

Quarterly Progress Report

June 2023

Project Title

**Sediment Mercury Concentrations in the Closed Area of Lavaca Bay and the Risk to
Wildlife from Mercury Remobilization During Dredging**

Contract # 041

Submitted to

Matagorda Bay Mitigation Trust

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Project Summary

The Closed Area of Lavaca Bay is a mercury (Hg) Superfund site that is undergoing long-term environmental monitoring. The proposed Matagorda ship channel expansion project will dredge in the Closed Area and could remobilize Hg stored in sediment back into the bay. This study will investigate how sediment Hg concentrations vary with depth throughout the proposed dredging area and undertake lab-based toxicity and bioaccumulation experiments to determine whether the Hg-rich sediment is toxic to benthic organisms. Agencies can use the data to make informed decisions about how to dredge and dispose of the Hg-rich sediment to minimize its environmental impact.

Project Goals and Objectives

The goal of this project is to investigate sediment Hg concentrations in the Closed Area of Lavaca Bay (with a focus on the area that will be dredged) and determine whether sediment Hg concentrations are high enough to pose a threat to the health of benthic organisms if Hg is remobilized during the proposed dredging activities. This study can be broken down into six objectives:

Objective 1: Investigate how THg concentrations change with sediment depth to determine 1) at what depth the greatest THg concentrations are found; 2) how thick the Hg layer is; and 3) how THg concentrations vary spatially throughout the Closed Area.

Objective 2: Map the bay floor and investigate the relationship between sediment THg concentrations and sediment characteristics (grain size and organic carbon content).

Objective 3: Use radioisotopes (^{210}Pb and ^{137}Cs) to create sediment age-depth profiles and determine sedimentation rates.

Objective 4: Speciate THg in the surface and Hg layer sediment to determine the MeHg concentration and percent MeHg and determine the bacterial composition of the sediment.

Objective 5: Calculate how much Hg could potentially be released into Lavaca Bay from the proposed dredging activities.

Objective 6: Determine whether sediment Hg concentrations are high enough to cause toxicity to benthic organisms (polychaete worms, amphipods, bivalves, gastropods) using laboratory-based toxicity tests and bioaccumulation experiments.

Project Update

Both PIs met with Benchmark Ecological Services, Inc. in May 2023 to discuss and schedule the sediment core collection. 32 sediment cores were collected during mid-June 2023 (26 next to the existing ship channel where new material will be dredged and 6 around the northern half of Dredge Island). All cores were stored in the dark at -1°C in a 16 ft reefer truck. Once transported to Texas State University, all cores were described and subsampled at regular intervals (work completed end of June 2023). All samples are stored at -20°C until further processing and

analysis. The coordinates and water depth where each core was collected, and the length of each core is shown in Table 1.

PI Dutton attended two meetings hosted by the U.S. Army Corps of Engineers in June 2023. Both meetings, held in Port Lavaca, discussed the proposed Matagorda Ship Channel Expansion Project.

1. Matagorda Ship Channel Improvement Project 2023 Conceptual Draft Sampling Plan (June 6)
2. Matagorda Ship Channel Improvement Project Supplemental Environmental Impact Statement Open House (June 7)

Goal for Next Quarter

- Collect data for objectives 1-3.

Table 1. Collection date, location, water depth, and core length for the 32 sediment cores collected during June 2023.

Core ID	Collection date	Latitude	Longitude	Water depth (cm)	Core depth (cm)
LB23-01	6/12/2023	28°39'42.31085"N	96°34'05.90487"W	172.7	102
LB23-02A	6/12/2023	28°39'25.90933"N	96°34'23.10856"W	96.5	40
LB23-02B	6/12/2023	28°39'25.85028"N	96°34'23.26292"W	96.5	141
LB23-03	6/12/2023	28°39'06.18588"N	96°34'31.49129"W	106.7	119
LB23-04	6/12/2023	28°39'13.67991"N	96°34'05.19001"W	40.6	66
LB23-05	6/12/2023	28°39'37.12456"N	96°34'22.07283"W	127.0	158
LB23-06	6/14/2023	28°38'39.94144"N	96°33'26.05159"W	477.5	43
LB23-07	6/13/2023	28°38'37.61193"N	96°33'30.49775"W	104.1	94
LB23-08	6/14/2023	28°38'36.43114"N	96°33'28.88230"W	269.2	32
LB23-09	6/13/2023	28°38'34.51271"N	96°33'35.96964"W	121.9	139
LB23-10	6/14/2023	28°38'33.45216"N	96°33'33.12059"W	281.9	31
LB23-11	6/13/2023	28°38'31.41176"N	96°33'40.73990"W	134.6	120
LB23-12	6/14/2023	28°38'30.34704"N	96°33'38.92905"W	170.2	152
LB23-13	6/12/2023	28°38'29.43531"N	96°33'49.72564"W	190.5	105.5
LB23-14A	6/13/2023	28°38'27.92569"N	96°33'45.15590"W	195.6	43.5
LB23-14B	6/13/2023	28°38'27.92569"N	96°33'45.15590"W	195.6	119.5
LB23-15	6/14/2023	28°38'27.50750"N	96°33'43.82768"W	264.2	90
LB23-16	6/13/2023	28°38'27.19897"N	96°33'51.87453"W	91.4	91
LB23-17	6/13/2023	28°38'24.64368"N	96°33'49.03493"W	152.4	128
LB23-18	6/14/2023	28°38'24.89089"N	96°33'47.31254"W	274.3	73
LB23-19	6/13/2023	28°38'21.28173"N	96°33'53.01940"W	144.8	99
LB23-20	6/14/2023	28°38'20.02780"N	96°33'50.73311"W	274.3	61
LB23-21	6/14/2023	28°38'15.65252"N	96°33'55.40691"W	254.0	67
LB23-22	6/14/2023	28°38'15.41006"N	96°33'53.90006"W	266.7	46
LB23-23	6/14/2023	28°38'11.97553"N	96°33'58.53639"W	657.9	74
LB23-24	6/15/2023	28°38'08.72761"N	96°33'55.94438"W	538.5	10
LB23-25	6/15/2023	28°38'04.26207"N	96°34'01.40136"W	274.3	49.5
LB23-26	6/15/2023	28°37'58.26566"N	96°34'03.05826"W	236.2	110
LB23-27	6/15/2023	28°37'50.42967"N	96°34'02.67699"W	254.0	128
LB23-28	6/15/2023	28°37'43.49040"N	96°34'04.38390"W	259.1	130.5
LB23-29	6/15/2023	28°37'35.84904"N	96°34'03.72827"W	226.1	158
LB23-30	6/15/2023	28°37'27.08942"N	96°34'03.64905"W	231.1	85