Contract# 0089
Matagorda Bay Mitigation Trust

Texas A&M University at Galveston
200 Seawolf Parkway, Galveston, TX 77554

PROGRESS REPORT

MAY 31, 2026

Project title: Assessment of groundwater quality and dynamics near Formosa plant and Alcoa Superfund Site, Lavaca Bay

Submitted to:
Matagorda Bay Mitigation Trust

Performing Laboratory:

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Assessment of groundwater quality and dynamics near Formosa plant and Alcoa Superfund Site, Lavaca Bay

Personnel

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Location(s):

Texas A&M University at Galveston

Project Duration:

01 September 2025 – 31 August 2028

Objectives:

Objectives 1: Assess the extent of hydrologic connectivity between aquifers and surface water in Lavaca Bay.

Objectives 2: Quantify the contaminant concentration in groundwater and identify the sources of pollutants.

Objectives 3: Conduct public education outreach to well owners and stakeholders regarding groundwater pollutants and their wells' susceptibility to contamination.

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1. INTRODUCTION

1.1 Background

This project investigates groundwater quality and subsurface contaminant transport near the Formosa Plastic Corporation and Alcoa Superfund Site in Lavaca Bay, where groundwater quality has not been previously tested. This project addresses the funding priority of Environmental Research by examining groundwater recharge-discharge processes and contaminant transport in a heavily industrialized area, as well as the associated public health risks. The knowledge gained will inform coastal management and water resource strategies, and aid state organizations in establishing regular monitoring protocols and offering well protection measures to local communities.

In this third progress report (March 1st, 2026 – May 31st, 2026) we provide a list of key accomplishments as per the third quarter of Year 1 of the project.

2. KEY UPDATES

Objectives 1: Assess the extent of hydrologic connectivity between aquifers and surface water in Lavaca Bay.

- Field activities for this objective are scheduled for June-July 2026.

Objectives 2: Quantify the contaminant concentration in groundwater and identify the sources of pollutants.

- We collected approximately 26 groundwater samples between October-December 2025 in Lavaca and Matagorda Bay area. In the second report, dated February 28, 2026, we presented summary results for pH, nitrate, heavy metals, total coliform and E. coli, total dissolved solids (TDS), and major ions (fluoride, chloride, and sulfate).
- We registered approximately 20 well owners in Port Lavaca, Olivia, and surrounding areas who are willing to have their wells sampled between June-July 2026.
- We have established the method limits of detection for the PAHs and PCBs method to quantify the persistent pollutants in the water samples. A full list of the analytes is listed in Table 1 below.

Table 1.List of PAHs and PCBs that will be monitored in water samples. The list shows the analyte names and their respective limits of detections (LODs) in µg/L.

Parameter	Units	Detection Limit (DL)
Naphthalene	µg/L	0.036
Acenaphthylene	µg/L	0.151
Acenaphthene	µg/L	0.255
Fluorene	µg/L	0.028
Phenanthrene	µg/L	0.034

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Parameter	Units	Detection Limit (DL)
Anthracene	µg/L	0.037
Fluoranthene	µg/L	0.008
Pyrene	µg/L	0.028
Benzo[a]anthracene	µg/L	0.027
Chrysene	µg/L	0.024
Benzo[b]fluoranthene	µg/L	0.031
Benzo[k]fluoranthene	µg/L	0.014
Benzo[a]pyrene	µg/L	0.023
Dibenzo[a,h]anthracene	µg/L	0.095
Indeno[1,2,3-cd]pyrene	µg/L	0.340
Benzo[ghi]perylene	µg/L	0.082
Perylene	µg/L	0.070
Benzo[e]pyrene	µg/L	0.065
Benzo[c]phenanthrene	µg/L	0.039
Cyclopenta[cd]pyrene	µg/L	0.115
Benzo[j]fluoranthene	µg/L	0.015
Dibenzo[ac]anthracene	µg/L	0.073
Picene	µg/L	0.125
Anthanthrene	µg/L	0.146
Dibenzo[ae]fluoranthene	µg/L	0.097
Dibenzo[al]pyrene	µg/L	0.425
Dibenzo[ae]pyrene	µg/L	0.085
Dibenzo[ai]pyrene	µg/L	0.204
Dibenzo[ah]pyrene	µg/L	0.678
1-Methylnaphthalene	µg/L	0.218
1,3-Dimethlynaphthalene	µg/L	0.107
1,6,7-Trimethylnaphthalene	µg/L	0.068
1,4,6,7-Tetramethylnaphthalne	µg/L	0.051
2-Methylphenanthrene	µg/L	0.019
3,6-Dimethylphenanthrene	µg/L	0.036
2-Methylanthracene	µg/L	0.251
2-Methylfluoranthene	µg/L	0.047
9,10-Dimethylanthracene	µg/L	0.183
1-Methylpyrene	µg/L	0.063
1-Methylbenzo[a]anthracene	µg/L	0.042
7,12-Dimethylbenzo[a]anthracene	µg/L	0.714
6-Methylchrysene	µg/L	0.076
Indole	µg/L	0.173
Quinoline	µg/L	0.061
Benzo[h]quinoline	µg/L	0.059
Carbazole	µg/L	0.098
Dibenzo[c,g]carbazole	µg/L	0.564
Acridine	µg/L	0.131
Dibenz[a,h]acridine	µg/L	0.229
Dibenzo[a,j]acridine	µg/L	0.281
Benzothiophene	µg/L	0.68
Dibenzothiophene	µg/L	0.038

Parameter	Units	Detection Limit (DL)
Benzofuran	µg/L	0.034
Dibenzofuran	µg/L	0.131
PCB 77 (DL)	µg/L	0.077
PCB 81 (DL)	µg/L	0.046
PCB 126 (DL)	µg/L	0.091
PCB 169 (DL)	µg/L	0.087
PCB 114 (DL)	µg/L	0.084
PCB 123 (DL)	µg/L	0.027
PCB 156 (DL)	µg/L	0.113
PCB 167 (DL)	µg/L	0.087
PCB 189 (DL)	µg/L	0.095
PCB 1	µg/L	0.113
PCB 18	µg/L	0.106
PCB 33	µg/L	0.060
PCB 52	µg/L	0.070
PCB 95	µg/L	0.072
PCB 101	µg/L	0.086
PCB 128	µg/L	0.098
PCB 138	µg/L	0.084
PCB 149	µg/L	0.107
PCB 153	µg/L	0.082
PCB 157	µg/L	0.087
PCB 170	µg/L	0.158
PCB 171	µg/L	0.111
PCB 177	µg/L	0.129
PCB 180	µg/L	0.100
PCB 183	µg/L	0.097
PCB 187	µg/L	0.102

*DL = dioxin-like PCB

- We have processed 10 groundwater samples for microplastics analysis, with results show an average concentration of 8.67 µg/L (range: 0 - 38.35 µg/L). The majority of microplastics identified consisted of PET and PVC.

Objectives 3: Conduct public education outreach to well owners and stakeholders regarding groundwater pollutants and their wells' susceptibility to contamination.

- The collected survey data from well owners regarding well water perception, maintenance practices, and vulnerability to hurricanes and drought are now being analyzed.

3. FURTHER WORK

Planned activities for the next reporting period (June – September 2026) include:

- Conduct hydrologic field sampling, including assessment of groundwater-surface water interaction in Lavaca Bay (Objective 1), in June/July 2026.
- Collect shallow and deep groundwater samples from study site and continue analysis of chemical parameters (Objective 2).
- Continue conducting statistical analyses for well owner survey results (Objective 3).

4. REFERENCES

None reported for this progress report.

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Reviewed by:

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Dr. Dini Adyasari, TAMUG, PI Date: 5/27/2026