

## Quarterly Report for Matagorda Bay Mitigation Trust December 31, 2023

**Project:** Lavaca Bay Ecosystem Assessment: Gathering Key Baseline Data Among Nursery Habitats Spread Across a Pollution Gradient

**Organizations:**

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<sup>2</sup>BIOWEST, INC.

**Investigators:**

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**Contract No.:** 0021

**Project Term:** 03/01/2022 – 08/31/2024

**Reporting Period:** 3/1/2022 – 11/30/2023 (7)

The contracted project with the Matagorda Bay Mitigation Trust was initiated as of March 1, 2022. After this date, we identified and got approval for a subcontractor with expertise in areas not covered by researchers at Texas A&M University-Corpus Christi. The chosen contractor was BIOWEST, Inc.

**Task 1 - Ecological Assessment:** Conduct a seasonal ecological assessment in fringing and back marshes in Lavaca, Cox, and Keller bays.

Status: Initiated

Spring '22

- BIO-WEST prepared for and participated in a site evaluation / site selection reconnaissance field effort on Friday, April 29th with coastal scientists from TAMU-CC. Following formal site selection, BIO-WEST initiated seasonal avian community sampling in the Lavaca Bay complex on May 17-19, 2022. This effort involved a team of two biologists performing timed point counts (8 per site) at each of four established sites within the Lavaca River Delta, Cox Bay, Keller Bay, and Carancahua Bay. At each site, two acoustic recorders were deployed and set to record autonomously throughout the remainder of the Spring breeding bird season. Point count surveys were performed in predominately emergent marsh habitats and produced a total of 1,587 individual birds represented by 53 species. The observed bird community was typical of the Texas Gulf Coast, with multiple species of rail inhabiting the marsh, and an abundance of foraging tern, heron, and wading bird species utilizing the edge habitat. In addition, several iconic species were observed including King Rail, American Oystercatcher, and Black Skimmer.

- BIO-West initiated data reduction and analysis of collected timed point count data. Acoustic analysis for Spring sampling was also initiated by reviewing recordings for evidence of calling Eastern Black Rail and Whooping Crane.
- CSSC selected 8 sampling sites within four zones after their recon trip with Bio-West, see map 1. These sites were first sampled on May 10<sup>th</sup>. Sampling included pulling three replicate epibenthic sled tows at each site for a total of 24 samples. Nurdle surveys were conducted at all eight sites.
- CSSC performed the second Spring sampling trip on May 26<sup>th</sup>. Nurdle surveys were conducted at all eight sites. CSSC currently has 48 marsh edge epibenthic samples in house.

#### Summer '22

- BIO-WEST traveled to the study sites in August to retrieve the acoustic recorders that had been in place since the completion of the Spring 2022 sampling event.
- BIO-WEST continued data reduction and analysis of collected timed point count data from Spring. Additionally, acoustic analysis for the summer quarter was initiated by reviewing recordings for evidence of calling Eastern Black Rail and Whooping Crane. Fall avian surveys will be conducted in late October / early November.
- CSSC completed the first of two Summer sampling events on August 9<sup>th</sup>. Three replicate tows were taken at all eight sites, accounting for 24 marsh edge epibenthic sled samples.
- CSSC completed the second Summer sampling event on August 22<sup>nd</sup>. All 24 marsh edge epibenthic samples are accounted for. Nurdle surveys were conducted at all eight sites. CSSC currently has 96 marsh edge epibenthic sled samples in house.

#### Fall '22

- BIO-WEST prepared for and conducted Fall 2022 avian community sampling in the Lavaca Bay complex from November 29 through December 1, 2022. This effort involved a team of two biologists performing timed point counts (10 per site) at each of four established sites within the Lavaca River Delta, Cox Bay, Keller Bay, and Carancahua Bay. At each site, two acoustic recorders were deployed and set to record autonomously throughout the remainder of the Fall breeding bird season. Point count surveys were performed in predominately emergent marsh habitats and produced a total of 2,244 individual birds represented by 66 species. The observed bird community was typical of the Texas Gulf Coast, with multiple species of rail inhabiting the marsh, and an abundance of foraging heron, wading bird species and terns utilizing the edge habitat. In addition, several iconic species were observed including Reddish Egret, Roseate Spoonbill, and Black Skimmer.
- BIO-WEST initiated data reduction and analysis of collected timed point count data. Acoustic analysis for Fall sampling was also initiated by reviewing recordings for evidence of calling Eastern Black Rail and Whooping Crane. The next seasonal avian survey is scheduled for Winter 2023.

- CSSC completed the first of two Fall sampling events on October 26<sup>th</sup>. Water levels were extremely low this date due to a proceeding northern front. As a result, LB\_3 was not sampled, and samples for sites LB\_5 & LB\_6 were taken far from the marsh edge where bay water was available. In addition to low water levels, the boat ramp at the top of Olivia Bay was under construction and the sea state was rough enough to prohibit traveling via boat to sites LB\_7 and LB\_8. Three replicate tows were taken at 5 of the 8 sites for a total of 15 samples taken on this date. Nurdle surveys were conducted at all sampled sites.
- CSSC completed the second Fall sampling event on November 10<sup>th</sup>. Water levels on this date were much better such that all sites had water reaching the marsh edge. The Olivia boat ramp was still under construction however the sea state was calm enough for us to travel to our further sites LB-7 and LB\_8. Three replicate epibenthic sled tows were performed at each site for a total of 24 samples taken on this date. Nurdle counts were also performed at each site. CSSC currently has 135 marsh edge epibenthic sled samples in house.

#### Winter '23

- BIO-WEST prepared for and conducted Winter 2022 avian community sampling in the Lavaca Bay complex from February 19 to 22, 2023. The same methodologies were used including recorder maintenance and repairs. Point count surveys were performed in predominately emergent marsh habitats and produced a total of 1,749 individual birds represented by 69 species. The observed bird community was typical of the Texas Gulf Coast, with multiple species of rail inhabiting the marsh, and an abundance of foraging heron, wading bird species and terns utilizing the edge habitat as well as large numbers of overwintering migratory ducks such as Northern Pintails and Green-winged Teals. In addition, several iconic species were observed including Reddish Egret, Roseate Spoonbill, and Wilson's Plovers.
- BIO-WEST initiated data reduction and analysis of collected timed point count data. Acoustic analysis for Winter sampling was also initiated by reviewing recordings for evidence of calling Eastern Black Rail and Whooping Crane. The next seasonal avian survey is scheduled for Spring 2023.
- CSSC attempted the first winter sampling event on February the 6<sup>th</sup>, 2023 and had to abort due to extremely low water levels. On this date, NOAA tide tables indicated a MLLW level of 0.22' at 10:48 falling throughout the date to a low of 0.17' at 14:06 (see graph 1). As this time sites 7 and 8 in Carancahua Bay were extremely shallow to the point where marsh edge was effectively eliminated as a habitat for nekton. The water's edge was three to five feet from the Marsh edge.
- CSSC returned to Lavaca Bay on February 9<sup>th</sup>, 2023 and were able to sample all eight sites including sites in Carancahua Bay. Water levels on this date were more favorable despite a lower MLLW lever according to NOAA's tide gauge in Lavaca Bay (see graph 2.) However, tidal predictions for the next week indicated water level's too low the following week and beyond. Consequently, CSSC was unable to perform a second Winter sampling session. Water levels are historically low during the month of February along the Texas coast. In some locations like Lavaca Bay, water levels fall low enough to leave marsh edge high and dry. Spring sampling will be more productive as water levels rise higher.

- CSSC currently has 159 marsh edge samples in house.

#### Spring '23

- BIO-WEST conducted Spring 2023 avian community sampling in the Lavaca Bay complex the week of 22 May 2023. Two biologists performed timed point counts (10 per site) at each of four established sites within the Lavaca River Delta, Cox Bay, Keller Bay, and Carancahua Bay. Point count surveys were performed in predominately emergent marsh habitats and produced a total 491 sightings of 1,092 individual birds represented by 70 species. The observed bird community was typical of the Texas Gulf Coast, with multiple species of rail inhabiting the marsh, and an abundance of foraging heron, wading bird species and terns utilizing the edge habitat. As expected, there was a reduction of overwintering migratory ducks that were observed during the winter surveys. In addition, several iconic species were observed including Reddish Egret, Roseate Spoonbill, and White Ibis. Some nesting behaviors were observed, including mobbing predatory species to drive them away from nesting grounds, and nests were directly observed of Black-necked Stilts, Least Terns, and Boat-tailed Grackles during the surveys. Acoustic analysis for Winter sampling recordings were reviewed but returned no evidence of calling Eastern Black Rail or Whooping Crane.
- CSSC completed the first Spring sampling event on May 3<sup>rd</sup>, 2023. Three replicate tows were taken at all eight sites, accounting for 24 marsh edge epibenthic sled samples. Water Levels on this date were fair and we experienced no issues.
- CSSC completed the second Spring sampling event on May 11<sup>th</sup>, 2023. We had no issues on this date and all 24 epibenthic samples were accounted for.
- CSSC currently has 207 marsh edge samples in house.

#### Summer '23

- BIO-WEST didn't have any field activities for the Lavaca Bay project during the summer quarter. Their involvement this past quarter was continuing to work on data reduction, QA/QC and statistical analysis from previous bird surveys. BIO-WEST's next scheduled field trip will be later this October / November (Fall 2023).
- CSSC completed the first Summer sampling event on August 16<sup>th</sup>, 2023. Three replicate tows were taken at all eight sites, accounting for 24 marsh edge epibenthic sled samples.
- CSSC completed the second Spring sampling event on August 31<sup>st</sup>, 2023. We had no issues on this date and all 24 epibenthic samples were accounted for. Per study design we continue to search for nurdles. To date, we have not found a single nurdle, which could be seen as good news.
- CSSC currently has 255 marsh edge samples in house.

#### Fall '23

- BIO-WEST conducted Fall 2023 avian community sampling in the Lavaca Bay complex the week of November 6, 2023. Timed point counts were performed at

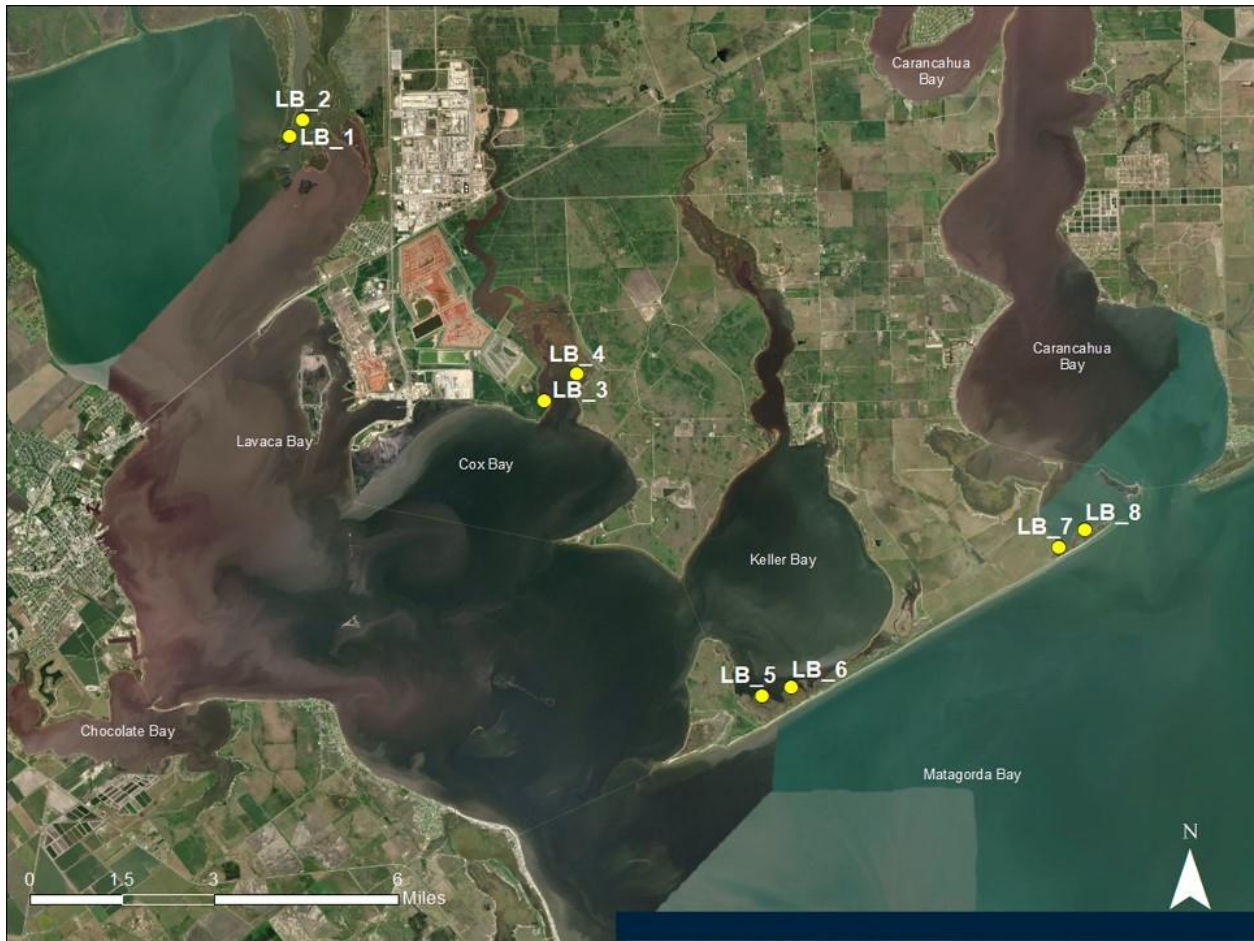
each of four established sites (8 per site) within the Lavaca River Delta, Cox Bay, Keller Bay, and Carancahua Bay. Point count surveys were performed in predominately emergent marsh habitats and produced a total of 569 individual birds represented by 54 species. The observed bird community was typical of the Texas Gulf Coast, with multiple species of rail inhabiting the marsh, and an abundance of foraging heron, wading bird species and terns utilizing the edge habitat. As expected, there was an increase of overwintering migratory ducks that were observed during the winter surveys, including Pintails, Northern Shoveler and Eared Grebes, as well as migratory Passerines, shorebirds, and sandpipers. Sandhill Cranes were surveyed flying over open water and emergent marsh habitat, seven in total. In addition, several iconic species were observed including Reddish Egret, Roseate Spoonbill, and White Ibis.

- CSSC completed the first Fall sampling event on October 24<sup>th</sup>, 2023. Three replicate tows were taken at all eight sites, accounting for 24 marsh edge epibenthic sled samples. Water Levels on this date were fair and we experienced no issues.
- CSSC completed the second Fall sampling event on November 2<sup>nd</sup>, 2023. We had no issues on this date and all 24 epibenthic samples were accounted for. Per study design we continue to search for nurdles, however we continue to find none.
- CSSC currently has 303 march edge samples in house.

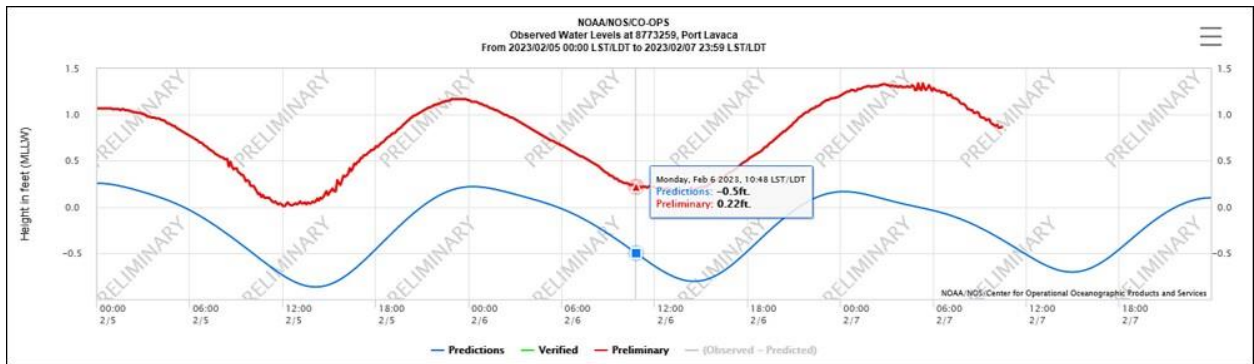
**Task 2 – Data Comparison:** Comparison of seasonal ecological data from this study and the MBMT Colorado River Delta project and TWDB Guadalupe River Delta project.

Status: Not yet begun

Map 1



Graph 1



Graph 2

