

Project Progress Report (April to August 2025)

Project No. 066: “Resuspension of contaminants in the Matagorda Bay due to storms, ship traffic, and dredging activities”

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Sample collection

On July 3rd, 2025, we had the first cruise for sample collection on R/V *Curt Johnson*, with a crew of 6 scientists and Captain Frank (Figure 1). Sediment and water samples (n=49) were collected from 5 sites along the Matagorda Ship Channel (MB01–MB05; Figure 2). 10 cores were collected at each site (except for MB05 as one core was lost during sampling). All samples were subsequently put on ice and returned to the lab the same day.

Sample processing

Once in the lab, the sediment cores were stored in a cold room at 4°C. For processing, the cores were taken to the lab and ran through the Gust Erosion Microcosm (UGEM) System (Figure 3). Until last week, the collected cores have all been being processed. Basically, cores in the sediment resuspension experiment were subjected to one of four treatment groups: control (zero shear stress), 0.2 Pa shear stress, 0.45 Pa shear stress, and 140 RPM shaker table disturbance. Figure 4 shows the transmissometer data, or turbidity, of two cores under different levels of shear stress. After being disturbed for 20 minutes, cores were allowed to rest for another 20 minutes in order to allow coarse particles to settle. After this, aliquots of 400mL for PAHs/PCBs, 30 mL for trace metals, 10 mL for Hg, and 10 mL for scanning electron microscopy (SEM) particle grain size analysis were collected from the overlying water of each core. Trace metal and Hg water samples were acidified with nitric acid to a pH < 2 and were stored at 4 °C along with the PAH/PCB water samples. Sediments were then sectioned for contaminant analysis at every 1 cm for the first 5cm depth, then at every 5cm for the remainder of the core. After sectioning, sediments were stored in a -20 °C freezer.



Figure 1. Getting ready for the field work!

After all cores from sites MB01–MB05 are processed, a second sampling trip in August 2025 will be conducted to collect cores from sites MB06–MB10, and the Liu Lab at UTMSI will begin analysis of PAHs/PCBs in water and sediment samples via GC-MS.

Next steps: Sample analysis and further sampling

The mercury and trace metal samples have been sent to Dr. Dutton's lab for analysis. Liu Lab will analyze PAHs and PCBs in the samples. The

analysis is currently on going. We proposed covering 10 stations, but rather than rushing to collect all the samples, we opted to wait until we have at least part of the data from the 5 stations already covered, which should offer guidance on how we further collect the samples. For example, it is unclear at this point whether we may be able to see difference in the levels of contaminants among the 5 stress levels. If not, we may have to adjust the shear stress levels. Also, it is unclear how differences we will see among the 5 sites. We expect to have at least the PAH data at the end of September. Accordingly, the next cruise is likely to be sometime in October.

In addition to the contaminant analyses, other ancillary geochemical parameters will also be analyzed to aid data interpretation, including organic carbon content, and mineral grain size.

Challenges and obstacles

Other than the initial delay in obtaining the UGEM system, the project has been progressing as expected.

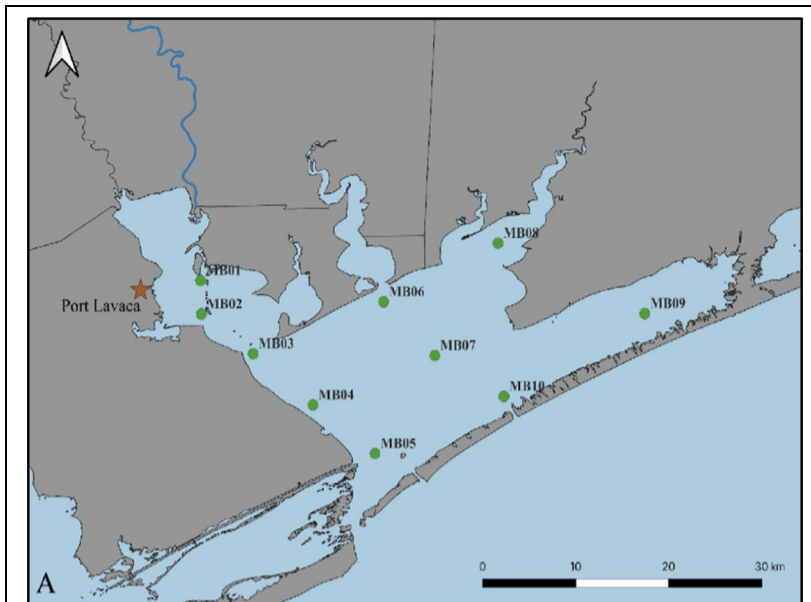


Figure 2. Map of sampling locations.



Figure 3. The UGEM system for sample processing

