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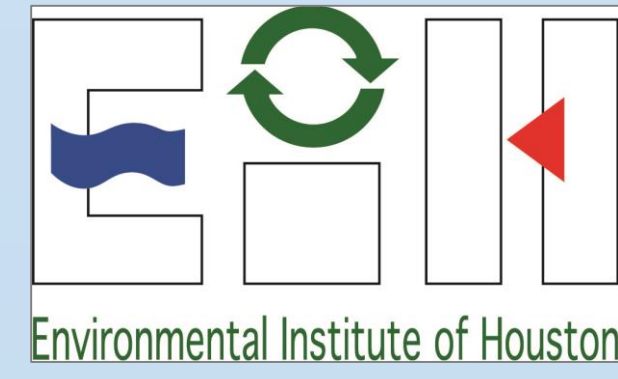
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Introduction

The Saltmarsh Topminnow has a preference for low to moderate salinities and is primarily found along the edge of saltmarsh habitat surrounding small intertidal creeks (Peterson & Ross 1991; Lopez et al. 2010; and Griffith 1974, Peterson et al. 2003). Given this species' restricted range in Texas and the recent projections of urban development, land subsidence, climate change, and sea level rise (Warren Pinnacle Inc., 2011; Montagna et al. 2011) it is important to document its habitat requirements and distribution. It is likely that the current TPWD coastal fisheries monitoring program design yields underestimates of occurrence and abundance of this species because of its documented habitat preference.

Photo of *Fundulus jenkinsi*.

Collection of fish caught in Breder Trap.

Study Objectives

1) Estimate local population abundance and density of the Saltmarsh Topminnow in Galveston Bay and Sabine Lake, Texas.

2) Estimate various demographic and population parameters of the Saltmarsh Topminnow in Galveston Bay and Sabine Lake, Texas.

3) Evaluate habitat preferences and water quality attributes of the Saltmarsh Topminnow in Galveston Bay and Sabine Lake, Texas.

4) Compare differences in CPUE and fish community composition between sampling methods and tide levels across sites in Galveston Bay and Sabine Lake, Texas

Methods

Sample sites were chosen that were tidally influenced and fell into the salinity levels (<22psu) utilized by *F. jenkinsi* (Peterson et al. 2003 and Lopez et al. 2011). Sites also contained some degree of *S. alterniflora* or other saltmarsh vegetation. Sampling was conducted quarterly within the Galveston Bay and Sabine Lake systems with additional monthly sampling ongoing at three sites within the Moses Bayou watershed of Galveston Bay.

During each sampling event fish were collected using a straight seine and Breder traps (Breder 1960). Water depth, tide stage, water quality, vegetation cover, and habitat type were recorded before seining and upon retrieving traps. Fish were administered a lethal dose of MS-222, fixed in a 10% formalin solution, and then brought back to the lab where they were identified, counted, and measured.

Results
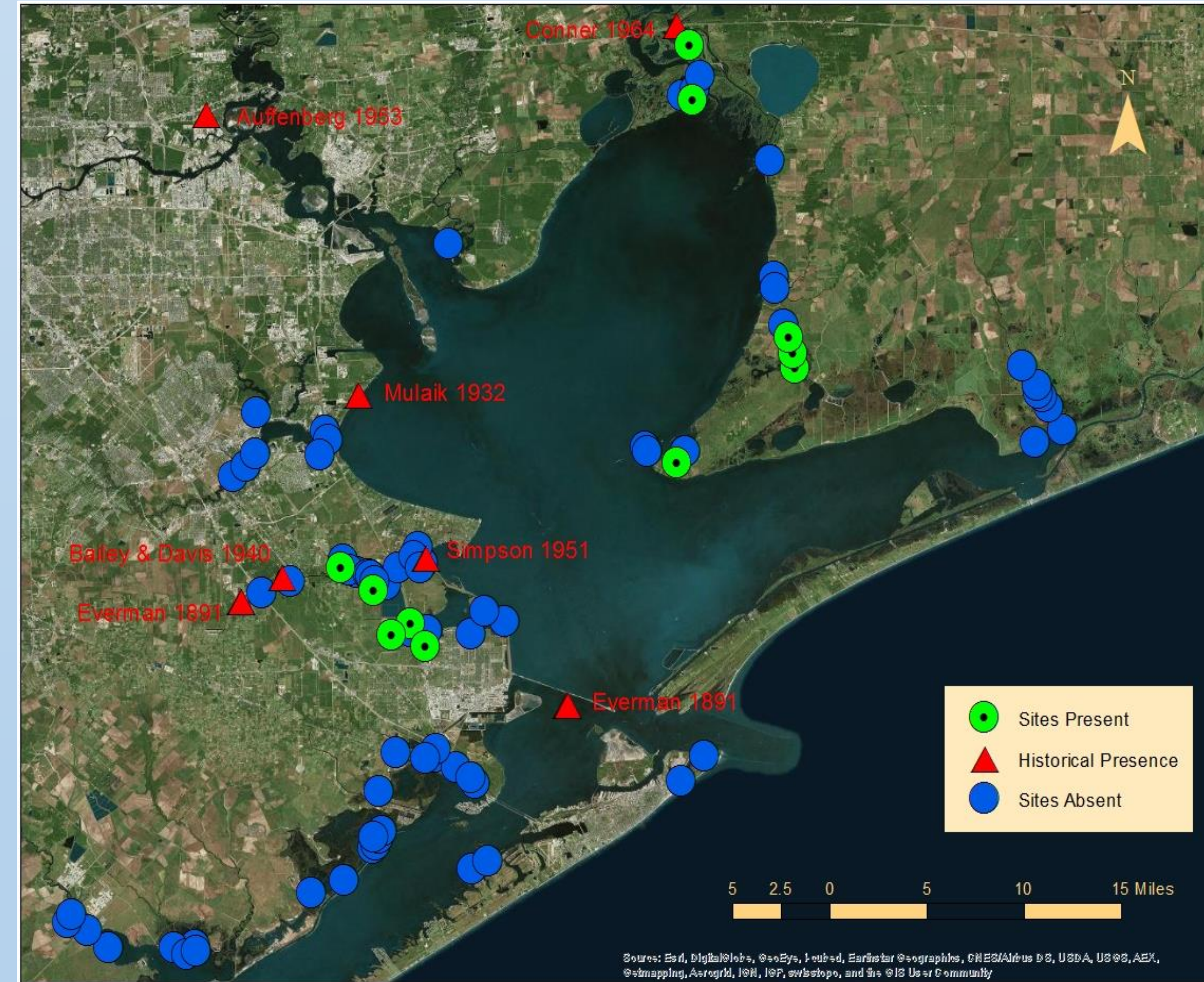
Map of sample sites and sites of historic *F. jenkinsi* presence surrounding Galveston Bay, Texas.
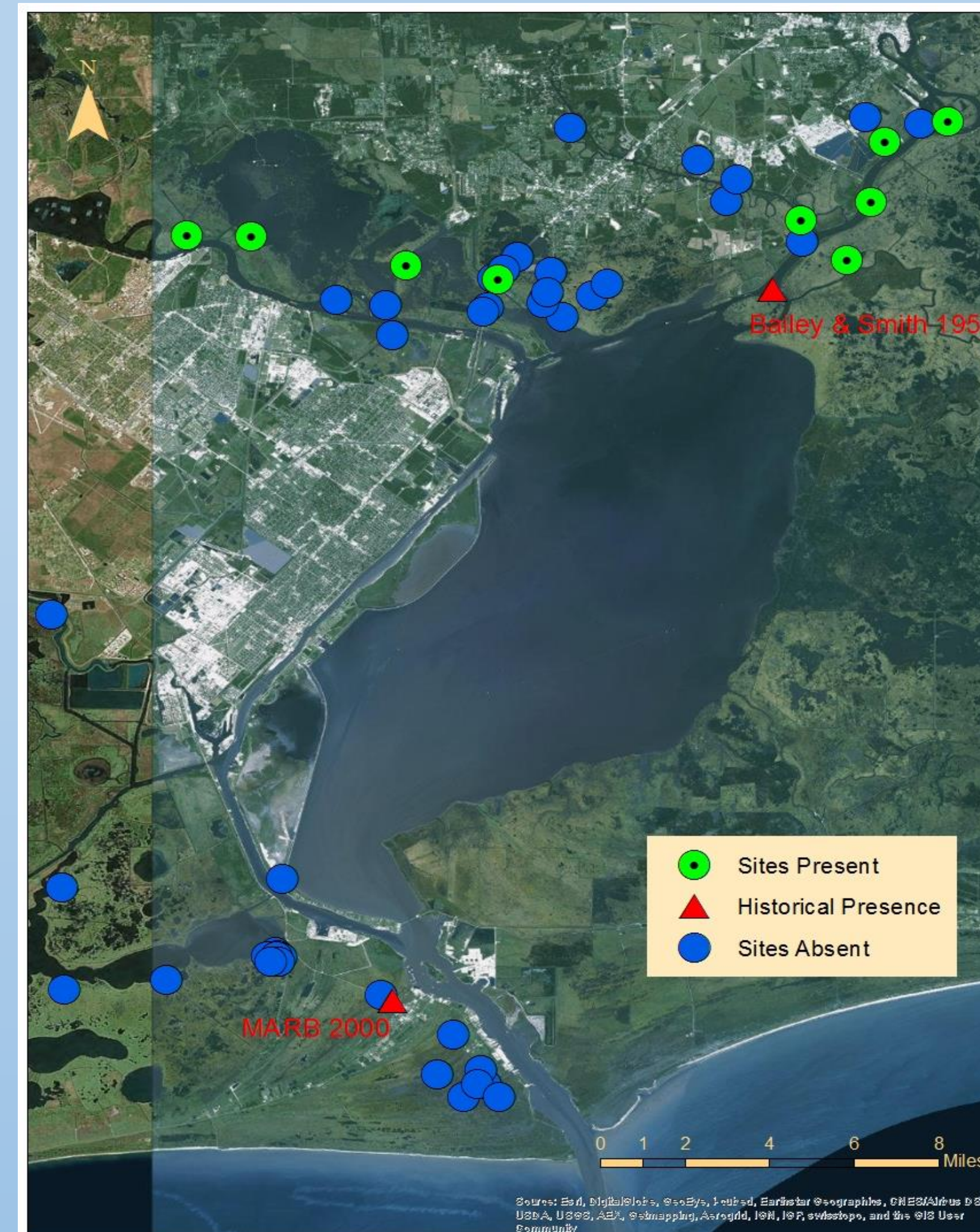
Map of sampling sites and sites of historic *F. jenkinsi* presence surrounding Sabine Lake, Texas.

Assemblage data was modified using 4th root transformation then converted into a Bray-Curtis resemblance matrix in PRIMER 6. A one-way ANOSIM showed a significant difference in the fish community assemblage where *F. jenkinsi* are present vs absent (Global R=0.123, p=0.005).

F. jenkinsi Presence by Month
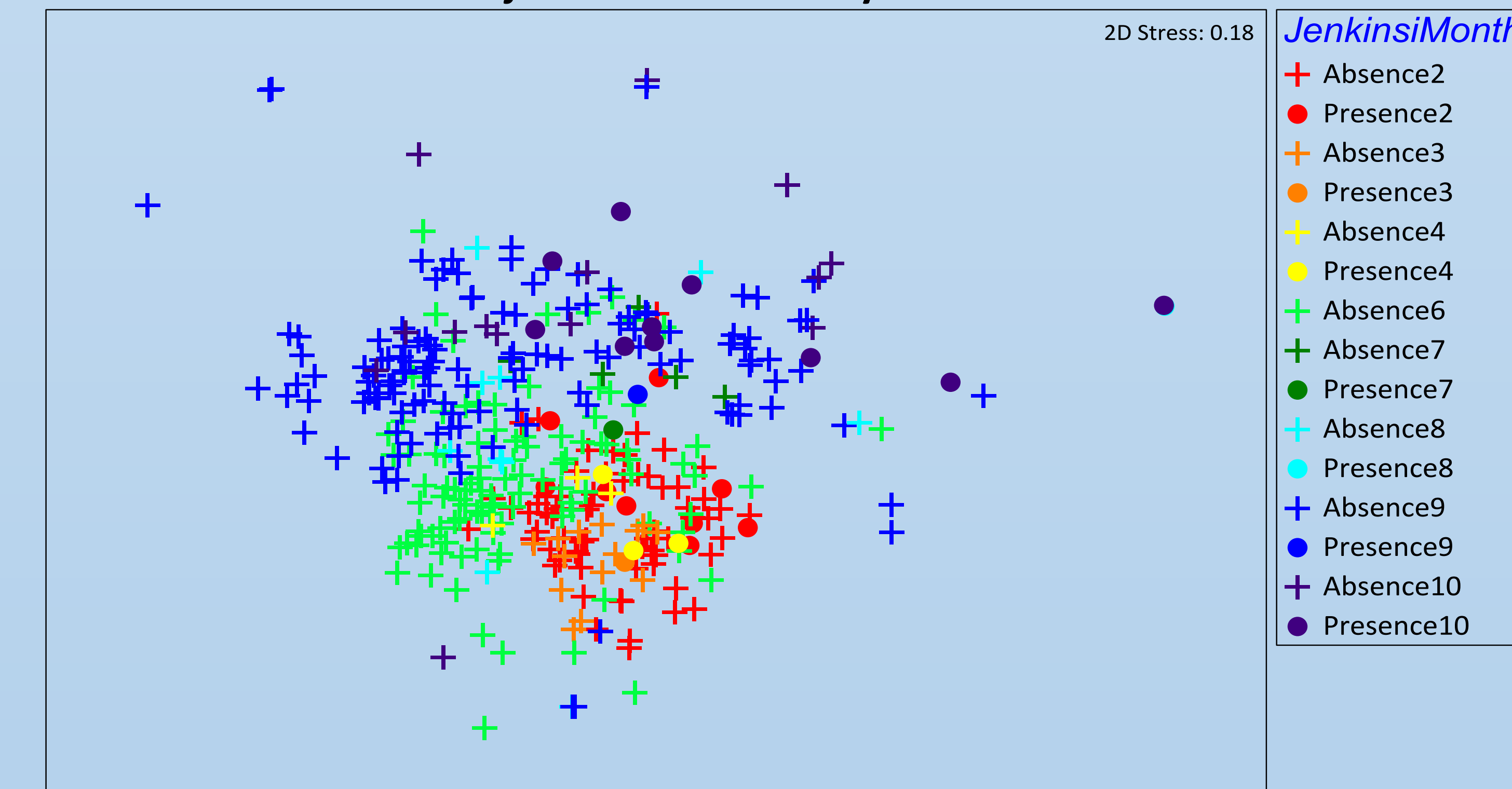
MDS plot of assemblage data illustrating presence or absence of *F. jenkinsi* by month sampled.

Future Analysis

1) Future analyses will consist of univariate and multivariate statistical approaches to evaluate fish community associations and environmental factors influencing the distribution of the Saltmarsh Topminnow.

2) The fish community structure of each site will be examined by calculating total species abundance (N), relative abundance (%), catch-per-unit-effort (CPUE), richness (S), diversity (H') and evenness (J').

3) PRIMER will be used on fish community data to test the differences in assemblage composition and determine if there is an influence of environmental factors and community structure on *F. jenkinsi* presence.

4) Mean monthly GSI will be calculated for each *Fundulus jenkinsi* individual and plotted by month for both males and females to compare reproductive condition by season.

Breder Trap set in saltmarsh habitat.

Sampling with a seine in the saltmarsh.

Acknowledgements

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

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