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Distribution, Abundance, and Habitat Use of the Saltmarsh Topminnow (*Fundulus jenkinsi*)

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Introduction

Fundulus jenkinsi has a preference for low to moderate salinities and is primarily found along the edge of saltmarsh habitat surrounding small intertidal creeks. *Fundulus jenkinsi* is under consideration for federal listing and given this species' restricted range in Texas and the recent projections of urban development, land subsidence, climate change, and sea level rise it is important to document its habitat requirements and distribution. Information about this species within Texas is lacking and it is likely that the current state fisheries agency (TPWD) monitoring program's design yields underestimates of occurrence and abundance of this species because of its documented habitat preference.

Photo of *Fundulus jenkinsi*.

Objectives

1. Estimate local population distribution and abundance of *F. jenkinsi* in Galveston Bay and Sabine Lake, Texas
2. Evaluate habitat preferences and water quality attributes of *F. jenkinsi* in Galveston Bay and Sabine Lake, Texas
3. Compare differences in fish community composition between season, sampling method, and tide level across sites

A) Breder Trap set in saltmarsh habitat B) Sampling with a seine

Methods

- Sampling was conducted quarterly in Galveston Bay and Sabine Lake
- Sites were chosen that were tidally influenced
- Sites contained *S. alterniflora* or other saltmarsh vegetation
- Fish were collected using a straight seine and Breder traps
- Water depth, tide stage, water quality, vegetation cover, and habitat type were recorded during each sampling event
- Assemblage data were modified using 4th root transformation and Bray-Curtis resemblance matrices were created in PRIMER 6
- MDS plots were created to compare assemblages across seasons, tides, and gear types
- Frequency of *F. jenkinsi* occurence by salinity were plotted for Galveston Bay and Sabine Lake (Fig. 1)

Acknowledgements

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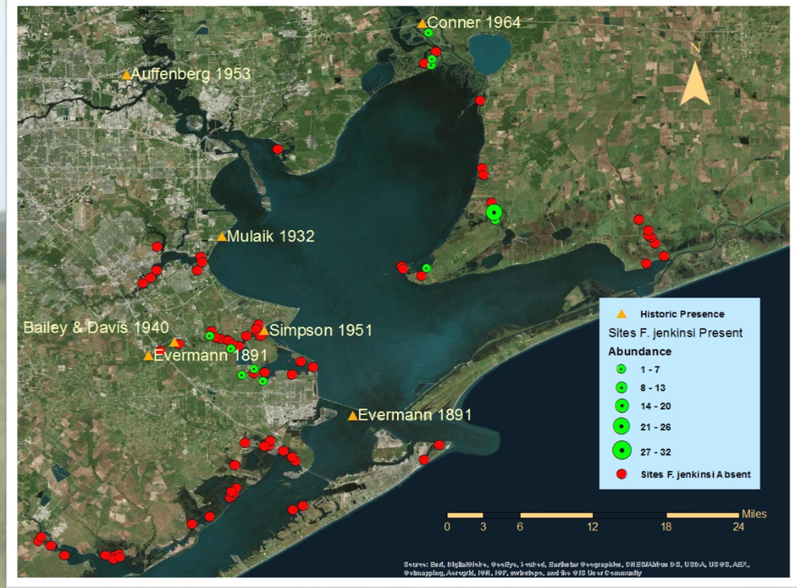
For Further Information

Please contact robertsonj@uhcl.edu More information about this and other projects can be obtained at the EIH webpage: www.eih.uhcl.edu



Map of *F. jenkinsi* distribution and abundance with historic *F. jenkinsi* presence surrounding Galveston Bay, Texas.

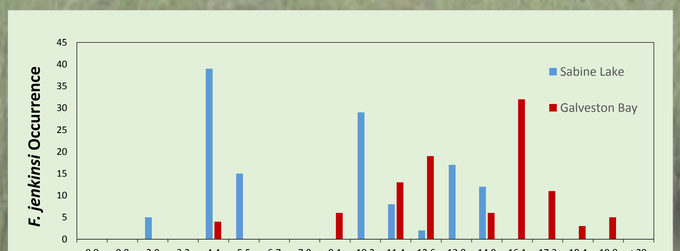
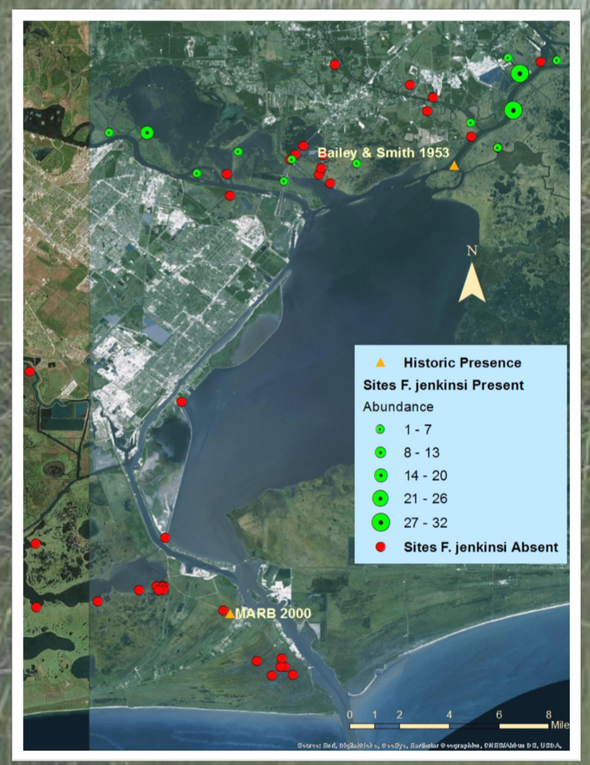


Figure 1. Histogram of the frequency of *F. jenkinsi* occurrences across salinity ranges for Galveston Bay and Sabine Lake.



Map of *F. jenkinsi* distribution and abundance with historic *F. jenkinsi* presence surrounding Sabine Lake, Texas.

Results

A total of 138 sites were sampled; 85 in Galveston Bay and 53 in Sabine Lake. A one-way ANOSIM showed a significant difference in the fish community assemblages where *F. jenkinsi* were present vs absent in Sabine Lake (Global R=0.136, p=0.001) but not in Galveston Bay (Global R= 0.074; p=0.12).

Fish assemblages differed seasonally in Galveston Bay (Global R= 0.43; p=0.001) and Sabine Lake (Global R= 0.345; p=0.001) with *F. jenkinsi* primarily occurring in the winter and spring (Fig. 2). Fish assemblages differed across tide stage in Galveston Bay (Global R= 0.144; p=0.001) and Sabine Lake (Global R= 0.105; p=0.001) with *F. jenkinsi* occurring more frequently during low tide (Fig. 3).

Fish assemblages differed by collection method (Global R= 0.33; p=0.001) across Galveston Bay and Sabine Lake (Fig. 6). *Fundulus jenkinsi* were captured using both seines and Breder traps.

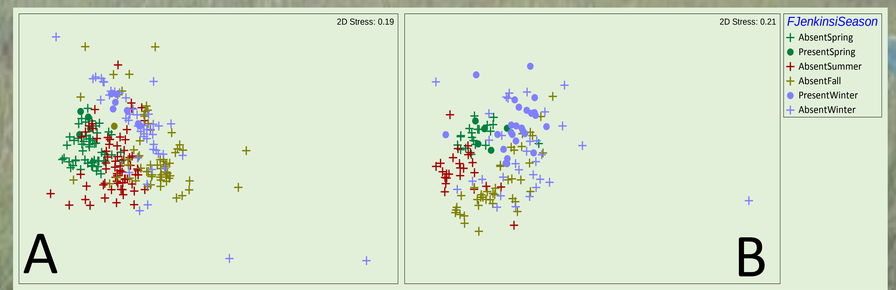


Figure 2. MDS plot of assemblage data illustrating presence or absence of *F. jenkinsi* by season sampled for A) Galveston Bay and B) Sabine Lake

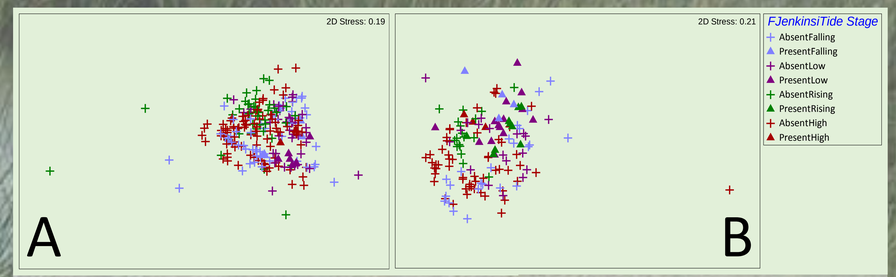


Figure 3. MDS plot of assemblage data illustrating presence or absence of *F. jenkinsi* by tidal stage for A) Galveston Bay and B) Sabine Lake

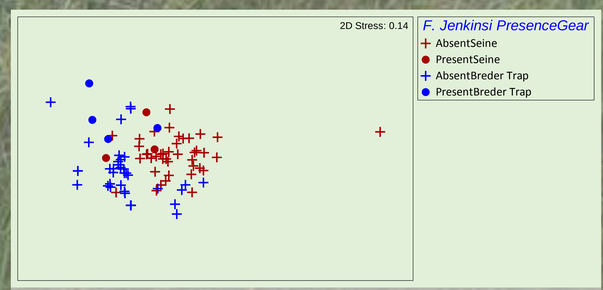


Figure 4. MDS plot of assemblage data illustrating presence or absence of *F. jenkinsi* by gear type for Galveston Bay and Sabine Lake

Conclusion

Both season and tide seem to contribute to *F. jenkinsi* presence. Considering water levels are related to season further analysis will be done to assess if these factors are related to one another. Future analyses will also consist of univariate and multivariate statistics to evaluate species associations and other environmental factors influencing *F. jenkinsi's* distribution, abundance, and habitat use.