

TENTH INTERIM PERFORMANCE REPORT

NOVEMBER 30TH, 2023

**Project Title: The Fate and Toxicity of Microplastics and
Persistent Pollutants in the Shellfish and Fish of
Matagorda Bay**

Submitted To:

Matagorda Bay Mitigation Trust

Performing Laboratory:

Texas A&M University on behalf of Texas A&M University at Galveston

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The Fate and Toxicity of Microplastics and Persistent Pollutants in the Shellfish and Fish of Matagorda Bay

Personnel

Principal Investigators:

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Consulting MBMT Project Coordinator:

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Location(s):

Texas A&M University at Galveston

Project Duration:

01 June 2021 – 31 August 2024

Objectives:

Objective 1: Quantify the extent of microplastics pollution in the surface waters and biota of Matagorda Bay.

Objective 2: Measure levels of persistent pollutants in surface waters, adsorbed to microplastics, and bioaccumulated in the biota of Matagorda Bay.

Objective 3: Study the toxicity of microplastics and adsorbed pollutants using embryolarval life stages of sheepshead minnow.

Objective 4: Public educational outreach to local high school students on the science of ecosystem health monitoring.

1. INTRODUCTION

1.1 Background

This project is studying the extent of microplastics, and persistent pollutant exposure of resident biota (shellfish and fish) sampled from Matagorda Bay and assessing any likely toxicity effects due to exposure. The *new knowledge* gained from the successful completion of this project will contribute to an understanding of the long-term fate and toxicity of microplastics (and adsorbed pollutants) in the Matagorda Bay system.

In this tenth interim report (September 1st, 2023 – November 30th, 2023) we provide a list of key accomplishments as per the second quarter of Year 3 of the project.

2. Key Updates

As of the period encompassing the tenth interim report (September 1st, 2023 – November 30th, 2023), the key achievements associated with each stated objective are detailed below.

Objective 1: Quantify the extent of microplastics pollution in the surface waters and biota of Matagorda Bay.

- We have completed all analyses of microplastics in the body-burdens (muscle and liver) of biota from Matagorda Bay. And for added comparison, we have also performed similar analysis in matching biota from Galveston Bay (as reported in the previous eighth interim report).
- We are currently preparing manuscripts for intended submission in Spring 2024.

Objective 2: Measure levels of persistent pollutants in surface waters, adsorbed to microplastics, and bioaccumulated in the biota of Matagorda Bay.

- We have completed all analyses of PAHs and PCBs in the body-burdens (muscle and liver) of biota from Matagorda Bay. And for added comparison, we have also performed similar analysis in matching biota from Galveston Bay (as reported in the previous eighth interim report).
- Our current focus is on preparing a high-impact manuscript for intended submission in Spring 2024. The manuscript will present our results on the levels of these legacy pollutants in the two Gulf of Mexico estuaries (i.e., Matagorda and Galveston Bays).

Objective 3: Study the toxicity of microplastics and adsorbed pollutants using embryo-larval life stages of sheepshead minnow.

- This objective is about to commence in Fall 2023 and onwards.
- An Animal Use Protocol (AUP) to perform *in vivo* experimentation with early life-stages of embryo-larval sheepshead minnows (*Cyprinodon variegatus*) has already been approved by the A&M Institutional Animal Care and Use Committee (IACUC).

Objective 4: Public educational outreach to local high school students on the science of ecosystem health monitoring.

- Educational outreach engagement was pursued in collaboration with the TAMUG Sea Camp program in Summer 2022. Outcomes from the outreach activity were reported in the *sixth* interim report.

3. FURTHER WORK

Planned work for completion over the duration of the *eleventh* interim report (Year 3) are as follows:

- 1) Prepare and submit manuscripts for publication by Spring 2024 on PAHs and PCBs levels in biota from Matagorda vs. Galveston Bays.
- 2) Prepare a manuscript describing the microplastics analysis methods and application to measuring levels in biota from Matagorda Bay (Spring 2024).
- 3) Prepare and submit manuscripts for publication by Summer 2024 on microplastics levels in biota from Matagorda vs. Galveston Bays.
- 4) Initiate toxicological studies on the effects of microplastics and PAH/PCB mixtures on embryo-larval life stages of sheepshead minnows (Fall 2023 - Spring 2024).

4. REFERENCES

None reported for this interim report.

Reviewed by:



Dr. David Hala, TAMUG, P.I.

11/29/2023

Date: _____

Approved by:



Mr. Steven J. Raabe, Trustee

Date: 11/29/2023