Southeastern Louisiana University, Center For Environmental Research, Hammond, Louisiana

INTRODUCTION

Environmental DNA (eDNA) has become a widely used tool for monitoring biodiversity in aquatic ecosystems. However, each aquatic ecosystem has a unique eDNA ecology. This study aims to improve understanding of eDNA biodiversity monitoring in the Tickfaw River and its terminus, Lake Maurepas, located in southeast Louisiana. The Tickfaw River is shallow, low gradient, slow moving, and heavily impacted by high sediment loads. Lake Maurepas is a shallow, brackish lake that is part of the greater Lake Pontchartrain estuary.

OBJECTIVES

- Compare species richness along the fluvial gradient.
- Determine homogeneity of fish assemblages at the river cross section of each site.

METHODS

Location

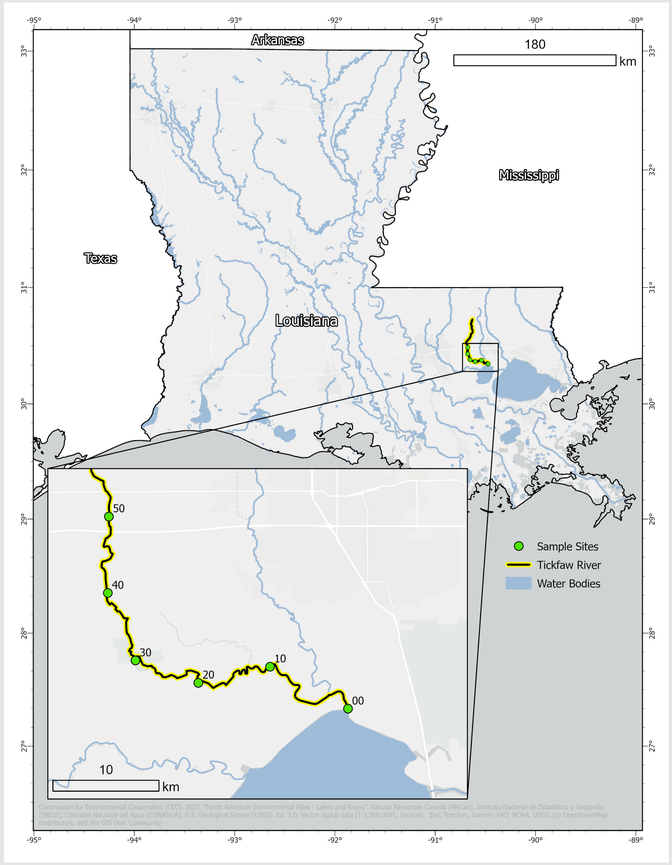

Figure 1. Tickfaw River, Louisiana, USA. Sites are marked by a green circle and represent every 10 river kilometers (rkm) sampled starting at the mouth (00) which enters Lake Maurepas to 50rkm upstream (50).

Sample

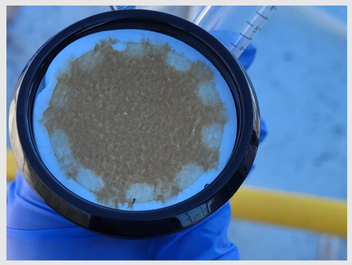

Figure 2. 47mm diameter, 1.5 µm glass microfiber filter after sampling 2L through the Smith Root eDNA Backpack Sampler.

- 6 sites, 9 samples collected/site.
  - 37 samples included in current analysis.

DNA Extractions

Qiagen DNEasy Blood and Tissue Kit

DNA Amplification

12S mtDNA Region, Miya et al. 2015

Sequencing

Illumina NextGen

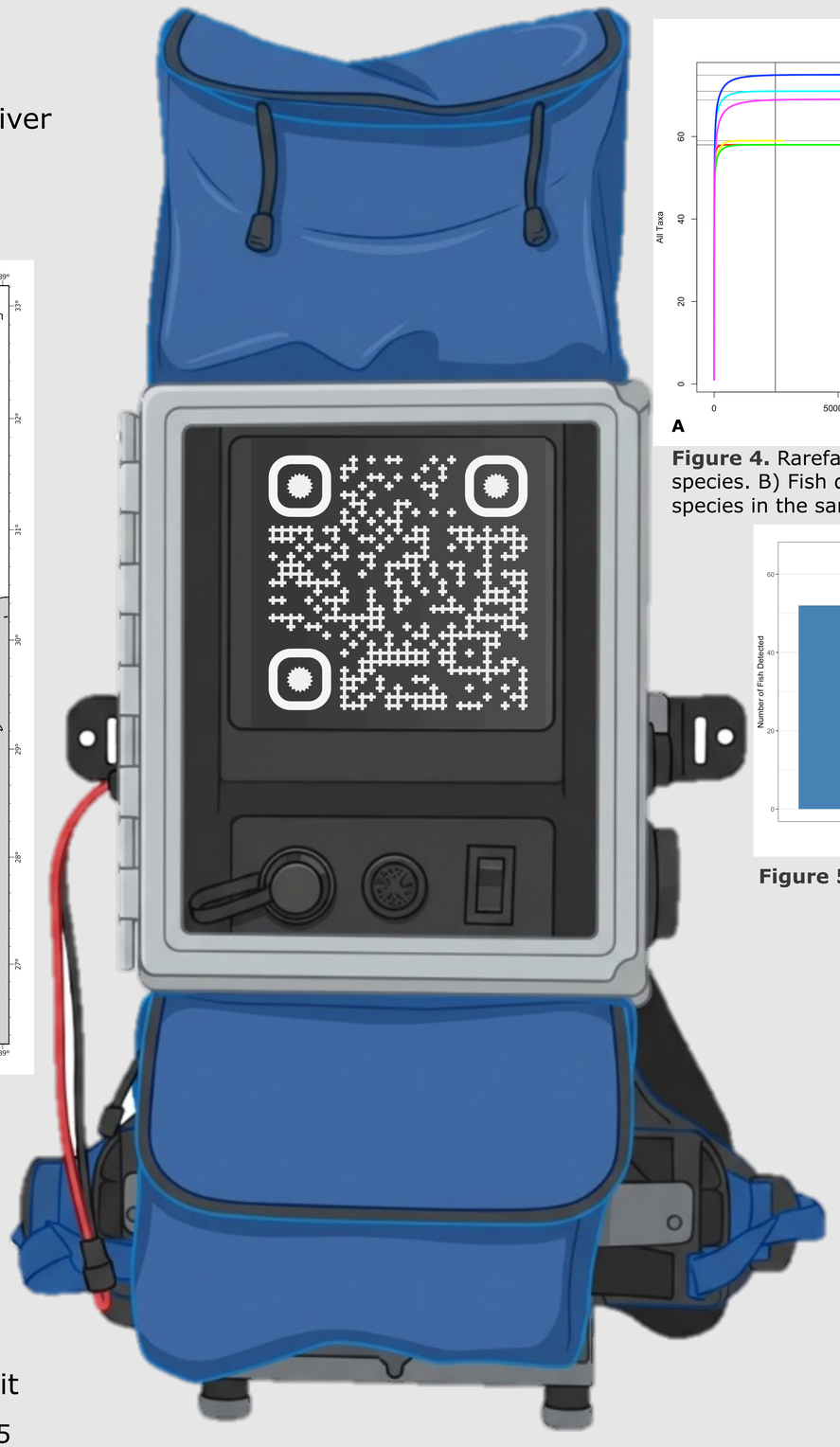

Figure 3. Smith-Root eDNA Backpack Sampler. Use the QR code to see the what species were detected!

RESULTS

- 7,212,262 number of raw reads representing 1,666 ASVs.
  - 5,000,767 filtered reads (mean= 135,156).
- 106 species (fish and non-fishes) detected using eDNA.
  - 86 fishes assigned at ≥97% identity.
  - 7 fishes assigned at <97% identity.
  - 13 non-fish species identified.

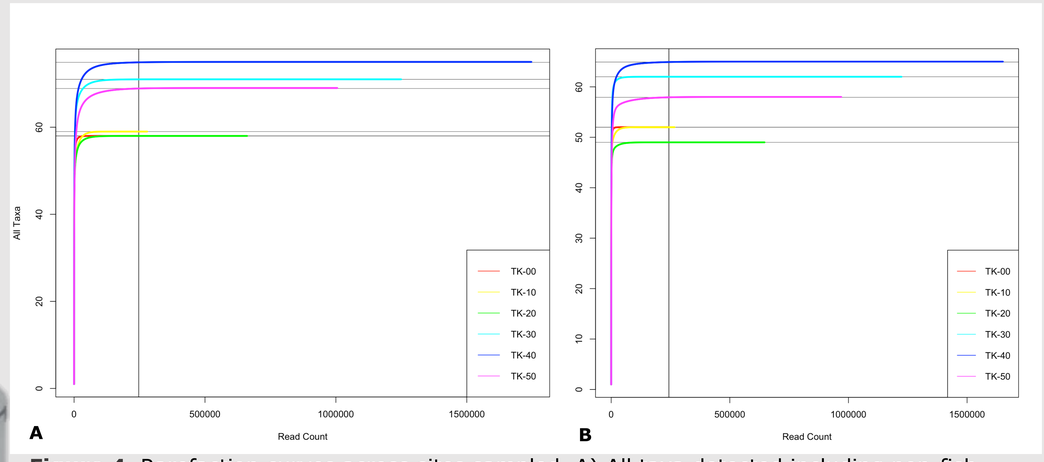

Figure 4. Rarefaction curves across sites sampled. A) All taxa detected including non-fish species. B) Fish detected at ≥97% identity. Sequencing depth was sufficient to detect most species in the sample.

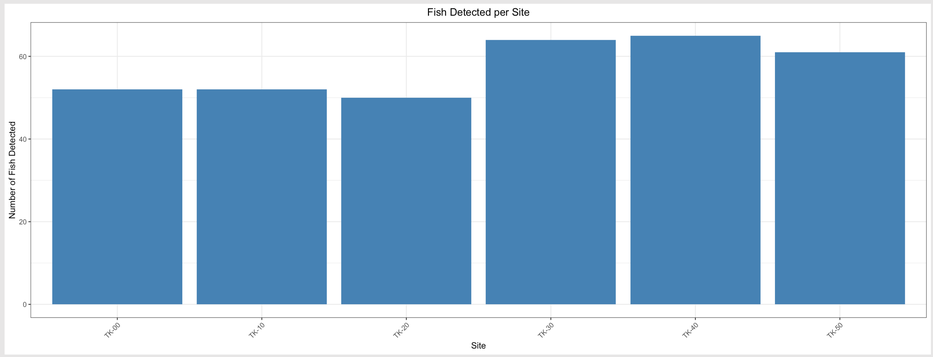

Figure 5. Number of fish species detected per site.

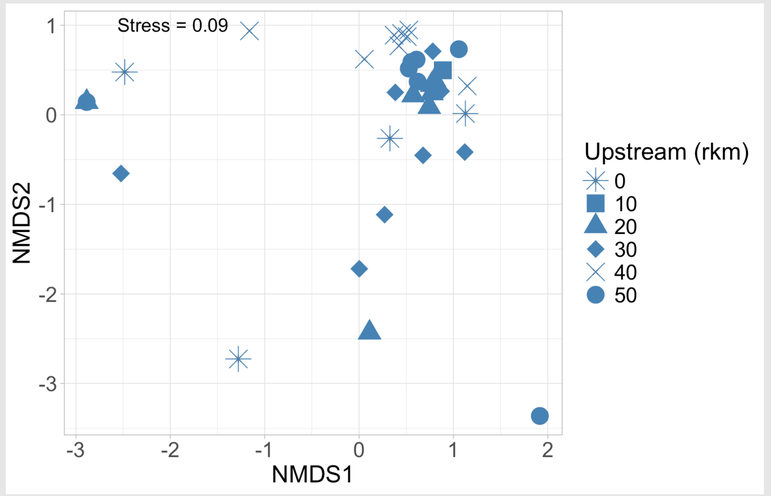

Figure 6. Nonmetric Multidimensional Scaling plot illustrating the comparison of fish assemblages showing strong homogeneity across the fluvial gradient. Labels correspond to rkm from the mouth (Fig. 1).

Acknowledgements
This study was supported by a grant from Air Products.
Map provided by Wray Gabel.