

# A Race Against Time: Using Environmental DNA to Detect Specimens of the River Redhorse in the Escambia River

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## Introduction

### River Redhorse

- Suckerfish of the Catostomidae family
  - Late spawner that spawns in the middle of April
- facilitates the transfer of matter and energy from the benthic food web to the pelagic food web
- Species of **greatest conservation need** in the state of Florida
  - Found only in the Escambia River in Florida
  - Collected from the Escambia River only **3 times** in the past 60 years
- Inflexible in habitat requirements and intolerant of pollution and heavy siltation
  - The Escambia River has long been polluted by industrial plants, landfills, and septic tanks

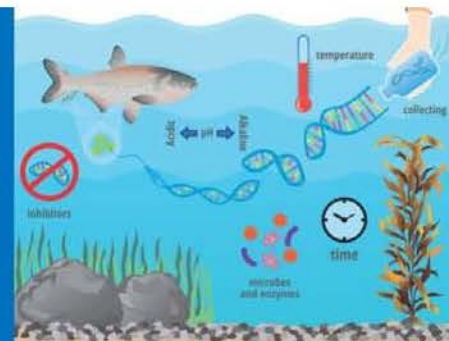
### Environmental DNA

- Alternate approach to conventional methods of sampling
  - Cost and time effective
  - Less destructive to habitats
- Detects presence of aquatic species
  - consists of sloughed-off skin cells, intestinal cells, scales, and/or mucus extracted from collected water samples
- Rapid degradation time of eDNA makes the tool useful for conservation purposes

## Methods

- The full length of the Escambia River and lower Conecuh River will be sampled
  - Collection dates are monthly, beginning in December and ending in May
- Three 15mL water samples will be collected from the surface at each site
  - water will be preserved in 1.5mL of sodium acetate and 33.5mL of ethanol
  - Samples will be placed on ice to protect the eDNA from damage and/or heat exposure.
- Collected DNA will be extracted
- Extracted DNA will be amplified using species specific primers and polymerase chain reaction
- Amplified DNA will be separated into fragments by gel electrophoresis to determine a positive or negative detection

# OBJECTIVE: Use environmental DNA to detect locations of the critically imperiled River redhorse (*Moxostoma carinatum*) in the Escambia River to provide conservation and management for the population in Florida.



Samples of water containing a target organism's DNA are collected. Factors like temperature, time, and inhibitors can degrade and denature collected eDNA.



Map of the length of the rivers sampled in green



Ethanol is added to collected water samples from the Escambia River (left) and collected water is added to 50 mL tubes while sampling the Conecuh River (right)

## Anticipated Outcomes

- Determine the presence of the River redhorse and its locations in the Escambia River
- Use conventional sampling methods in target locations
  - Specimen collection
  - Limit habitat damage
  - More cost and time effective
- Management of the habitat and migration routes of the Escambia River population
  - Habitat restoration and conservation
  - Population restoration and conservation