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



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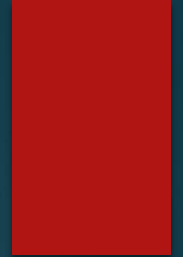
<sup>2</sup>Environmental Institute of Houston

# Habitat

- ▶ In saltmarshes along the Gulf of Mexico from FL to TX
- ▶ In low to moderate salinities <sup>1,2,3</sup>
- ▶ Link between *Spartina alterniflora* habitat and *F. jenkinsi* occurrences <sup>4</sup>
- ▶ Utilize edge of saltmarsh habitat <sup>5</sup>
- ▶ Small intertidal creeks act as access points for evading predators, foraging, and reproduction



# Conservation Status



- ▶ Listed as a species of concern in LA, MS, AL, and FL<sup>1</sup>
- ▶ Petition to list species as threatened or endangered under the Endangered Species Act issued in 2011
- ▶ USFWS commissioned to review species' status and make a determination
- ▶ TPWD responsible for coordinating with partners to monitor and address the needs of *F. jenkinsi* within Texas<sup>2,3</sup>

# Significance of this Study



- ▶ Lack of information about the population and distribution of the Saltmarsh Topminnow within Texas
- ▶ Need to obtain more complete and comprehensive data on environmental and habitat characteristics of *F. jenkinsi* for effective conservation management

# Study Objectives

- ▶ Estimate distribution and abundance of *F. jenkinsi* in Galveston Bay and Sabine Lake
- ▶ Identify factors attributing to differences in *F. jenkinsi* presence between sites in Galveston Bay and Sabine Lake



# Location of Study

- ▶ Quarterly sampling within Galveston Bay and Sabine Lake, Texas
- ▶ Sites tidally influenced
- ▶ Site contained some degree of saltmarsh vegetation



# Methods – Data Collection

- ▶ Water quality measurements
- ▶ Water levels
- ▶ Fish collected using straight seine
- ▶ Fish Assemblages
  - ▶ *F. jenkinsi* presence/absence
  - ▶ Species Abundance (N)
  - ▶ Diversity ( $H'$ )

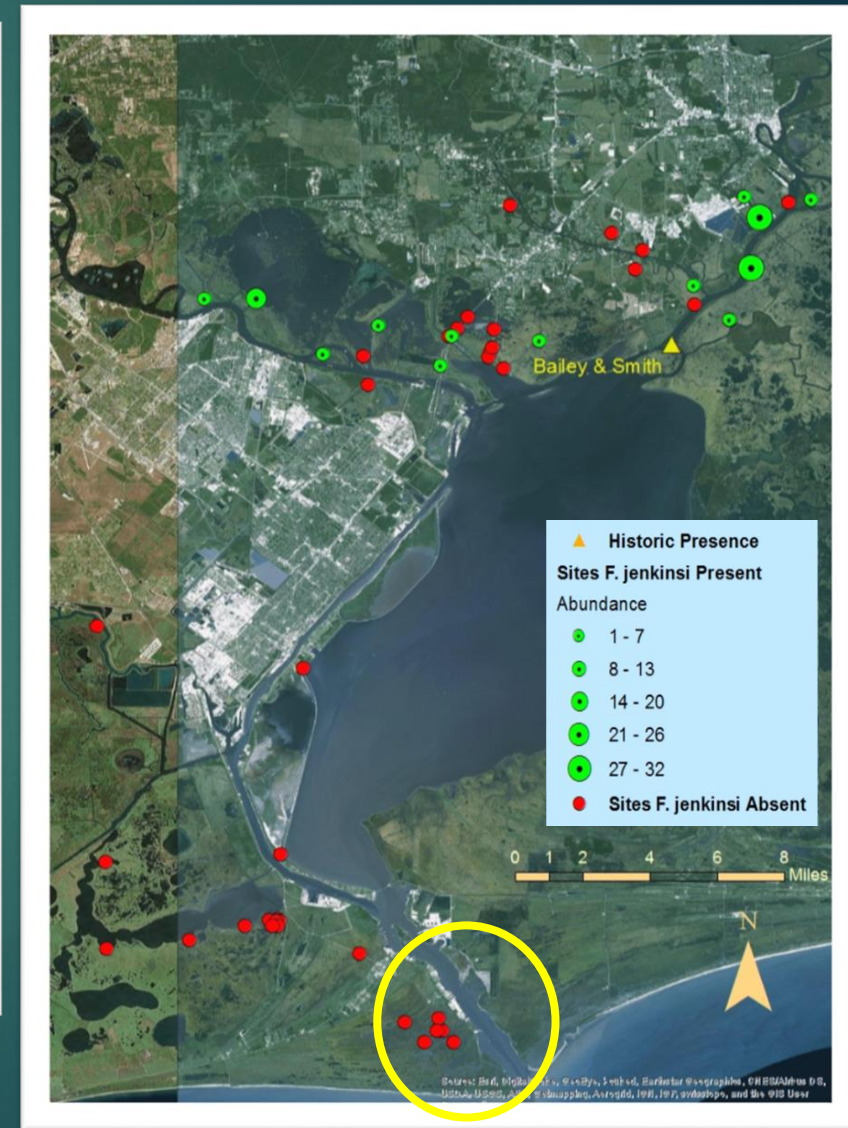
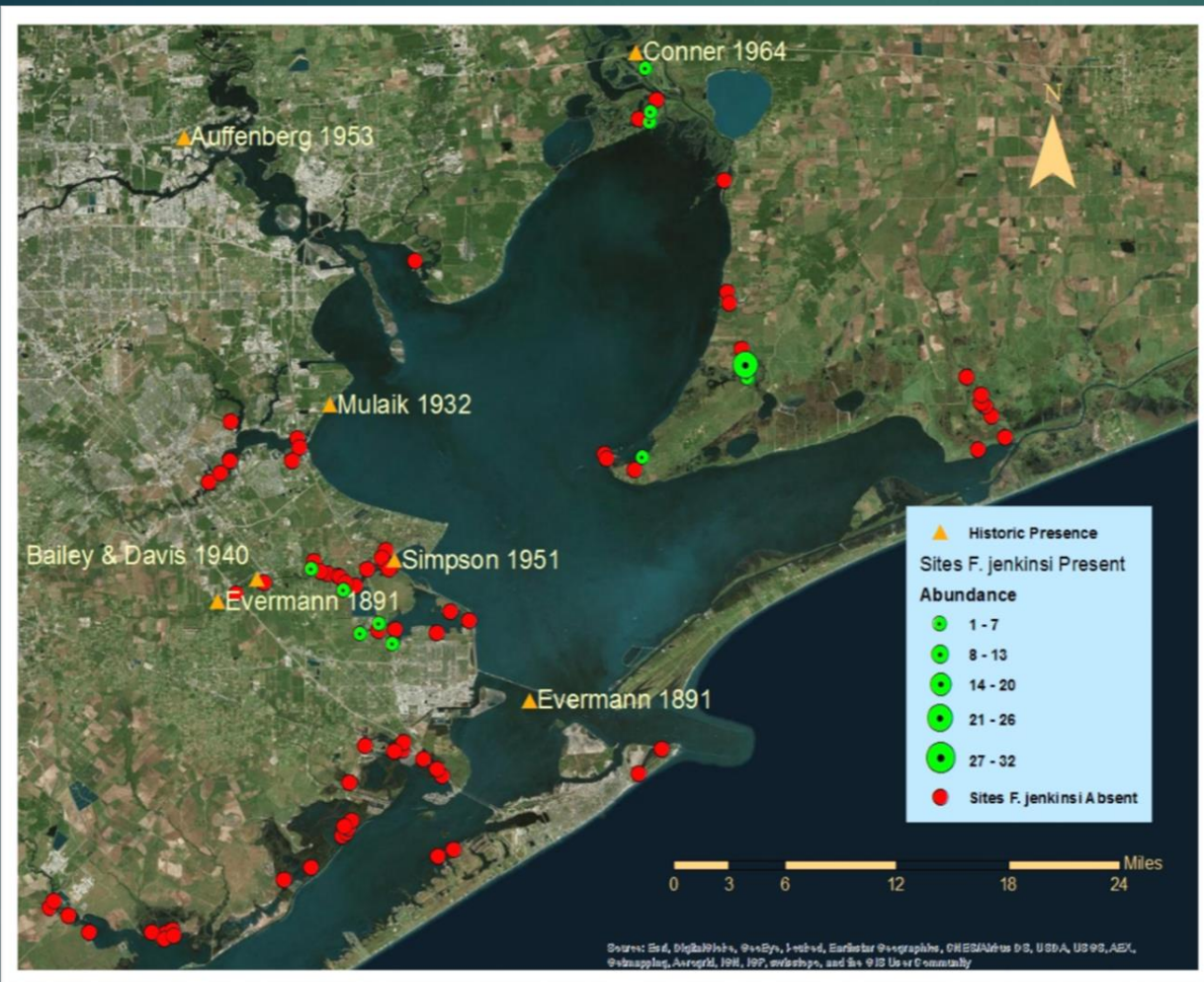




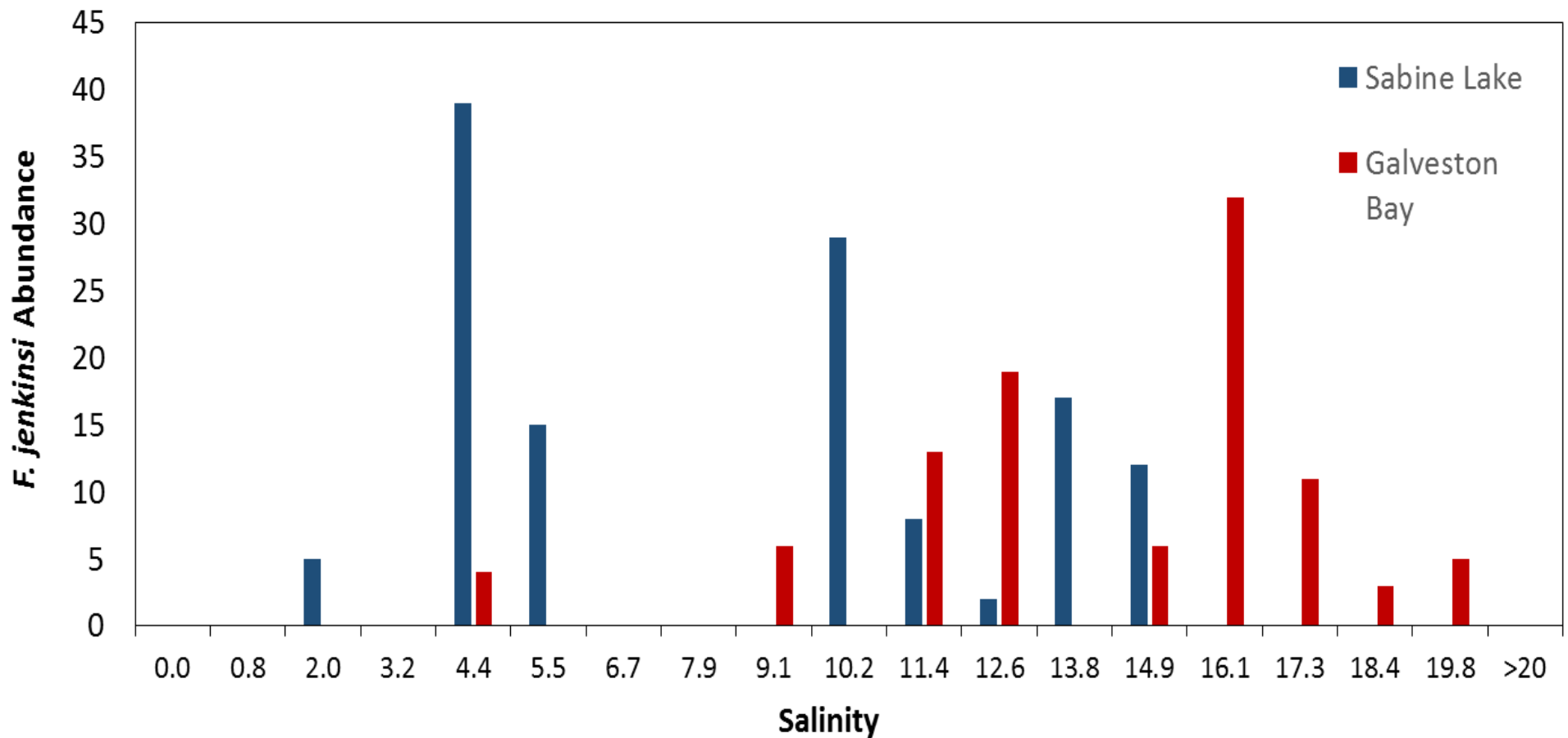
# Methods – Fish Community Data Analysis

- ▶ Data run through 4<sup>th</sup> root transformation
- ▶ Community comparison using Bray-Curtis similarity index
- ▶ Analysis of similarity (ANOSIM) used to test for differences in fish assemblages
  - ▶ Test differences in fish assemblages
    - ▶ *F. jenkinsi* presence vs absence
    - ▶ *F. jenkinsi* presence vs absence – Seasonal effects
    - ▶ *F. jenkinsi* presence vs absence – Tidal effects

# Results – Distribution & Abundance

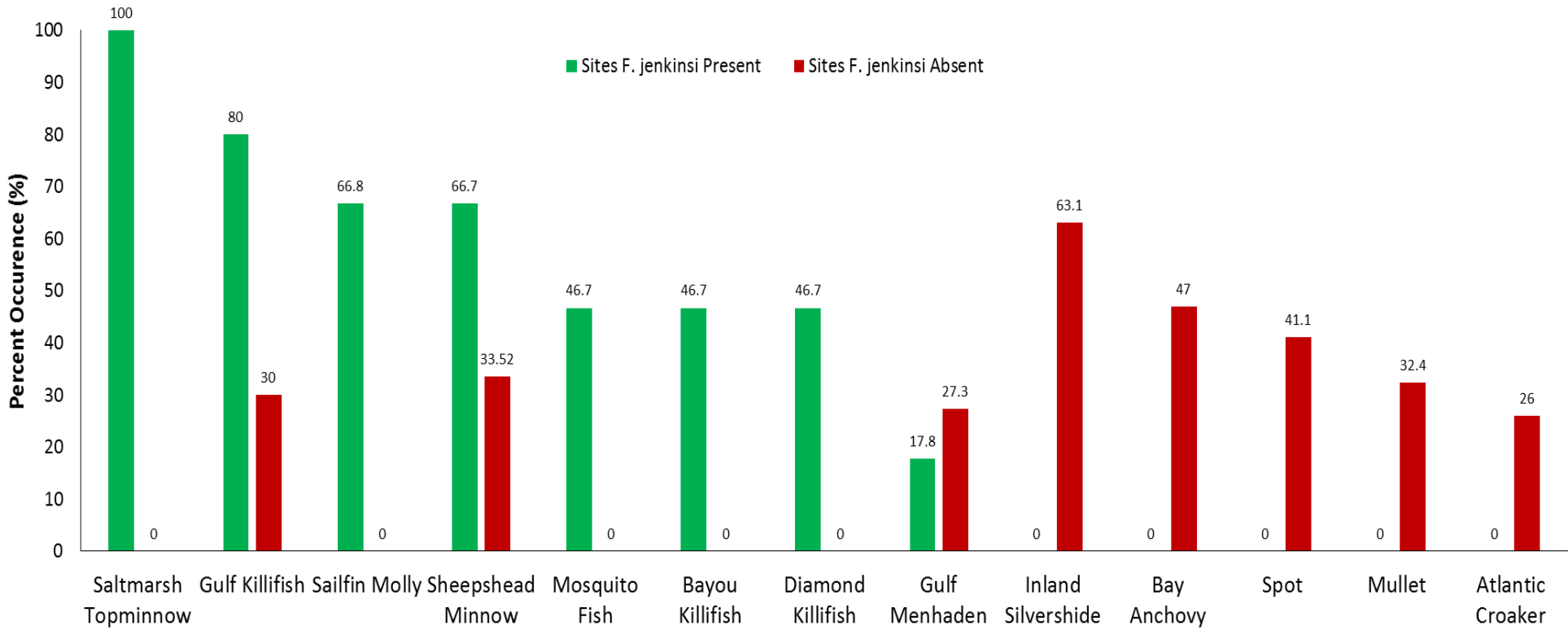


# Results – Salinity Gradients



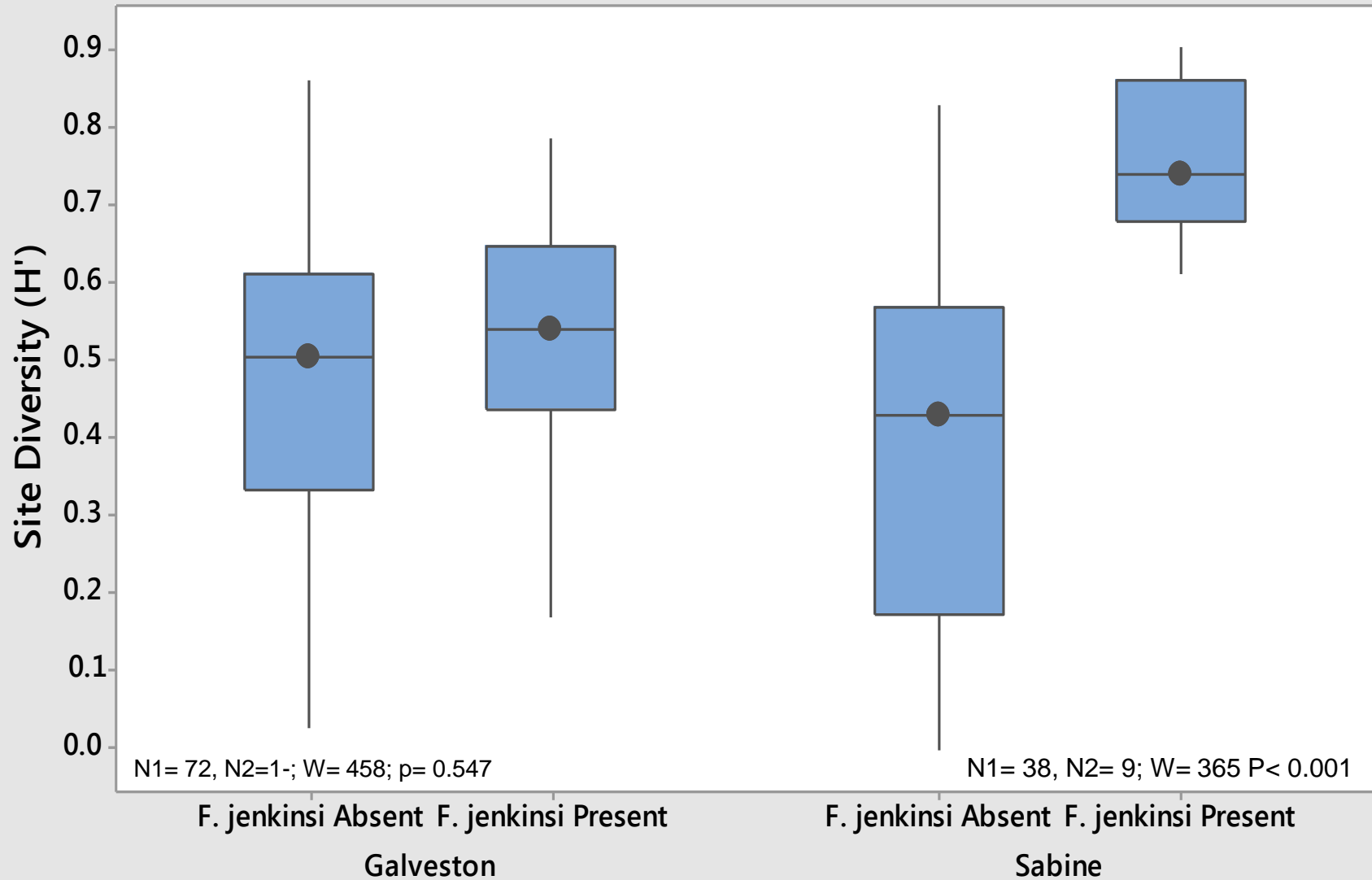
# Results – Conspecific Associations

### Conspecifics Associated with *F. jenkinsi* Presence & Absence



# Results – Site Diversity

## Diversity ( $H'$ ) of Site Assemblages



# Results – Analysis of Similarity

- ▶ A one-way ANOSIM showed a significant difference in the fish community assemblages between Galveston Bay and Sabine Lake, Texas ( $R=0.08$ ,  $p= 0.001$ )
- ▶ ANOSIM showed significant difference between assemblages where *F. jenkinsi* present vs absent at both Sabine Lake ( $R=0.14$ ,  $p= 0.013$ ) and Galveston Bay ( $R=0.18$ ,  $p=0.008$ )

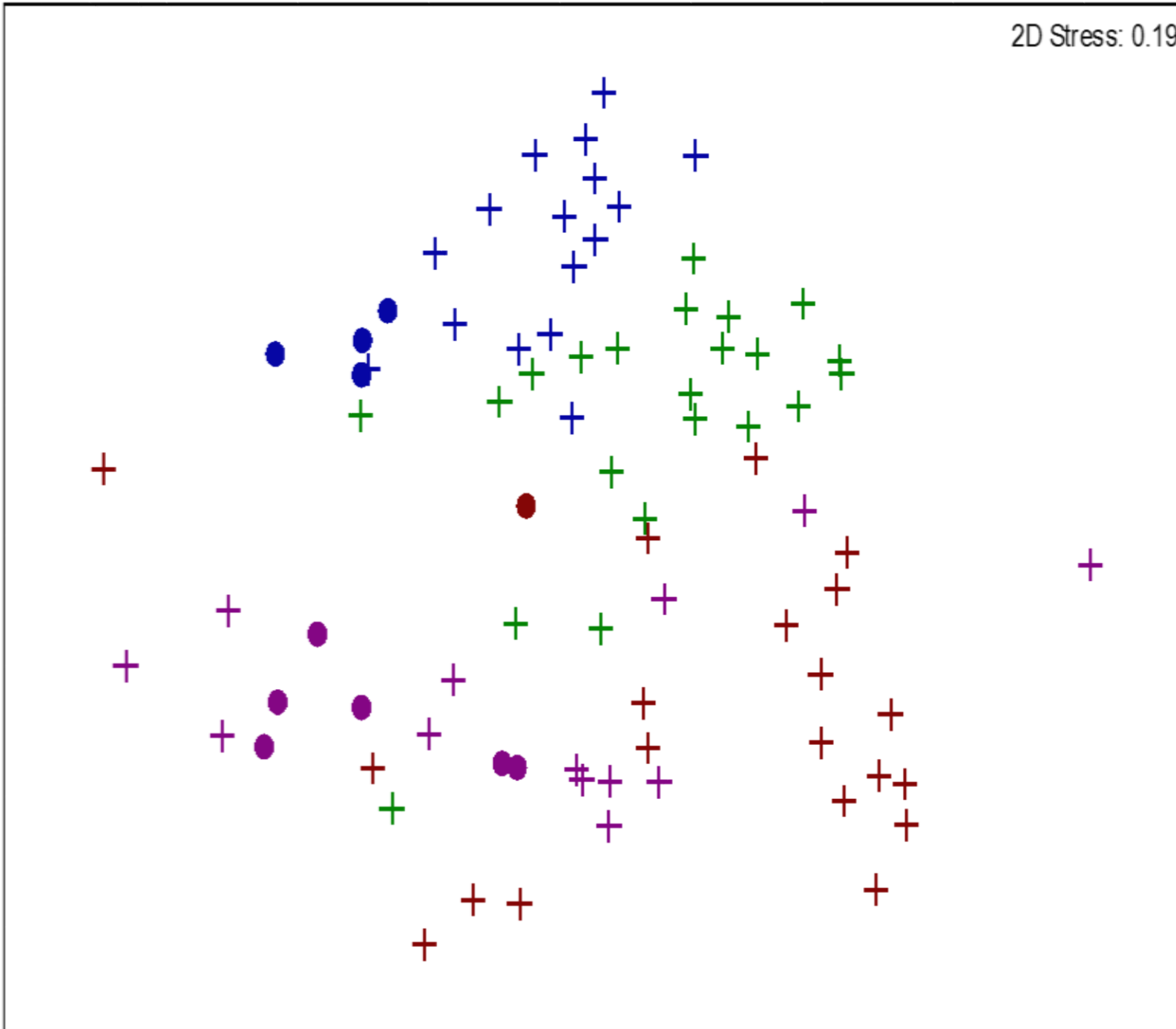
# *F. jenkinsi* Presence in Galveston Bay vs Season

2D Stress: 0.19

*Fjenkinsi*Season

- PresentWinter
- + AbsentWinter
- + AbsentSpring
- + AbsentSummer
- PresentSummer
- + AbsentFall
- PresentFall

(Global R= 0.34,  
p= 0.003)



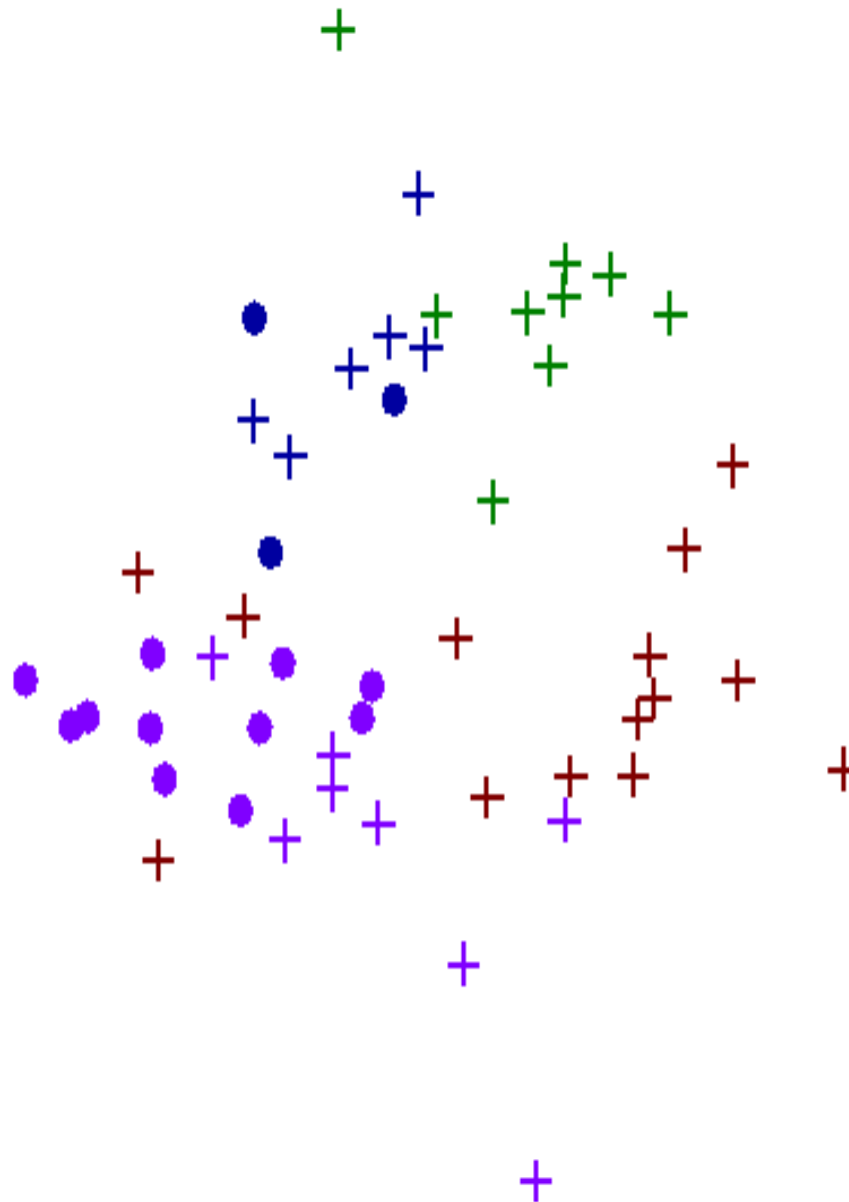
# *F.jenkinsi* Presence in Sabine vs Season

2D Stress: 0.19

*Fjenkinsi*Season

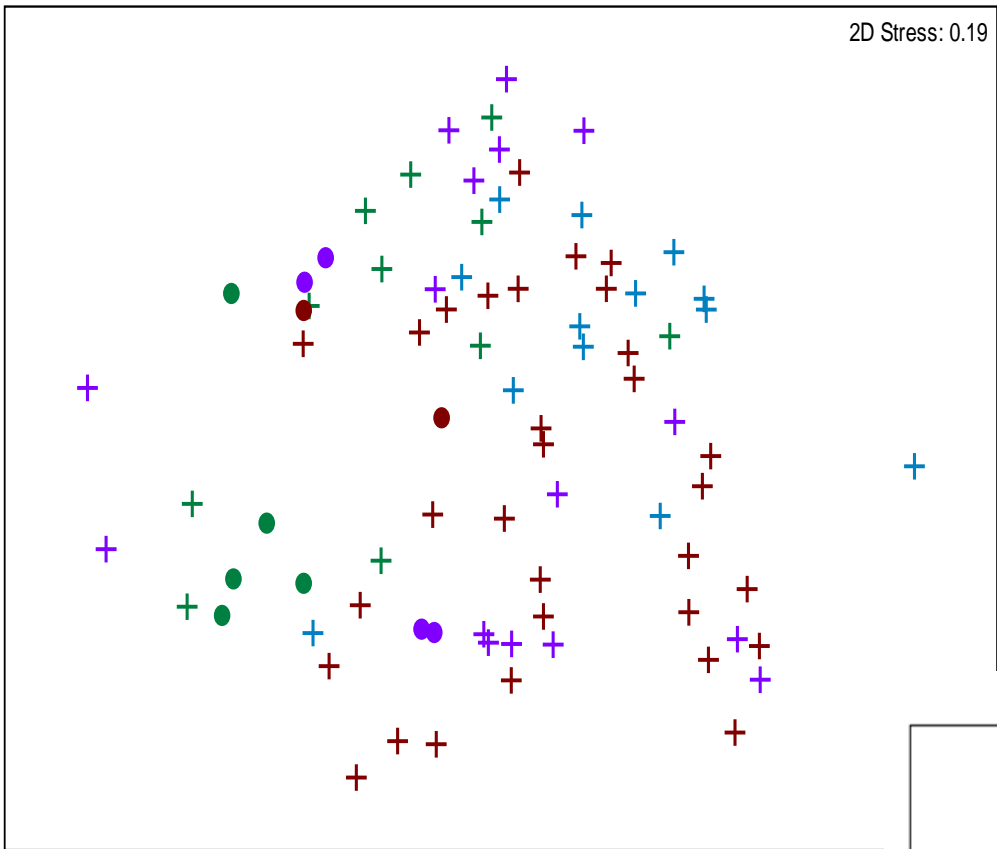
- PresentWinter
- + AbsentWinter
- + AbsentSpring
- + AbsentSummer
- PresentFall
- + AbsentFall

Global R= 0.41  
p= 0.001





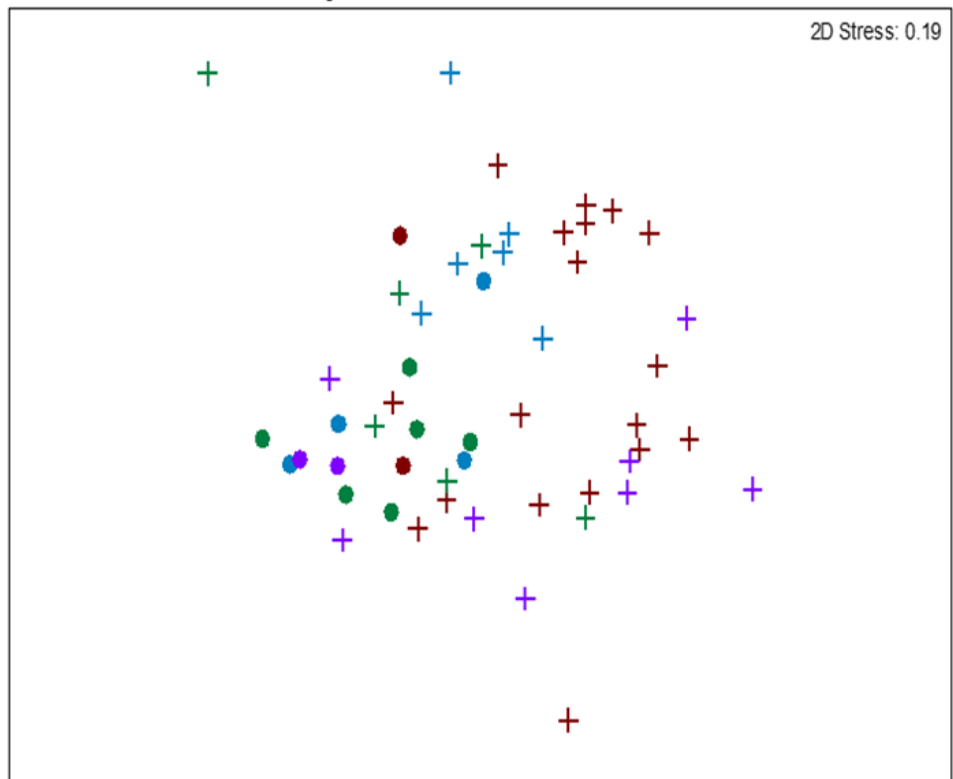
# F. jenkinsi Presence in Galveston Bay vs Tide



- F.jenkinsi* Tide Stage
- PresentFalling
  - + AbsentFalling
  - PresentLow
  - + AbsentLow
  - + AbsentRising
  - PresentHigh
  - + AbsentHigh

Global R= 0.13  
p= 0.112

# F. jenkinsi Presence in Sabine vs Tide



- F.jenkinsi* Tide
- PresentFalling
  - + AbsentFalling
  - PresentLow
  - + AbsentLow
  - PresentRising
  - + AbsentRising
  - PresentHigh
  - + AbsentHigh

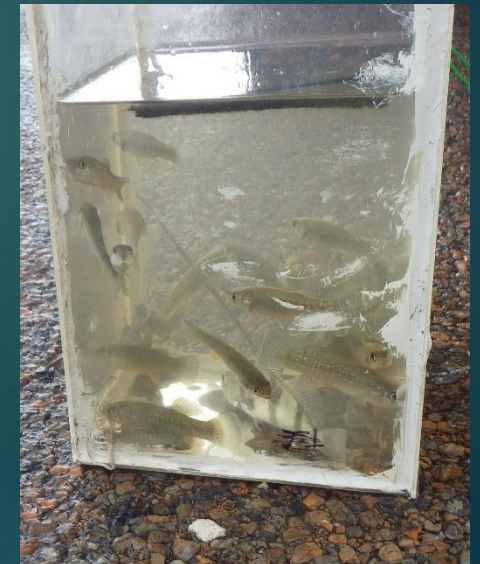
Global R=0.26  
p= 0.052

# Conclusions

- ▶ *F. jenkinsi* were found in multiple locations within Galveston Bay and Sabine Lake
- ▶ Salinity gradient *F. jenkinsi* found in may vary depending on the system and habitat availability
- ▶ Seasonal differences influence assemblages with *F. jenkinsi* presence
- ▶ Water level may be a contributing factor influencing the presence of *F. jenkinsi* in our samples and the conspecifics associated with their presence

# Future Analysis

- ▶ Further analyses will be done to evaluate specific effects water level and other environmental factors have on *F. jenkinsi* presence
- ▶ Comparison of sampling methods (Breder Trap vs seine)



# Acknowledgements



# Questions?

