

Project Name: Assessing multi-trophic impacts of microplastic pollutants across macroinvertebrate food webs in Matagorda Bay, Texas

P.I.: Adam Mitchell, Tarleton State University

Contract No: 0046

Reporting Period: 9/01/2024-11/30/2024

Task I: Collect free plastic pollutants found along coastal and wetland environments in Matagorda Bay to develop baseline information on chemical composition and pollution level within microplastic loads.

Status of the task during this reporting period: not started in progress completed

- Describe the major accomplishments for this reporting period
 - *New Lab Manager (Lab Technician) hired to continue ongoing research associated with Tasks I and III of project.*
 - *Performed Fourier Transform Infrared Spectroscopy (FTIR) and microscopy training for Lab Technician to begin processing samples for Fall 2024.*
 - *Rescheduled sampling for free plastic pollutants along coastal and wetland environments for Summer 2024 as result of Hurricane Bailey. Rescheduled sampling occurred September 2024. All bays and adjacent waterways sampled for this period.*
- List the deliverable(s)/milestone(s) completed during this reporting period
 - *Developed manuscript of standard protocol for filtering, sorting, and calibrating sediment and saltwater samples for microplastic and nanoplastic assessment. Manuscript will be submitted for publication by December 2024.*
- Were there any problems or obstacles encountered during this reporting period (e.g., delays, remedial action taken, schedule revision). Yes No If Yes, please explain:
- Briefly describe plans for the next reporting period.
 - *Will complete sampling of water, sediment, vegetation, and macroinvertebrates from Matagorda Bay and adjacent bays (East/West Matagorda, Tres Palacios, Turtle, Vaes, Keller, Cox, Lavaca, and Chocolate) for 2024 calendar year for continued calibration and assessment of chemical composition and pollution loads.*
 - *Review manuscript of standard protocol for microplastic assessment and submit to professional journal for publication by December 2024.*
 - *The team will continue to compare inventories of baseline samples and historical record to identify taxa for microcosm experiments as part of Task II and Task III.*

Task II: Determine the presence, identity, and concentration of toxic or unique chemicals/elements found in plant tissues following the introduction of free plastic pollutants and how these pollutants impact plant growth, development, and nutritional content.

Status of the task during this reporting period: not started in progress completed

- Describe the major accomplishments for this reporting period
 - *Graduate student research associated with Task II (i.e., field sampling and experimental microcosm) is ongoing. Micro and macrophyte tissues obtained from field surveys for Task I. FTIR is ongoing.*
 - *Microphyte taxa selected for study include three algal genera (Rhodomonas, Tetraelmis, and Isochrysis) for inclusion with copepod and jellyfish microcosm as part of Task III. Selection of macrophyte candidate species for study include three plant genera (Cymodoeca, Halophila, and Haoldule) for inclusion with macroinvertebrate microcosm as part of Task III.*
- List the deliverable(s)/milestone(s) completed during this reporting period
- Were there any problems or obstacles encountered during this reporting period (e.g., delays, remedial action taken, schedule revision). Yes No If Yes, please explain:
- Briefly describe plans for the next reporting period.
 - *We will purchase additional tanks and other materials necessary for microcosm study upon selection of candidate taxa.*
 - *Will continue to collect additional water, sediment, vegetation, and macroinvertebrates from Matagorda Bay and adjacent bays (East/West Matagorda, Tres Palacios, Turtle, Vaes, Keller, Cox, Lavaca, and Chocolate) for continued calibration and assessment of chemical composition and pollution loads for Spring and Summer 2025.*

Task III: Determine the presence, identity, and concentration of toxic or unique chemicals/elements of free plastic pollutants found in macroinvertebrates (herbivores, detritivores, and their predators) and how these pollutants impact macroinvertebrate growth, development, and behavior.

Status of the task during this reporting period: not started in progress completed

- Describe the major accomplishments for this reporting period
 - *New Lab Manager (Lab Technician) hired to continue ongoing research associated with Tasks I and III of project.*
 - *Microcosm experiment ongoing for partial completion of Task III including Calanoid copepods (Acartia spp.) and cannonball jellyfish (Stomolophus meleagris). Experiment to conclude December 2024.*
 - *Microcosm experiment animal use protocols (AUP) approved at primary institution for macroinvertebrates (e.g., crustaceans, gastropods, insects). Selection of crustacean (Daphnia) and insect (Odonata) for candidates for study.*
- List the deliverable(s)/milestone(s) completed during this reporting period
 - *Graduate student researcher presented preliminary findings for Task I and III at Welder Wildlife Student Research Symposium, October 2024, in Sinton TX.*
- Were there any problems or obstacles encountered during this reporting period (e.g., delays, remedial action taken, schedule revision). Yes No If Yes, please explain:
 - *Initial rearing conditions for microcosm experiment at primary institution required revised methods to ensure sustainable culture of macroinvertebrates. Developing new protocols for application in next reporting period.*
- Briefly describe plans for the next reporting period.
 - *Microcosm ongoing; study to continue into 2025*
 - *We will purchase additional tanks and other materials necessary for microcosm study upon revised protocol for rearing culture of candidate taxa.*