State of Louisiana
Coastal Protection and Restoration Authority (CPRA)

2025 Short Summary Report

for

East Marsh Island Marsh Creation

State Project Number TV-21
Priority Project List 14

October 2025
Iberia Parish

Prepared by:
Maggie Daigle
and
Ivy Thibodeaux, P.E.

Operations Division
Lafayette Regional Office
635 Cajundome Boulevard
Lafayette, LA 70596

2025 Short Summary Report
For
East Marsh Island Marsh Creation (TV-21)

Table of Contents

I. Preface

The East Marsh Island Marsh Creation Project (TV-21) 2025 short summary report includes monitoring data collected through July 2025.

This report is intended to update NRCS and EPA on the latest land/water, hydrographic, vegetation and elevation change data. For more detailed analyses, see the previous comprehensive OM&M reports (2018 and 2022) and short summary report (2020) online at http://lacoast.gov/new/Projects/Info.aspx?num=TV-21. A final comprehensive OM&M report is scheduled for 2030.

II. Monitoring Activity

Pursuant to a CWPPRA Task Force decision on August 14, 2003 to adopt the Coastwide Reference Monitoring System-*Wetlands* (CRMS) for CWPPRA, the TV-21 Monitoring Plan was written to merge it with CRMS and provide more useful information for modeling efforts and future project planning while maintaining the monitoring mandates of the Breaux Act. In this report, three CRMS sites (outside of the project area) are to be used to assess the effectiveness of the project along with the project-specific monitoring.

a. Monitoring Goals

The East Marsh Island Marsh Creation Project (TV-21) was designed to restore areas that were previously lost due to lateral marsh erosion. The project was designed to target the areas of the island exhibiting the most land loss due to Hurricane Lili (EPA 2008). The marsh nourishment component of the TV-21 project was designed to deposit new sediments into uncontained marsh areas in the project and provide an influx of nutrients, as well as the benefit of increased elevation.

The objectives of the East Marsh Island Marsh Creation project are:

1. Create approximately 362 acres of emergent marsh in shallow open water and mud flats.
2. Create/nourish an additional 797 acres of brackish marsh with unconfined dredged sediment.
3. Reduce the future loss rate of new and existing marsh in the project area by 50%.

b. Monitoring Elements

Aerial Photography

Aerial photography will be collected for the entire coast through CRMS-*Wetlands* and will be used to evaluate TV-21 along with project specific photography. Land:Water analysis of the 1 km CRMS-like sites will be done using an automated classification methodology using only minimal manual delineation. Photography for the entire TV-21 project area as well as the CRMS-like sites within the project area was acquired in 2016, 2018 and 2021.

Salinity

Salinity data from both continuous recorder and discrete soil porewater stations are monitored to characterize the spatial variation in salinity throughout the project area. Hourly salinity and water levels (ft, NAVD88) are monitored with continuous recorders in one containment area and one nourishment area at two CRMS-like sites (TV21CR01 and TV21CR02). The CRMS-like sites were installed in September 2011 (Adequate settlement of the containment areas was required prior to construction) and ran continuously until 2017. The recorder at TV21CR01 was pulled on 2/16/2017 due to its similarity to TV21CR02 and to save project funds. The TV21CR02 recorder was again deployed from 2018-2019, 2021-2022 and 2023-2024. CRMS0523 was selected to be the hydrologic reference site. At each rod-surface elevation tables (RSET)/accretion data

collection, a measurement of interstitial water salinity is collected at the boardwalk in the marsh at 10 and 30 cm. Interstitial water salinity is also determined at each of the vegetation plots, when vegetation is surveyed.

Water Level

Water level within the marsh is measured at the CRMS-like sites and reference sites listed above every hour with a water-level gauge installed within an area that is hydrologically connected to the surrounding water body. The gauge is surveyed relative to the top of the RSET (NAVD 88). Water level data is used to document the variability in water levels and duration of inundation in project and reference areas.

Emergent Vegetation

Emergent vegetation parameters are evaluated at each CRMS-like site using techniques described in Folse et al. (2018) to describe species composition, richness, and relative abundance. Annually in late summer at each site, data are collected from ten, 4-m^2 sample plots randomly established along a 282.8 m transect that crosses diagonally through a 200-m × 200-m sampling area in the middle of the site.

Individual species' cover data were summarized according to the Floristic Quality Index (FQI) method (Cretini et al. 2011). The FQI assigns a low score to invasive species indicative of disturbance and a high score to native species indicative of stability. The two CRMS-like sites inside and three CRMS sites outside (522, 523, 524) the project area were used for this report. Data from 2022 - 2025 will be presented. Vegetation was not sampled at the TV-21 sites in 2017. Vegetation sampling was not originally scheduled for 2019, but was added to determine the effects of Hurricane Barry.

Soil Surface Elevation Change

Soil surface elevation change utilizing a combination of RSET and vertical accretion from feldspar horizon markers, were measured twice a year at each site until 2021, after which data collection shifted to an annual schedule conducted in the spring. These data will be used to describe general components of elevation change and establish accretion/subsidence rates. The RSET was surveyed to a known elevation datum (ft, NAVD 88) so it could be directly compared to other elevation variables such as water level. Data collected over at least 5 years was used to calculate rates for the project sites and reference CRMS sites; therefore, the displayed elevation change rates are an estimation of that temporal trend. RSET and vertical accretion were not sampled at the TV-21 sites in 2017. RSET sampling was originally not scheduled for 2019, but was added to determine the effects of Hurricane Barry.

c. Monitoring Results and Discussion

i. Aerial Photography

For the two CRMS-like sites in the project area, land/water analysis was completed for the 2018 and 2021 digital imagery (Table 1). A slight loss of land occurred at both TV21-CR01 and TV21-CR02, due to small interior ponds opening up. There was a total loss of -4 acres between both sites. Since 2012, however, the entire TV-21 project area (containment plus nourishment areas) has gained approximately 42 acres of land, roughly 4% in both the two containment areas and the four nourishment areas. This appears mostly attributed to the infilling of interior ponds. Even though overall there has been an increase in land acreage it is important to note there is noticeable erosion occurring along the northern shoreline of nourishment areas 3 and 4 (Figures 1 and 2).

Table 1. Land:Water acreages for 2018 and 2021 at CRMS-like sites in the project area.

CRMS-like Site		2018		2021		Change 2018 to 2021
		acres	%	acres	%	acres
TV21-CR01	Land	208.6	84.42	205.1	83.00	-3.5
	Water	38.5	15.58	42	17.00	
	Total	247.1		247.1		
TV21-CR02	Land	211.5	85.59	211	85.40	-0.5
	Water	35.6	14.41	36.1	14.61	
	Total	247.1		247.1		
Total change						-4.0

Figure 1. East Marsh Island Marsh Creation (TV-21) project 2012 Land:Water analysis.

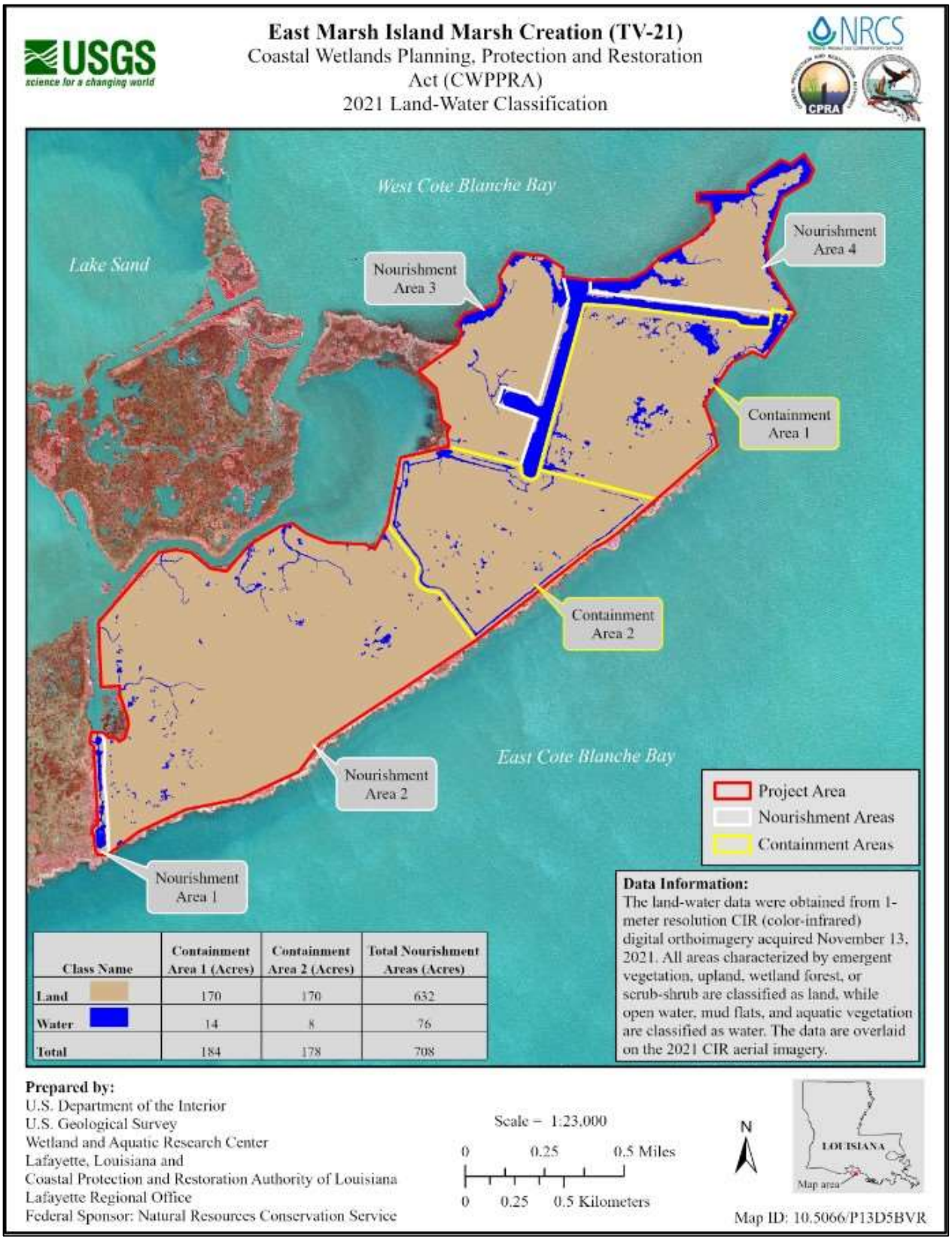

Figure 2. East Marsh Island Marsh Creation (TV-21) project 2021 Land:Water analysis.

ii. Salinity

Salinities at both the project and reference areas averaged around 5 ppt from 2012-2025 (Figure 3a). Besides seasonal fluctuations with salinity increasing slightly in the late summer/fall months, spikes in salinity were due to Hurricane Isaac in 2012 and droughts in 2018 and 2023. Salinity spiked over 25 ppt, during Hurricane Isaac and ranged between 15 and 20 ppt during the droughts. The drought of 2023 caused the longest lasting increase in salinity lasting from mid-summer through the end of the year.

Average weekly salinities were compared between the project station and the reference station to determine if a difference in salinity occurred between the two. A non-parametric one-way median analysis showed that salinities were not statistically different across the period of record between TV21CR02 and the recorder at the reference site CRMS0523 (x^2=0.0000, p=1.0000).

Yearly means of interstitial water salinity at the project site and CRMS reference site are presented in Figures 3b and 3c. Overall, porewater salinities averaged around 6 ppt at CRMS0523 and 7 ppt at TV21CR02 for the period of record. Porewater salinity remained comparable between the two sites except in 2011, 2012 and 2023 in which TV21CR02 saw a rise in soil salinities (10+ ppt) due to drought conditions. However, conditions post-drought allowed these salinity spikes to quickly decline back to average levels alongside CRMS0523.

iii. Water Level

Water levels at both project sites and CRMS0523 were nearly identical (Figure 4), and this pattern persisted even after 2017, when TV21CR01 was taken offline and only TV21CR02 remained in operation. A non-parametric one-way median test revealed a significant difference between the project site TV21CR02 and reference site CRMS0523 (x^2 = 15.5005, p <.0001). However, this statistical difference is not ecologically meaningful, as environmental conditions at both sites are highly comparable. Across the period of record, mean water levels differed by only 0.10 ft, with TV21CR02 maintaining a slightly higher water elevation.

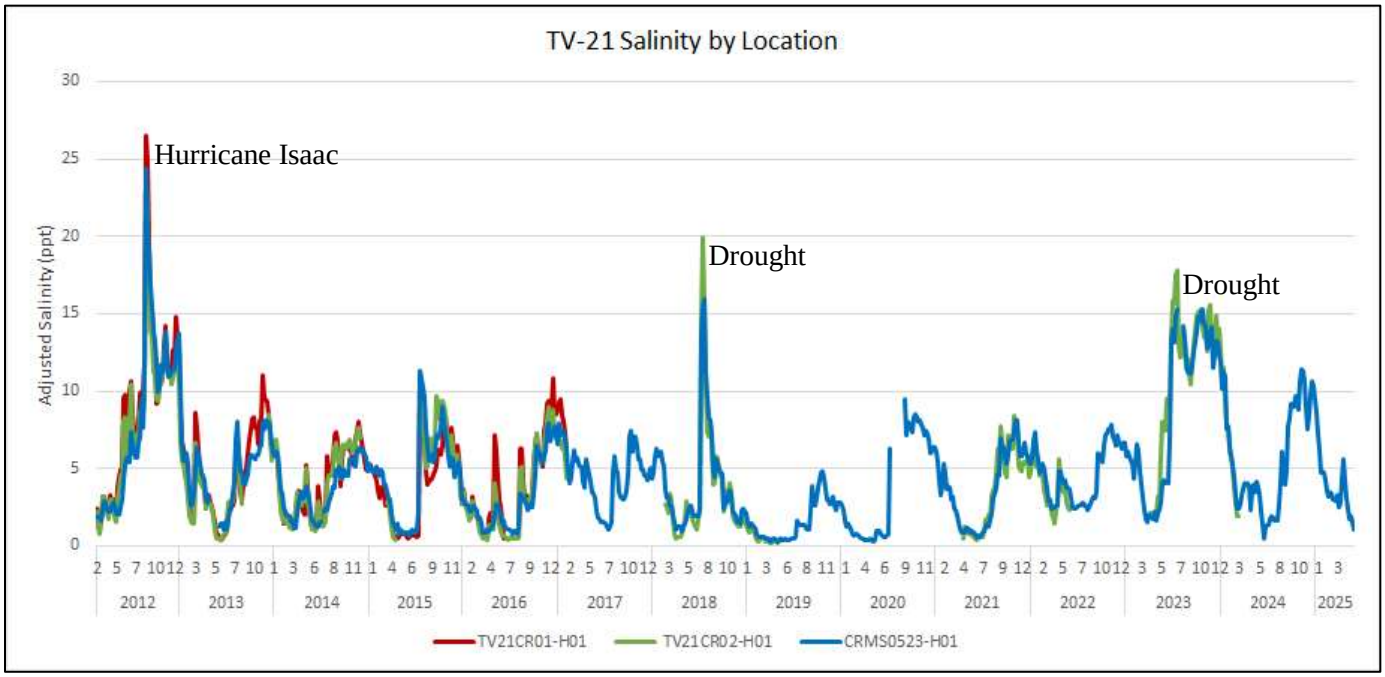

Figure 3a. Weekly means of salinity data collected at project and CRMS reference sites.

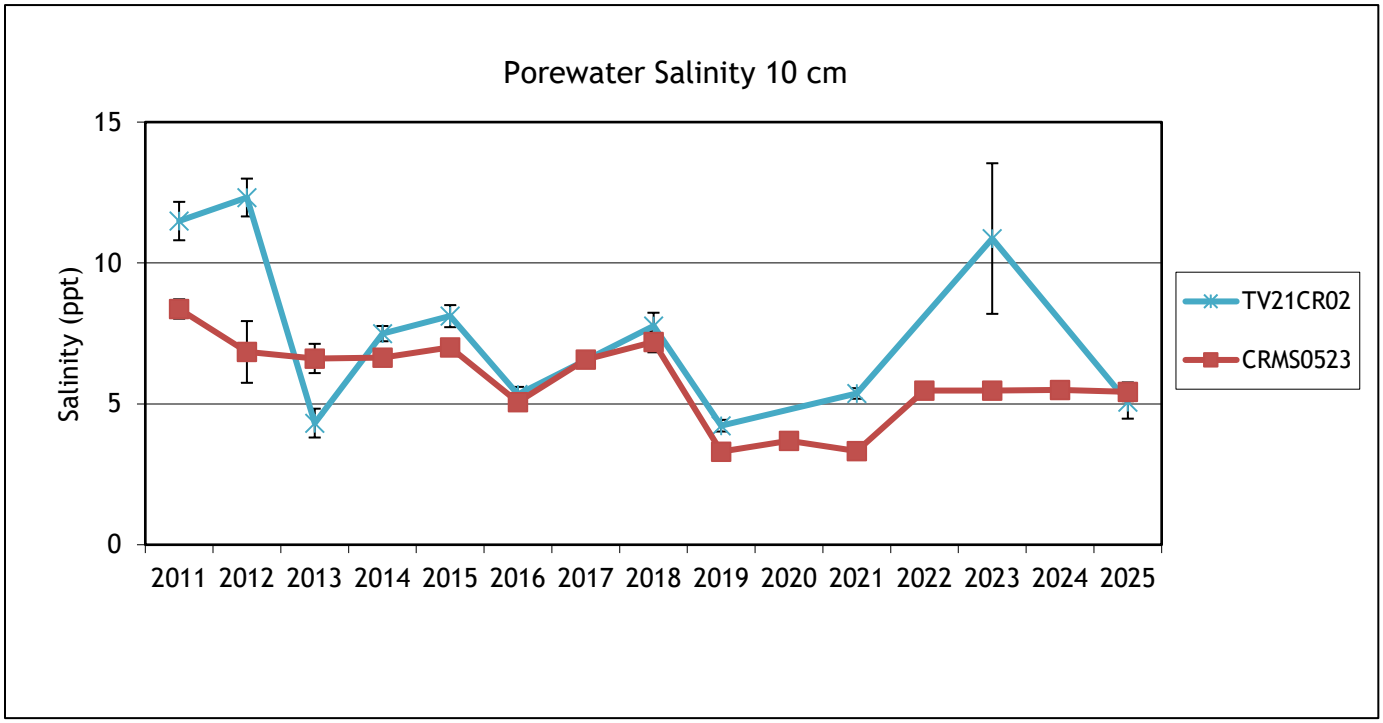

Figure 3b. Yearly Means of Interstitial water salinity at 10 cm below the soil surface at project and CRMS reference sites. Mean ± SE.

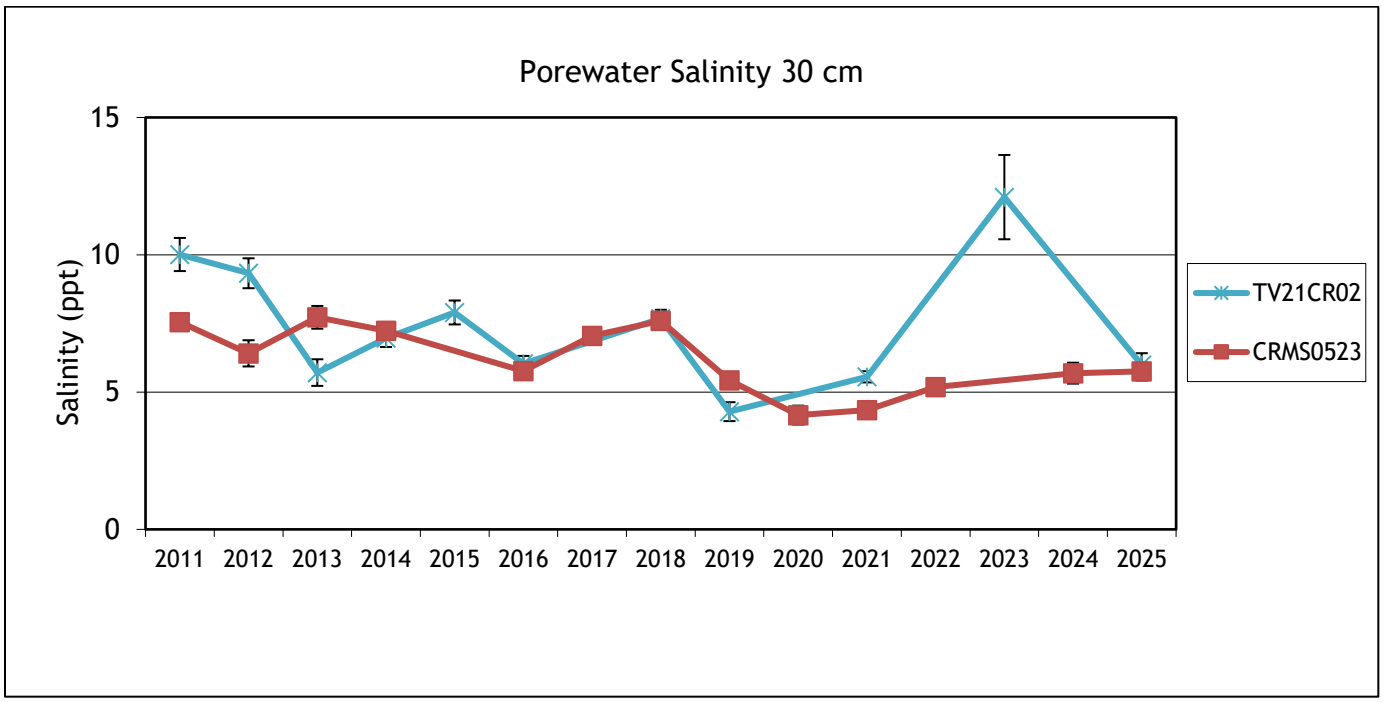

Figure 3c. Yearly Means of Interstitial water salinity at 30 cm below the soil surface at project and CRMS reference sites. Mean ± SE

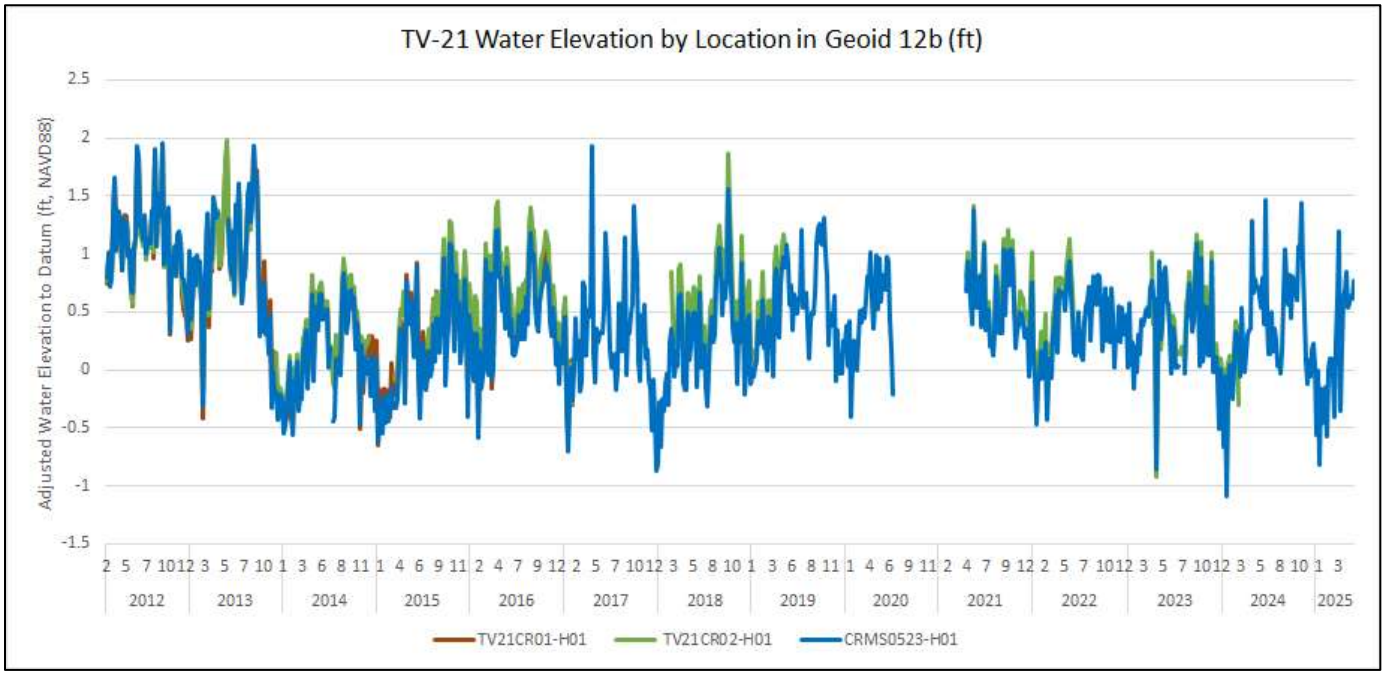

Figure 4. Weekly means of water level data collected at project and CRMS reference sites.

iv. Emergent Vegetation

Vegetation in the containment area, TV21CR01, has transitioned from a mix of *Schoenoplectus*, *Baccharis* and *Phragmites* into a monoculture of *Phragmites* with some *Spartina patens* (Figure 5a). Hurricane Barry seemingly had little effect on vegetative cover in this area, as it has remained over 70% prior to and after the storm. The nourishment area, TV21CR02, has been dominated by *Spartina patens* and *Schoenoplectus americanus*, along with some *Phragmites* since 2018 (Figure 3b). Vegetative cover in this area has been at least 80% except 2023 in which cover dropped to around 60%. This is likely attributed to the intense drought experienced that year with *Spartina patens* and *Schoenoplectus* being more sensitive to higher saline conditions rather than *Phragmites*, which is why the *Phragmites* dominated containment area showed no drought effects in 2023. Additionally, this area is prone to extensive herbivory damage by muskrats and nutria.

The nourishment (TV21CR02) most closely resembles the CRMS reference sites in regards to species assemblages. All three reference sites, CRMS0522, 523 and 524 are dominated mostly by *Spartina patens* along with some *Eleocharis parvula*, *Distichlis spicata* and *Spartina alterniflora* (Figures 5c – 5e). Overall, the CRMS sites maintained vegetative cover of at least 60%, which indicated little to no impacts from Hurricane Barry in 2019. CRMS0523 and CRMS0524 did see a slight dip in vegetative cover in 2023, likely due to drought conditions and some herbivory but increased in cover again in 2024.

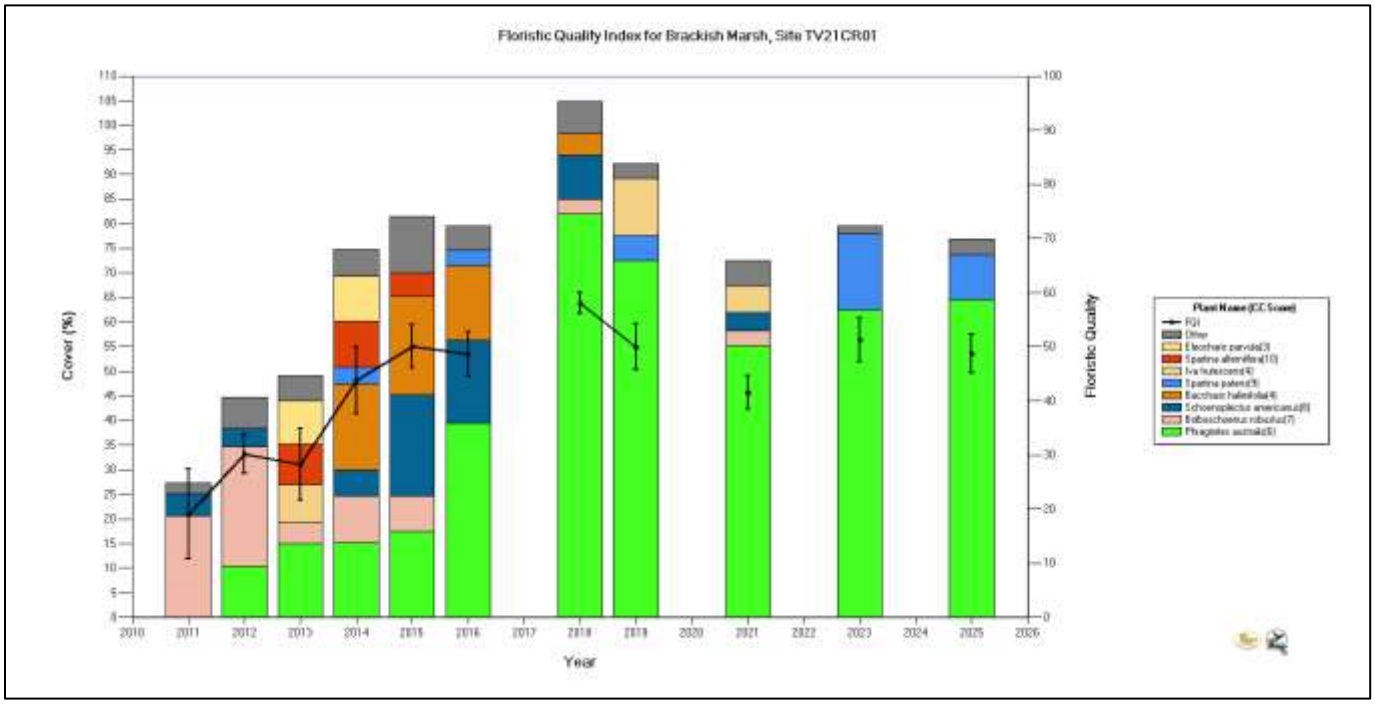

Figure 5a. Percent coverage and floristic quality index of species collected from station TV21-CR01 within the project area in years 2011-2024. The CC scores represent the quality of individual species from 1 to 10 where 1 represents disturbance species and 10 indicates stability.

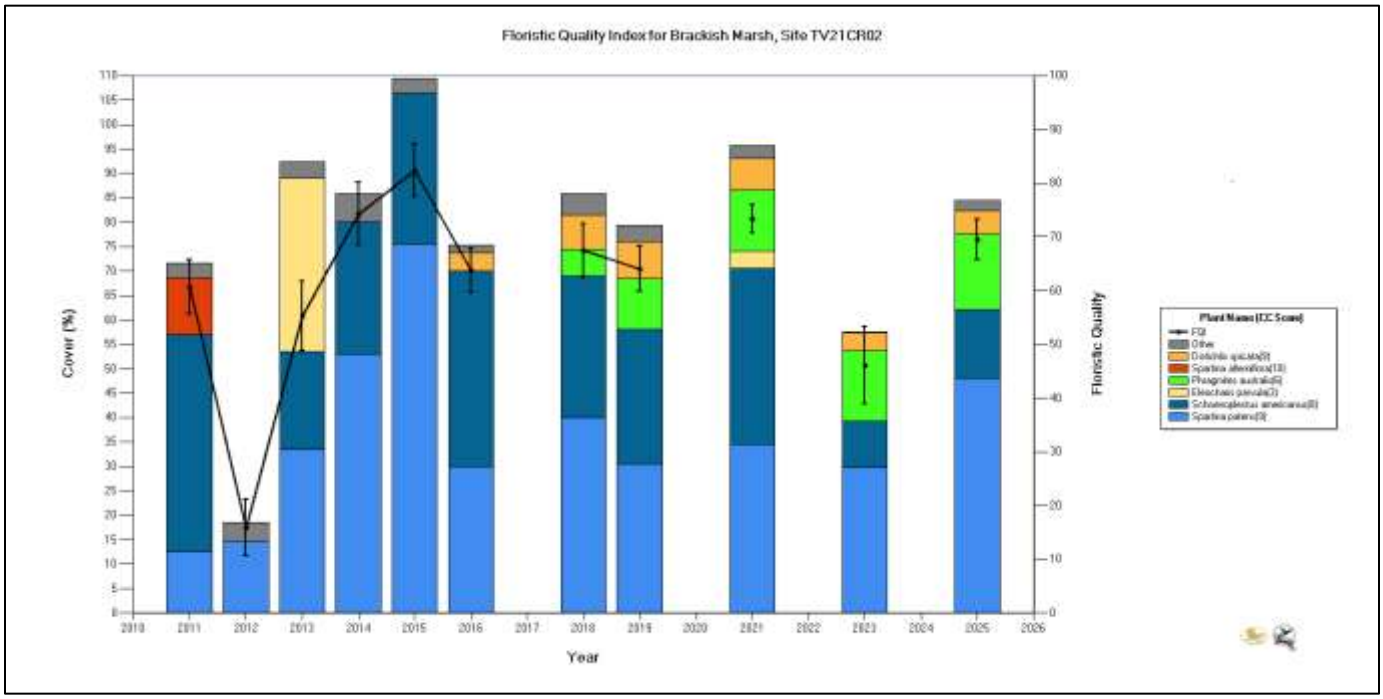

Figure 5b. Percent coverage and floristic quality index of species collected from station TV21-CR02 within the project area in years 2011-2024. The CC scores represent the quality of individual species from 1 to 10 where 1 represents disturbance species and 10 indicates stability.

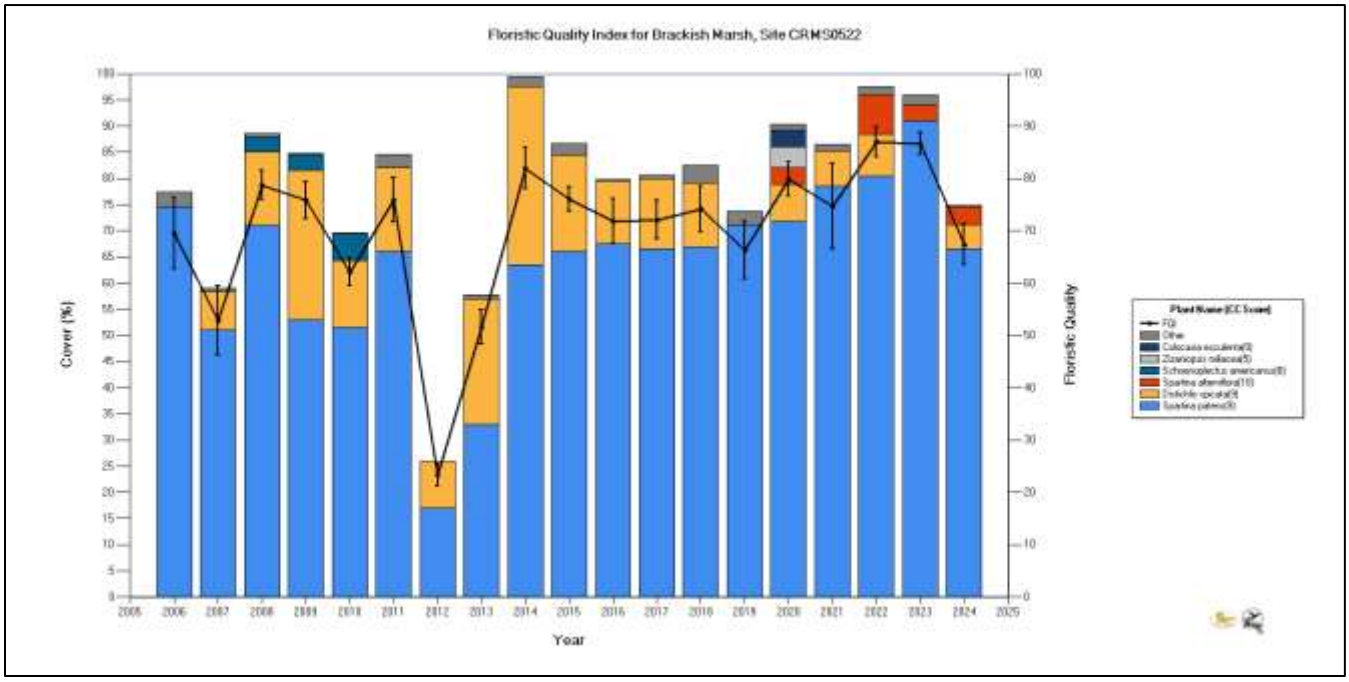

Figure 5c. Percent coverage and floristic quality index of species collected from reference site CRMS0522 in years 2006 - 2024. The CC scores represent the quality of individual species from 1 to 10 where 1 represents disturbance species and 10 indicates stability.

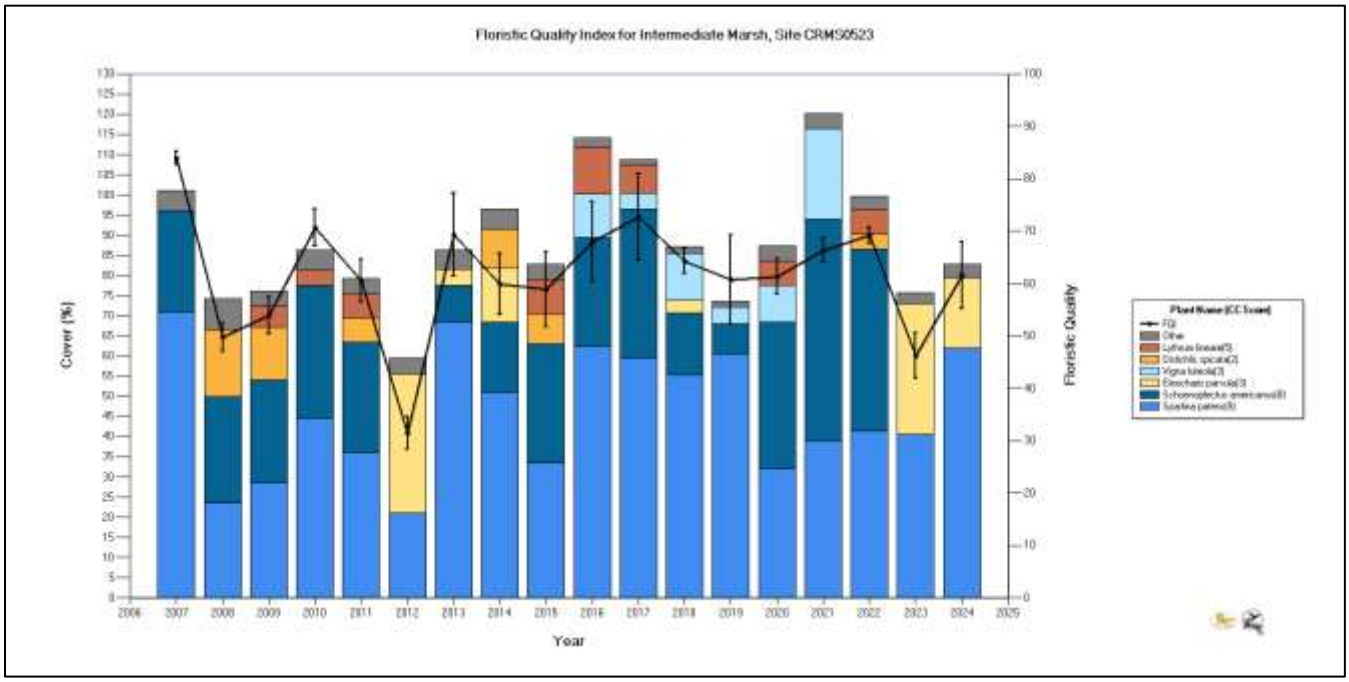

Figure 5d. Percent coverage and floristic quality index of species collected from reference site CRMS0523 in years 2007 - 2024. The CC scores represent the quality of individual species from 1 to 10 where 1 represents disturbance species and 10 indicates stability.

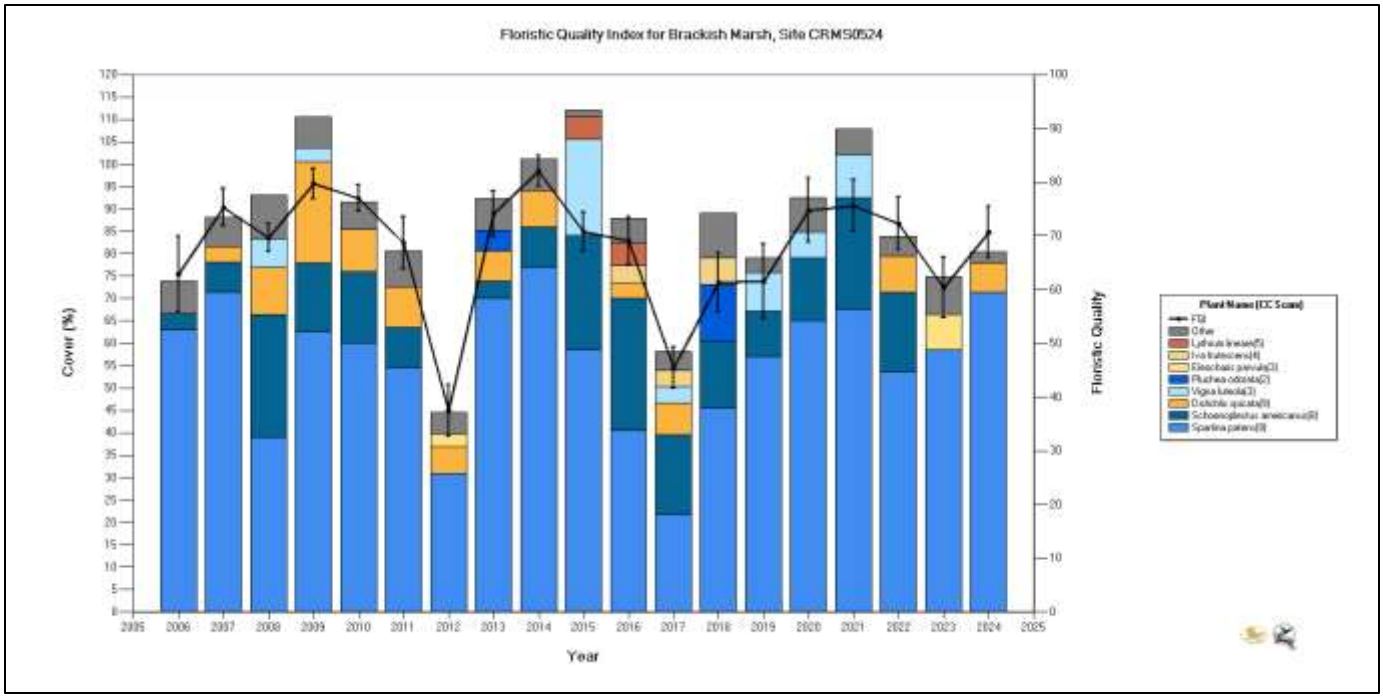

Figure 5e. Percent coverage and floristic quality index of species collected from reference site CRMS0524 in years 2006 - 2024. The CC scores represent the quality of individual species from 1 to 10 where 1 represents disturbance species and 10 indicates stability.

v. Soil Surface Elevation Change

Over the period of record, the surface elevation change (SEC) rate in the containment area, TV21CR01, was negative immediately after construction. Initial settlement lasted until 2016, settling to -12 cm (Figure 6). Elevation plateaued until the fall of 2018 and since then SEC has shown an upward trend, gaining elevation to -4.5 cm until 2023. Severe drought conditions during 2022-2023 are reflected in the current decline of SEC to -7.3 cm. Although vertical accretion (VA) rates at this site have been consistently positive (1.64 cm/yr, Table 2), with visible accumulation from Hurricanes Barry (2019), Laura and Delta (2020), these gains have been offset by high shallow soil factor rates (1.58 cm/yr). As a result, the net surface elevation gain has been minimal (0.06 cm/yr).

In contrast, SEC and VA in the nourishment area, TV21CR02, have had positive trajectories since data collection began, performing more like the natural marsh platform. Following a small initial loss in elevation between fall 2012 and spring 2013, likely due to consolidation of spoil material and nutria disturbance of the soil surface, SEC rates then stabilized. Since then, SEC (0.25 cm/yr) and VA (1.54 cm/yr) at this site have closely paralleled the average rates at the three reference CRMS sites (0.37 cm/yr SEC; 0.93 cm/yr VA; Figure 4, Table 2). Shallow soil factor rates at TV21CR02 (1.29 cm/yr) has been elevated relative to the reference marshes (0.56 cm/yr), but higher rates of VA have compensated for these losses, allowing the site to maintain elevation capital over the monitoring period.

Table 2. Vertical accretion, surface elevation, and shallow soil factor change rates collected at TV-21 project sites and reference CRMS sites (Rates were averaged for CRMS0522, 523, and 524 ± 1 SE).

			Rates of Change (cm/yr)		
Site	Data Collection Period		Surface Elevation	Vertical Accretion	Shallow Soil Factor
TV21CR01	Fall 2012 - Spring 2025		0.06	1.64	1.58
TV21CR02	Fall 2012 - Spring 2025		0.25	1.54	1.29
Average of Ref CRMS sites	Spring 2012 - Spring 2025		0.37 ± 0.08	0.93 ± 0.17	0.56 ± 0.19

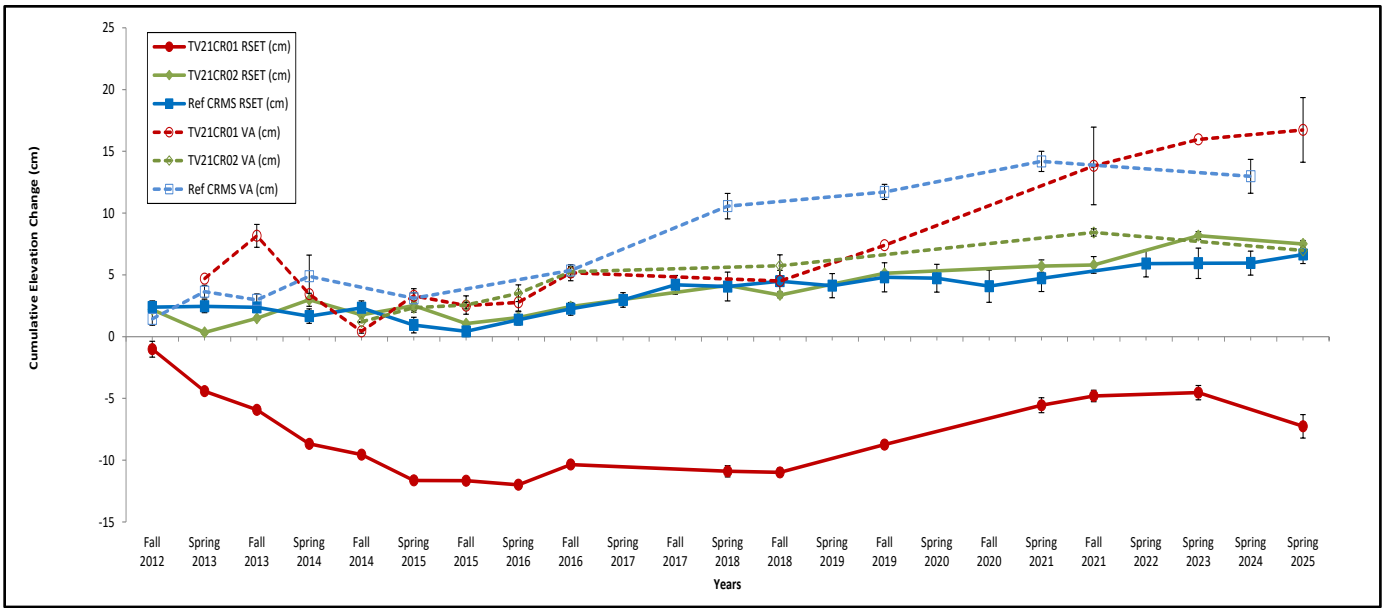

Figure 6. Cumulative elevation change calculated from surface elevation measurements collected at rod-surface elevation tables (RSET) and vertical accretion measurements collected from horizon markers (VA) at TV-21 project and reference sites (CRMS0522, 523, 524) over time. Mean ± SE.

III. Conclusions

a. Project Effectiveness

For the entirety of the TV-21 project area, since 2012, there has been land gain of 42 acres. Land change analyses showed minor interior ponding and overall stability within the CRMS-like project sites (TV21CR01 and TV21CR02) since 2018. Salinity and water levels within the project area remained comparable to CRMS reference marshes, with only temporary increases observed during droughts and storm events. Vegetation in the nourishment area (TV21CR02) remains diverse and representative of surrounding brackish marshes, however, the containment area (TV21CR01) has shifted towards a total monoculture of *Phragmites australis*, though overall vegetative cover remains high. Elevation dynamics highlight the strongest contrast between the containment area and the nourishment area. In the containment area, fill settlement and high shallow soil factor rates have largely offset gains from vertical accretion, including storm deposition, resulting in minimal net elevation change. Conversely, the nourishment area stabilized after an initial period of consolidation and now closely tracks with the CRMS reference marsh averages. Despite elevated shallow soil factor rates compared to the reference sites, high accretion rates and maintained elevation capital show that the nourishment area is functioning similarly to the surrounding marsh platform.

IV. Literature Cited

Cretini, K.F., and Steyer, G.D. 2011, Floristic Quality Index-An assessment tool for restoration project and monitoring sites in coastal Louisiana: U.S. Geological Survey Fact Sheet 2011-3044, 4p.

Folse, T. M., L. A. Sharp, J. L. West, M. K. Hymel, J. P. Troutman, T. McGinnis, D. Weifenbach, W. M. Boshart, L. B. Rodrigue, D. C. Richardi, W. B. Wood, and C. M. Miller. 2018. A Standard Operating Procedures Manual for the Coast-wide Reference Monitoring System-Wetlands: Methods for Site Establishment, Data Collection, and Quality Assurance/Quality Control. Louisiana Coastal Protection and Restoration Authority, Office of Coastal Protection and Restoration. Baton Rouge, LA. 228 pp.

U.S. Environmental Protection Agency (EPA). 2008. East Marsh Island Marsh Creation (TV-21). Revised Project Information Sheet for Wetland Value Assessment. 12 pp.