshwater inflow regimes in the Trinity River Estuary.

Study area

Ten study sites throughout Trinity River Delta



Methods

Duration

- February 2018 – August 2019

•Field work

⑩Environmental monitoring.

- •Salinity, temperature and water level.

⑩Atlantic Rangia and sediment sampled quarterly.

- •Hand sampling: 1 m^2 Quadrat (x3)
- •Clam rake: 30 second pull (x3).

Monthly maintenance: HOBO cleaning and data retrieval

Quarterly clams sampling
(Hand and Rake, 3 replicates)

Sediment sampling

Methods: **Lab work**

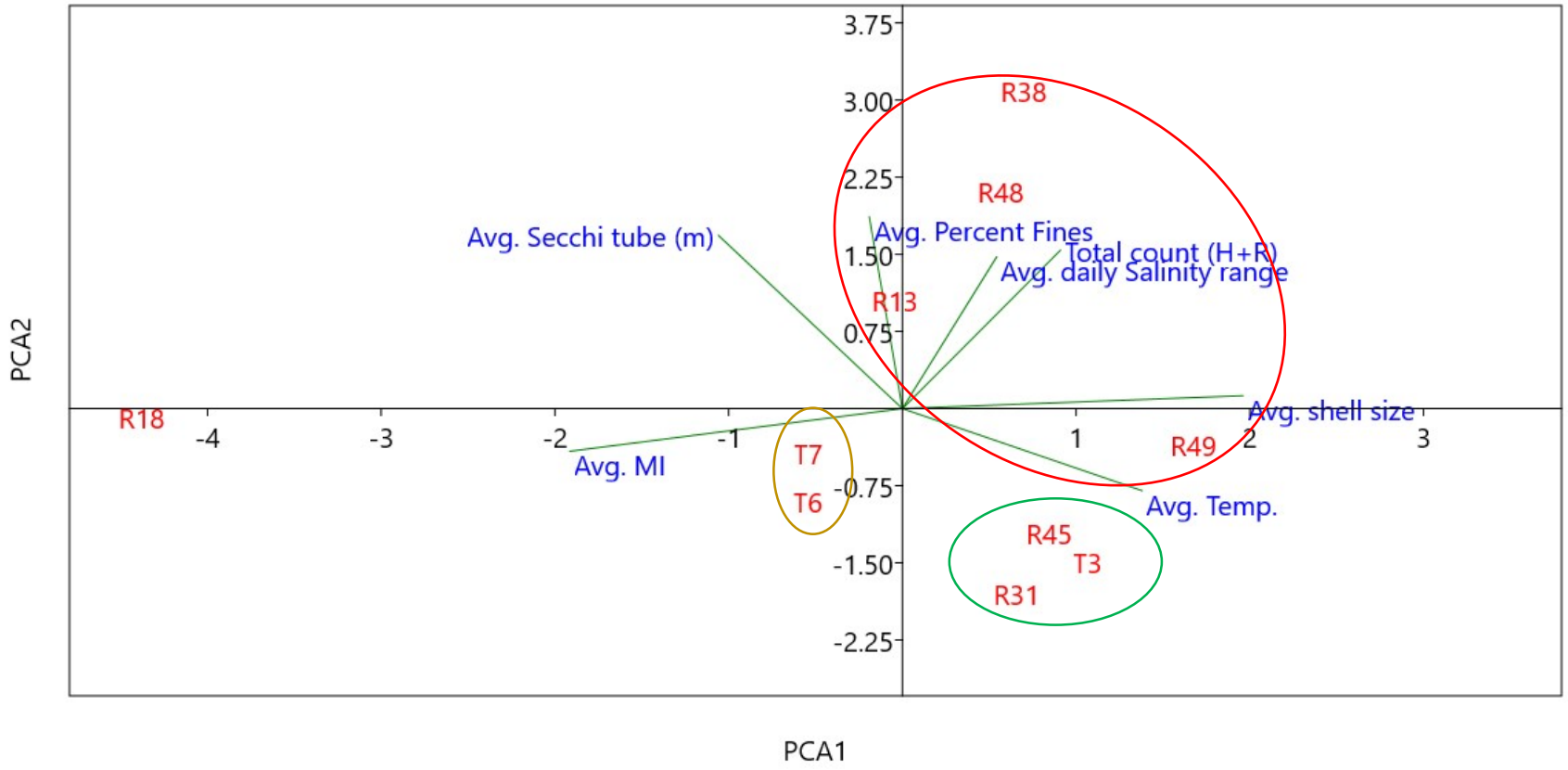
Up to 20 clams from each site measured for morphometrics (length, height and width)

Up to 10 clams from each site weighed for health assessment (meat index, MI%).

Sediment samples processed for percent fines analysis.

Results

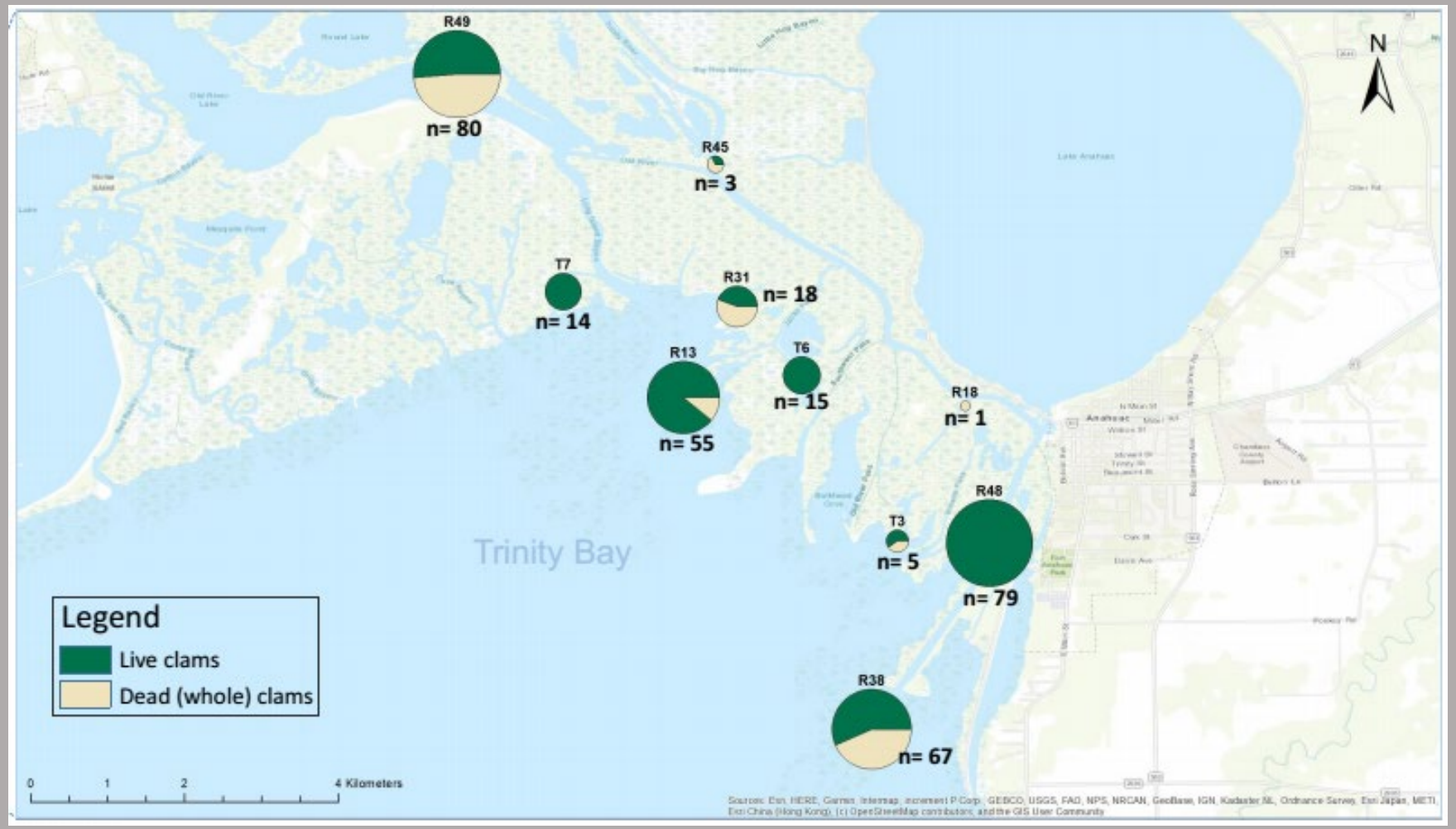
Sites were clustered based on correlation of measurements into groups by applying Principal Components Analysis (PCA)

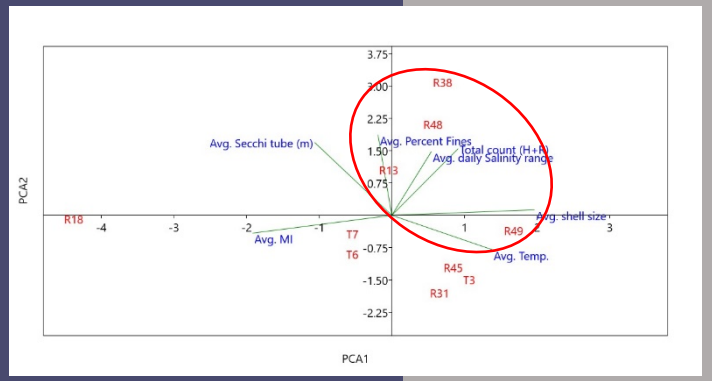


Results

Abundance

Total count





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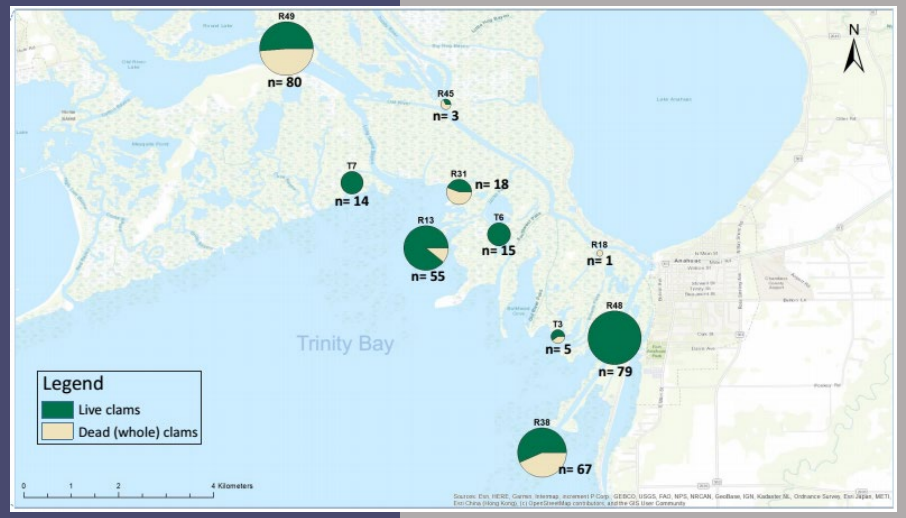

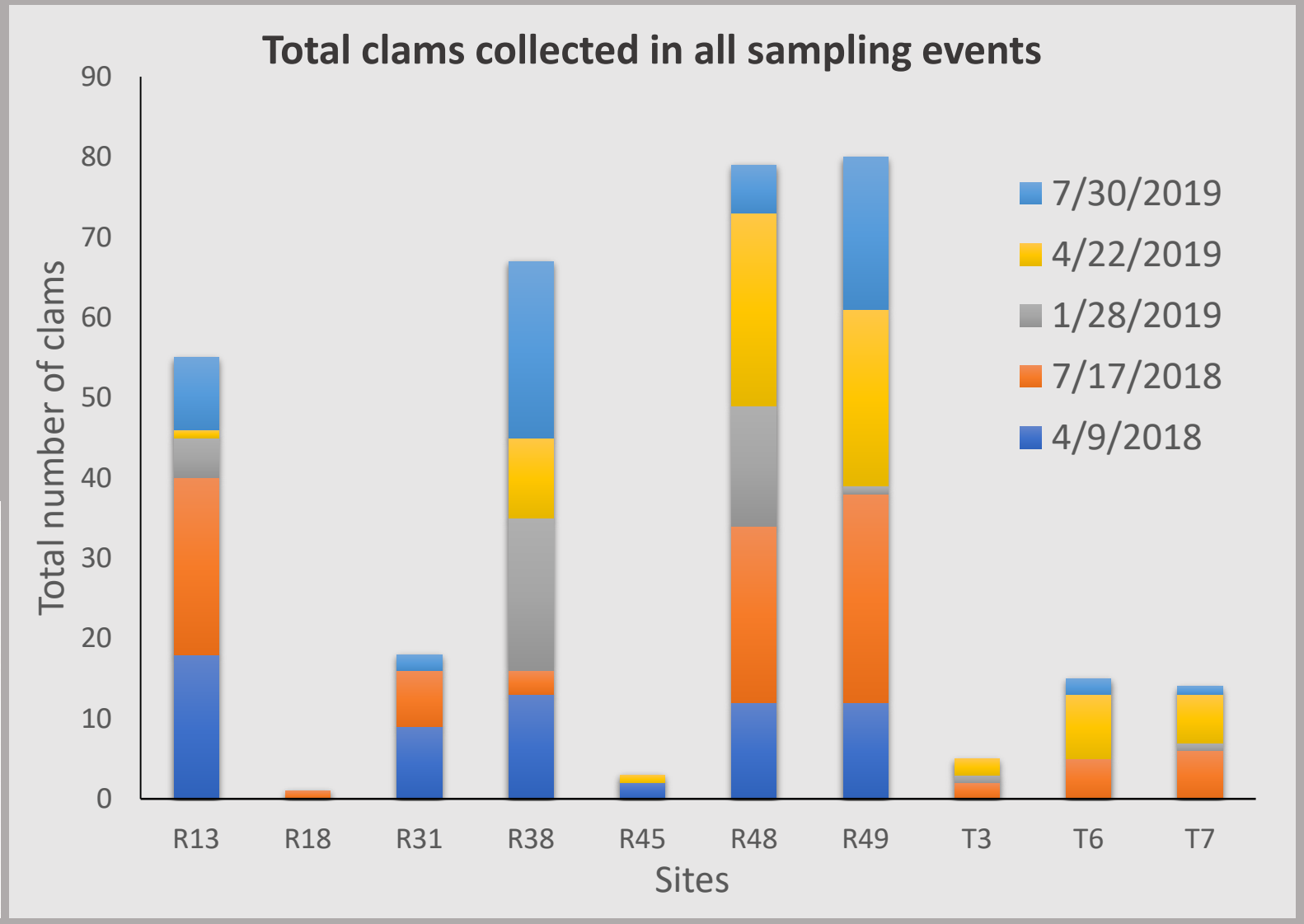

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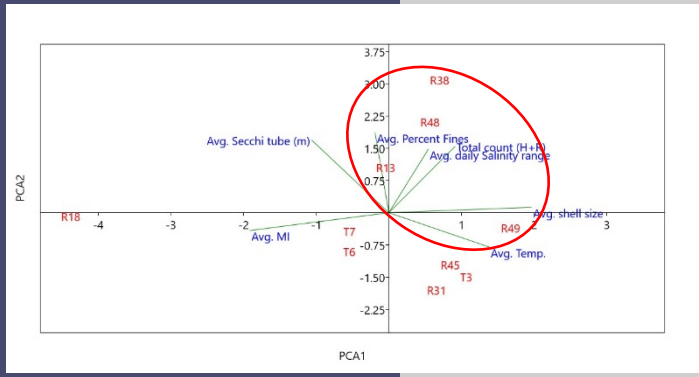
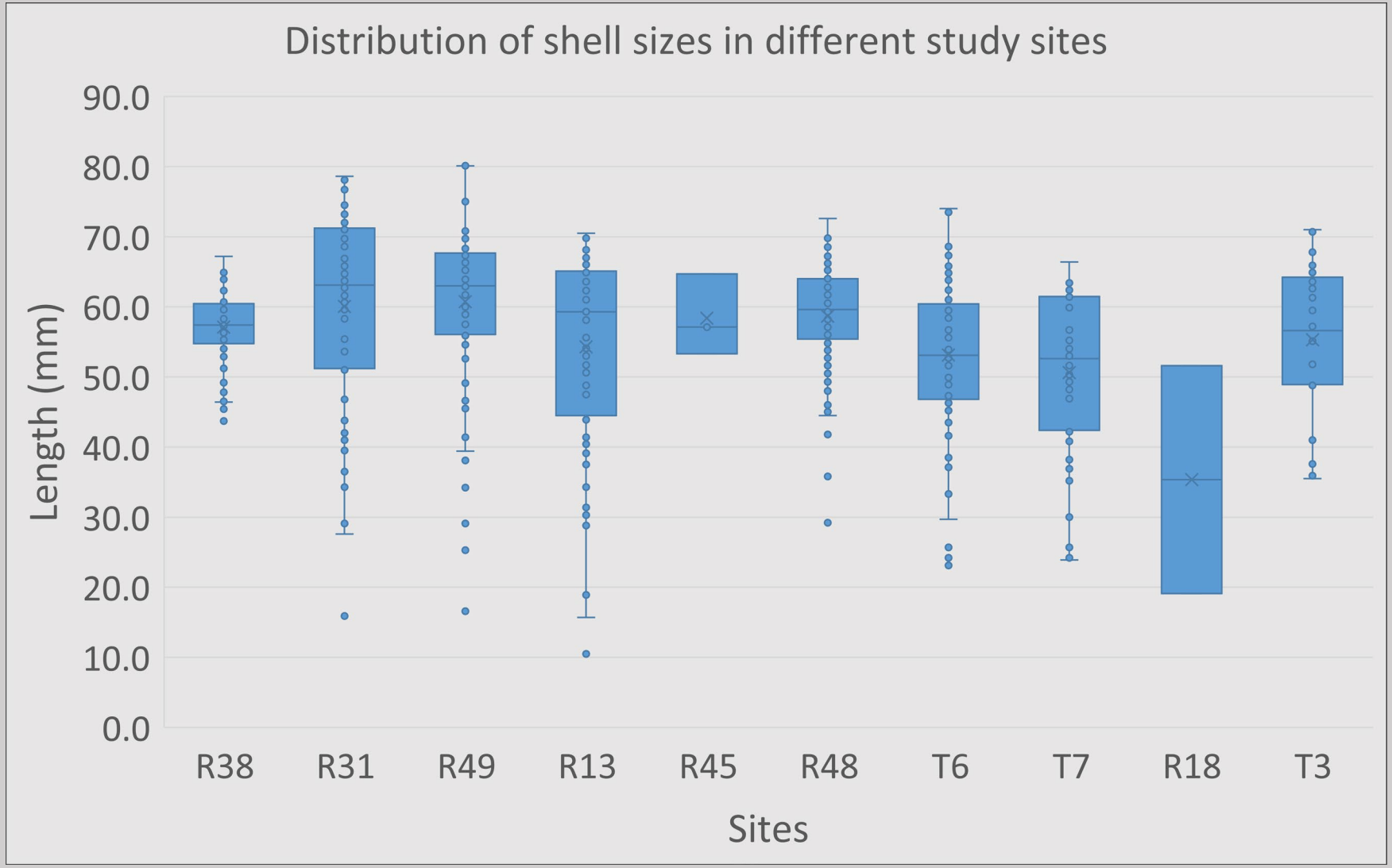


Shell length

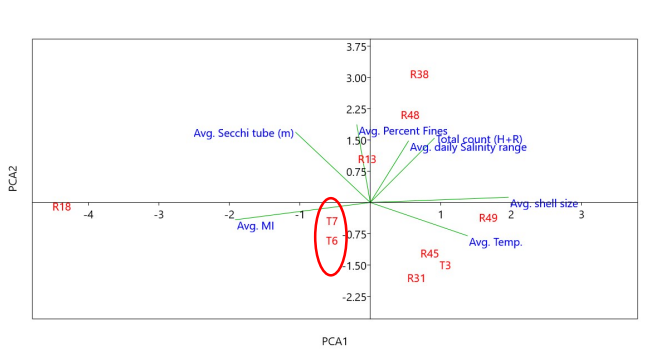
Shell size distribution

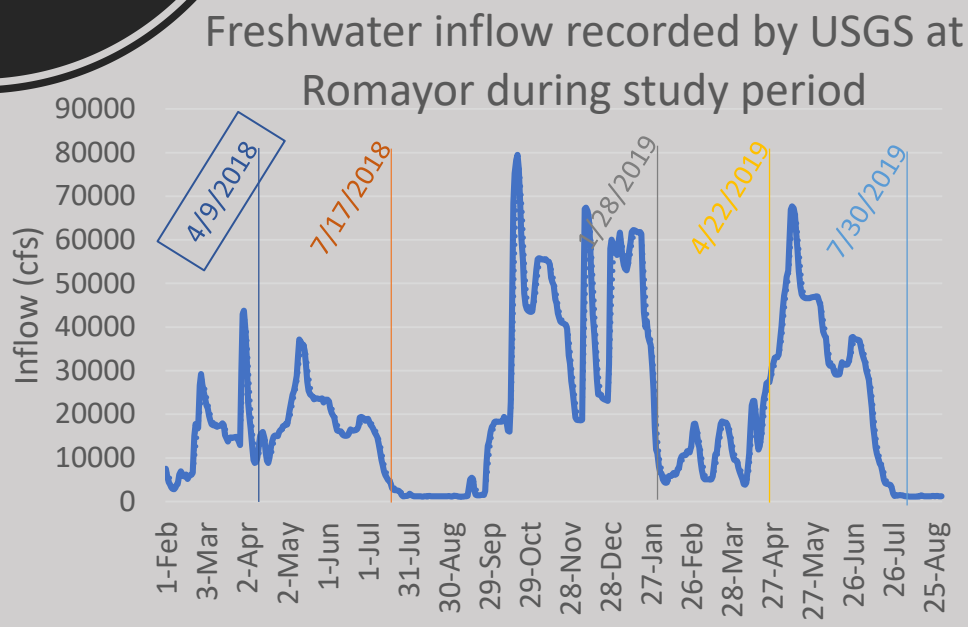


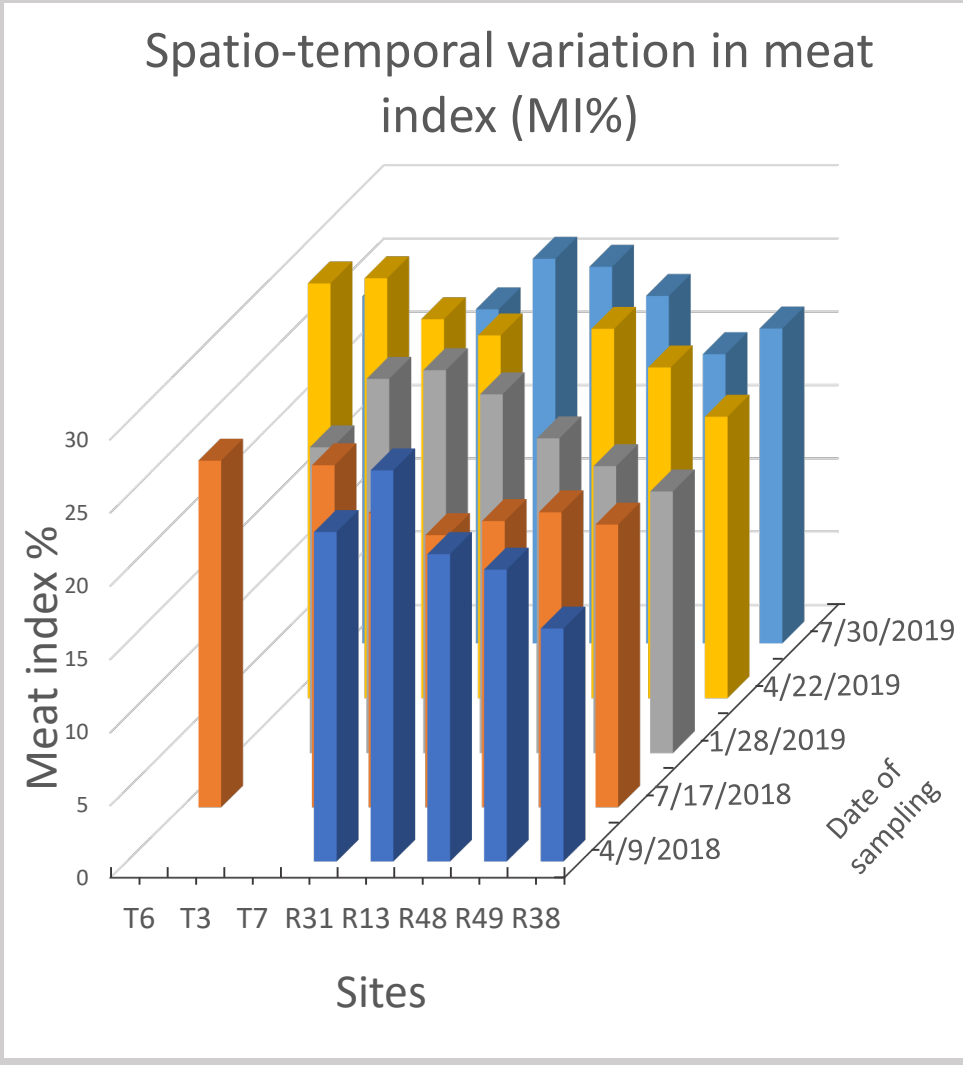
Meat index

Spatio-temporal variation in meat index in relation to inflow

Results



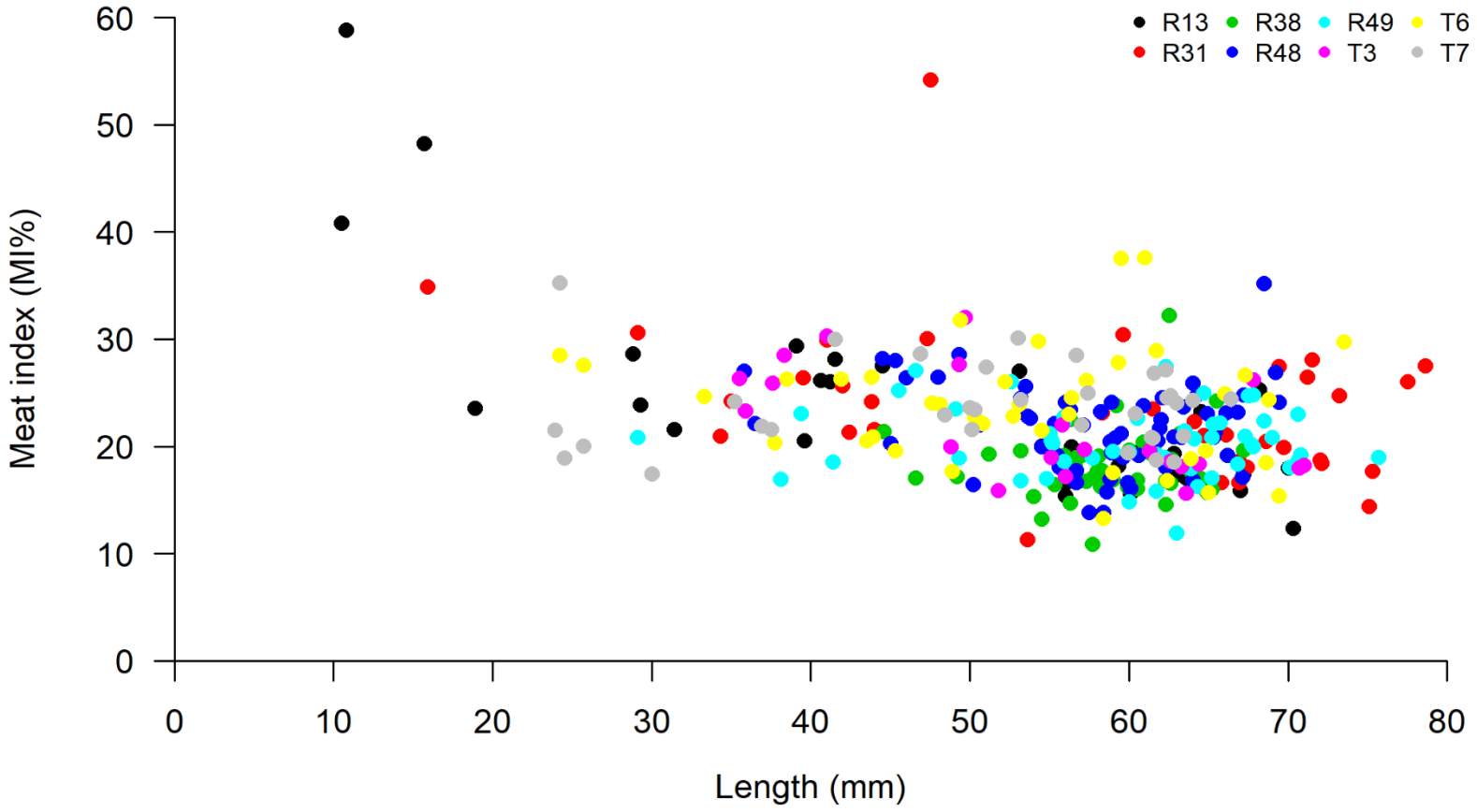




Results

Meat index

Relationship between meat index (MI%) and shell length



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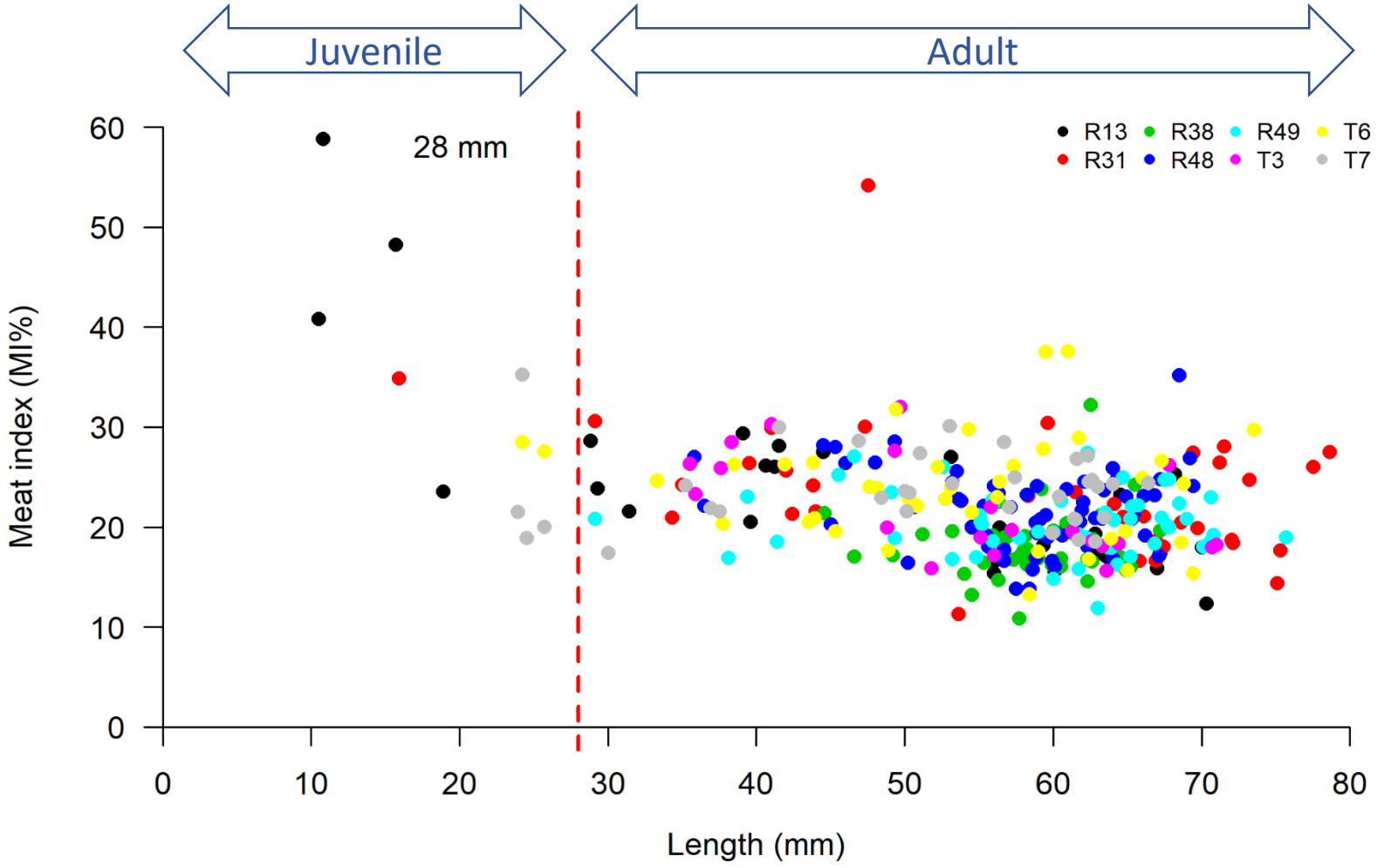
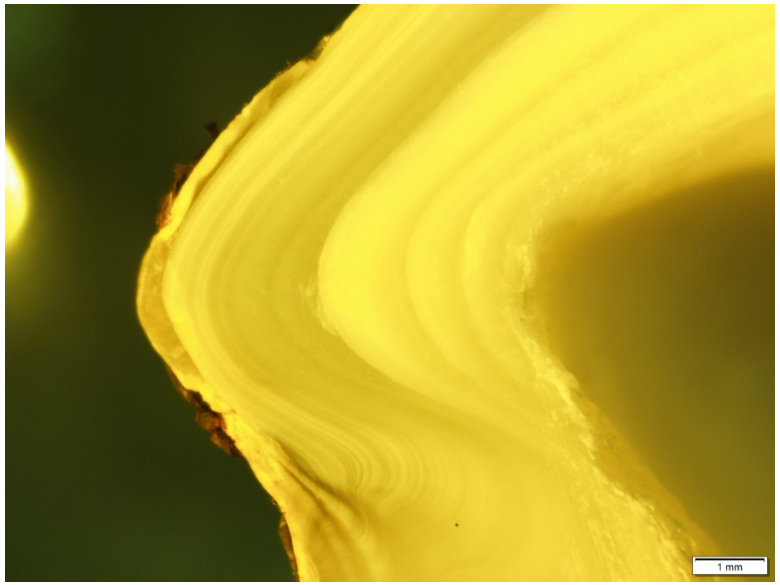


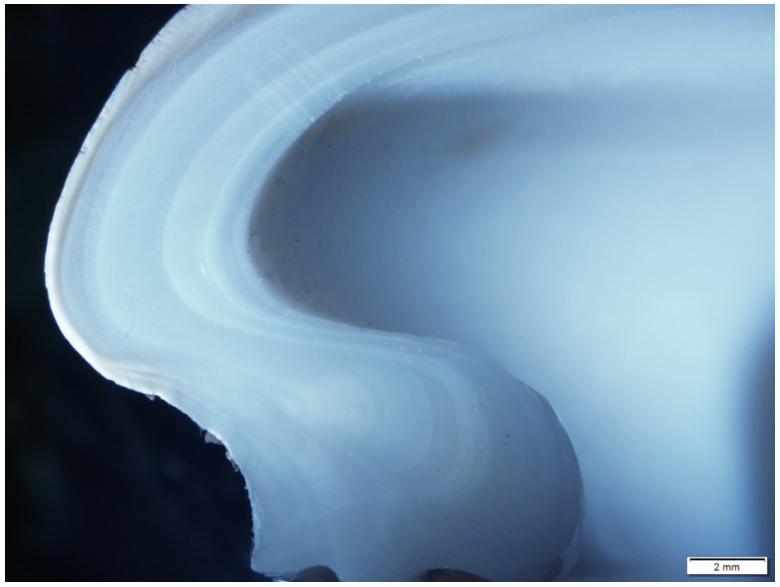
Discussion

- Sites through the Trinity River Delta vary in terms of environmental conditions (salinity, temperature, sediment, …etc.) they are exposed to.
- Population abundance and health of Atlantic Rangia are consequently impacted.
- Meat index is subject to continuous variation due to many factors as: reproduction state, animal size and other factors (AK Nishida 2006).
- Preliminary evaluation suggest that there is not a strong direct correlation between MI and recent historical salinity patterns, analysis is ongoing.
- Shell weight and incrementation could be less susceptible to short term variation in environmental condition and used as long term growth index.

Ongoing work
Shell sectioning and aging

- ❑Shells from different sites on different sampling events are sectioned along the longest growth line using tile saw and low speed diamond saw.
- ❑Sections are sanded and polished.
- ❑Shells are aged by counting growth increments.





Ongoing work
Shell sectioning and aging

- ❑Shell dimensions (L+H+W) will be used instead of length as a function of size.
- ❑Size-age relationship will be mathematically and statistically observed to examine the impact of environmental conditions, basically salinity, on shell growth.

Future work

EIH staff are working on developing a hydrological model to simulate the distribution of inflow through the Trinity River Delta.

Understanding the hydrology of delta will help estimate the range of optimum inflow that should keep the population in optimum conditions.

Acknowledgments

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