October 9, 2020

Mr. Mark Messersmith
South Carolina Ports Authority
176 Concord Street
Charleston, South Carolina 29401

RE: Year 1 Post-Construction Monitoring Report
Drum Island Marsh Restoration
Charleston County, South Carolina
JMT Project Number: 18-03770-001

Dear Mr. Messersmith,

Enclosed is a summary of the post-construction monitoring activities that have occurred at the Drum Island Marsh Restoration Site (Figures 1 and 2). Monitoring activities were conducted in accordance with the Drum Island Tidal Marsh Restoration Plan, developed by Newkirk Environmental and Collins Engineers, dated August 2, 2018, our letter proposal dated October 10, 2018, and subsequent discussions with the South Carolina Port Authority (SCPA). As stated in the Plan, the intent of the Drum Island Restoration project was to create a natural marsh grade by removing existing dredge material, grading around the existing dikes, and replanting with indigenous plant species. The Drum Island restoration project included excavation and removal of 110,519 cubic yards (CY) of dredge material to lower the area elevation and the construction of protective revetments to armor the tidal creek inlet to protect the southern tip of the island against erosive forces.

Tidal Cycle Monitoring

On October 30, 2018, four titanium HOBO water level bluetooth data loggers (model MX2001-04) were installed to monitor pre-construction hydrologic conditions and tidal cycles and ranges within the restoration areas and reference areas. The gauges were distinctly marked with eight-foot sections of 2-inch PVC pipe and were GPS located. Gauges 1 and 2 were placed in an existing marsh directly adjacent to the restoration site to monitor reference hydrologic conditions. Gauges 3 and 4 were placed in the restoration area. Refer to Figure 3 for a depiction of gauge locations.

Pre-construction hydrology data was available from the end of October through mid-November of 2018. Tidal gauges located in the restoration area (Gauges 3 and 4) were temporarily removed on November 21, 2018, to avoid damage during construction activities, and were re-installed on May 16, 2019, after construction was completed. Baseline and Time-Zero hydrology data was documented in a Pre-Construction Monitoring Report, dated January 4, 2019 and a Time-Zero (As-Built) Post Construction Monitoring Report, dated January 7, 2020.

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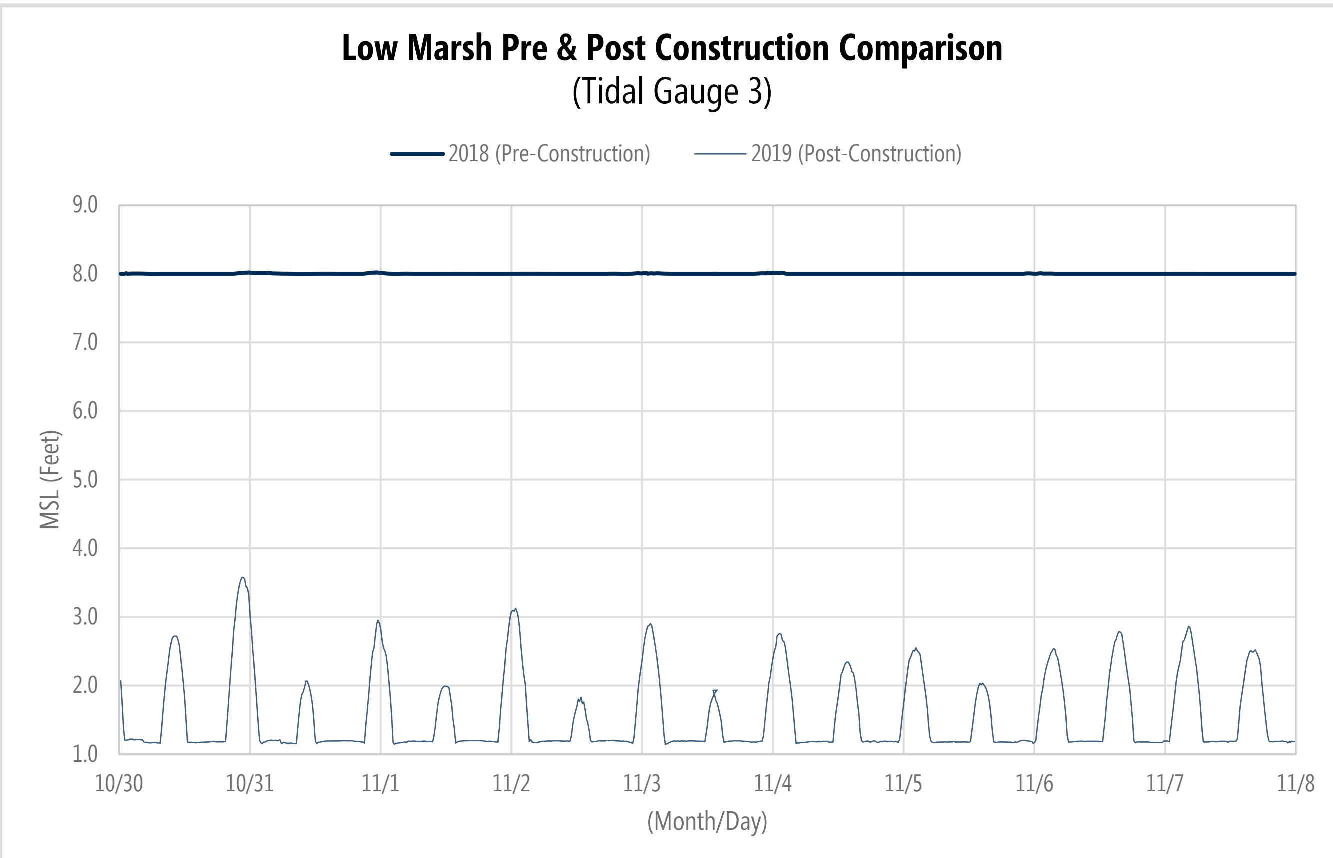
Year one hydrology data was downloaded on September 13, 2019, November 8, 2019, January 7, 2020, March 5, 2020, May 4, 2020, July 10, 2020 and August 14, 2020. The data was subsequently processed, exported into an excel file, the data was corrected to surveyed ground elevations and converted into charts that depict the water levels relative to Mean Sea Level (MSL). It should be noted, MSL is based on survey elevations collected during the As-Built Survey following construction. Minor variations in ground surface may occur over time, including small movements of the PVC pipe (the well floating/sinking) and ground subsidence. A second survey will be conducted in Year 3 of monitoring to establish that elevations on the mitigation site are stable.

Yearly hydrographs at each tidal gauge are presented from October 2018 to August 2020 in Appendix A. Data gaps appear during construction or due to gauge failure/maintenance. Tidal water levels at Gauge 3 (Low Marsh Restoration) and Gauge 4 (High Marsh Restoration) were compared to their respective references: Gauge 2 (Low Marsh Reference) and Gauge 1 (High Marsh Reference) and pre-construction hydrologic conditions.

Charts 1 and 2 below illustrate water levels during the pre-construction monitoring period compared to the subsequent year over the same timeframe.

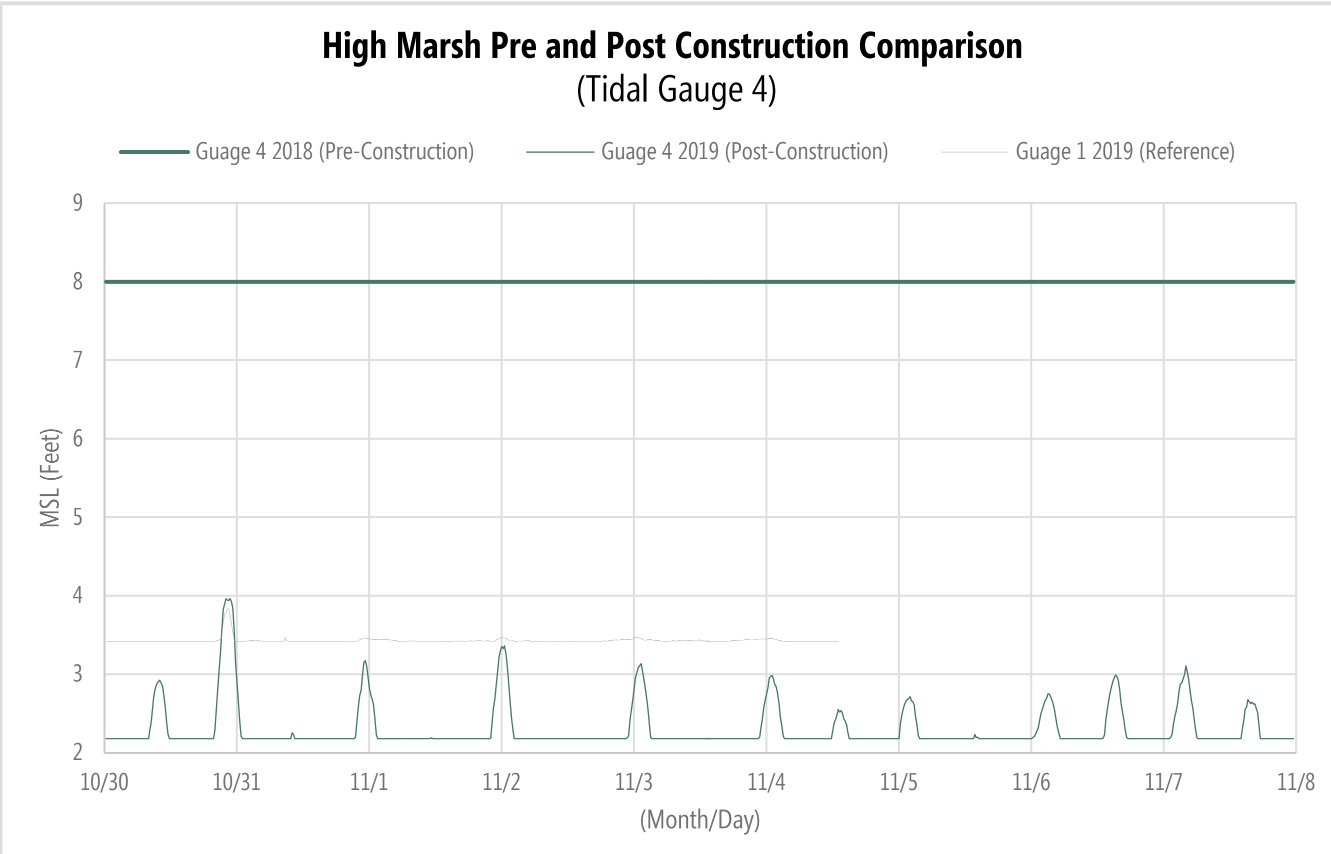
Chart 1: Pre-Construction and Post-Construction Water Level Comparison for Low Marsh Restoration



*Reference data for the selected time-period was not available due to gauge failure.

Pre-construction hydrology data for Tidal Gauge 3 (Low Marsh Restoration), suggest that these areas experienced little or no tidal influence prior to construction, with water levels less than 0.2 feet reaching the ground surface only for brief periods of time. Tidal influence is evident throughout the post-construction period at Tidal Gauge 3.

Chart 2: Pre-Construction and Post-Construction Water Level Comparison for High Marsh Restoration

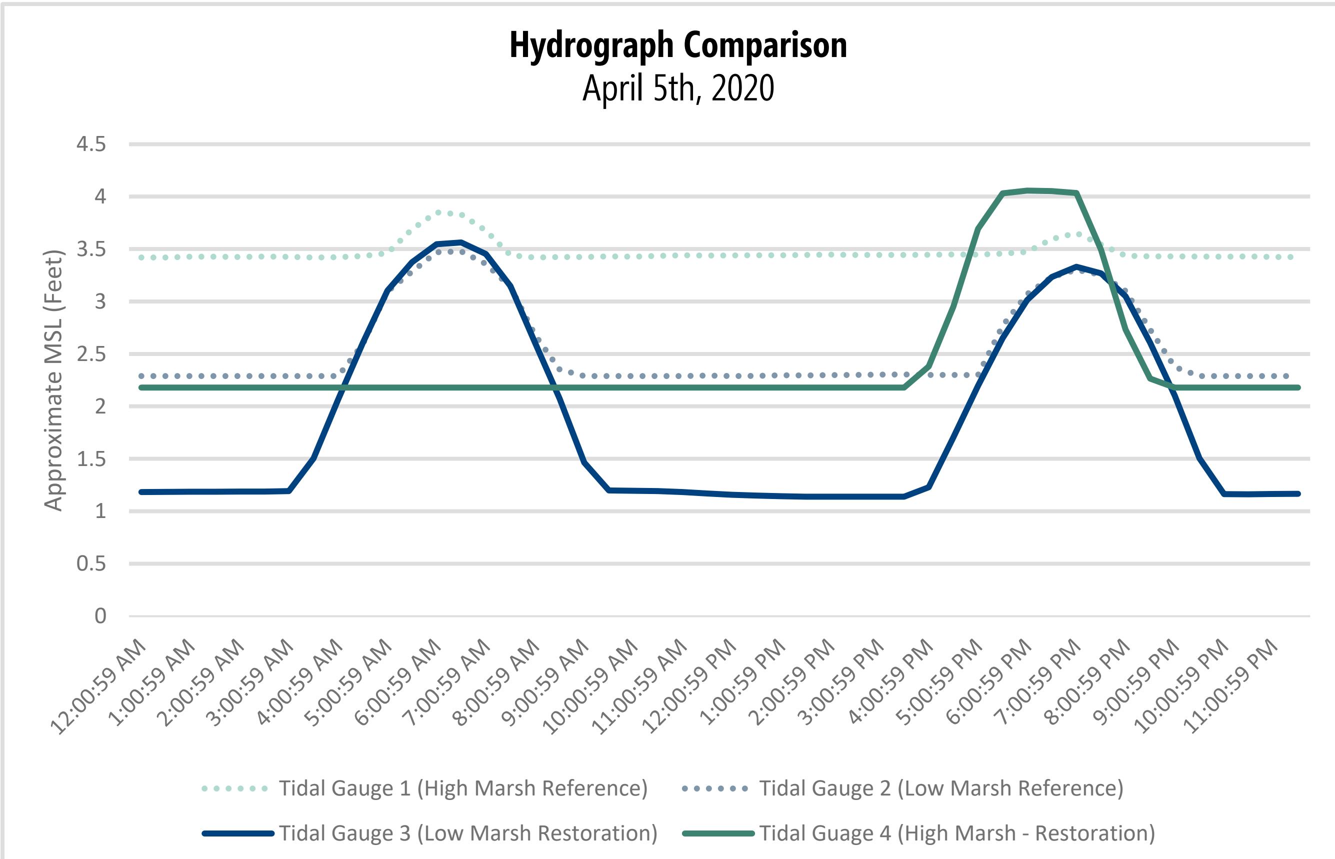


*Reference data for the time-period displayed was not available after November 4, 2019 due to gauge failure.

Pre-construction hydrology data for Tidal Gauge 4 (High Marsh Restoration), shown in Chart 2 above, suggest that these areas experienced no tidal influence prior to construction. Post construction monitoring activities for Tidal Gauge 4 indicate that tidal influence is evident throughout the post-construction period and is comparable to Reference Conditions (Tidal Gauge 1).

Hydrographs at a smaller scale (24-hour tidal cycle) were also reviewed. Charts 3 and 4 below are depictions of the tidal fluctuation for each gauge over a 24-hour period occurring on April 5, 2020 and July 11, 2020.

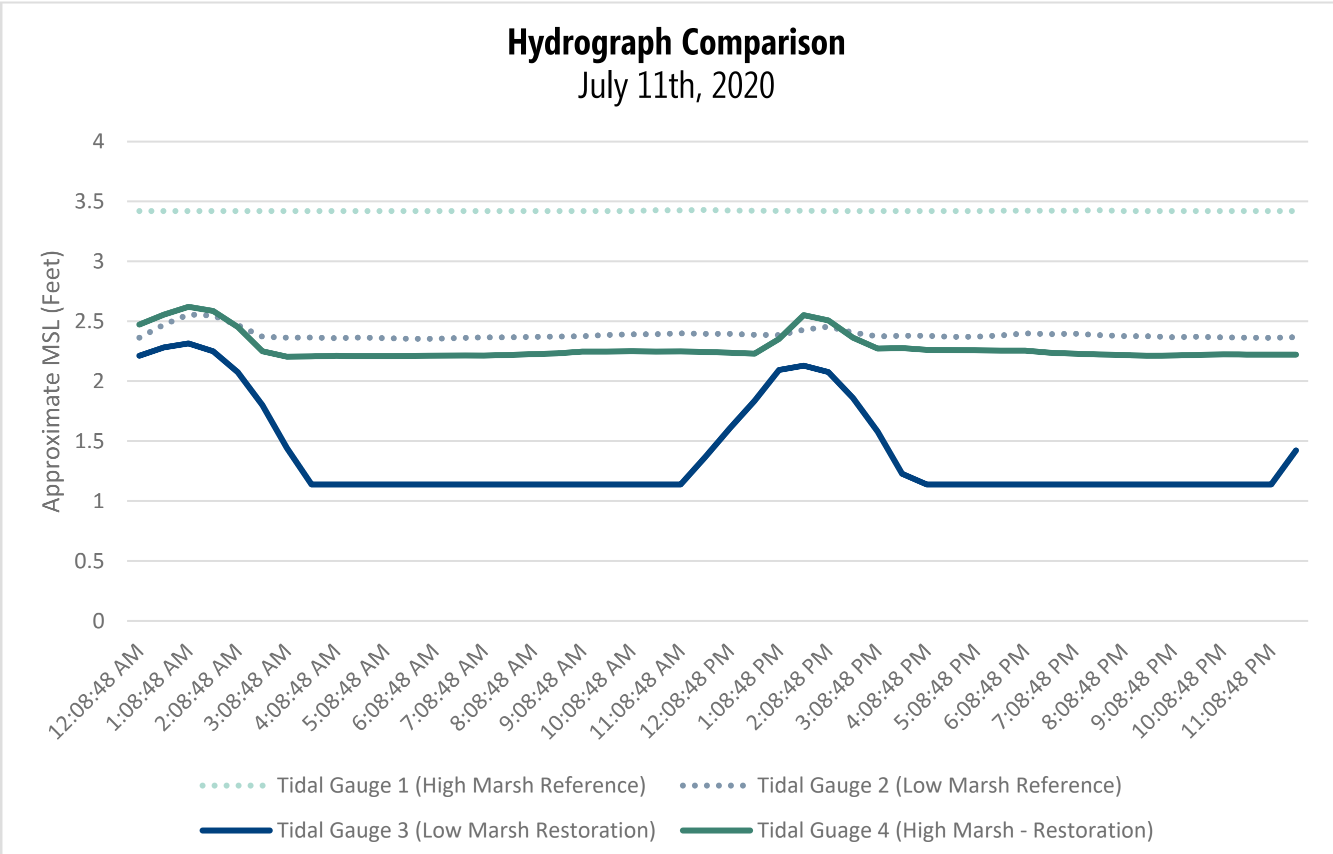
Chart 3: Representative Tidal Cycle on April 5th, 2020



*Water level data was corrected to surveyed elevations collected during the As-Built survey.

Tidal movement appears to be functioning properly for Gauges 1, 2, and 3. Gauge 4, located in the high marsh restoration area, did not show tidal influence during the first tide, but shows tidal influence earlier than the surrounding gauges for the second tide. This is likely attributed to gauge malfunction that resulted in slightly incorrect readings. The gauge began reading abnormally incorrect values shortly after, on May 4th, 2020. The gauge was sent off for maintenance and replaced. Due to the abnormality observed in Chart 3 above, Chart 4 below was created to show tidal fluctuation on July 11th, 2020 to ensure tidal lag is not occurring.

Chart 4: Representative Tidal Cycle on July 11th, 2020



Tidal movement appears to be functioning properly throughout the restoration areas and tidal fluctuations are experienced during the same time periods. Tidal flushing has been successfully introduced. Post construction trends will continue to be monitored in subsequent monitoring events to document whether tidal flows are increasing or decreasing over time and/or whether subsidence is occurring on the project site.

Tidal Creek Conditions

During post-construction field visits tidal creeks were observed and noted as stable. First-order tidal streams appear to be naturally forming adjacent to the constructed channel. Complexity of the tidal channel network appears to be increasing over baseline conditions. Figure 1 below is a depiction of potentially newly forming tidal creeks adjacent to the main channel.

Figure 1: Imagery of the Drum Island Restoration Project taken on July 31, 2019 by Holy City Helicopters

Figure 2 below is a photograph of the initial stage of a small tidal drainage system forming due to natural sedimentation. During various filed visits throughout the post-construction monitoring period, minute surface drainage patters within the intertidal zone appear to be becoming more pronounced and exhibit morphology typical of a tidal channel. General site photographs of the tidal creeks are included in Appendix B.

Figure 2: Beginning stages of a small tidal stream naturally forming adjacent to the main channel

The tidal creeks observed appeared to be a natural conduit for the tidal waters to enter the restoration area with flooding and ebbing with the natural tidal cycles evident. A variety of organisms have begun to colonize the intertidal zone that were not observed during pre-construction or during baseline monitoring including: mud fiddler crabs (*Uca pugnax*), sand fiddlers (*Uca minax*), blue crabs (*Callinectes sapidus*), shrimp and small fish were also noted as present in the main channel.

Figure 3 below is a photograph of the revetment taken on July 31, 2019 by Holy City Helicopters.

Figure 3: Aerial View of the revetment along the southern end of Drum Island

The riprap revetment appears to be stabilized with no visible signs of erosion.

Figure 4 below shows photographs of the tidal creek inlet. The photo on the left was taken during time-zero monitoring shortly after construction. The photo on the right was taken approximately 1-year following construction.

Figure 4: Tidal Creek Inlet Photographs 2019-2020

Time-Zero
Taken August 2019

Year 1
Taken August 2020

No visible changes regarding the stability or integrity of the riprap adjacent to the mouth of the tidal creek was observed during the most recent monitoring event. The riprap appears to be stabilized with no visible signs of erosion.

Vegetation Monitoring

Vegetation in restoration areas were removed and replanted using native plant sprigs/bare-root at the designated locations (Figure 3). Table 1 below demonstrates the total number of each species planted in designated habitat restoration areas.

Table 1: Total Number of Planted Species Per Habitat

Habitat	Species	Scientific Name	Number Planted
Low Marsh	Saltmarsh cordgrass	*Spartina alterniflora*	72,111
High Marsh	Black needle rush	*Juncus roemerianus*	9,700
	Perennial glasswort	*Salicornia virginica*	3,200
	Sea oxeye daisy	*Borrichia frutescens*	3,480
	Salt grass	*Distichlis spicata*	1,600
	Saltwort	*Batis maritima*	1,600
	Marsh elder	*Iva frutescens*	3,200
	Saltmeadow cordgrass	*Spartina patens*	10,000
Upland Transitional Slope	Sweetgrass	*Muhlenbergia filipes*	1,100
	Yaupon holly	*Ilex vomitoria*	60
	Groundsel tree	*Baccharis halimifolia*	60
	Red cedar	*Juniperus virginiana*	60

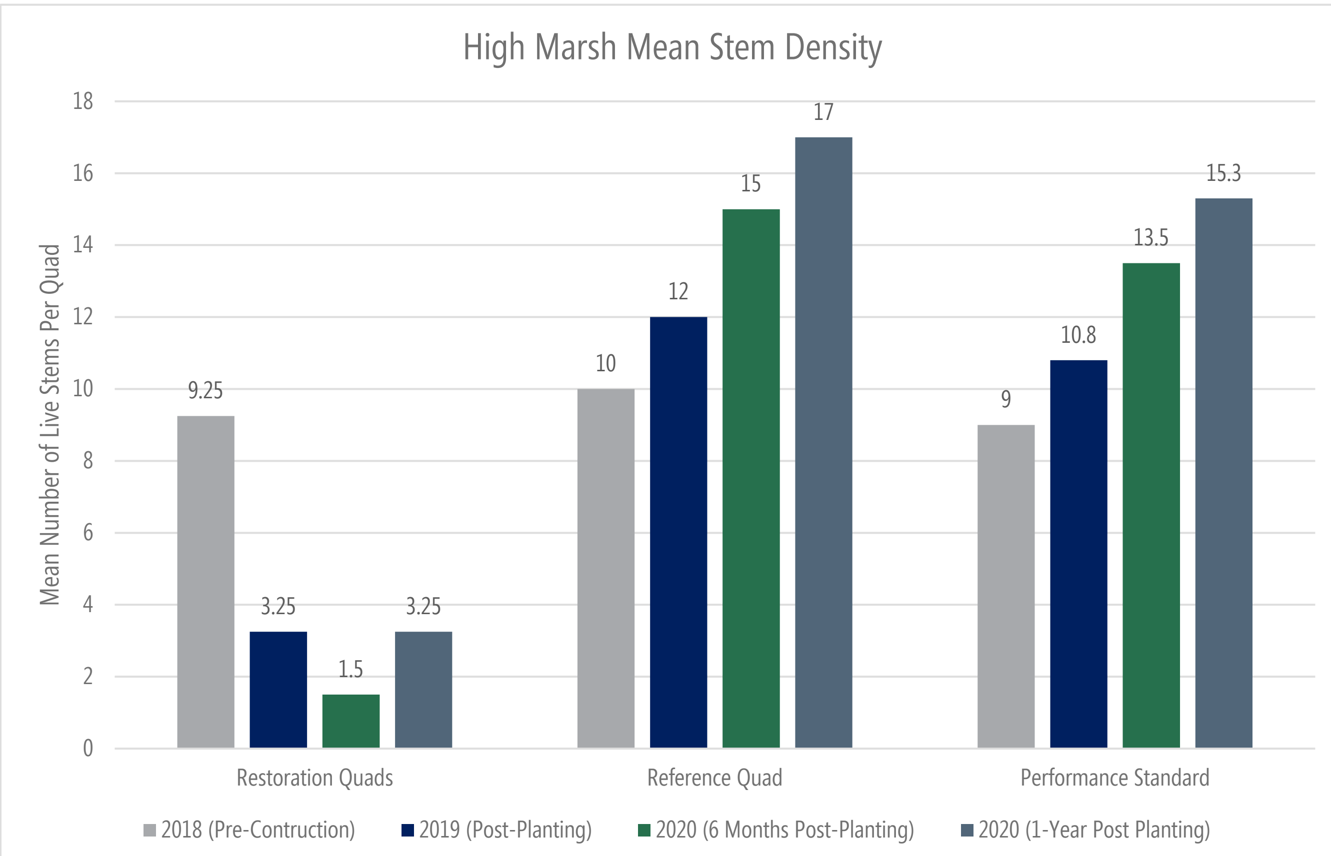
Post-construction vegetation data was collected on August 9, 2019 (Post-Planting), January 7, 2020 (Six [6] Months Post-Planting) and August 14, 2020 (One [1]-Year Post Planting) within a total of thirteen $1m^2$ monitoring frames. Plant species stem count (density up to 100 stems) and estimated percent cover were recorded within all vegetation quadrats. Ten vegetation quadrats were located within the restoration area and three vegetation quadrats within the reference area. The monitoring frames were located in the same general location as pre-construction monitoring frames. The vegetation monitoring quadrats and transects were distinctly marked and GPS located for efficient monitoring. Refer to Figure 3 for a depiction of vegetation quadrat locations.

Reference Quadrat #1 (Figure 3) is representative of high marsh conditions, this quadrat is dominated by naturally occurring sea oxeye daisy (*Borrichia frutescens*). Reference Quadrats #2 and #3 (Figure 3) are representative of low marsh plant communities. Both low marsh reference quadrats were dominated by saltmarsh cordgrass (*Spartina alterniflora)*. Plant composition, density and percent cover within reference quadrats remained relatively consistent between pre and post construction conditions. Minor variations across time in reference quadrats is likely attributed to the subjectivity of field estimation techniques. Vegetation field data and photographs are included in Appendix B.

Stem Density

Mean stem density (number of live stems per quadrat) in the restored (planted) marsh was compared with applicable reference quadrats for low marsh and high marsh areas. Charts 5 and 6 below depict the average stem density per quad when compared to reference conditions for high marsh and low marsh areas.

Chart 5: Average Stem Density for High Marsh Quadrats

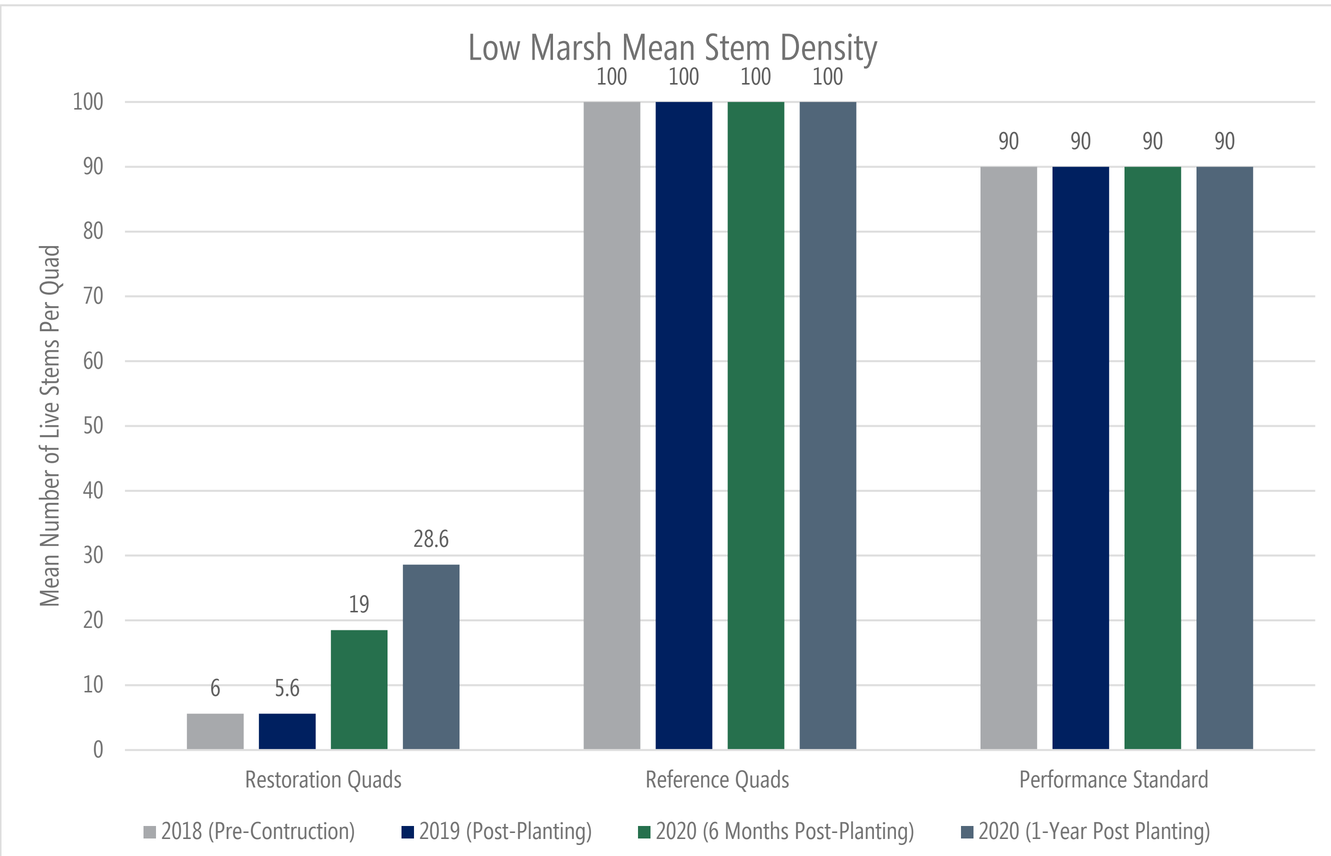


*Performance standard (≥90% reference) is for third monitoring year.

Stem counts for the high marsh reference (Ref Quadrat #1) have ranged from 10 – 17 stems over the monitoring period. The noticeable increase in stem counts for reference conditions is attributed to the limited scale of the y-axis display, and minor variations in quadrat placement. This increasing trend is likely not indicative of increasing density for reference conditions.

High marsh restoration quadrats had an average density of approximatly 3 stems per quad during the most recent monitoring event. Vegetation quadrat stem count data suggests some planted high marsh species have thrived, while other species have not survived and suitable volunteer species have begun to naturally regenerate. Perennial glasswort (*Salicornia virginica*) has shown propagation over baseline, while black needle rush (*Juncus roemerianus*) has remained visibly stressed at Quadrat #1 and did not survive in the remaining sampled Quadrats. Sea oxeye daisey (*Borrichia frutescens*) did not survive at Quadrat #2 and shows improvement at Quadrat #5. Saltmarsh cordgrass (*Spartina alterniflora*) propagation is evident at Quandrat #4 and field observations indicate *Spartina* along with other suitable species are naturally regenerating throughout the majority of the high marsh restoration areas.

Chart 6: Average Stem Density for Low Marsh Quadrats



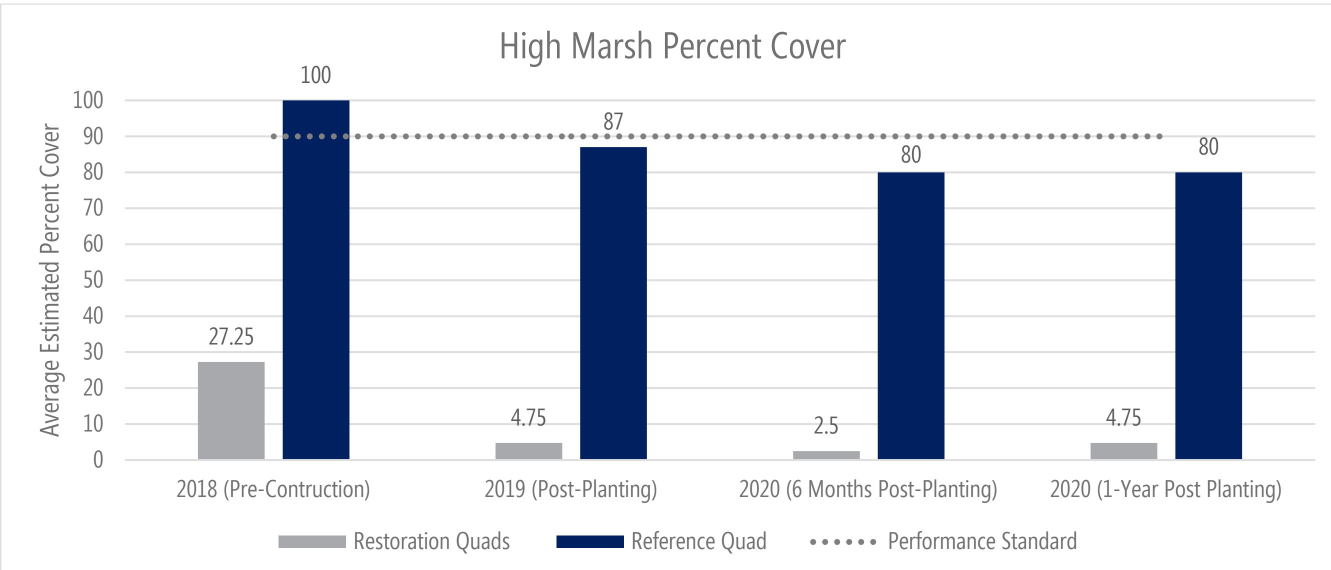
*Performance standard (≥90% reference) is for third monitoring year.
*Number of live stems were counted up to 100.

Low marsh quadrats had an average density of 29 stems during the most recent monitoring event. Stem counts increased by over 5 times the number of stems that were present during time-zero monitoring. Low Marsh Quadrats were dominated exclusively by saltmarsh cordgrass (*Spartina alterniflora*). Field observations indicated planted specimen in the reference areas appeared larger in height and width when compared to reference vegetative conditions. The *Spartina* are thriving and are expected to continue to disperse and show an increase in density in subsequent monitoring years.

Percent Cover

Estimated vegetative percent coverage of the restoration areas was compared with applicable reference quadrats for low marsh and high marsh areas. Charts 7 and 8 below depict the average estimated percent cover of restoration quadrats when compared to reference conditions.

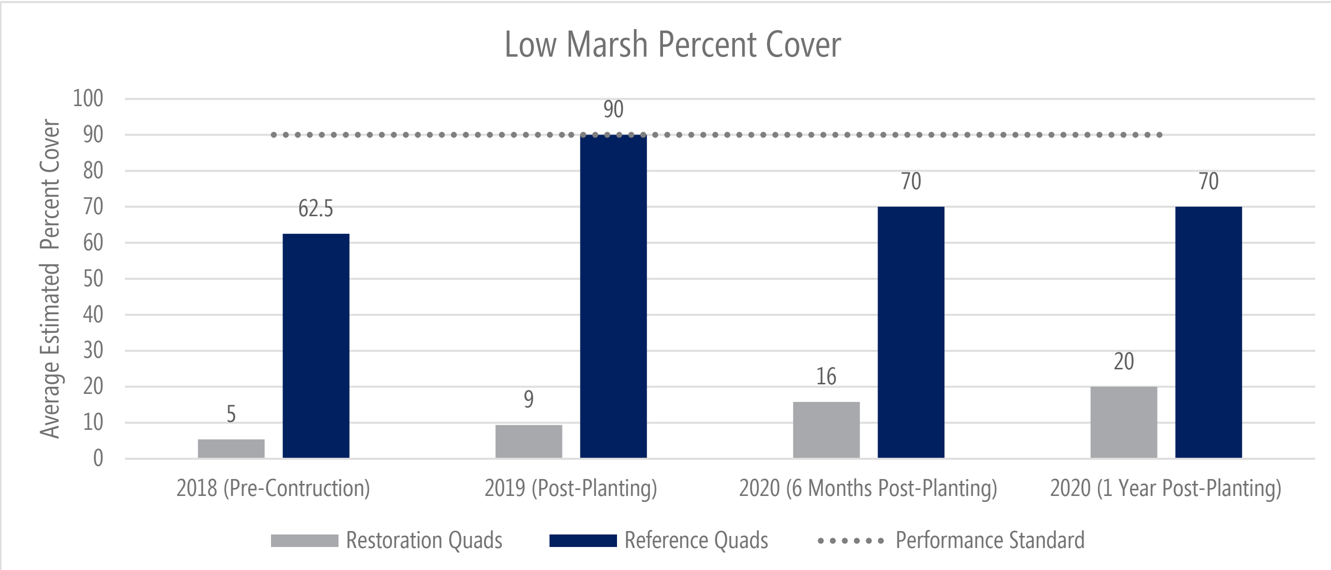
Chart 7: Average Percent Cover for High Marsh Quadrats



**Performance standard (≥90%) is for third monitoring year.

The average percent cover of restoration quadrats decreased from 2018 to 2019 due to removal of the existing vegetation and re-planting of the site with native sprigs. A minimal decrease in percent coverage in the 6-month period after planting is attributed to plant mortality that has occurred. During the most recent monitoring event (one-year post planting), the average percent cover has recovered to the same level (4.75%) noted during "time-zero" monitoring. Most of the high marsh vegetation that has survived is currently thriving and is expected to show an increase in percent coverage in subsequent monitoring events.

Chart 8: Average Percent Cover for Low Marsh Quadrats



*Performance standard (≥90%) is for third monitoring year.

Low marsh restoration quadrats had an average estimated percent coverage of 20% during the most recent monitoring event. The percent coverage has more than doubled since the time-zero monitoring event. Field observations indicate that planted sprigs have dispersed and growth throughout the low marsh areas is evident and is expected to continue to occur.

It should be noted that the performance standards included in the Drum Island Tidal Marsh Restoration Plan indicates that vegetative coverage of the planted areas should be > 90% to meet success criteria. However, given the percent coverage of high marsh reference conditions has ranged from 80% - 100% cover and low marsh has ranged from 60-90% cover over the monitoring period, a > 90% threshold may not be appropriate for the target plant community.

The following table provides total estimated percent vegetative cover within the restoration area based on vegetation quadrat data and field observations.

Table 2: Estimated Total Vegetative Percent Cover

Mitigation Unit	Area (acres)	Total Estimated Percent Cover	Estimated Vegetated Area (acres)
Low Marsh	15.48	20%	3.1
High Marsh	5.94	4.75%	0.28
Tidal Creek	1.15	0%	0
Armor Protection	0.60	0%	0
Upland / Transitional Slope*	0.34	10%	0.03
Dike/Marsh Hammock*	2.3	15%	0.35
Total Mitigation Site	**25.81**	**14.57%**	**3.76**

*estimated based on field observations

Invasive Species

Invasive plant species have not been observed within the restoration area during monitoring activities.

Summary

Tidal movement appears to be functioning properly throughout the restoration areas and tidal fluctuations are experienced during the same time periods. Tidal creeks are stable with new tidal streams that may be forming adjacent to the constructed channel. Post construction hydrology monitoring activities indicate that tidal influence is evident throughout the post-construction period.

Vegetation quadrat data and field observations suggests that low marsh areas are thriving, while high marsh areas have not shown the same level of planting success as the surrounding low marsh. The majority of saltgrass (*Distichlis spicata*), marsh elder (Iva frutescens) and salt meadow cordgrass (Spartina patens) have not survived. Some areas of black needle rush (*Juncus roemerianus*) and oxeye daisy (*Borrichia frutescens*) are either not thriving or have not survived.

Perennial glasswort (*Salicornia virginica*) and an assortment of suitable volunteer species, including Spartina have begun to naturally regenerate throughout the high marsh areas. Due to the observed recruitment of suitable volunteer species in the high marsh, it is likely that performance standards will still be met by year 3. Survival related performance standards (minimum of 75% survival of planted species or suitable volunteer replacements) appear to be on track to meet performance standards. High marsh percent coverage has increased or remained the same since the time-zero monitoring event and is expected to show an increase in subsequent monitoring events. As previously noted, the percent coverage performance standard (> 90%) may not be appropriate for the target plant community for the high marsh or low marsh based on reference conditions. Restoration areas appear to be on track to meet vegetative density requirements by the third monitoring year. This trend will continue to be monitored in subsequent monitoring events.

If you have any questions, please feel free to contact me at mmanning@jmt.com or (843) 810-8135.

Very truly,

JOHNSON, MIRMIRAN & THOMPSON, INC.
Mary Elizabeth Manning
Environmental Scientist
South Carolina Natural & Cultural Resources Group

Attachments:

<u>Figures</u>
Figure 1 – Vicinity Map
Figure 2 – Location Map
Figure 3 – Monitoring Map
Figure 4 – Estimated Conversion Map

<u>Appendices</u>
Appendix A - Hydrographs
Appendix B - Vegetation Quadrat Data and Photos

Figures

Figure 1 – Vicinity Map

Figure 2 – Location Map

Figure 3 - Monitoring Map

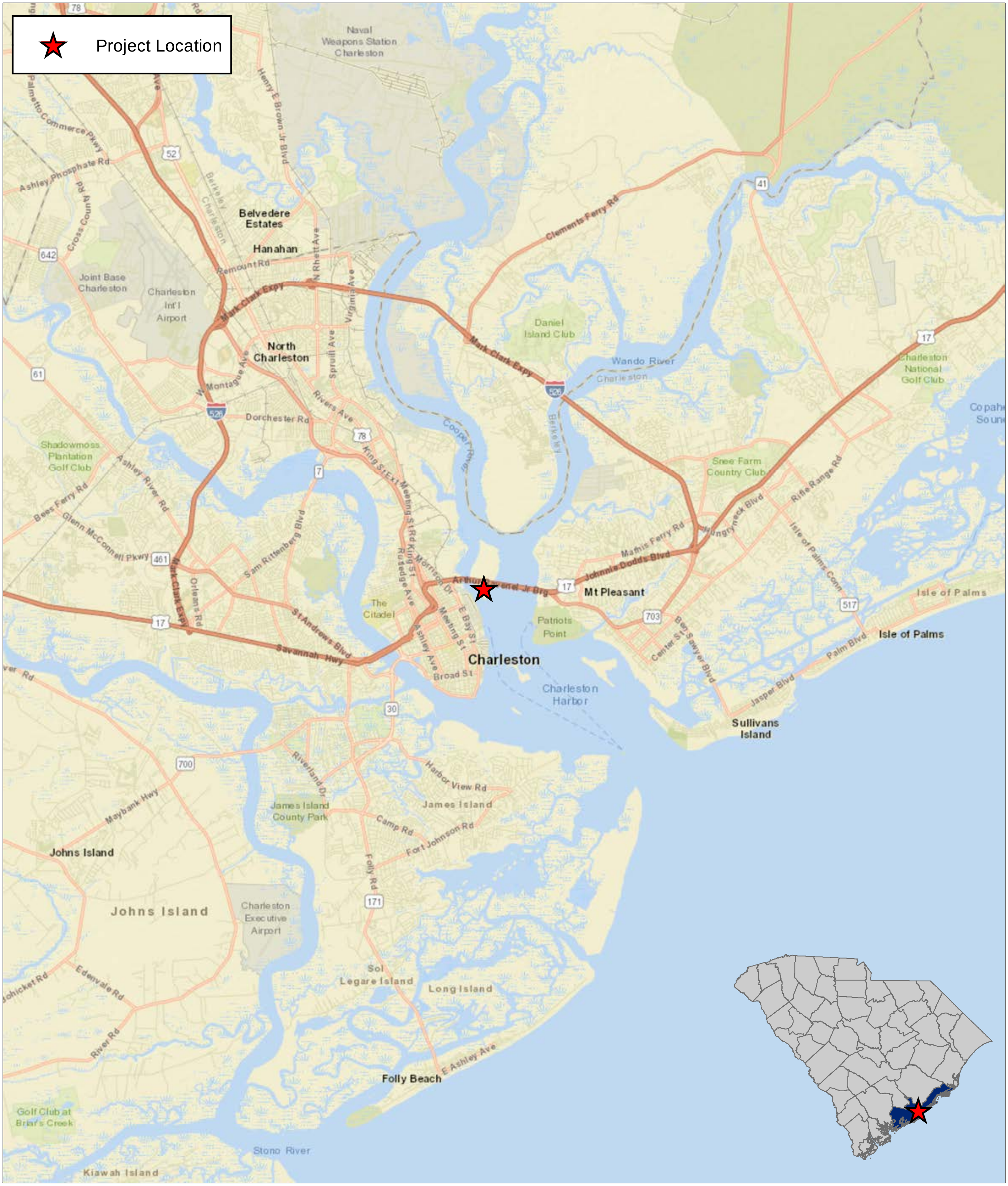


Figure 1 - Vicinity Map

Drum Island Marsh Creation
Charleston County, South Carolina
Source: ESRI

0 1.5 3 6 Miles

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Figure 2 - Location Map

Drum Island Marsh Creation
Charleston County, South Carolina
Source: ESRI

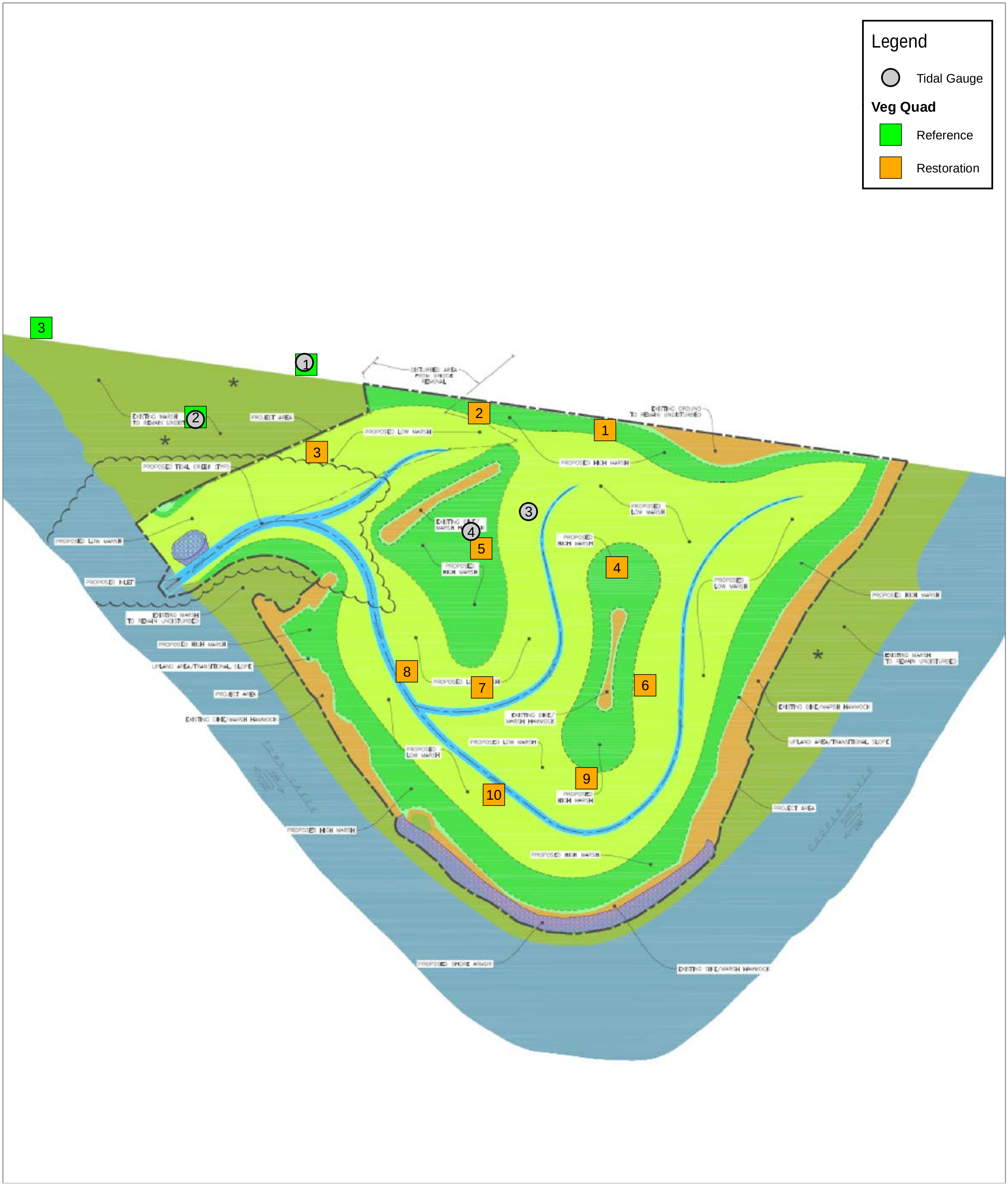

Figure 3 - Monitoring Map

Drum Island Marsh Creation
Charleston County, South Carolina
Source: Collins Engineers and JMT

0 150 300 600 Feet

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Legend

Estimate of Probable High Marsh Conversion to Low Marsh (1.5 AC)

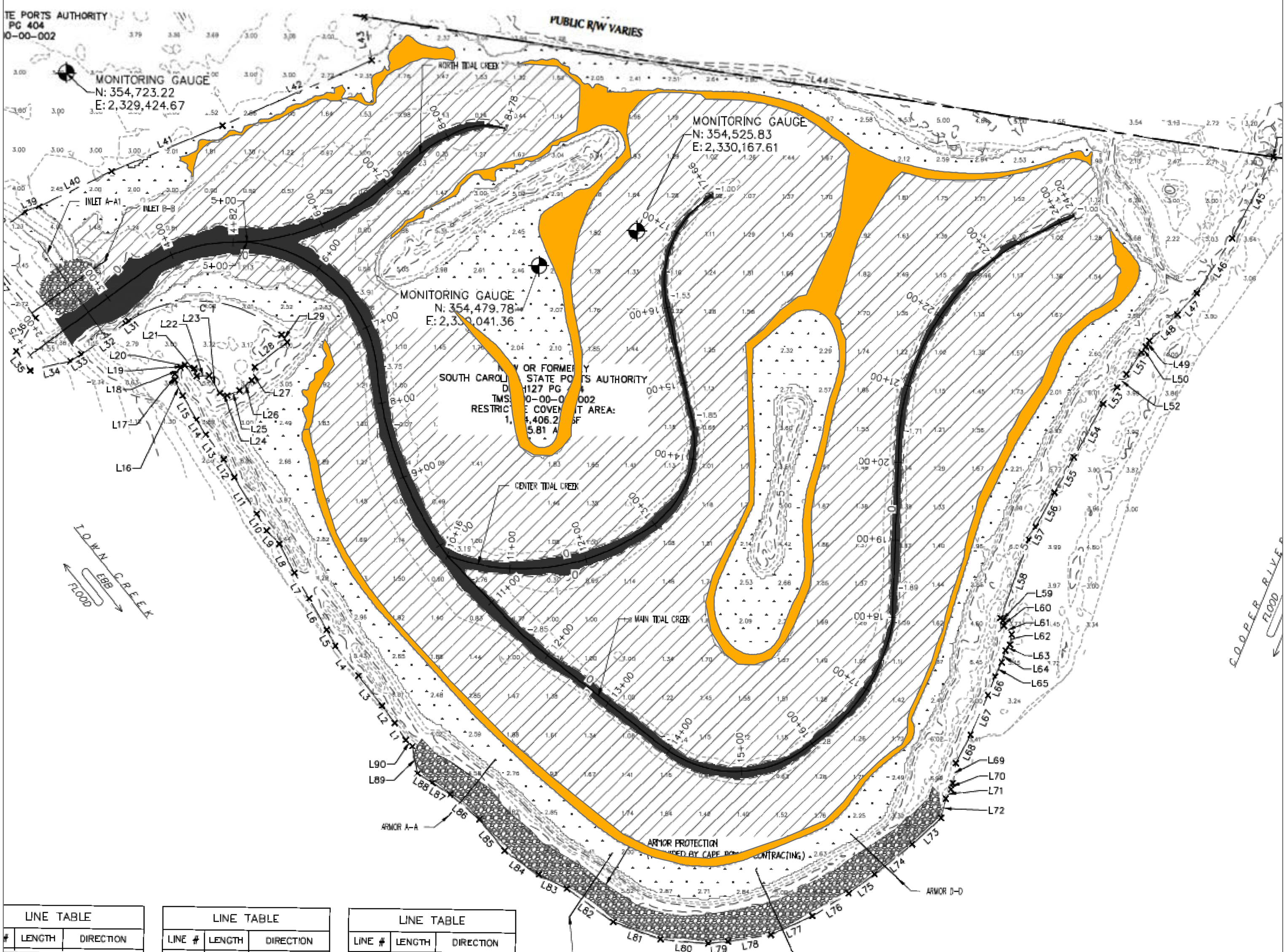

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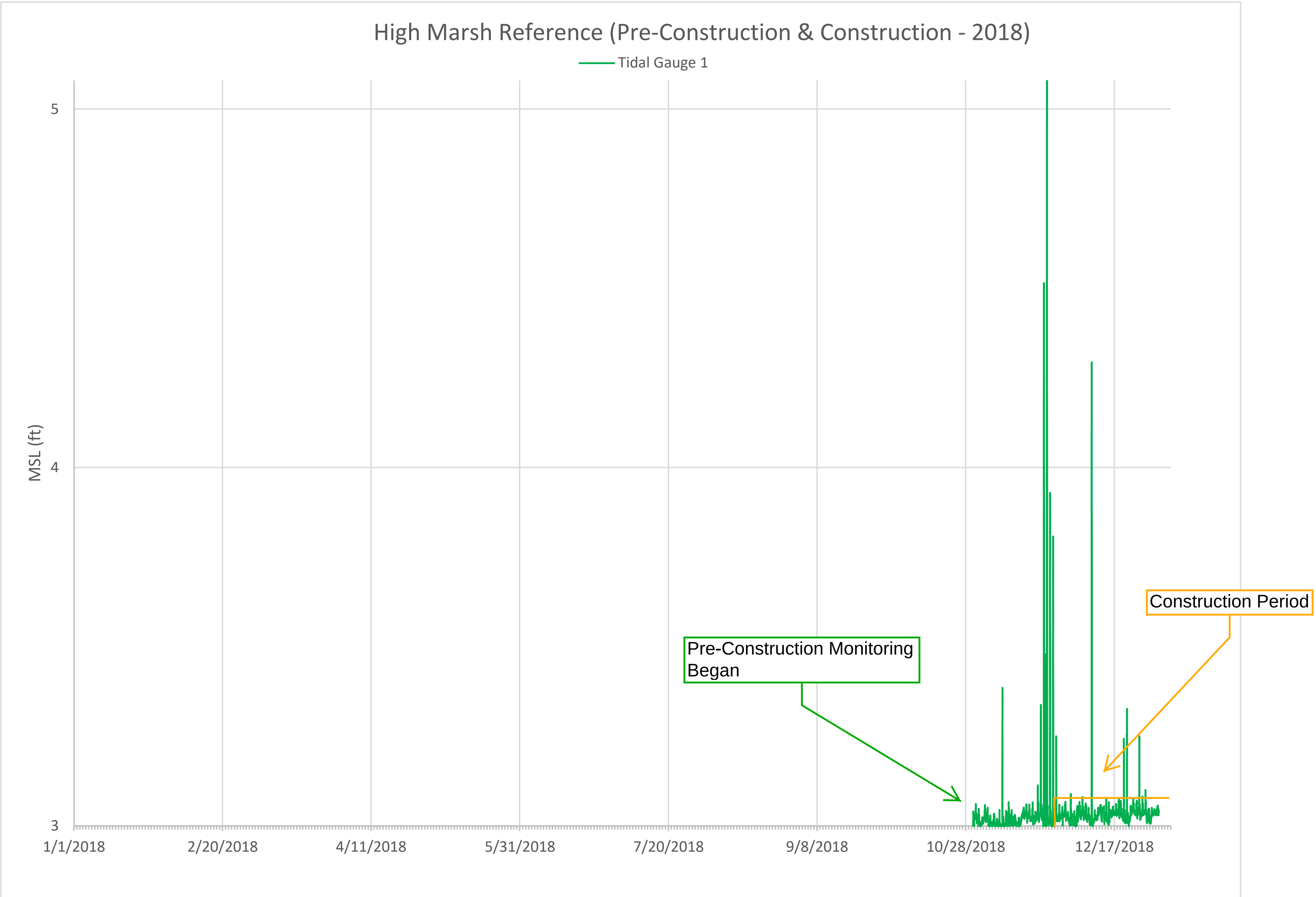
Figure 4 - Estimated Conversion Map

Drum Island Marsh Creation
Charleston County, South Carolina
Source: IPW Construction Group, LLC and JMT

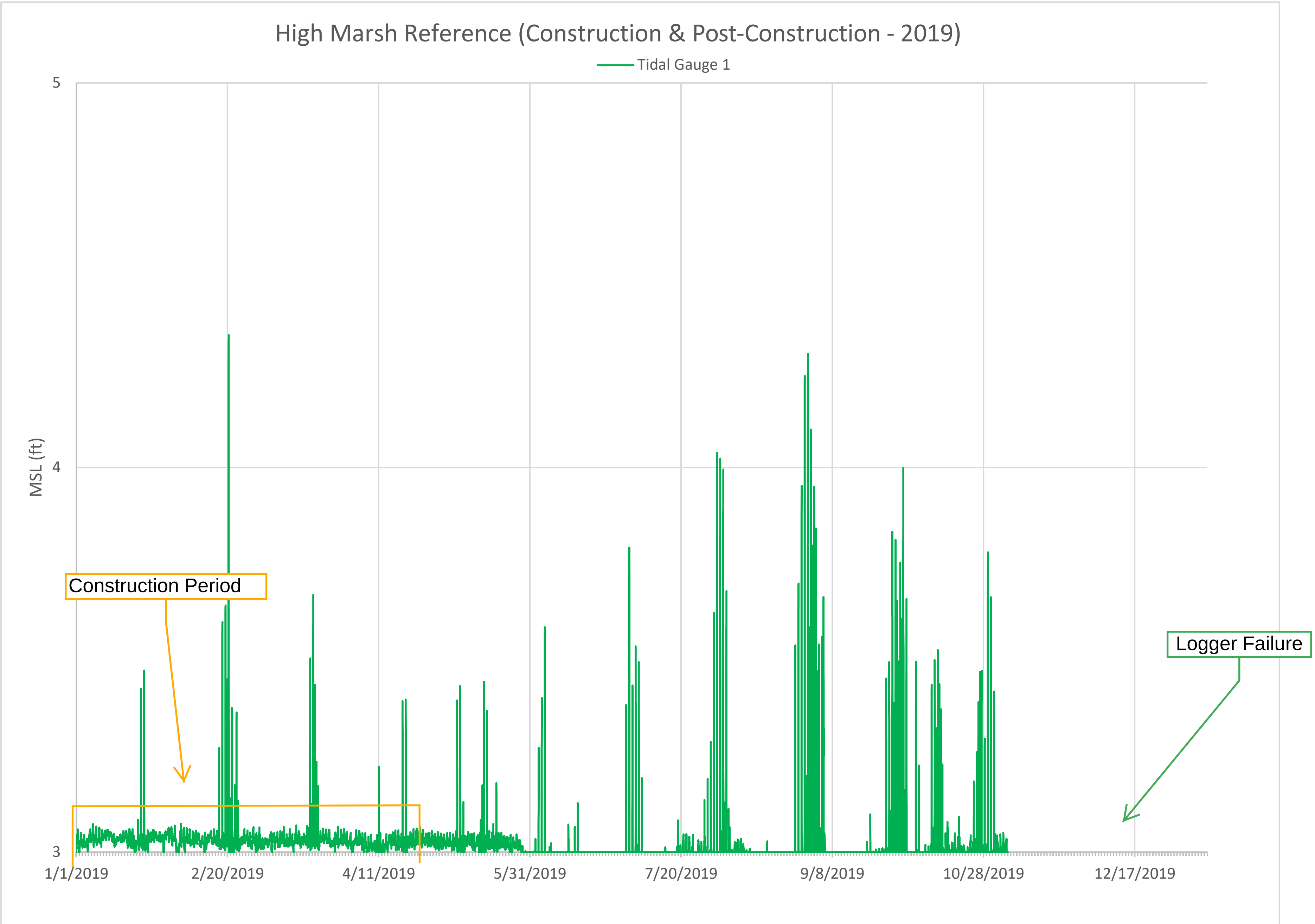
0 100 200 400
Feet

Appendix A

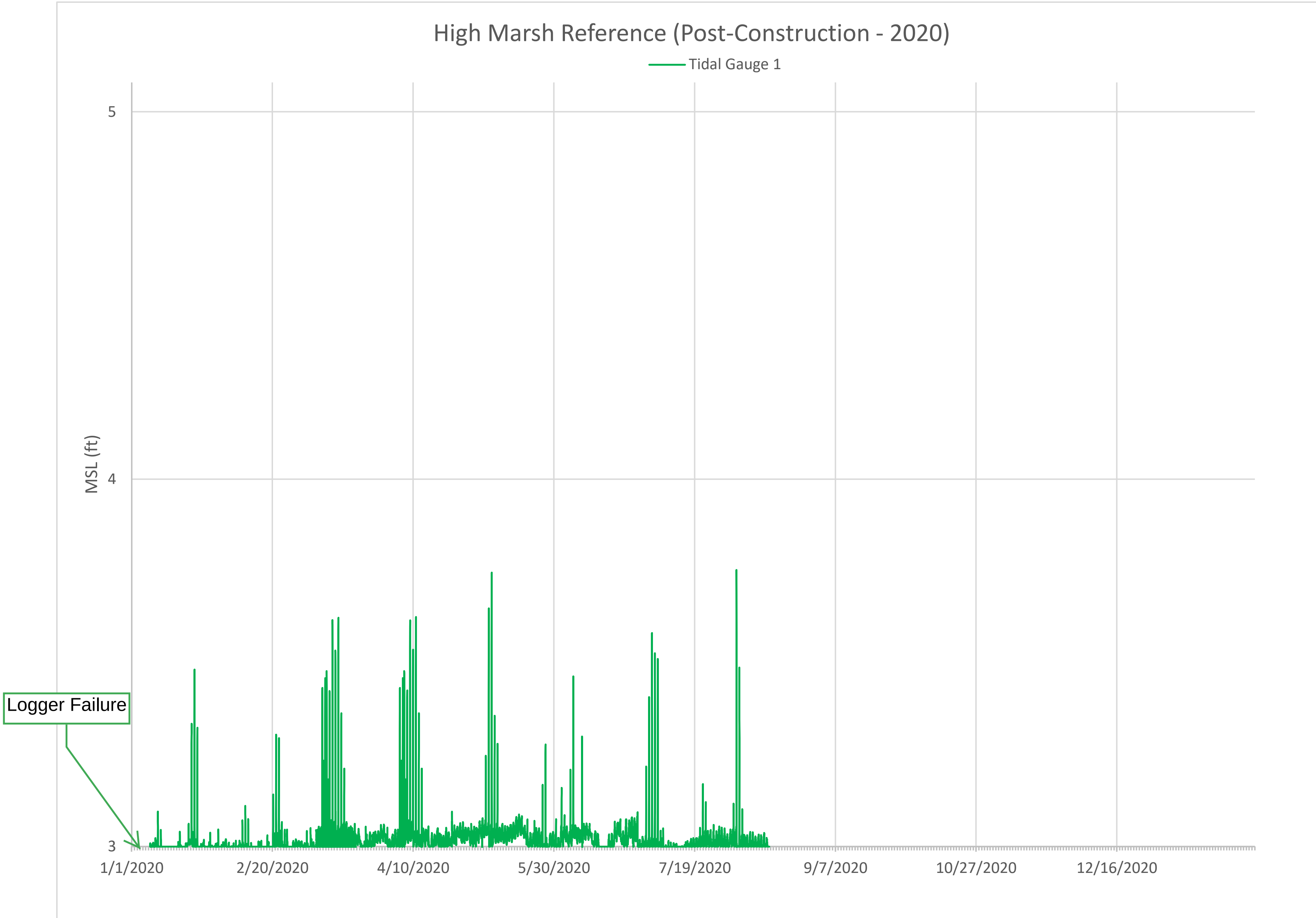
Pre-Construction and Post-Construction Hydrographs

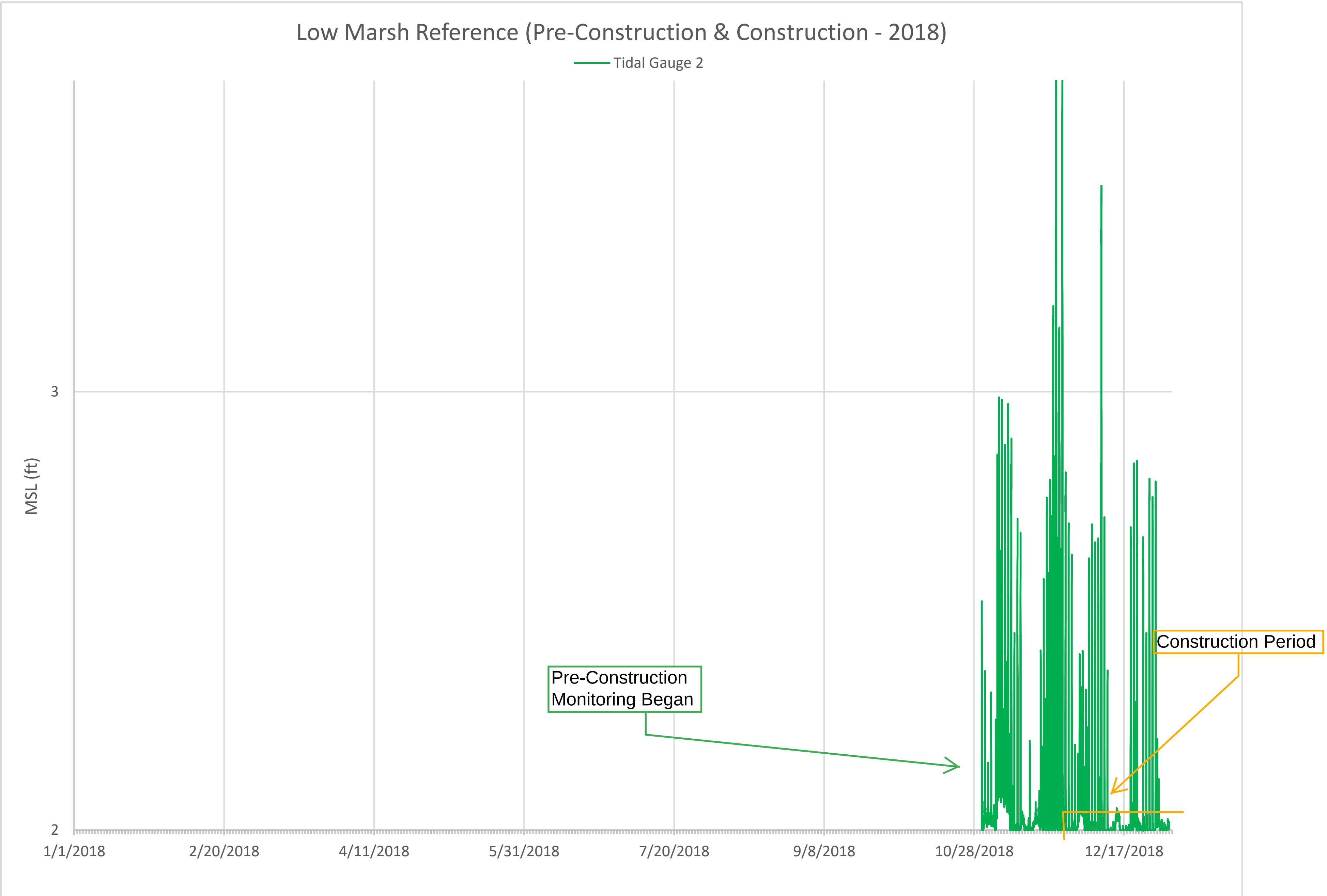


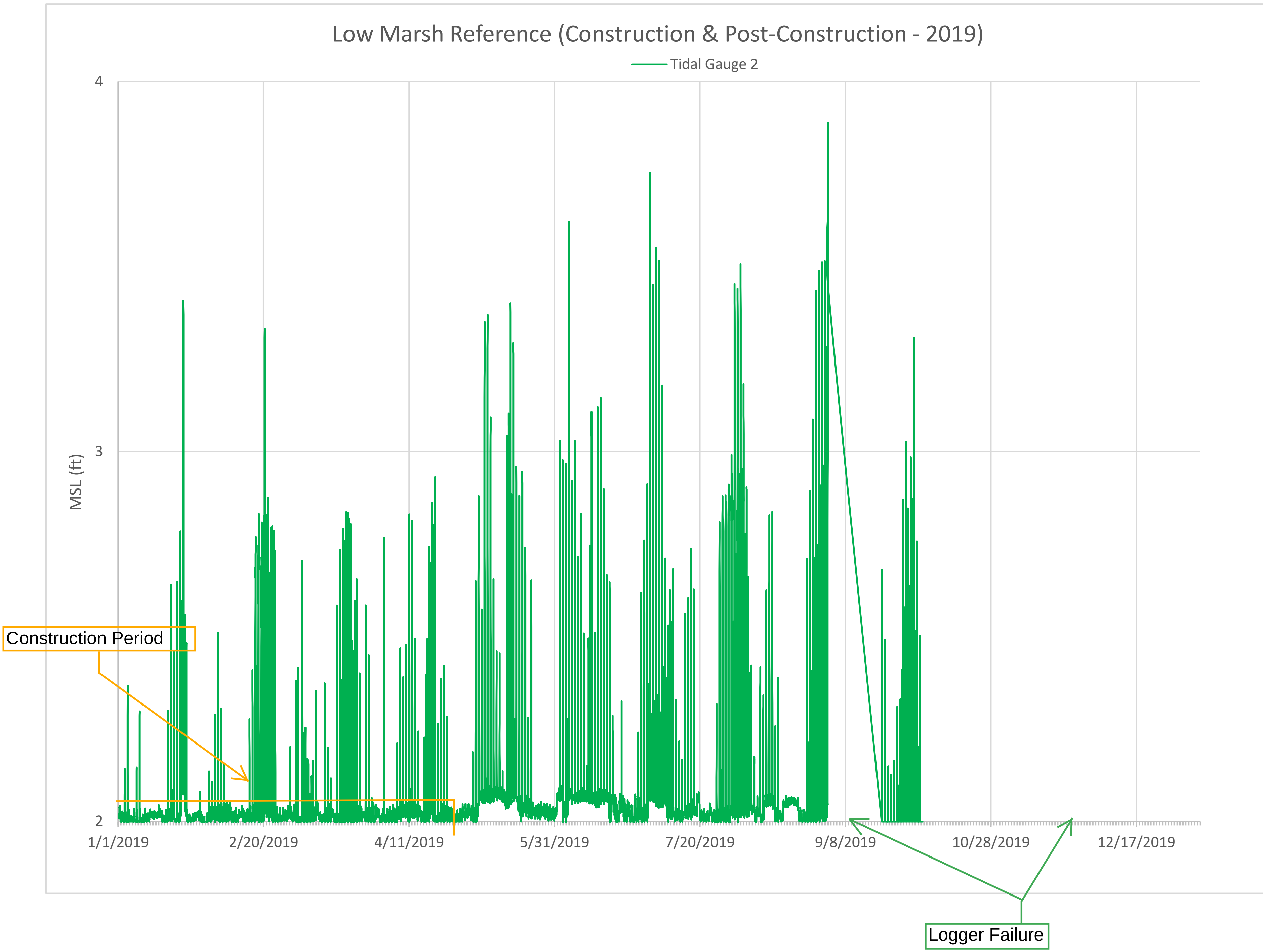
High Marsh Reference (Pre-Construction & Construction - 2018)
Tidal Gauge 1
MSL (ft)
5
4
3
1/1/2018
2/20/2018
4/11/2018
5/31/2018
7/20/2018
9/8/2018
10/28/2018
12/17/2018
Pre-Construction Monitoring Began
Construction Period

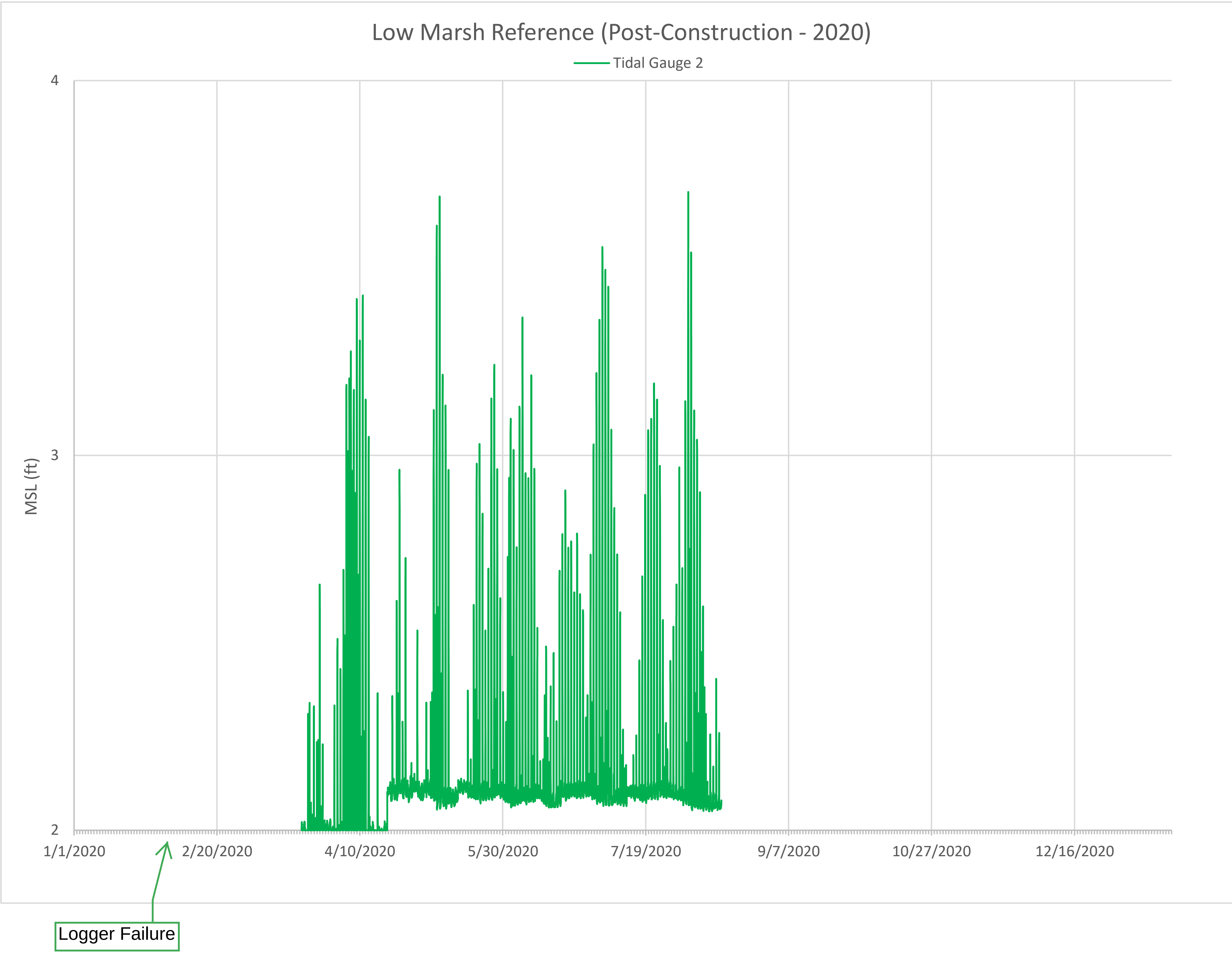


High Marsh Reference (Construction & Post-Construction - 2019)
Tidal Gauge 1
MSL (ft)
5
4
3
1/1/2019
2/20/2019
4/11/2019
5/31/2019
7/20/2019
9/8/2019
10/28/2019
12/17/2019
Construction Period
Logger Failure


High Marsh Reference (Post-Construction - 2020)
Tidal Gauge 1
MSL (ft)
5
4
3
1/1/2020
2/20/2020
4/10/2020
5/30/2020
7/19/2020
9/7/2020
10/27/2020
12/16/2020
Logger Failure


Low Marsh Reference (Pre-Construction & Construction - 2018)
Tidal Gauge 2
MSL (ft)
3
2
1/1/2018
2/20/2018
4/11/2018
5/31/2018
7/20/2018
9/8/2018
10/28/2018
12/17/2018
Pre-Construction Monitoring Began
Construction Period


Low Marsh Reference (Construction & Post-Construction - 2019)
Tidal Gauge 2
MSL (ft)
4
3
2
1/1/2019
2/20/2019
4/11/2019
5/31/2019
7/20/2019
9/8/2019
10/28/2019
12/17/2019
Construction Period
Logger Failure



Low Marsh Reference (Post-Construction - 2020)
Tidal Gauge 2
MSL (ft)
4
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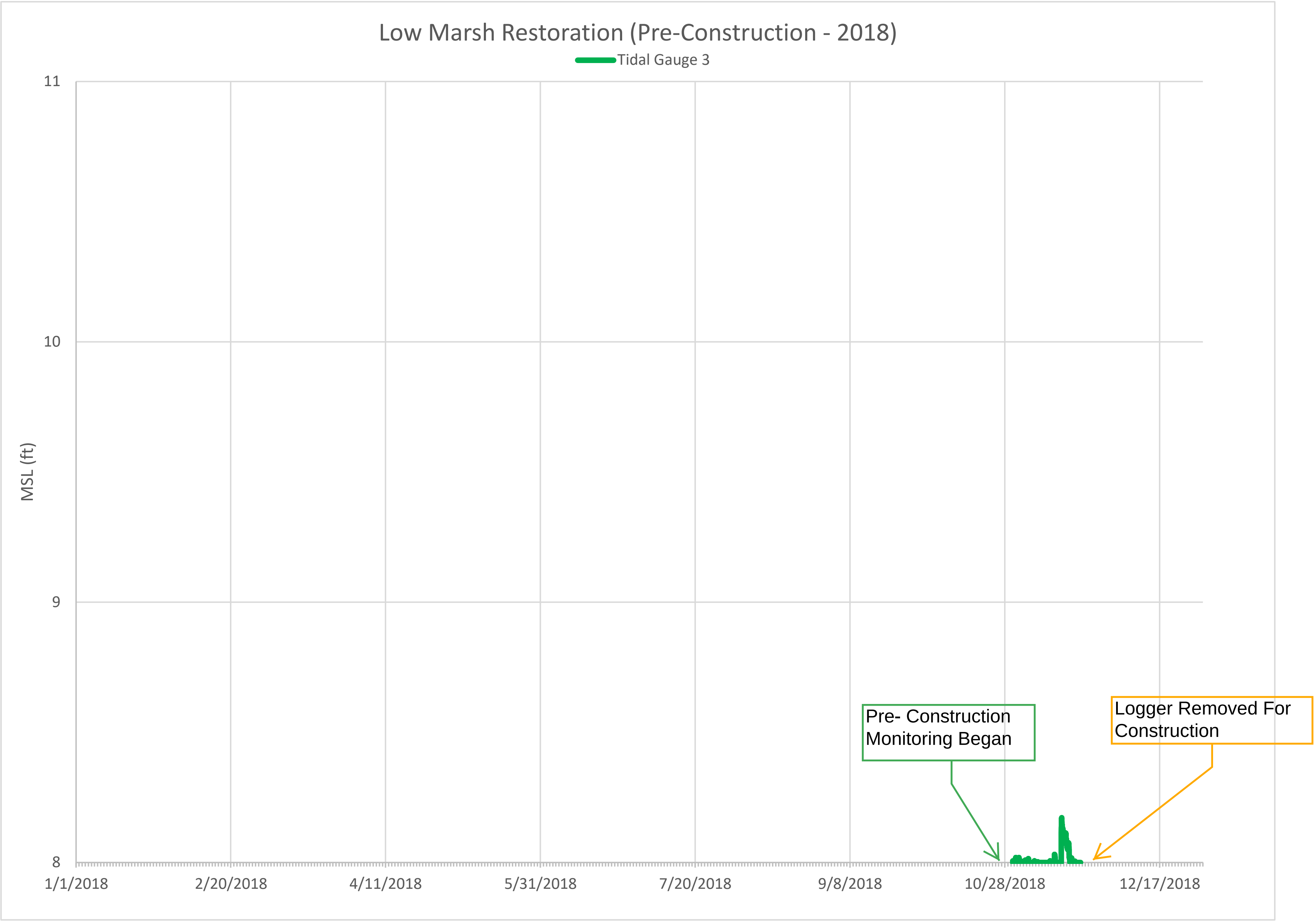
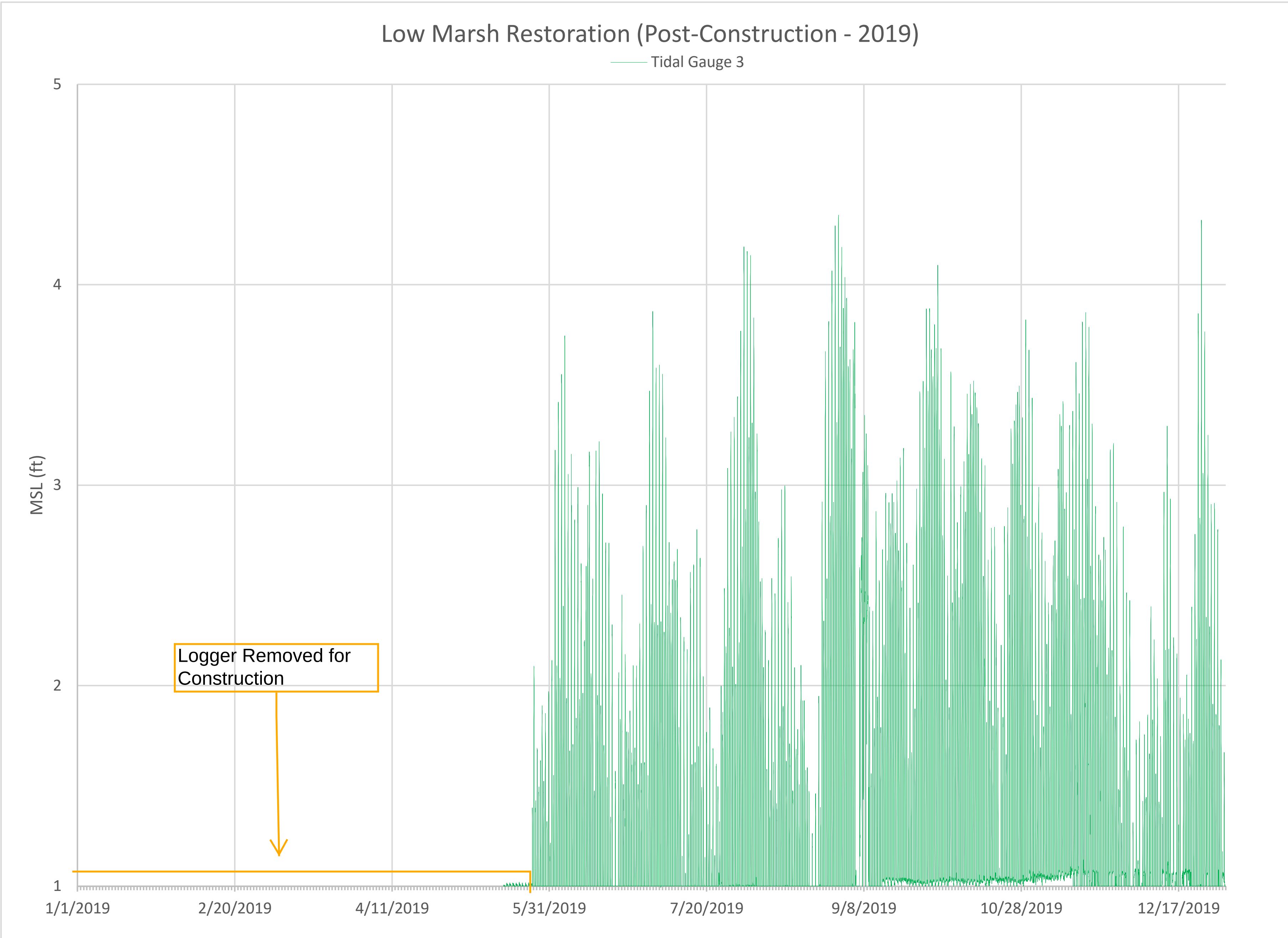
1/1/2020
2/20/2020
4/10/2020
5/30/2020
7/19/2020
9/7/2020
10/27/2020
12/16/2020
Logger Failure



Low Marsh Restoration (Pre-Construction - 2018)
Tidal Gauge 3
11
10
9
8
MSL (ft)
1/1/2018
2/20/2018
4/11/2018
5/31/2018
7/20/2018
9/8/2018
10/28/2018
12/17/2018
Pre- Construction Monitoring Began
Logger Removed For Construction



Low Marsh Restoration (Post-Construction - 2019)
Tidal Gauge 3
MSL (ft)
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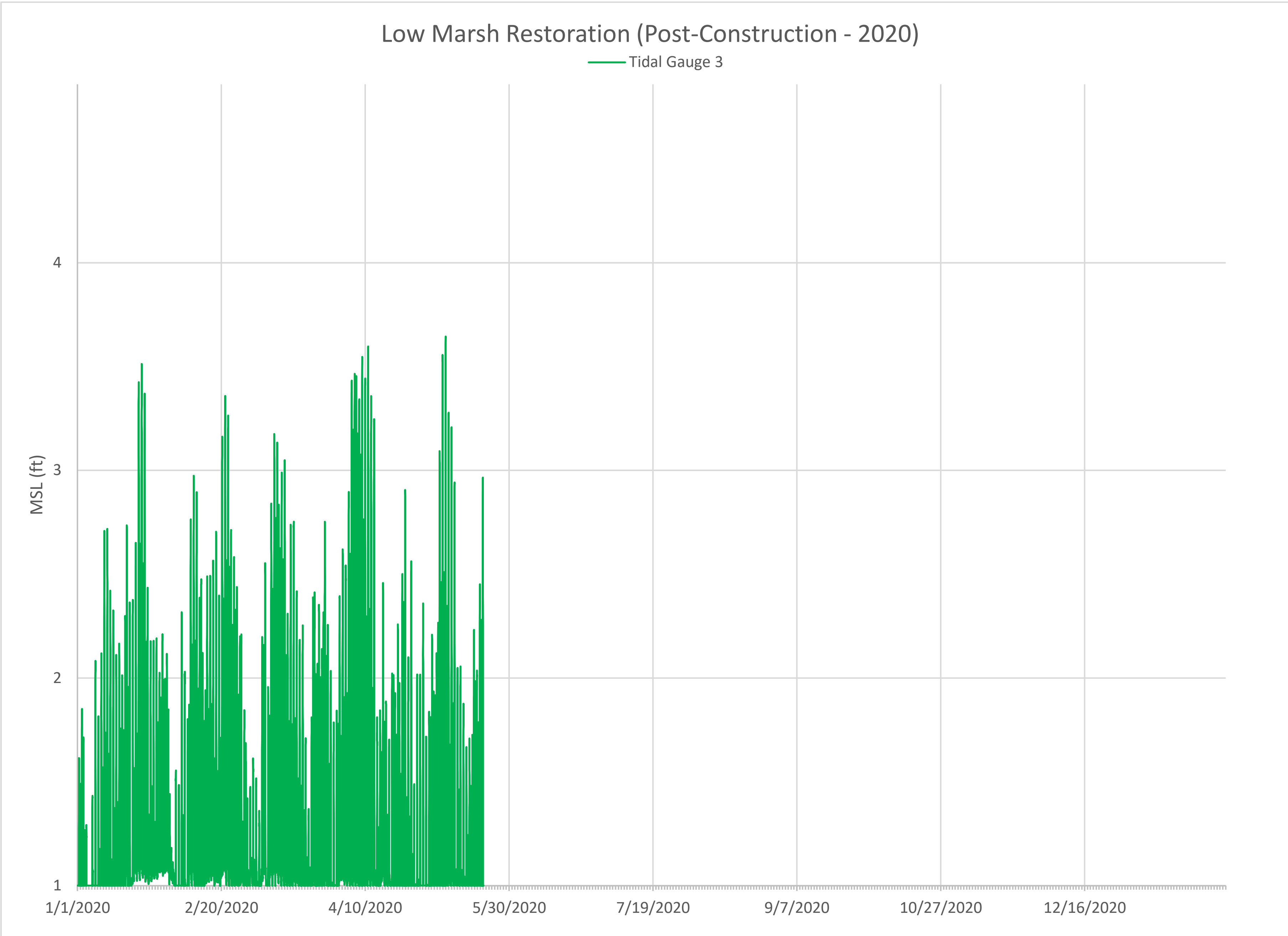
4/11/2019
5/31/2019
7/20/2019
9/8/2019
10/28/2019
12/17/2019
Logger Removed for Construction


Low Marsh Restoration (Post-Construction - 2020)
Tidal Gauge 3
MSL (ft)
4
3
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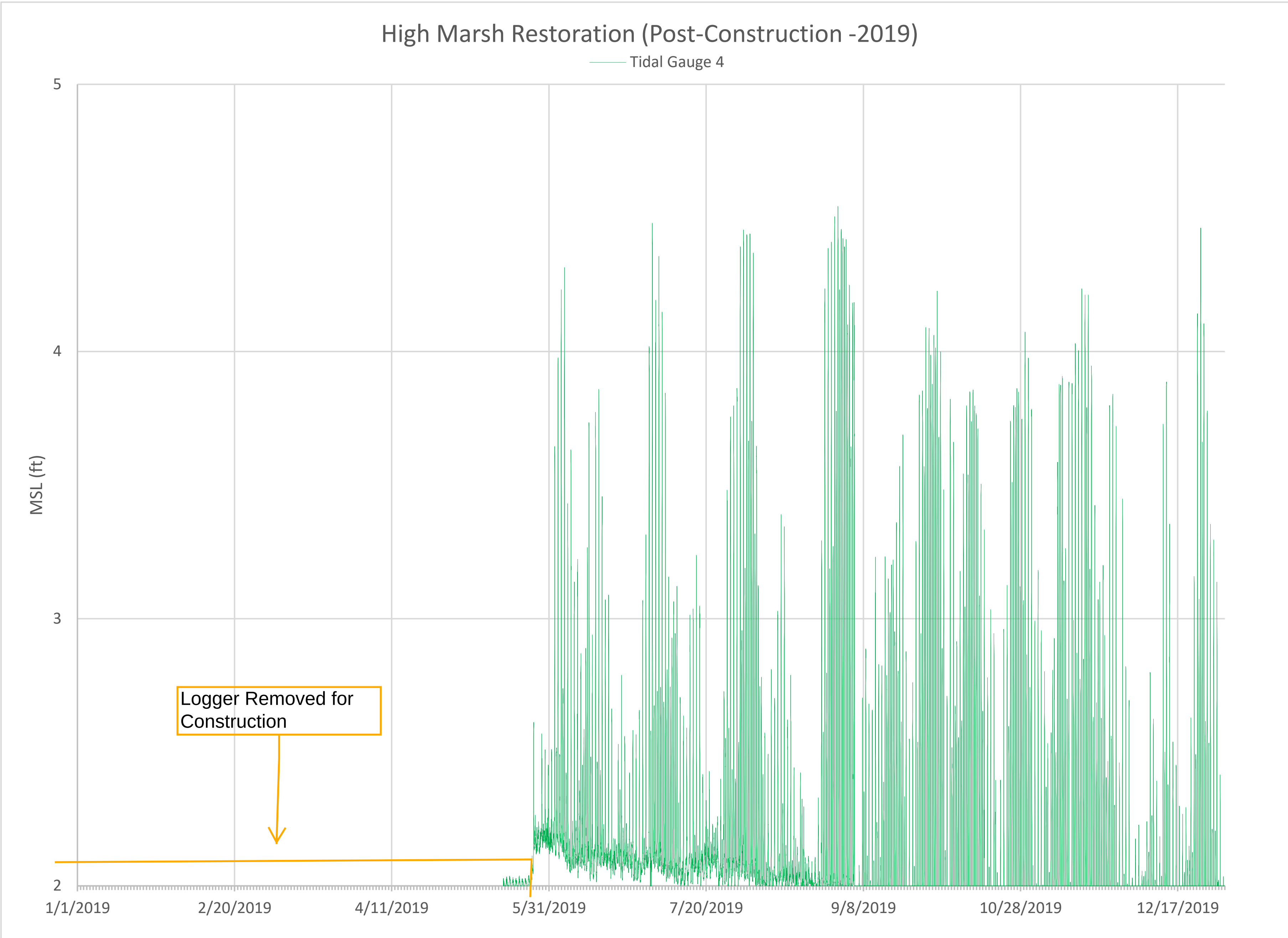
1/1/2020
2/20/2020
4/10/2020
5/30/2020
7/19/2020
9/7/2020
10/27/2020
12/16/2020

High Marsh Restoration (Pre-Construction -2018)
Tidal Gauge 4
MSL (ft)
11
10
9
8
1/1/2018
2/20/2018
4/11/2018
5/31/2018
7/20/2018
9/8/2018
10/28/2018
12/17/2018
Pre-Construction Monitoring Began
Logger Removed for Construction


High Marsh Restoration (Post-Construction -2019)
Tidal Gauge 4
MSL (ft)
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4/11/2019
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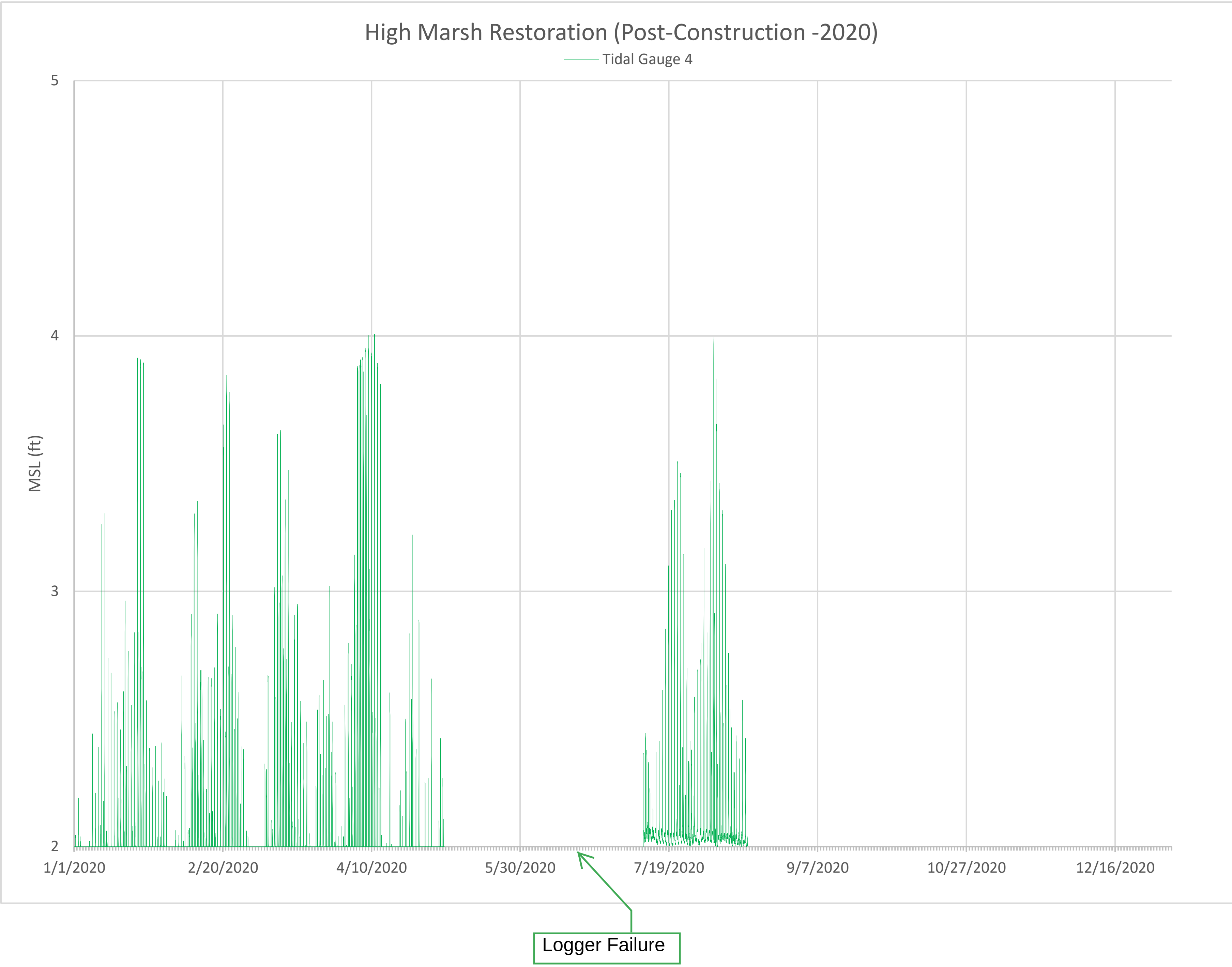

High Marsh Restoration (Post-Construction -2020)
Tidal Gauge 4
MSL (ft)
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4
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2
1/1/2020
2/20/2020
4/10/2020
5/30/2020
7/19/2020
9/7/2020
10/27/2020
12/16/2020
Logger Failure

Appendix B

Vegetation Quadrat Data and Photos

Drum Island Marsh Creation Pre & Post-Construction Vegetation Data

REFERENCE QUAD 1 (High Marsh)	Common Name	Scientific Name	*Density*				*% Cover*			
			2018 (Pre-Contruction)	2019 (Post-Planting)	2020 (6 Months Post-Planting)	2020 (1-Year Post Planting)	2018 (Pre-Contruction)	2019 (Post Planting)	2020 (6 Months Post-Planting)	2020 (1-Year Post Planting)
	Oxeye Daisy	*Borrichia frutescens*	10	12	15	17	100	87	80	80
	Total		**10**	**12**	**15**	**17**	**100**	**87**	**80**	**80**

REFERENCE QUAD 2 (Low Marsh)	Common Name	Scientific Name	*Density*				*% Cover*			
			2018 (Pre-Contruction)	2019 (Post-Planting)	2020 (6 Months Post-Planting)	2020 (1-Year Post Planting)	2018 (Pre-Contruction)	2019 (Post Planting)	2020 (6 Months Post-Planting)	2020 (1-Year Post Planting)
	Saltmarsh Cordgrass	*Spartina alterniflora*	100	100	100	100	60	70	70	70
	Total		**100**	**100**	**100**	**100**	**60**	**70**	**70**	**70**

REFERENCE QUAD 3 (Low Marsh)	Common Name	Scientific Name	*Density*				*% Cover*			
			2018 (Pre-Contruction)	2019 (Post-Planting)	2020 (6 Months Post-Planting)	2020 (1-Year Post Planting)	2018 (Pre-Contruction)	2019 (Post Planting)	2020 (6 Months Post-Planting)	2020 (1-Year Post Planting)
	Saltmarsh Cordgrass	*Spartina alterniflora*	100	100	100	100	65	70	70	80
	Total		**100**	**100**	**100**	**100**	**65**	**70**	**70**	**80**

Drum Island Marsh Creation Pre & Post-Construction Vegetation Data

	Common Name	Scientific Name	***Density***				***% Cover***			
			2018 (Pre-Contruction)	**2019 (Post-Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**	**2018 (Pre-Contruction)**	**2019 (Post Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**
QUAD 1 (High Marsh)	Goldenrod Species	*Solidago sp.*	3	0	0	0	1	0	0	0
	Bushy Bluestem	*Andropogon glomeratus*	2	0	0	0	70	0	0	0
	Nutsedge Species	*Cyperus sp.*	4	0	0	0	2	0	0	0
	Oxeye Daisy	*Borrichia frutescens*	0	0	0	0	0	0	0	0
	Fleabane Species	*Erigeron sp.*	1	0	0	0	1	0	0	0
	Black Needle Rush	*Juncus roemerianus*	0	1	1	1	0	3	3	4
	Perennial Glasswort	*Salicornia virginica*	0	1	1	2	0	1	2	6
	Total		**10**	**2**	**2**	**3**	**74**	**4**	**5**	**10**

	Common Name	Scientific Name	***Density***				***% Cover***			
QUAD 2 (High Marsh)	**Common Name**	**Scientific Name**	**2018 (Pre-Contruction)**	**2019 (Post-Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**	**2018 (Pre-Contruction)**	**2019 (Post Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**
	Oxeye Daisy	*Borrichia frutescens*	7	3	2	0	5	3	2	0
	Black Needle Rush	*Juncus roemerianus*	0	1	0	0	0	2	0	0
			7	**4**	**2**	**0**	**5**	**5**	**2**	**0**

	Common Name	Scientific Name	***Density***				***% Cover***			
QUAD 3 (Low Marsh)	**Common Name**	**Scientific Name**	**2018 (Pre-Contruction)**	**2019 (Post-Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**	**2018 (Pre-Contruction)**	**2019 (Post Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**
	Saltmarsh Cordgrass	*Spartina alterniflora*	9	1	1	2	9	5	4	5
	Total		**9**	**1**	**1**	**2**	**9**	**5**	**4**	**5**

	Common Name	Scientific Name	Density				% Cover			
	Common Name	**Scientific Name**	**2018 (Pre-Contruction)**	**2019 (Post-Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**	**2018 (Pre-Contruction)**	**2019 (Post Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**
QUAD 4 (High Marsh)	Eastern Baccharis	*Baccharis halimifolia*	1	0	0	0	5	0	0	0
	False Cedar	*Chamaecyperis sp.*	1	0	0	0	1	0	0	0
	Bushy Bluestem	*Andropogon glomeratus*	2	0	0	0	20	0	0	0
	Eastern Baccharis	*Baccharis halimifolia*	1	0	0	0	1	0	0	0
	Black Needle Rush	*Juncus roemerianus*	0	1	0	0	0	5	0	0
	Saltmarsh Cordgrass	*Spartina alterniflora*	0	0	0	5	0	0	0	5
	Total		**5**	**1**	**0**	**5**	**27**	**5**	**0**	**5**

	Common Name	Scientific Name	Density				% Cover			
	Common Name	**Scientific Name**	**2018 (Pre-Contruction)**	**2019 (Post-Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**	**2018 (Pre-Contruction)**	**2019 (Post Planting)**	**2020 (6 Months Post-Planting)**	**2020 (1-Year Post Planting)**
QUAD 5 (High Marsh)	Bushy Bluestem	*Andropogon glomeratus*	15	0	0	0	3	0	0	0
	Black Needlerush	*Juncus romerianus*	0	1	0	0	0	3	0	0
	Oxeye Daisy	*Borrichia frutescens*	0	2	2	5	0	2	3	4
	Total		**15**	**3**	**2**	**5**	**3**	**5**	**3**	**4**

Drum Island Marsh Creation Pre & Post-Construction Vegetation Data

QUAD 6 (Low Marsh)	Common Name	Scientific Name	*Density* 2018 (Pre-Contruction)	*Density* 2019 (Post-Planting)	*Density* 2020 (6 Months Post-Planting)	*Density* 2020 (1-Year Post Planting)	*% Cover* 2018 (Pre-Contruction)	*% Cover* 2019 (Post-Planting)	*% Cover* 2020 (6 Months Post-Planting)	*% Cover* 2020 (1-Year Post Planting)
	Saltmarsh Cordgrass	*Spartina alterniflora*	0	3	27	33	0	10	20	25
	Total		**0**	**3**	**27**	**33**	**0**	**10**	**20**	**25**

QUAD 7 (Low Marsh)	Common Name	Scientific Name	*Density* 2018 (Pre-Contruction)	*Density* 2019 (Post-Planting)	*Density* 2020 (6 Months Post-Planting)	*Density* 2020 (1-Year Post Planting)	*% Cover* 2018 (Pre-Contruction)	*% Cover* 2019 (Post-Planting)	*% Cover* 2020 (6 Months Post-Planting)	*% Cover* 2020 (1-Year Post Planting)
	Saltmarsh Cordgrass	*Spartina alterniflora*	0	2	12	38	0	10	10	15
	Total		**0**	**2**	**12**	**38**	**0**	**10**	**10**	**15**

QUAD 8 (Low Marsh)	Common Name	Scientific Name	*Density* 2018 (Pre-Contruction)	*Density* 2019 (Post-Planting)	*Density* 2020 (6 Months Post-Planting)	*Density* 2020 (1-Year Post Planting)	*% Cover* 2018 (Pre-Contruction)	*% Cover* 2019 (Post-Planting)	*% Cover* 2020 (6 Months Post-Planting)	*% Cover* 2020 (1-Year Post Planting)
	Sugarberry	*Celtis laevigata*	18	0	0	0	1	0	0	0
	Cabbage Palmetto	*Sabal palmetto*	1	0	0	0	2	0	0	0
	Saltmarsh Cordgrass	*Spartina alterniflora*	0	20	34	40	0	7	15	20
	Total		**19**	**20**	**34**	**40**	**3**	**7**	**15**	**20**

QUAD 9 (Low Marsh)	Common Name	Scientific Name	*Density* 2018 (Pre-Contruction)	*Density* 2019 (Post-Planting)	*Density* 2020 (6 Months Post-Planting)	*Density* 2020 (1-Year Post Planting)	*% Cover* 2018 (Pre-Contruction)	*% Cover* 2019 (Post-Planting)	*% Cover* 2020 (6 Months Post-Planting)	*% Cover* 2020 (1-Year Post Planting)
	Saltmarsh Cordgrass	*Spartina alterniflora*	0	2	14	33	0	15	20	25
	Total		**0**	**2**	**14**	**33**	**0**	**15**	**20**	**25**

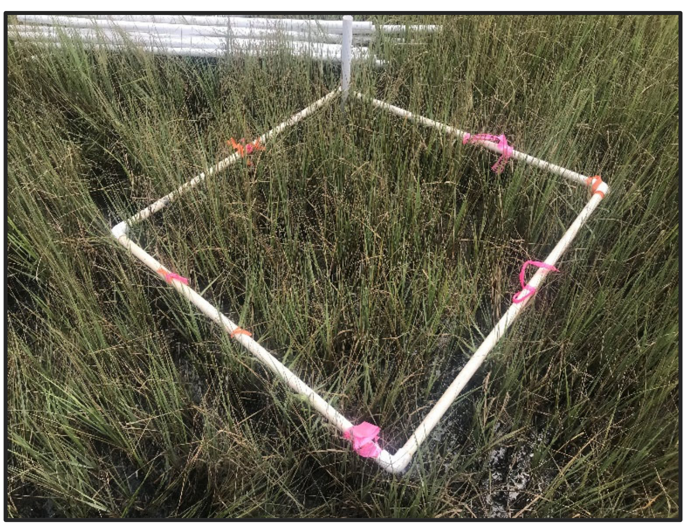
QUAD 10 (Low Marsh)	Common Name	Scientific Name	*Density* 2018 (Pre-Contruction)	*Density* 2019 (Post-Planting)	*Density* 2020 (6 Months Post-Planting)	*Density* 2020 (1-Year Post Planting)	*% Cover* 2018 (Pre-Contruction)	*% Cover* 2019 (Post-Planting)	*% Cover* 2020 (6 Months Post-Planting)	*% Cover* 2020 (1-Year Post Planting)
	Saltmarsh Cordgrass	*Spartina alterniflora*	0	2	12	30	0	15	30	35
	Total		**0**	**2**	**12**	**30**	**0**	**15**	**30**	**35**

REFERENCE QUADRAT #1 - HIGH MARSH

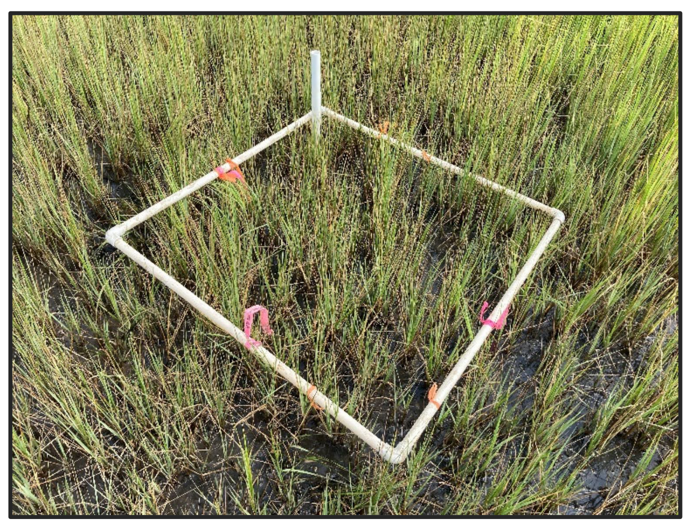
Time-Zero - Taken August 9, 2019

Year 1 – Taken August 14, 2020

REFERENCE QUADRAT #2 – LOW MARSH



Time-Zero - Taken August 9, 2019



Year 1 – Taken August 14, 2020

REFERENCE QUADRAT #3 – LOW MARSH

Time-Zero - Taken August 9, 2019

Year 1 – Taken August 14, 2020

QUADRAT #1 – HIGH MARSH

Time-Zero - Taken August 9, 2019

Year 1 – Taken August 14, 2020

QUADRAT #2 – HIGH MARSH

Time-Zero - Taken August 9, 2019

Year 1 – Taken August 14, 2020

QUADRAT #3 – LOW MARSH

Time-Zero - Taken August 9, 2019

Year 1 – Taken August 14, 2020

QUADRAT #4 – HIGH MARSH


Time-Zero - Taken August 9, 2019


Year 1 – Taken August 14, 2020

QUADRAT #5 – HIGH MARSH


Time-Zero - Taken August 9, 2019


Year 1 – Taken August 14, 2020

QUADRAT #6 – LOW MARSH


Time-Zero - Taken August 9, 2019


Year 1 – Taken August 14, 2020

QUADRAT #7 – LOW MARSH

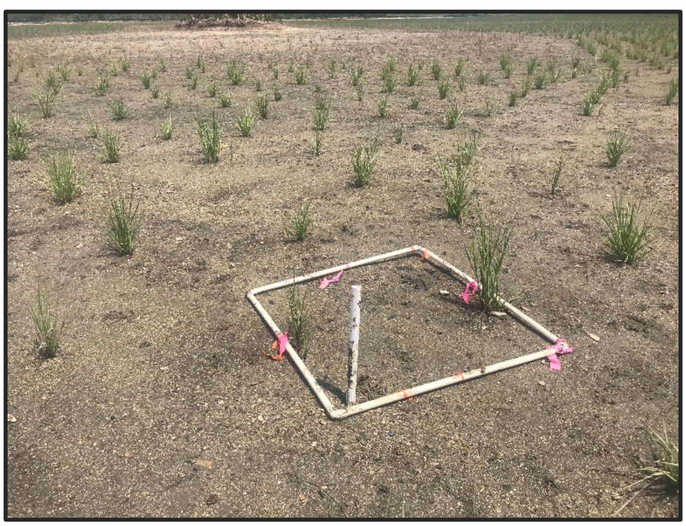
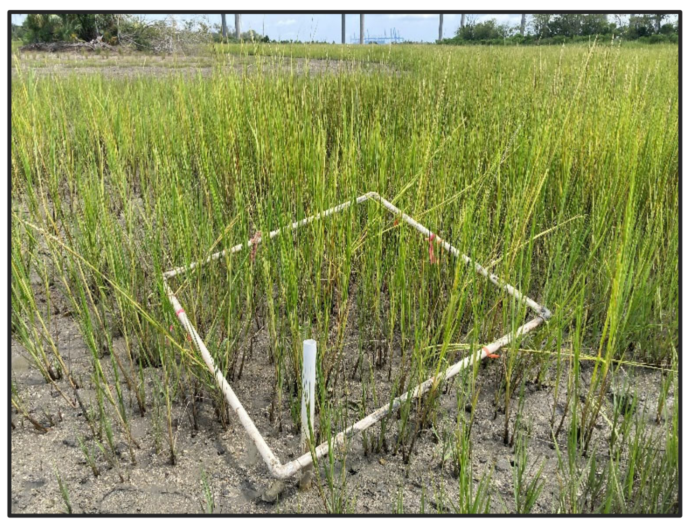

Time-Zero - Taken August 9, 2019


Year 1 – Taken August 14, 2020

QUADRAT #8 – LOW MARSH

 Time-Zero - Taken August 9, 2019	 Year 1 – Taken August 14, 2020

QUADRAT #9 – LOW MARSH

 Time-Zero - Taken August 9, 2019	 Year 1 – Taken August 14, 2020

QUADRAT #10 – LOW MARSH

Time-Zero - Taken August 9, 2019

Year 1 – Taken August 14, 2020

TIDAL CREEK INLET

Time-Zero - Taken August 9, 2019

Year 1 – Taken August 14, 2020

TIDAL CREEK REPRESENTATIVE PHOTOGRAPHS


Year 1 – Taken August 14, 2020


Year 1 – Taken August 14, 2020


Year 1 – Taken August 14, 2020


Year 1 – Taken August 14, 2020