

# Molecular Microbial Source Tracking for Source-Specific Management of Water Quality on the Mississippi-Alabama Coast

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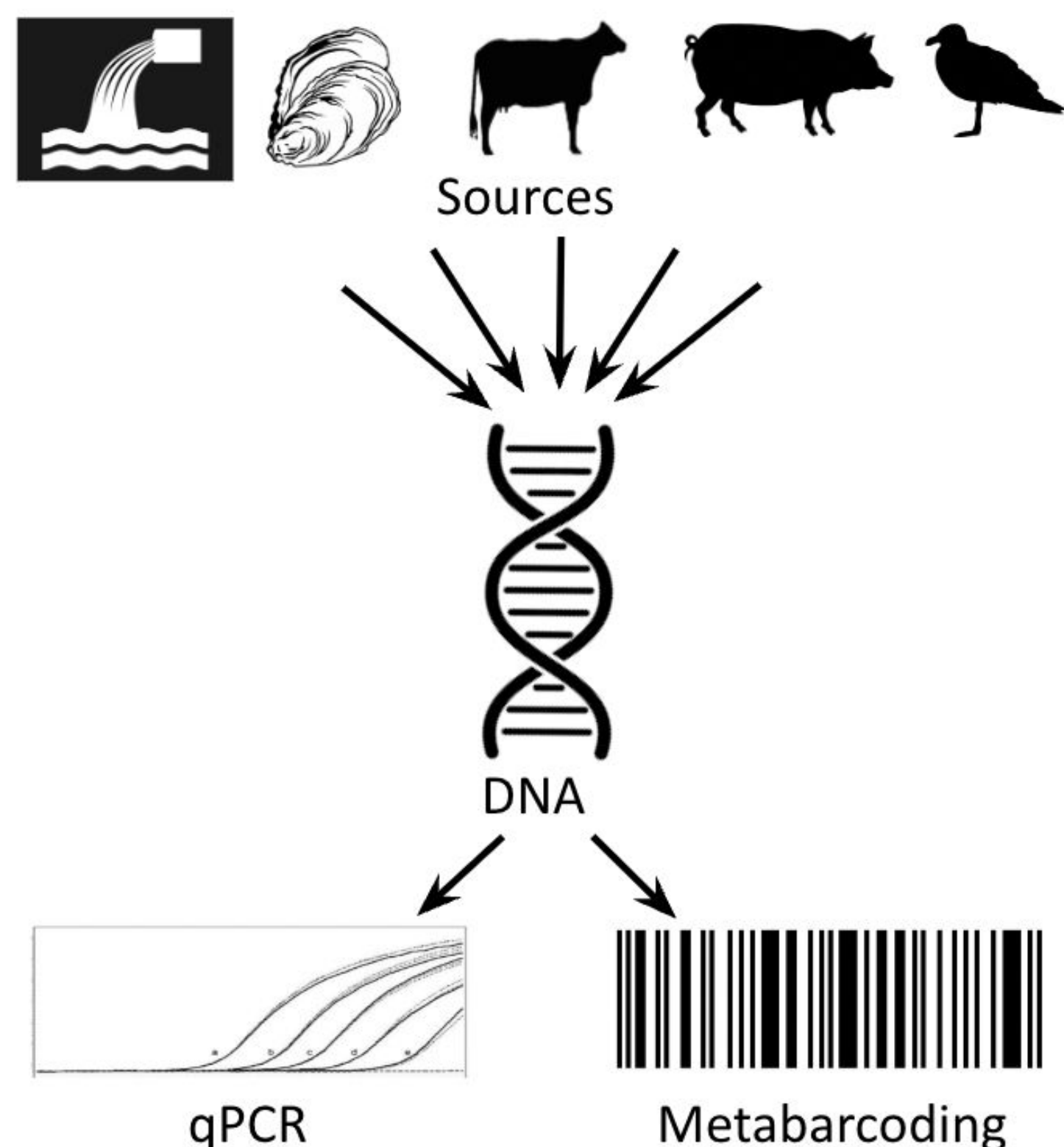
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## Introduction

- Urbanization of coastlines introduces microbes from terrestrial sources to aquatic systems, increasing risks to human health from contaminated swimming waters or fisheries
- Traditional MST methods are unable to distinguish between human and non-human sources, making management of potential pathogens difficult
- Currently, microbial sources to the Mississippi-Alabama coast are largely undefined

## Molecular MST Methods

- Molecular methods are able to identify and quantify fecal sources
- **Quantitative PCR (qPCR)** methods can provide source identification by targeting different groups of *Bacteroides*
- **Environmental DNA (eDNA)** metabarcoding methods can track broad-scale patterns in the distribution of biotic diversity

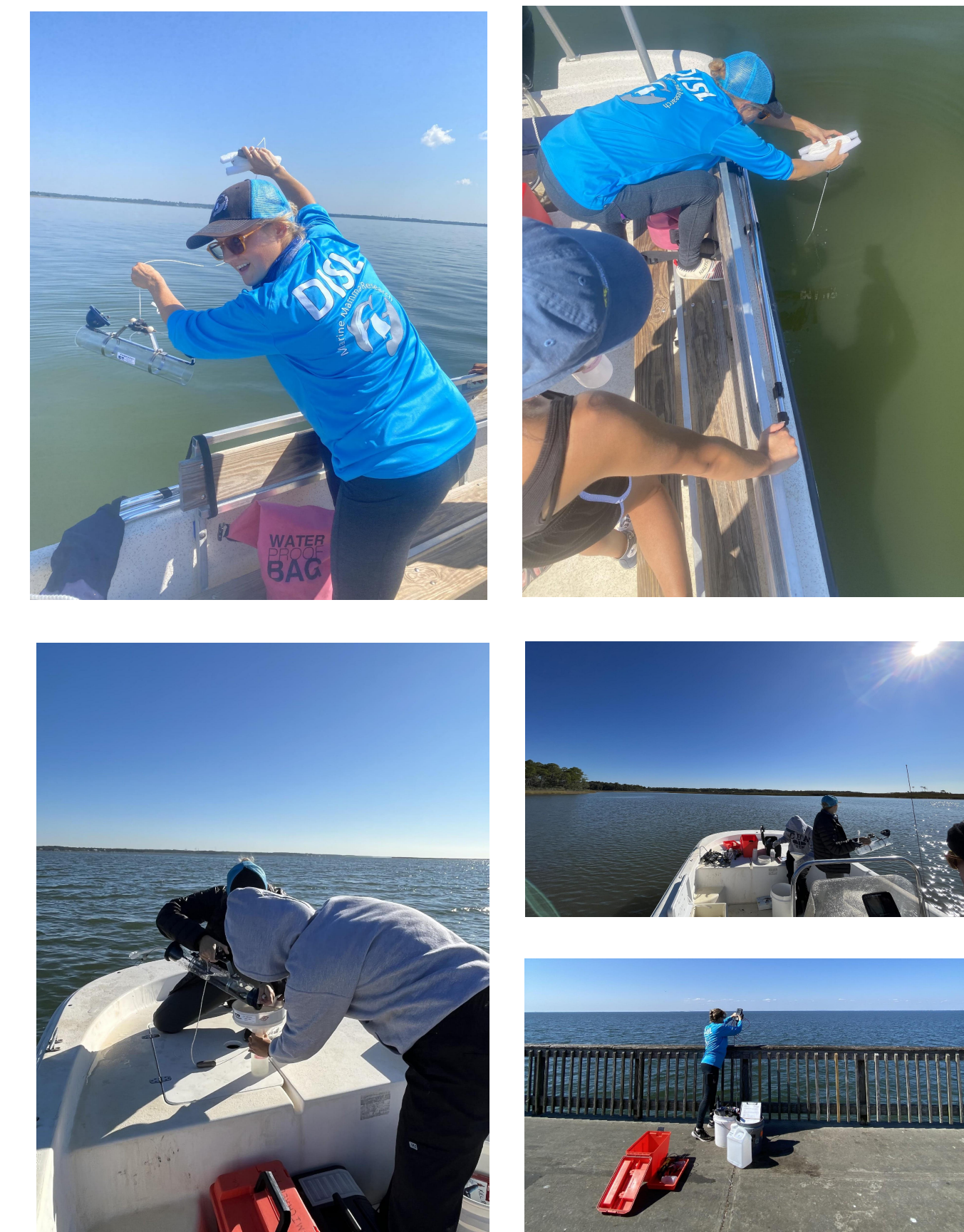
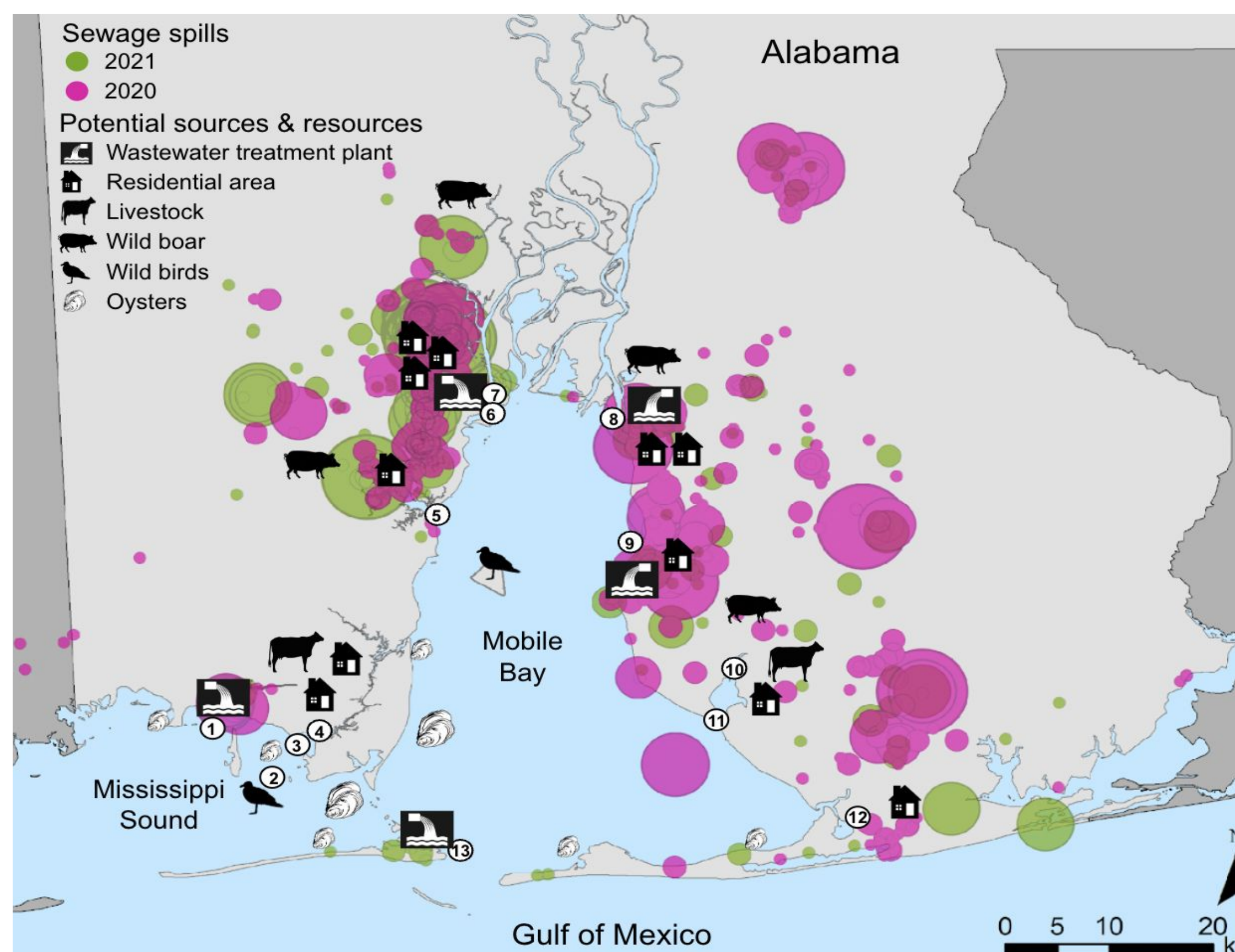


**Figure 1.** Integration of advanced MST methods to identify key sources of microbial indicators to Alabama waters.

**Objective:** To use advanced microbial source tracking methods to better identify and quantify sources of fecal-associated microbes to the Alabama coast.

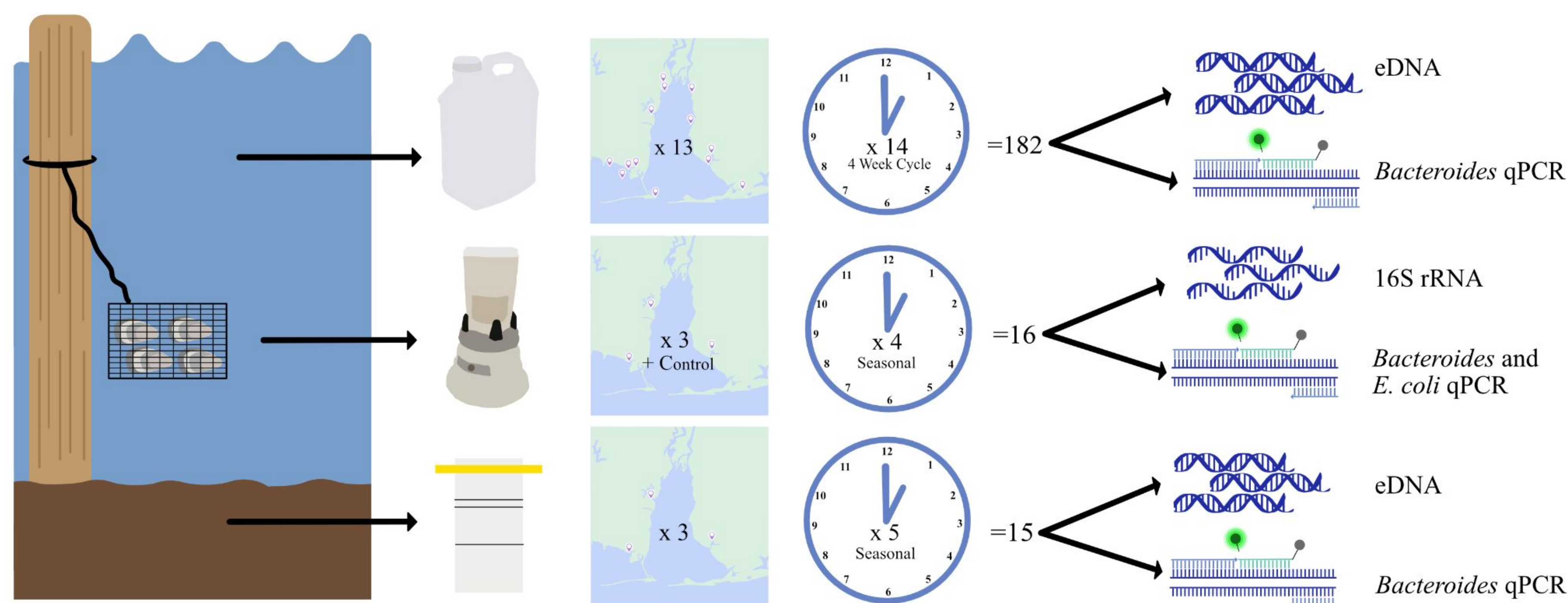
## Methods

- Water sample collection occurs monthly at sites identified to be key potential entry points of contamination to Alabama's coastal waters (**Fig. 2**)



**Figure 3.** Water sample collection.

**Figure 2.** Sampling sites and nearby potential microbial sources, including locations of known sewage spills, residential areas, livestock, and wildlife (data from Mobile Baykeeper, AUSL, MBNEP).



**Figure 4.** Flowthrough of methods detailing sample collection (location and timing) and sample types, through eDNA metabarcoding and qPCR.

## Acknowledgments

We would like to thank our stakeholders for their support. This project is funded by Environmental Protection Agency grant MX-02D17922 to BKR, RHC, and SNC.

## Metadata Clearinghouse

- To facilitate data sharing, we created a publicly available MST metadata clearinghouse for existing microbial indicator and source tracking data
- View or contribute to the clearinghouse via the Alabama MST Metadata Questionnaire (QR code)
- For more information visit our webpage: "Our Wastewater Footprint" <https://www.disl.org/wastewaterfootprint>

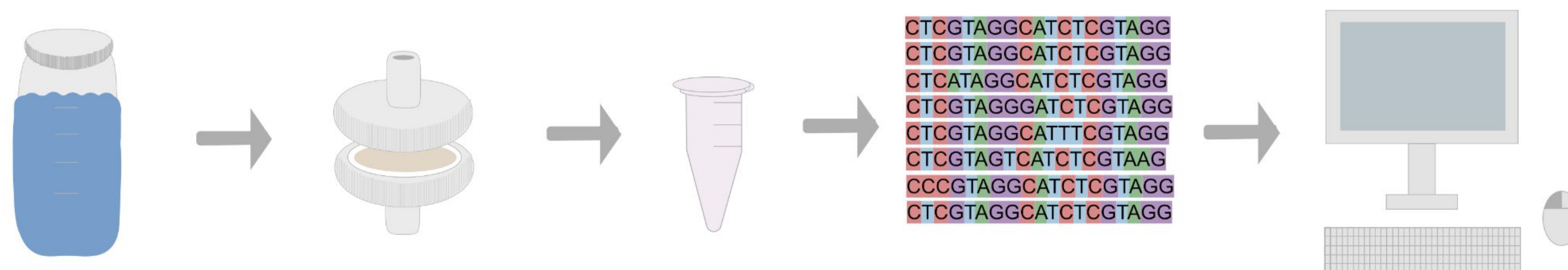


For any questions or comments, please email [wastewaterfootprint@disl.org](mailto:wastewaterfootprint@disl.org)



## eDNA Toolkit

We are developing an eDNA toolkit to enhance monitoring and management efforts by our community partners



**Figure 5.** Conceptual model of eDNA toolkit from sample collection, filtration, and DNA extraction, through sequencing and bioinformatic analysis.