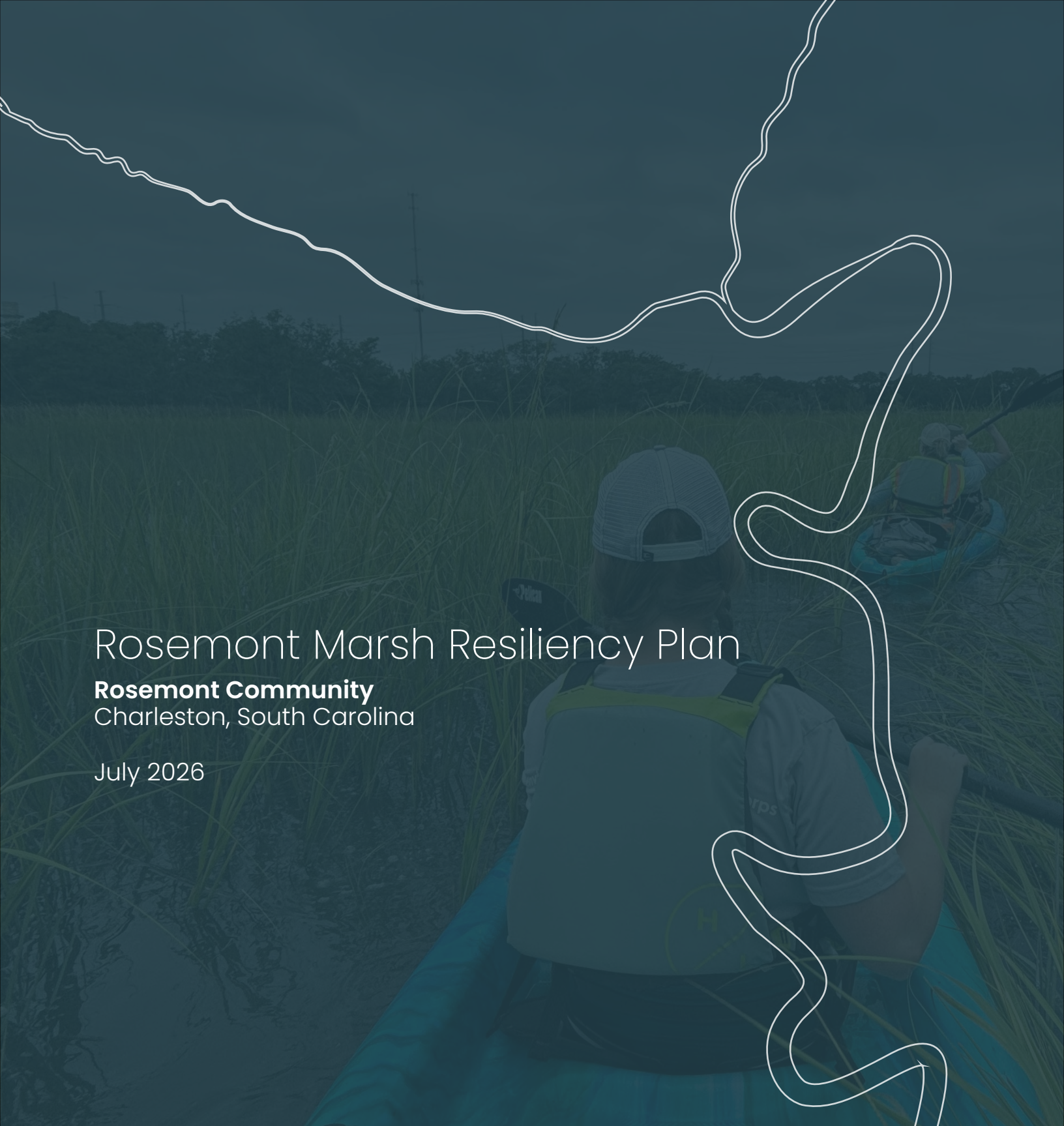




Rosemont Marsh Resiliency Plan

Rosemont Community
Charleston, South Carolina

July 2026

Prepared for  **The Sustainability Institute**

Prepared by  **Biohabitats**

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01

Introduction

A Message from the Rosemont Community

“My family moved to Richland Village, known today as Rosemont, in 1943, and we have been here ever since. Rosemont is the essence of the beloved community as articulated by Dr. Martin Luther King Jr. The neighborhood has seen, and continues to go through, many changes amid the impending threat of gentrification.

The marsh has been, and remains, an everlasting buffer between Rosemont and the Ashley River. Economic growth and development are the most pressing external threats to the community and our marsh.

The Rosemont neighborhood is being significantly impacted by floodplain requirements, zoning, and new construction guidelines and ordinances. My greatest concern is the unforeseen externalities: higher taxes and insurance costs, the displacement of historical residents through gentrification, and the loss of all that made Rosemont that beloved community family.”

— Rev. Chris Buggs, Rosemont Neighborhood Association Board President

This Marsh Resilience Plan aims to lay the groundwork for conserving and enhancing the defender of the community, so that the marsh may continue to protect Rosemont for generations to come, just as it always has.

The Big Picture

Rosemont is a community that has existed for generations alongside the marsh that borders it. The two have always been connected. The marsh shapes how water moves through the neighborhood, how storms are experienced, and the quality of life for people living in Rosemont. It has long provided ecological value, a sense of place, and a natural buffer between land and water.

Today, both the community and the marsh are under increasing pressure. Flooding is more frequent. Sea levels are rising. The neighborhood sits near legacy industrial sites and areas of known contamination. At the same time, many residents face economic constraints that make it harder to respond to and recover from these challenges. These are not separate issues; they compound one another, shaping daily life in Rosemont and increasing the community’s vulnerability over time.

This Marsh Resiliency plan begins from that reality. It recognizes that the health of the marsh and the well-being of the community are inseparable. A resilient marsh can help reduce flooding, buffer storm impacts, and improve water quality. But its ability to do so depends on how it is managed, restored, and supported in the years ahead.

In partnership with the Rosemont community, the Sustainability Institute engaged Biohabitats to better understand the condition of the marsh and to develop a path forward. Together with community members and partner organizations, this work draws on field data, hydrodynamic modeling, and scientific research to inform a set of strategies aimed at strengthening both the marsh and the community it protects.

Key Findings

The Rosemont marsh is a functioning tidal salt marsh, even though it has been heavily altered by past land use and is under stress from what surrounds it today.

The Rosemont marsh is in fair condition.

Field surveys found the marsh to be in fair condition but moderately degraded. It’s health varies by location: the areas closer to the Ashley River and toward the marsh interior are healthier, while the edges next to roads, seawalls, and other hard infrastructure, along with the section closest to the neighborhood, are more degraded.

Blocked tidal water flow is an underlying cause behind many of the marsh’s problems.

The main creek channel itself is holding up reasonably well, but there’s a major choke point where the marsh meets the river, caused by an old human-made berm suspected to be from an old rail line, a blocked-off area behind the marina, and other narrow spots scattered along the creek. This restricted flow is making water quality worse, causing standing water and dying plants, and is suspected to be one major reason that large patches of smooth cordgrass (*Spartina alterniflora*), the most common marsh grass in South Carolina, appear stressed.

The vast majority of vegetation in the marsh is native.

Salt marsh vegetation was entirely native in the Rosemont marsh. No invasive plants like common reed (*Phragmites australis*) were present. However, invasives were commonly observed along the marsh’s edge.

Heavy metals were not detected in collected water samples.

Pollutants commonly associated with a legacy of industrial land use, like heavy metals, were not detected in the marsh.

The marsh still supports a good variety of wildlife, despite signs of stress to the ecosystem.

Healthy marshes tend to attract certain birds and pollinators, and Rosemont marsh has them. However, some of those species were seen only in small numbers, and many of the animals found were tough, adaptable types that tend to do well even in struggling environments. Taken together, this suggests a marsh that still has ecological value but is under real strain.



Water testing shows a consistent bacteria problem, especially near the Freddie Whaley Community Center.

Bacteria levels linked to sewage or animal waste exceeded healthy levels in nearly every water sample collected over 10 months, at every testing location. The water near the Community Center stood out as different from the other two testing sites in almost every way (lower oxygen, lower pH, murkier water, and a gasoline smell that lingered for months), suggesting something specific to that location is adding extra stress.

Stormwater runoff from streets and roofs gets trapped in the marsh.

The tides rise and fall in the marsh, but the areas farthest from the Ashley River do not flush out with the tide. Stormwater runoff from the streets and roofs introduces more freshwater, nutrients and pollutants to this area that is already stressed, which leads to algal blooms and poor water quality. Interventions to improve tidal exchange can mitigate these stressors.

Rare and protected species are not a major concern for future design work.

A few rare, threatened, or endangered protected species could potentially be found in or near the marsh, but this isn't expected to significantly limit restoration plans. Coordinating early with wildlife agencies and looking for opportunities to improve habitat for these species is still a good practice.

The pressures facing the marsh and the pressures facing the community are connected.

The same forces putting stress on the marsh, like development, paved surfaces, and changes to how water flows, are also putting stress on the neighborhood itself, through rising flood insurance and building requirements, zoning changes, and the risk of long-time residents being priced out.

Top Recommendations at a Glance

This Marsh Resiliency Plan aims to lay the groundwork for conserving and enhancing the defender of the community, so that the marsh may continue to protect Rosemont for generations to come, just as it always has.

Three connected problems emerged from this year-long study: **restricted tidal flow**, **poor water quality near the community**, and a **marsh with no room to migrate** as seas rise. The following actions respond directly to those three themes. The high-level actions below are organized by the party best positioned to lead each effort.

1

City of Charleston

- Remove tidal restrictions, including the berm at the mouth of Rosemont Creek and the Austin Avenue bridge, to restore natural tidal exchange and sediment accretion through the marsh.
- Establish a protected marsh buffer, prioritizing a fully natural critical buffer nearest the marsh edge and a managed buffer beyond it, to filter pollutants and preserve room for the marsh to migrate inland as seas rise. This would require working with all marsh-adjacent property owners and property owners in low-lying areas to convert land into protected marsh buffer.
- Commission a contaminant source study, with a commitment to resolve any findings, and a local watershed-wide drainage study to identify the best locations and types of water quality improvements needed to treat stormwater before it reaches the marsh.

2

SC Department of Environmental Services & U.S. Environmental Protection Agency

Conduct post-closure testing and environmental justice review at the former landfill beneath Stanley Chisolm Park, and support excavating the site to restore it as high marsh, maritime forest, and public park space.

3

The Sustainability Institute, South Carolina Department of Natural Resources, and other Non-profit and Community Partners

Install nature-based water quality solutions, including pocket wetlands throughout the community to filter runoff before it reaches the marsh and oyster-based living shorelines along the main channel.

Implement near-term restoration such as runnels, shallow channels dug to drain ponded water in the marsh, and support healthier vegetation growth.

4

U.S. Army Corps of Engineers & TBD Partners

Pursue thin layer placement as a longer-term adaptive management strategy, using dredge material to raise the marsh surface in the lowest, most vulnerable areas to help it keep pace with sea level rise.

5

Rosemont Community

Stay engaged in monitoring, planning meetings, and public comment opportunities to keep these actions moving and ensure the plan reflects the neighborhood's priorities.



02

Rosemont Place, People, and the Marsh

100% of the 326 people living in Rosemont are exposed to flooding.

A Community and Its Marsh

Rosemont is a historic community in Charleston with roots dating back to the Reconstruction era (1865–1877) immediately following the Civil War. Generations of families have lived here, shaping a neighborhood defined by strong social ties, cultural identity, and a lasting connection to place. Today, it remains predominantly a community of color, where many residents have deep personal and family histories tied to the area.

The marsh borders the community and plays a central role in how Rosemont functions. It influences how water moves through the neighborhood, absorbs and filters runoff, and helps reduce the impacts of storms and tides. It is both a natural system and a part of daily life, contributing to the character of the neighborhood and the way people experience their surroundings.

The relationship between Rosemont and the marsh is direct. The health of the marsh affects residents' quality of life, how water moves through the community, and how flooding is experienced. In turn, the marsh is influenced by the surrounding landscape and the decisions made within and around the neighborhood. The community and the marsh are closely linked, and their futures depend on one another.

A Resilient People

As this document is a “resiliency plan,” it is important to recognize that Rosemont and the Rosemont marsh are already resilient in the face of long-standing pressures. The area has persisted alongside a range of stressors, including industrial activity, chemical spills, multiple Superfund sites, former landfill use, the construction of Highway 26 which physically divided the neighborhood and altered drainage patterns, and ongoing development in surrounding areas that contributes additional stormwater runoff into the Rosemont marsh.

These environmental conditions intersect with social and economic realities in the community. During flooding events, compromised drainage and reduced water quality can contribute to the movement of contaminants into residential streets and yards. At the same time, Rosemont includes a significant population of **older adults (22% of the community)**, and some residents face mobility, health, or resource constraints that shape how they experience and respond to flooding and other environmental stressors. According to the EJ Strong Rosemont Field Practicum Report (2022), **100% of the 326 people living in Rosemont are exposed to flooding and chemical release.**

The condition of the marsh is directly tied to the health and well-being of the people of Rosemont: when it is functioning well, it helps moderate water levels and improve water quality; when it is degraded or overwhelmed, those protective functions are reduced, and community exposure to flooding impacts increases.

The Marsh and the Forces Around It



Figure 1: The Marsh and the Forces Around It

Sources
[Southern Environmental Law Center](#)
[EPA Map of Superfund Sites](#)
[EJ Strong Rosemont Field Practicum Report \(2022\)](#)

The Marsh and the Forces Around It

The Rosemont marsh is a small remnant salt marsh system that persists within a heavily altered and industrialized landscape along the Ashley River. Now approximately 42 acres in size, the marsh likely once formed part of a much larger tidal marsh and coastal upland habitat complex that occupied the Charleston peninsula prior to widespread filling, dredging, and development. Today, the marsh is characterized primarily by low marsh habitat dominated by short-form smooth cordgrass (*Spartina alterniflora*) with scattered pockets of high marsh on old berms supporting greater vegetative diversity, including species such as sea oxeye daisy (*Borrchia frutescens*), saltmeadow cordgrass (*Spartina patens*) and glasswort (*Salicornia virginica*). A primary tidal creek channel meanders inland from the Ashley River before splitting into two smaller channels. These forked smaller creeks border the Rosemont community. There is also a single hummock island (about 0.3 acres) located near the intersection of the three creek channels in the marsh. Hummocks (or hammocks) provide valuable habitat for wildlife.



Yellow flower of *Borrchia frutescens* (left) and *Passiflora incarnata* (right).



View from upland buffer towards the salt marsh (dominated by *Spartina alterniflora*). Subtle differences in elevation and hydrology result in changes in the plant community composition.

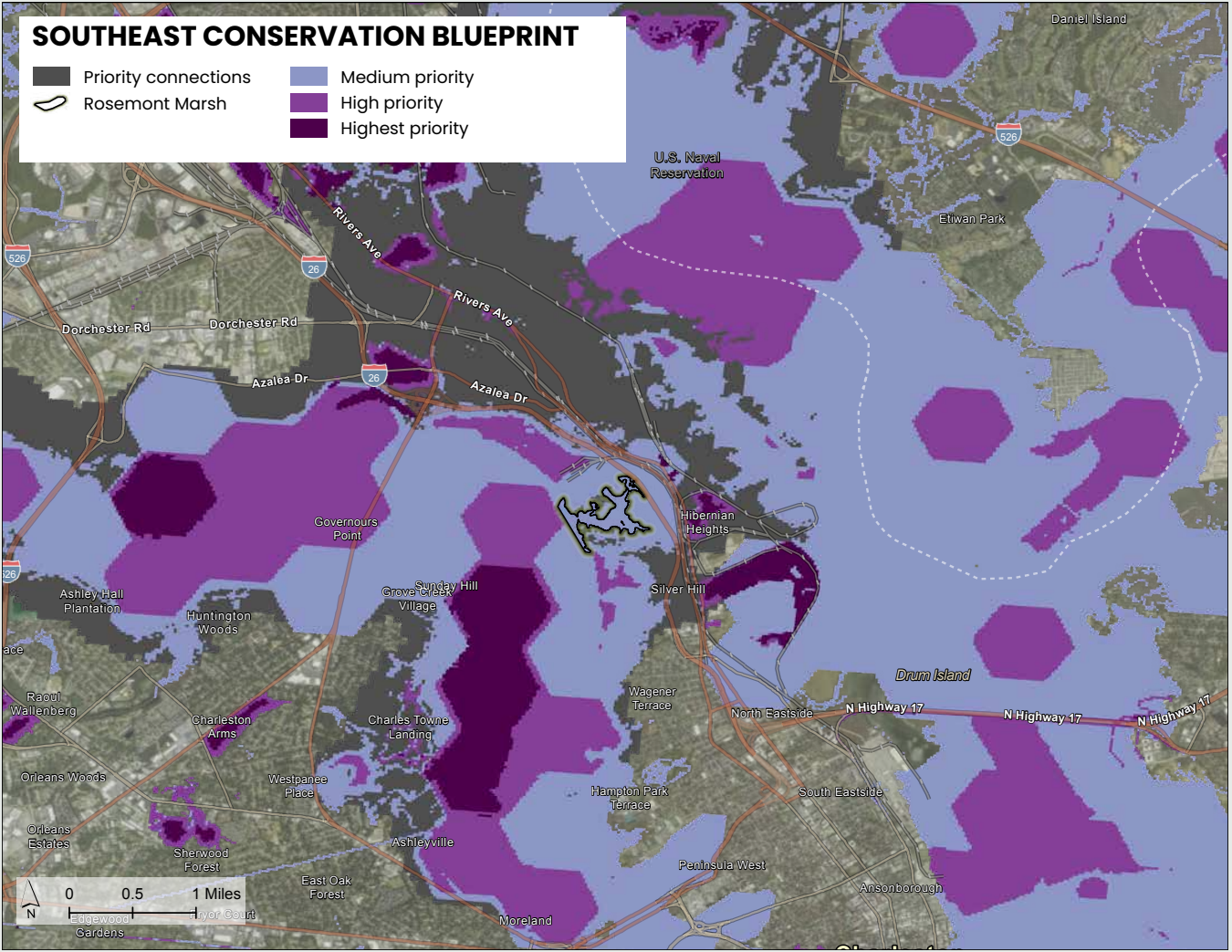
The marsh is bordered by a mosaic of industrial, transportation, recreational, and remediated land uses that reflect the long history of human manipulation in this portion of Charleston. To the north are a chemical transport facility, Dolphin Cove Marina, and Coach Stanley Chisholm Park, a former landfill site that has reportedly been capped and now supports dense vegetative cover around its perimeter. Historic dredging associated with marina access in the Ashley River resulted in dredge fill placement between the marina and the park, further altering the marsh edge and surrounding topography. To the south lies Dominion Energy's Hagood Station and additional industrial properties, while larger regional pressures include nearby Superfund sites, chemical facilities, expanding development including the planned Magnolia Landing residential development. Interstate 26, the major transportation corridor connecting the Charleston peninsula to the mainland, physically divided the Rosemont community and contributed substantial impervious surface and hydrologic alteration to the surrounding landscape.

Despite these pressures, the marsh edge continues to support a diverse assemblage of coastal vegetation. Native species observed along the marsh edge include wax myrtle (*Morella cerifera*), groundseltree (*Baccharis halimifolia*), muscadine vine (*Vitis rotundifolia*), dwarf palmetto (*Sabal minor*), cabbage palm (*Sabal palmetto*), yaupon holly (*Ilex vomitoria*), eastern red cedar (*Juniperus virginiana*), Jesuit's bark (*Iva frutescens*), live oak (*Quercus virginiana*), loblolly pine (*Pinus taeda*), and red buckeye (*Aesculus pavia*). However, invasive species are also prevalent throughout the marsh perimeter, particularly Chinese tallow (*Triadica sebifera*), which is widespread in patches across the site, along with scattered instances of pampas grass (*Cortaderia selloana*), chinaberry (*Melia azedarach*), and Japanese honeysuckle (*Lonicera japonica*). Together, these conditions reflect both the ecological resilience of the Rosemont marsh and the substantial environmental pressures imposed by decades of surrounding development and land alteration.

Viewed at a larger regional scale, the Rosemont marsh is an increasingly rare natural feature on the Charleston peninsula and it's a critical connector between other nearby slivers of nature. It is one of only a few tidal creek systems still present on the peninsula today. According to the Southeast Conservation Blueprint, the Rosemont marsh is considered a medium-priority conservation area and is sandwiched between areas ranked as high and highest priority for conservation action. The Southeast Conservation Blueprint identifies the area as especially important for imperiled amphibians and reptiles, ranking it within the top 5% of a larger regional analysis area for those species groups. The marsh also provides habitat value for imperiled and range-restricted mammals and has been identified as a potential restoration opportunity area for Atlantic migratory fish habitat. Together, these findings reinforce that Rosemont Marsh is more than an isolated urban wetland. It remains connected to the larger ecological systems of the Charleston region and continues to support important coastal habitat functions despite decades of surrounding change and development.



Diversity of vegetation in high marsh near the Western end of Hagood St.



How We Studied the Marsh

To better understand the condition of the Rosemont marsh and how it may change in the future, the project team combined on-the-ground fieldwork, community knowledge, historical research, water quality testing, and computer modeling. The goal was to build a clearer picture of how the marsh has changed over time, how it functions today, and what challenges it may face in the future. This work was designed to directly address community concerns related to flooding, water quality, marsh health, and future marsh loss from sea level rise and continued development pressure.

Several different tools and approaches were used to study the marsh. A Marsh Rapid Assessment Method (MarshRAM) survey was completed across eight transects throughout the marsh. This MarshRAM served as a structured framework for the team to walk, wade, and float the entire marsh to document marsh condition, vegetation, tidal flow patterns, and signs of stress or disturbance. Weekly water quality sampling helped identify potential pollution concerns and better understand the overall health of the marsh system. Testing included nutrients,

bacteria levels, dissolved oxygen, temperature, turbidity, salinity, heavy metals, and other indicators of marsh condition. The team also documented plant and wildlife species throughout the study because biodiversity can provide important insight into marsh health and resilience. Wildlife observations are detailed in the appendices of this report, but a single-day BioBlitz in April 2026 recorded 464 wildlife observations spanning 170 species. A few species stood out as indicators of marsh health: clapper rail (*Rallus crepitans*) and marsh periwinkle snails (*Littoraria irrorata*), both sensitive to water quality, were present but in low numbers. Fish species found were highly tolerant of poor conditions. Together, these findings point to a marsh that still functions but remains under real ecological stress.

Historical aerial imagery dating back to 1939, sourced from the University of South Carolina Libraries aerial photo collection, was reviewed to better understand how the marsh and surrounding landscape have changed through decades of filling, dredging, industrial activity, road construction, and urban development.



Figure 3: Side by side of Rosemont in 1939 and Rosemont as of November 2025.

Elevation data and hydrologic computer modeling were also used to better understand how water moves through the marsh today, and how flooding may change in the future under different restoration approaches, rainfall amounts, and sea level rise scenarios. The team's first step was to check the model against real-world data collected from a tide gauge installed in the creek near the end of Odessa Street, making sure the model accurately reflected what was actually happening in the marsh. Once that was confirmed, the team began looking at how different parts of the marsh behave under different tidal conditions, asking questions about how deep water gets in different areas of the marsh, and how long that water stays before draining back out. Next, the team created additional models to test many different conditions at once, including a wider marsh outlet, different amounts of rainfall in the watershed, and different tide heights.

Together, these different layers of information helped create a more complete understanding of the Rosemont marsh as both an ecological system and an asset to prevent future storm damage. More detailed technical information and supporting data are included in the appendices.

Table 1: Overview of Data Collected		
Dataset/Tool	What it tells us	Detailed Results Location
Water Quality Testing	Pollution and ecosystem condition	Appendix A & B
MarshRAM (Marsh Rapid Assessment Method)	Marsh health and resilience as compared to other marshes	Appendix C
Habitat & Species Inventory	Biodiversity is a metric of ecosystem health	Appendix D & E
Hydrological & Hydraulic modeling	Flooding and water level patterns now and in the future	Appendix F
Geospatial Desktop Analysis	Historic influences to the marsh, local watershed extent, flooding extent, existing infrastructure, land cover, vegetation change analysis	Appendix G

A person with blonde hair, wearing a grey hoodie and orange pants, stands in a field of tall, dry grass. The field is dense with grass that has turned a golden-brown color. In the background, there is a line of green trees and two tall utility poles with power lines stretching across the sky. The sky is a clear, pale blue.

03

What We Found
The Health of the
Marsh Today

What Does A Healthy Marsh Look Like?

A healthy salt marsh is a vibrant, living landscape: an expanse of dense grasses, winding tidal creeks, soft pluff mud, and shallow pools that change with the tides each day. Birds feed along the marsh edge, fish and crabs move through tidal channels, oysters filter the water, and marsh grasses sway with the incoming tide. Although marshes can appear quiet from a distance, they are among the most productive and important ecosystems along the coast.

A healthy salt marsh is also constantly changing and adapting over time. It is shaped by tides, sediment, plants, wildlife, and the movement of water across the landscape. Healthy marshes are not flat or uniform, they contain a mix of elevations that create different habitat types, from regularly flooded low marsh to slightly higher marsh areas and hummock islands that support a greater diversity of plants and animals. These variations in elevation are important because they allow marsh plants to survive changing water levels and give wildlife different places to feed, shelter, and reproduce.

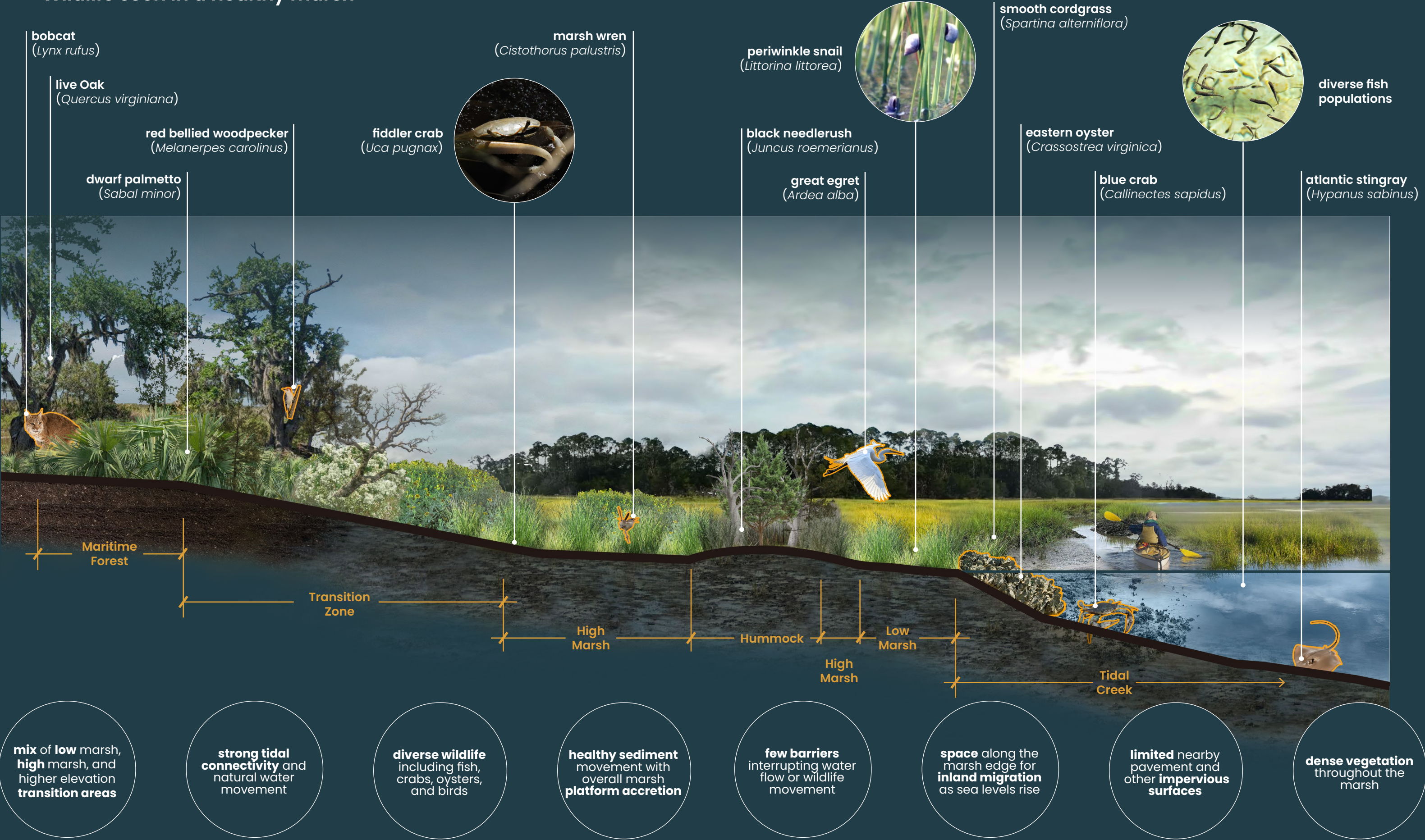
A healthy marsh is also well connected. Tides and salt water are able to move in and out of nearby creeks and rivers, bringing oxygen, nutrients, and sediment that help the marsh grow and maintain itself. At the same time, flooding occurs at the right frequency: enough to support marsh plants, but not so much that vegetation becomes drowned before it has the ability to gradually shift inland as sea levels rise. Healthy marshes are also connected to surrounding natural habitats and have space along their edges for marsh migration over time. Roads, pavement, buildings, walls, and other barriers can interrupt these natural processes, limit wildlife movement, and prevent marshes from adapting to changing conditions.

One of the clearest signs of a healthy marsh is dense, thriving vegetation. In coastal South Carolina, healthy marshes are typically dominated by smooth cordgrass (*Spartina alterniflora*) in lower elevations, with more diverse primary vegetation in higher marsh areas and the transition zones between marsh and the upland. A healthy marsh generally has very little bare mud or open water within the marsh platform itself. Beneath the surface, dense root systems help hold sediment in place and reduce erosion, while oysters, crabs, fish, birds, and many other species are present. In general, high biodiversity, meaning many different kinds of plants and animals, is a strong indicator of marsh health and resilience.

Research by NOAA and other coastal scientists has shown that “persistent” or resilient marshes tend to share several common traits. One of the strongest indicators of marsh health is having a substantial amount of marsh vegetation at slightly higher elevations relative to current water levels. **Marshes with more high marsh habitat and fewer large unvegetated areas are generally better able to keep pace with sea level rise and environmental change.** Scientists have also found that unhealthy marshes can deteriorate in many different ways, making marsh decline harder to identify early on. Because of this, understanding marsh health requires looking at the entire landscape including vegetation, flooding patterns, elevation, sediment movement, tidal connectivity, and surrounding land use, rather than relying on any single measurement alone.

What Makes a Marsh Healthy?

Wildlife seen in a healthy marsh



30 Figure 4: What Makes a Marsh Healthy

Is the Marsh Healthy?

The Rosemont marsh is alive and functioning, but it is under significant stress that will likely become worse into the future if no action is taken. A full year of monitoring has told us that **the marsh retains real ecological value, and certain areas remain in reasonably good condition, but there are degraded and disconnected portions, water quality regularly fails to meet state standards, and the marsh has essentially no room to adapt as sea levels continue to rise.**

What's working In the Rosemont Marsh?

The areas of the marsh closest to the Ashley River, along the main creek channel, and a few small pockets of slightly higher elevation with greater plant diversity, show the strongest signs of marsh health. Vegetation in these areas is taller, denser, and more diverse, which indicates better tidal exchange and more stable ecological conditions. Wildlife surveys also turned up species that depend on healthy marsh habitat, including clapper rails (*Rallus crepitans*), great egrets (*Ardea alba*), marsh periwinkle snails (*Littoria irrorata*), and blue crabs (*Callinectes sapidus*).

The absence of ditching or other direct alteration directly inside the marsh is also a meaningful positive finding. Many historic salt marshes along the Atlantic coast were extensively ditched for mosquito control or for rice cultivation, a practice that severely damaged marsh structure and hydrology throughout the southeast. The Rosemont marsh does not appear to have that legacy, which gives it a slightly better foundation for restoration compared to many other urban marshes.

What is stressed or degraded in the Rosemont Marsh?

The east side of the marsh furthest from the Ashley River and areas further away from the main creek channel show signs of stress. Vegetation is shorter, less diverse, and dying off entirely in some spots. Several patches have converted to ponds with no way for water to escape. Standing water, poor drainage, and eroded marsh/upland edges were all documented.

The inner marsh platform is tidally active and dominated by smooth cordgrass (*Spartina alterniflora*), which is a stress tolerant, saltmarsh species that occupies areas of the marsh that are usually underwater a few times at day at high tide. *S. alterniflora* does not tolerate being permanently underwater, nor does it survive above mean high water because it is outcompeted by other species. In areas of weaker tidal exchange, but too wet for other species, a shorter and less vigorous form of *S. alterniflora* grows (short-form).

The dominance of short-form *S. alterniflora* in the marsh platform is indicative of a productive marsh community; however, it is incredibly vulnerable to sea level rise. Less vigorous vegetative growth and pockets of unvegetated areas can lead to degradation of the marsh platform and a net loss in marsh elevation. As sea level rises, the inner marsh platform will be more susceptible to drowning and transitioning to less productive, unvegetated open water.

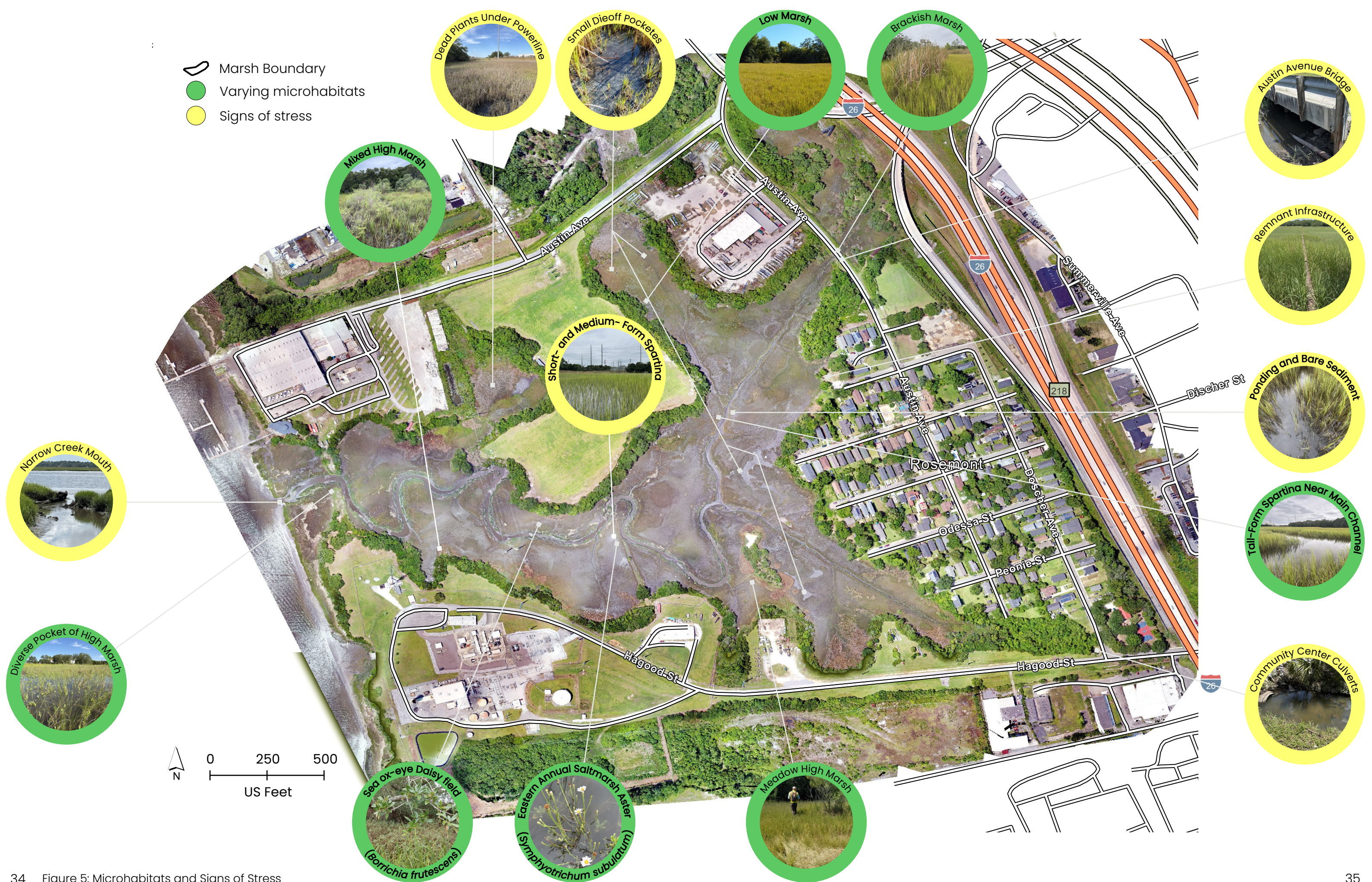
The dominance of *S. alterniflora* is evidence of tidal connectivity, but due to the size of the marsh platform, the areas of the marsh most distant from the Ashley River may be tidally connected but without adequate tidal exchange. Tidal exchange flushes out the marsh and prevents freshwater inputs from the watershed (e.g., stormwater runoff) from accumulating. With poor exchange, freshwater can be trapped and plant

communities will shift to brackish or less salt tolerant species such as cattail (*Typha spp.*) and big cordgrass (*Spartina cynosuroides*) and may be more susceptible to invasion by less desirable species, like common reed (*Phragmites australis*). Evidence of brackish communities were observed upstream of Austin Avenue bridge, ditches near the Freddie Whaley Community Center, and other areas on the fringe of the marsh.

Tidal connectivity, the regular exchange of saltwater that keeps a salt marsh functioning, is restricted at several points. Saltwater and the sediment it carries in during high tide doesn't reach as far as it should, largely due to an old earthen berm pinching the mouth of the creek, along with several other points throughout the marsh that don't receive enough salt water at high tide. When water cannot move freely in and out, salt marsh plants weaken and eventually die off, and the marsh platform doesn't receive as much sand, silt, and mud to grow vertically to keep pace with sea level rise.

A related observation was that there is no room for the marsh to move and grow as sea levels rise, either horizontally or vertically. The Rosemont marsh and community are surrounded by cement and industrial sites thus limiting horizontal movement. This and the existing stormwater inputs also cause excess freshwater from the surrounding area to flow directly into the marsh through culverts and ditches near the Freddie Whaley Community Center and under the Austin Avenue bridge.

Invasive plant species, including species like Japanese honeysuckle (*Lonicera japonica*) and Chinese tallow (*Triadica sebifera*), were also documented along most marsh edges, and a power line corridor crossing the marsh shows a distinct band of dead vegetation consistent with herbicide application.



How does the marsh compare to reference conditions?

Other marshes nearby along the Ashley River were also examined to identify possible differences between them and the Rosemont marsh. Other marshes had tall, dense *Spartina* grass throughout the marsh. In SC reference marshes the team also observed areas of higher elevation in the interior marsh and along the marsh edge, which will allow the marsh to migrate as sea levels rise in the future. Reference marshes also had multiple entry points for water from the Ashley River to enter and exit. Rosemont is lacking this space to grow and this larger connection to the Ashley River.

The Rosemont marsh was also compared to reference marshes in other areas of the world, using a method called the Marsh Rapid Assessment Methodology (MarshRAM). This method was adjusted slightly to match South Carolina marsh conditions. Full details on the MarshRAM are located in Appendix C.

After using the MarshRAM on the Rosemont marsh, it received an Index of Marsh Integrity (IMI) score of 6.26 out of a theoretical maximum of 10.0, placing it low in the “intermediately degraded” category when compared against a published dataset of other salt marshes. For context, a completely undisturbed marsh would score a 9.0. Rosemont falls in the middle of that reference dataset, meaning it is neither among the worst marshes assessed nor among the healthiest.

This IMI score reflects a marsh that has measurable ecological integrity remaining but is meaningfully impacted by its urban industrial surroundings.

Index of Marsh Integrity Compared to Reference Marshes

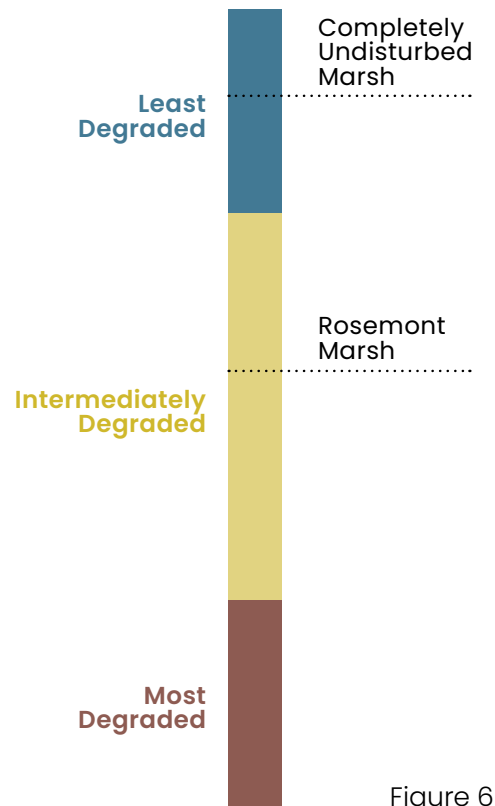


Figure 6



Migration Potential Score

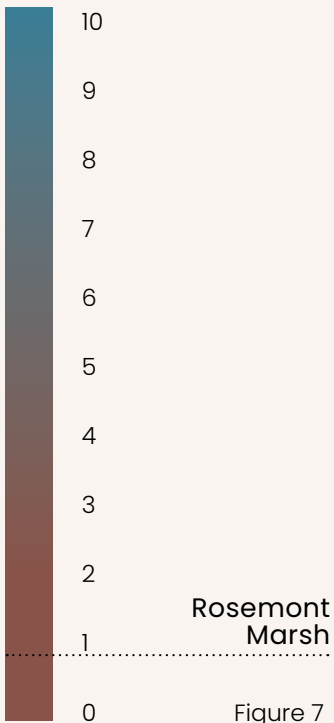


Figure 7

The Rosemont marsh also received a “migration potential score” of 1.0 out of 10.0, with zero percent of the area capable of migrating landward as sea levels rise. One way that healthy marshes can keep pace with sea level rise by gradually shifting to higher ground. The Rosemont marsh is completely surrounded by roads, buildings, and infrastructure, leaving it nowhere to go as water levels become higher in the future. Without intervention, this could mean that the marsh will shrink over time and eventually become open water.



Water Quality

Water quality testing at three locations in the marsh, next to the Austin Avenue bridge, the Community Center, and at the end of Odessa Street, found poor water quality for bacteria, nutrients, dissolved oxygen, pH, and a handful of concerning qualitative observations.

Bacteria levels linked to sewage and animal waste were too high in nearly every sample collected over 10 months, at all three locations. This likely points to a pollution problem coming from somewhere in the local drainage area. Bacteria levels also went up after it rained, which tells us that runoff from streets and yards is likely carrying pollution into the marsh. Nutrient pollution, the kind that often comes from lawn fertilizer, pet waste, leaking septic tanks, and other everyday sources, was also high enough at most sites to be considered poor water quality.

The team was able to test the water at the mouth of Rosemont Creek, where it meets the Ashley River, by boat during an outgoing tide. Those results showed much better results which supports a hypothesis that the marsh is doing its job to improve water quality as water moves through it.

The water near the Community Center was different from the other two sites in nearly every way we measured: it had less oxygen, was more acidic, less salty, and clearer, and the water sat still (not flowing) throughout almost the entire study. It also smelled like gasoline between mid-December and late April. Oxygen levels there were too low to support healthy aquatic life on nearly every testing day. Together, these signs suggest something specific to the water entering the marsh through the culverts emptying near the Community Center is adding extra stress to the marsh. On a positive note, it seems that it is being filtered effectively by the forest and marsh vegetation before reaching the Odessa Street sampling site. Also fortunately, testing for heavy metals like lead and mercury came back clean at all three locations, well below any level of concern.

Given the high bacteria levels across all the testing sites, the team also conducted a single round of DNA testing of the water. In this saltwater and brackish environment, the DNA testing showed a strong human DNA signal associated with elevated *E. coli* levels at the Community Center site. While the exact source has not been definitively identified, these results suggest there is a high likelihood that human wastewater inputs, such as stormwater carrying human waste or leaking septic infrastructure, are contributing to the elevated bacterial levels.

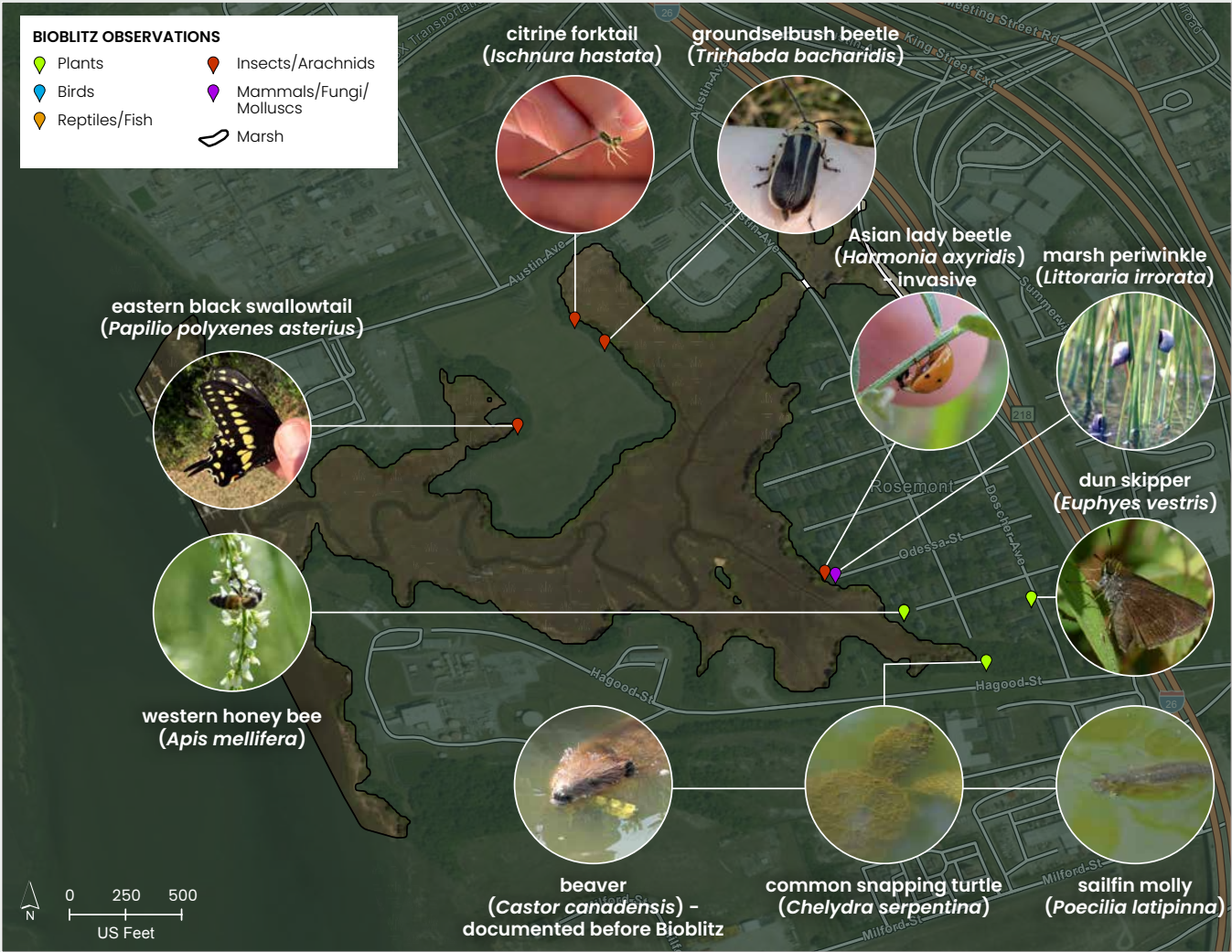
Plants, Animals, and Habitat

Throughout this study, the team looked closely at the plants and animals living in and around the Rosemont marsh, because a healthy variety of wildlife is one of the best signs that a marsh is doing its job. Volunteers and experts teamed up for a “BioBlitz” and found 170 different plants and animals, everything from birds and bugs to fish and turtles. Some finds were especially good news, like the painted bunting (*Passerina ciris*), a colorful songbird that conservationists across South Carolina are working hard to protect, which may be nesting right in the neighborhood. The team also spotted helpful native plants like Virginia

creeper (*Parthenocissus quinquefolia*) and muscadine grape (*Vitis rotundifolia*), though some unwelcome invasive plants, like Chinese privet (*Ligustrum sinense*) and Japanese honeysuckle (*Lonicera japonica*), were common too, especially along the marsh’s edges. During months of water testing, the team also regularly spotted marsh periwinkle snails (*Littorina littorea*) and fiddler crabs (*Uca pugnax*), along with egrets, ospreys (*Pandion haliaetus*), hawks, and even a beaver (*Castor canadensis*) near the Community Center.

Certain animals can tell us a lot about how healthy the marsh really is. Periwinkle snails, for example, don’t do well in polluted water, so seeing them throughout the marsh all year is a good sign. On the other hand, the clapper rail, a marsh bird that needs healthy, abundant food sources to survive, was only heard a few times all year, suggesting there aren’t many of them living here right now. The team did not conduct a comprehensive fish survey, but the two

fish species observed in the marsh are both known for being able to survive in poor water conditions, which is a sign that the water isn’t as healthy as it could be. The team also checked state and federal records for rare or protected species that might live nearby, like the black rail, tricolored bat, and diamondback terrapin, but none of these are expected to get in the way of future restoration work. All together, these findings show a marsh that’s still alive and supporting wildlife, but one that could use some help to be truly thriving.



Marsh Topography and Tidal Behavior

At the mouth of Rosemont Creek, an old berm that was built about 90 years ago (perhaps longer; this estimate is based on historic imagery available from the University of South Carolina) to connect the north and south side of the channel restricts tidal flow into the marsh. This bottleneck creates what is known as a muted tide: by the time high tide in the Ashley River begins to recede, water has not been able to reach as far or for as long a duration into the Rosemont marsh as it naturally should. This assumption is supported by hydrodynamic computer modeling, which compared current conditions against a scenario in which the berm was removed.

Based on an accurate 3D computer model of the marsh, built using field data and other available data sources, water moves through Rosemont unevenly, with some areas flushed regularly by the tide and others holding water for long stretches. The team calibrated this model to match, as closely as possible, the actual conditions of how water moves in and out of the marsh, then used it to experiment with different scenarios for improving that flow. Through this process, the team found that widening the creek's mouth could help more of the marsh stay tidally connected without increasing flood risk to the community, along with several other findings detailed below, all aimed at understanding how to move water more effectively in and out of the marsh, closer to how it likely moved under natural conditions before the marsh was altered by human development.

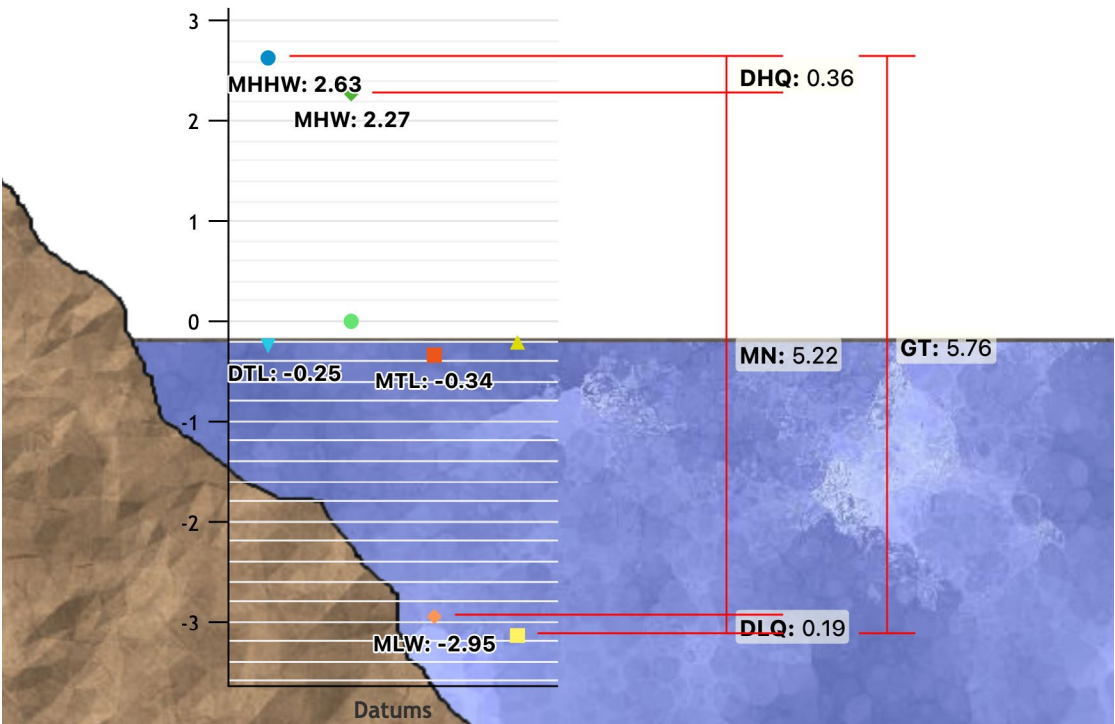


Figure 9: Normal Water Levels for Rosemont Marsh based on tide datums for NOAA gage 8665530, Charleston, SC, referenced to NAVD88.

In general, the ground elevations in the marsh range from about 2 feet above sea level near the main channels to about 4 feet above sea level near the upland edges where there are woody buffers. For reference, the Freddie Whaley Community Center is at an approximate elevation of 12 feet above sea level and the Austin Avenue bridge is about 6 feet above sea level. This makes sense as the mean higher high water (MHHW: a.k.a. a normal high tide) is about 2.6 feet above sea level. The creek channel bottoms range from about 2 feet near Austin Avenue Bridge to 5 feet in the ditch near the Community Center. The channel bottom is about 0.5 feet below sea level where the two tributaries meet, and about 3 feet below sea level where the main

creek channel meets the Ashley River. This corresponds with the mean lower low water (MLLW: a.k.a. a normal low tide) elevation of approximately -3 feet (3 feet below sea level).

Water does not spread out evenly across the marsh. It's also not perfectly flat. It has subtle high and low spots that affect how water moves and what plants can grow where. Currently, high tides, which have an average MHHW of 2.6' (Figure 10: stripes), don't reach the full marsh boundary. However, in the future, this is expected to change with sea level rise. During an average high tide in 2050 of 3.8' (Figure 10: light blue) and a major high tide of 4.9' in 2050 (Figure 10: dark blue) a larger area of the marsh and community will have flooding during high tide.

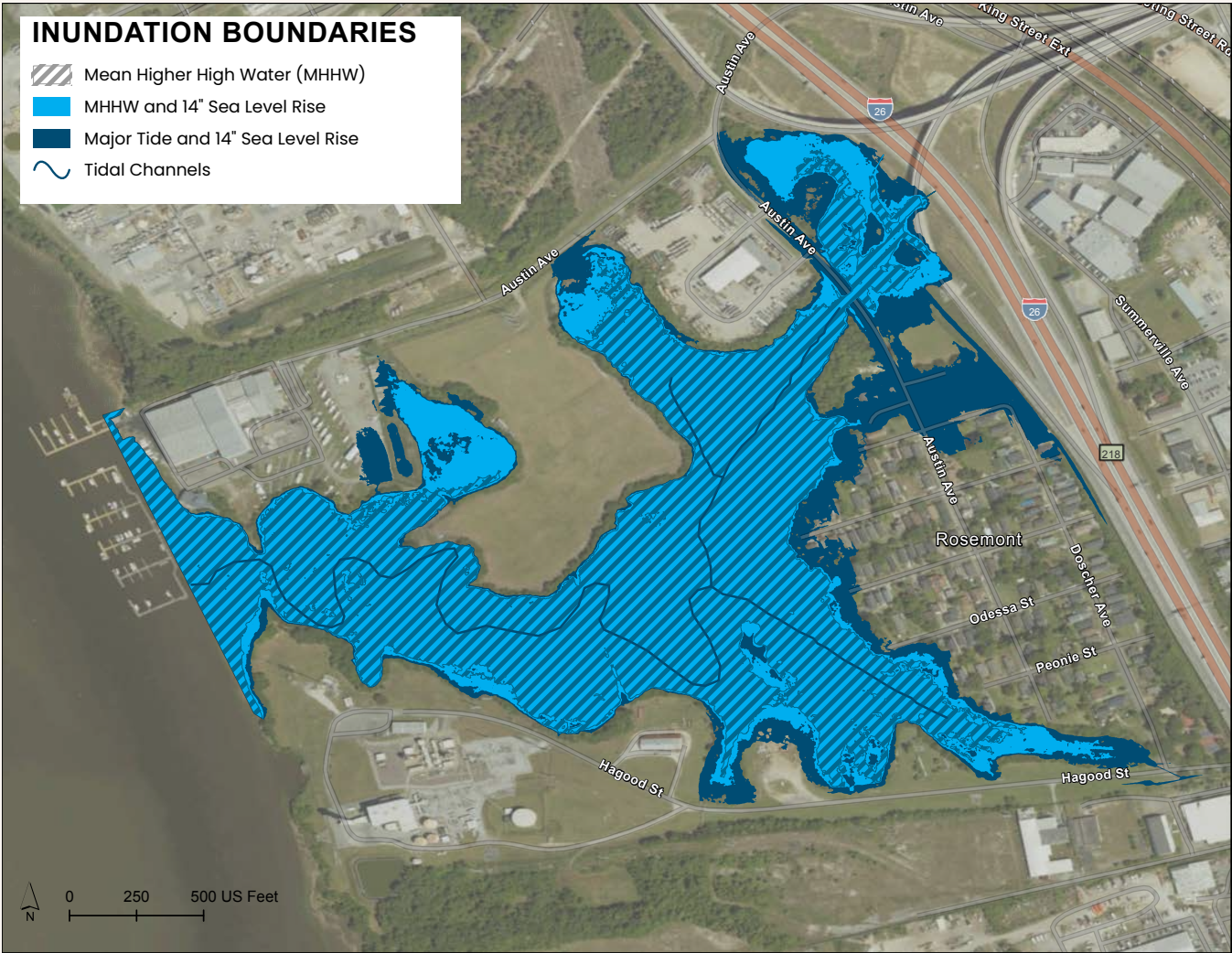


Figure 10: Modeled water footprint (tidal inundation boundary) at high tide under current conditions (stripes), 14" of sea level rise (light blue) and major tide tide plus 14" sea level rise (dark blue)

In areas of the marsh that do get covered by the tide, water doesn't stay for the same amount of time everywhere. Some spots hold water much longer than others, particularly in areas within or close to the marsh's main channels, which is normal. But the model also revealed pockets of marsh away from the main channels that hold water for a long time. In some cases, these coincided with areas identified as pools or mud flats during the marsh health survey (MarshRAM) portion of this study. These marsh pockets don't flush out with the tide as often as they should, potentially creating a more stressful environment for marsh grasses like *S. alterniflora*.

Inundation is defined here as the covering of land with water. Marshes are normally “inundated” and the percentages shown represent the percentage of time that the marsh would be covered with water in a given time period.

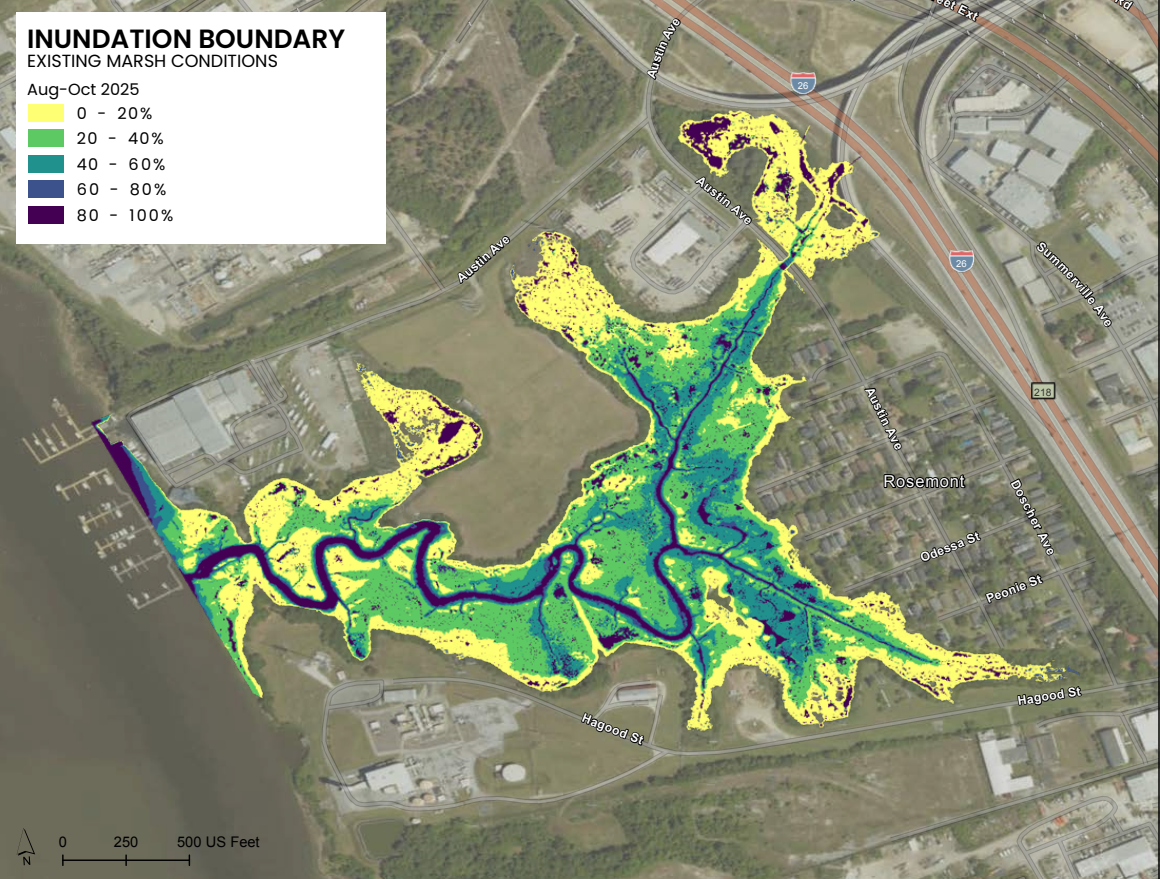


Figure 11: Modeled percent of time inundated by tide during spring (higher) tide cycle (August - October, 2025) under existing conditions

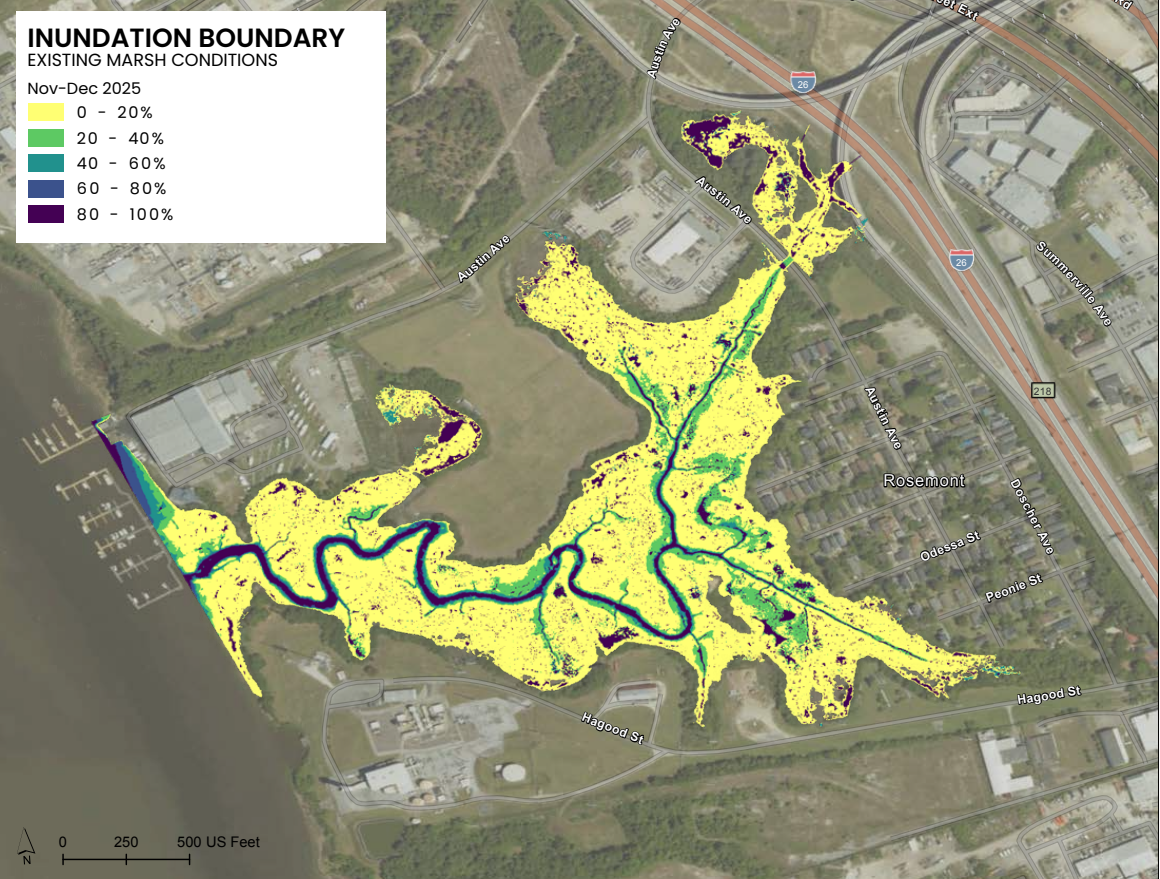


Figure 12: Modeled percent of time inundated by tide during neap (lower) tide cycle (November - December, 2025) under existing conditions

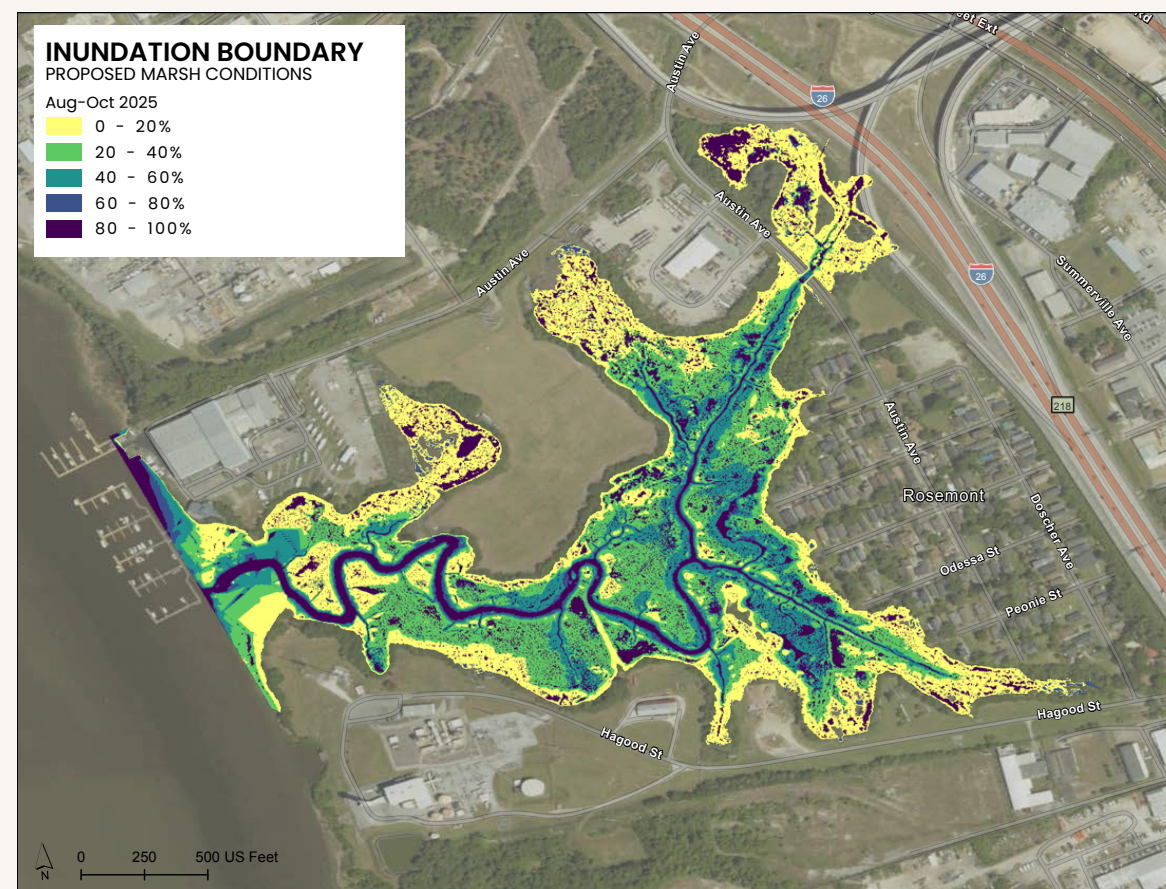


Figure 13: Modeled percent of time inundated by tide during spring (higher) tide cycle (August - October, 2025) with mouth of creek widened

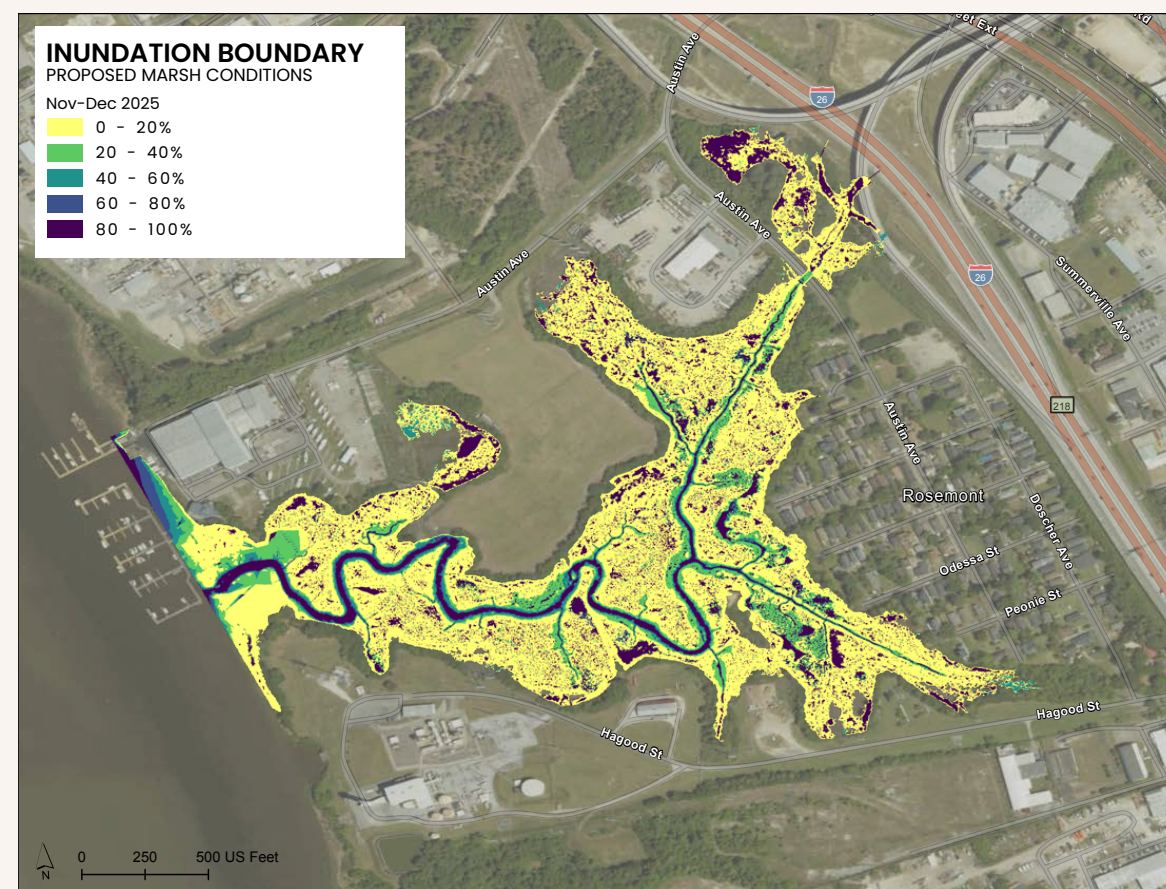


Figure 14: Modeled percent of time inundated by tide during neap (lower) tide cycle (November - December, 2025) with mouth of creek widened

The team tested what would happen if the mouth of the creek, where it meets the Ashley River, were widened. This change had a measurable effect on the marsh, but that effect appeared to be very localized rather than marsh-wide. The benefit of this proposed opening is that it would help restore a more natural tidal prism, making the tidal channel more active and improving flushing in the upper reaches of the marsh. Looking at the modeled marsh from August through October 2025, the percentage of the marsh covered by water at any given time increased from about

35% to 40% as a result of opening up the entrance to the Rosemont marsh. Longer periods of inundation like this can promote more vigorous growth of *S. alterniflora* and support increased sedimentation, helping the marsh build elevation over time. Averaged across the whole marsh, the maximum water depth only increased slightly from 2.33 feet to 2.36 feet. This small increase means that this proposed restoration action would not meaningfully increase flooding in the Rosemont community during a normal king tide.

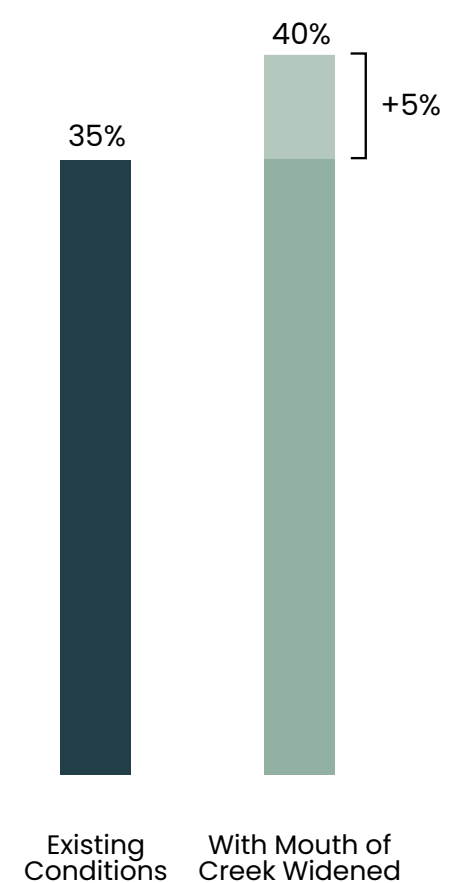
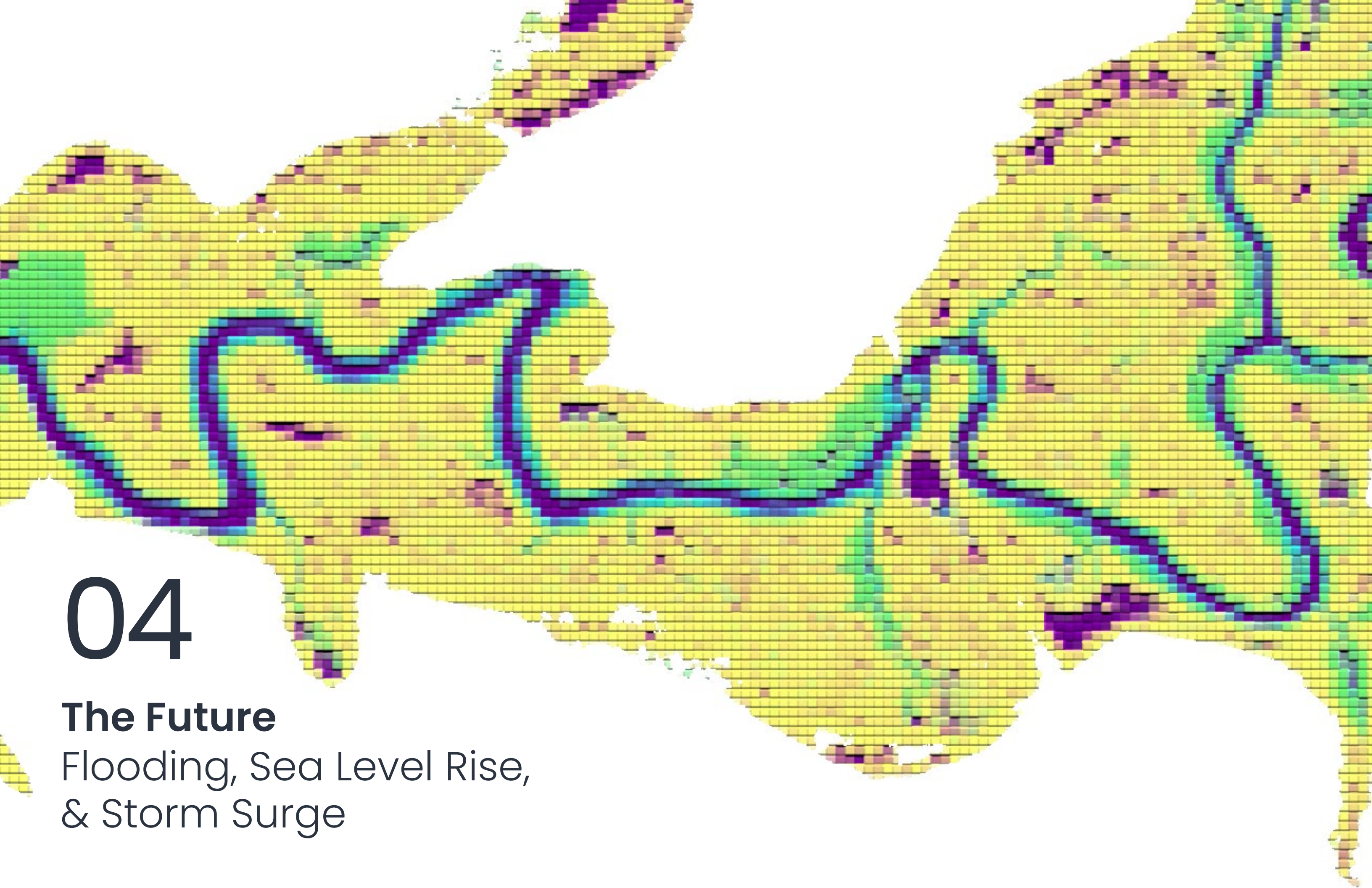


Figure 15: Modeled percent of marsh inundated by tide before and after widening the mouth of the creek



Figure 16: Modeled depth of water on marsh before and after widening the mouth of the creek



04

The Future

Flooding, Sea Level Rise,
& Storm Surge

Sea Level Rise in Rosemont

Rising seas are not a distant threat for Charleston, including Rosemont. The City of Charleston has experienced 13 inches of sea level rise over the past 100 years, according to historic tide gauge data from the National Oceanic and Atmospheric Administration (NOAA). However, this increase has not been gradual or steady: nearly half of that century’s worth of sea level rise has occurred in just the last 20 years, indicating that the rate of sea level rise is accelerating. In the coming future, NOAA projects an additional 14 inches of rise by 2050 and 24 to 48 inches by 2070.

Title: 48-hours of modeled tides from Rosemont Flood Action Plan

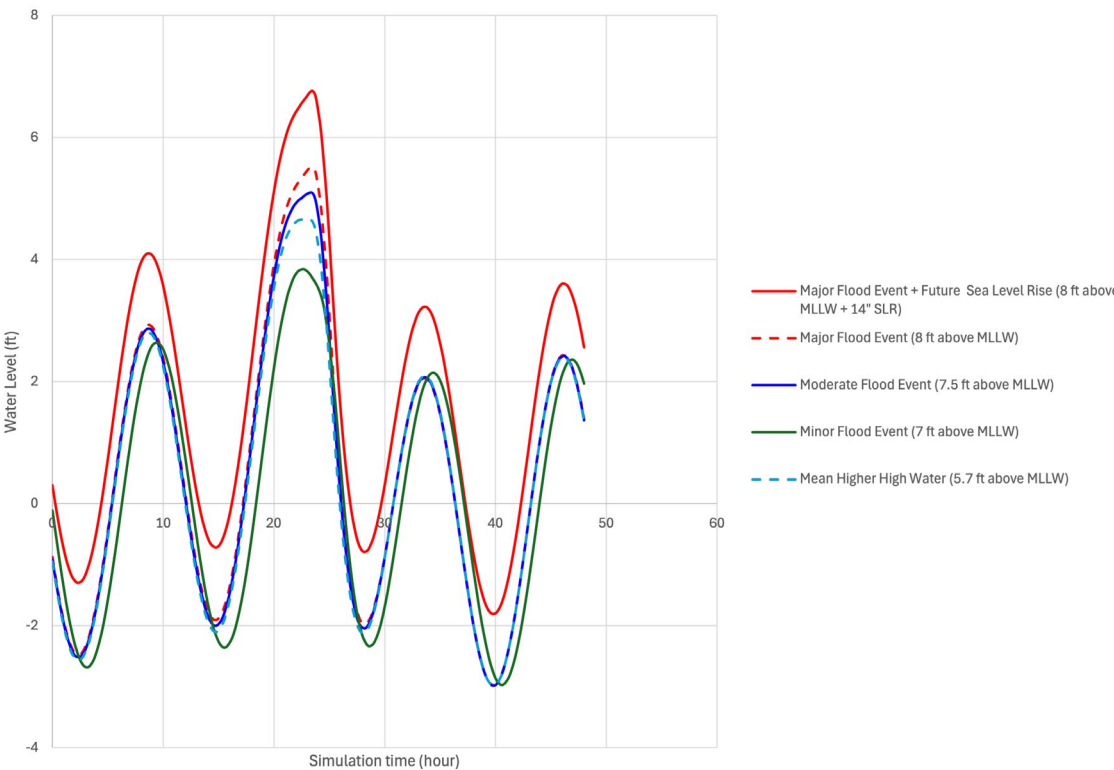


Figure 17: As part of the Rosemont Flood Action Plan, published in early 2026, these modeled (synthetic) tides were created to mimic actual conditions under various tide scenarios. The Rosemont Marsh Resiliency Study built a marsh model using these same assumptions.

MLLW stands for mean lower low water, which is the average height of the lowest daily low tide. MLLW is used as the baseline from which flood conditions are calculated.

Tidal Scenarios

A digital model of the Rosemont marsh was created to understand how sea level rise could influence the marsh in the future and how it may respond to any proposed changes. The goal was to use this digital model to inform recommendations for restoration and to improve the marsh’s resilience.

The following conditions were analyzed in the model to see how it would respond:

Existing Conditions: This scenario allowed the team to see in detail how water moves through the marsh today.

Proposed Conditions: This scenario included partial removal of the berm at the mouth of the creek and allowed the team to evaluate if removing this pinch point could allow for greater tidal exchange in the marsh.

For each of these conditions, the team evaluated various scenarios to see how water moves through the marsh at different times of the year, different tides, anticipated sea level rise, and during different design storms. The team evaluated the following scenarios for each condition:

- Scenario based on actual water levels that occurred in the marsh near Odessa Street from August – October 2025 (spring tide) and November – December 2025 (neap tide). These date ranges captured the natural variation in tide levels throughout the year. This was used to calibrate the model.
- Scenario running 48 hours of a normal tidal cycle through the model to visualize how water moves through the marsh based on today’s MHHW.
- Scenario running 48 hours of tidal cycle based on today’s MHHW plus 14” of SLR.
- Scenario running 48 hours of tidal cycle based on a major tide (2.3’ above MHHW) plus 14” of SLR.
- Scenario running 48 hours of tidal cycle based on today’s MHHW plus 4” of rainfall from a typical rainstorm (100% chance of occurrence storm).
- Scenario running 48 hours of tidal cycle based on today’s MHHW plus 7” of rainfall from an above average storm (10% chance of occurrence storm).

MHHW stands for mean higher high water, which is the average height of the highest daily high tide. **SLR** stands for sea level rise, which is the increase in average height of the ocean’s surface across the globe.

ALL WATER FOOTPRINTS OVERLAYED INUNDATION BOUNDARIES

- Proposed Marsh Nov-Dec 2025
- Existing Marsh Nov-Dec 2025
- Proposed Marsh Aug-Oct 2025
- Existing Marsh Aug-Oct 2025
- Tidal Channels

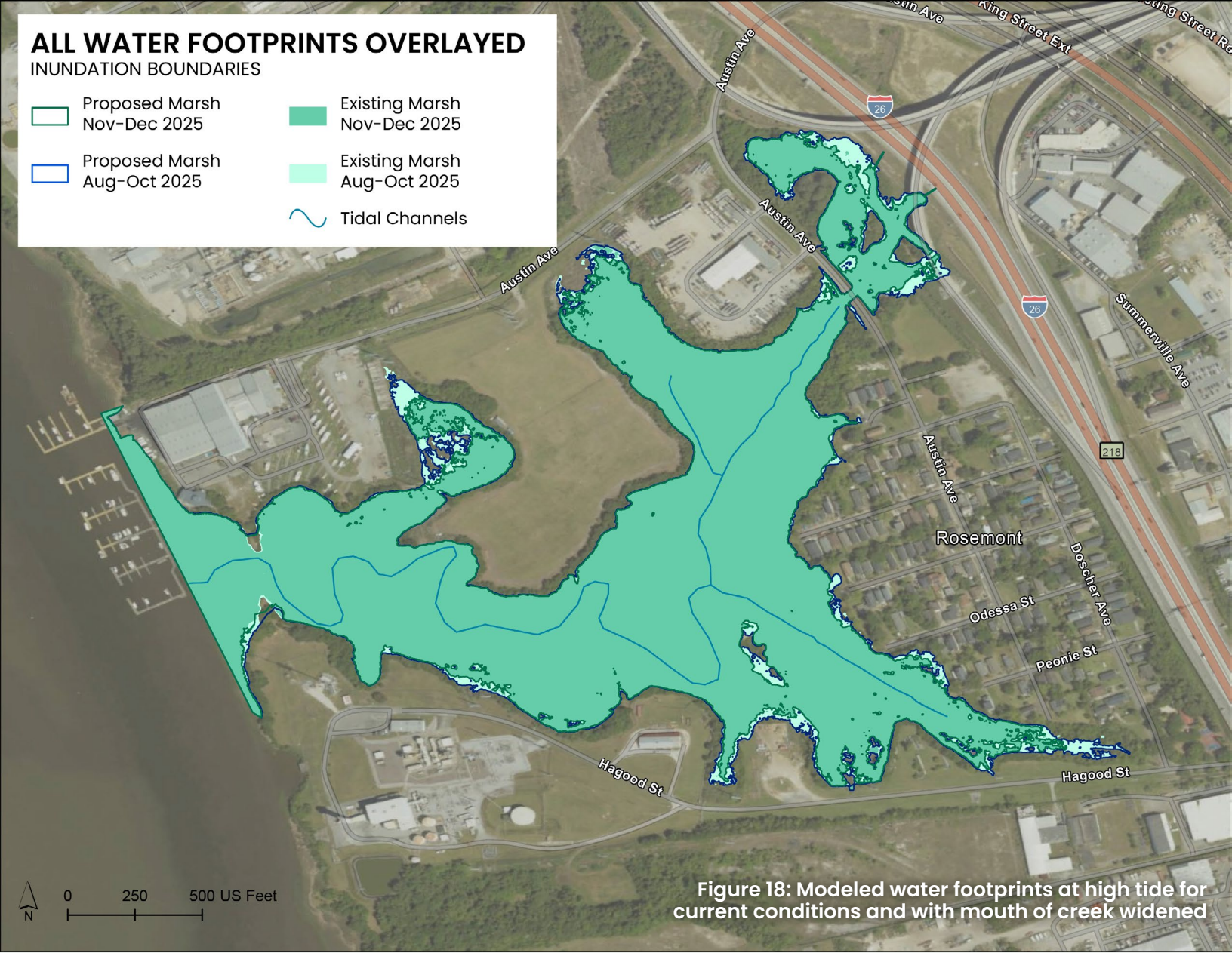


Figure 18: Modeled water footprints at high tide for current conditions and with mouth of creek widened

Rainfall and tidal flow affect different parts of the marsh in different ways. For both existing and proposed conditions, the model shows that today's MHHW alone doesn't flood the upper reaches of the marsh, including areas near the Community Center and the Powerline Easement between Coach Stanley Chisolm Park and the marina. When only tidal flow is considered, the maximum water surface elevation stays consistent across the marsh, meaning that the higher areas of the marsh receive little to no tidal water.

Rainfall tells a different story. Areas closer to the surrounding uplands, including the Powerline Easement, Community Center, and Austin Avenue Bridge, see a much higher water level during storms than the rest of the marsh. This is because stormwater runoff flows into these areas from the neighborhood above. In the ditch near the Community Center, for example, a 7-inch rainfall event raised the maximum water level in the marsh by about one foot compared to a normal high tide with no rain at all.

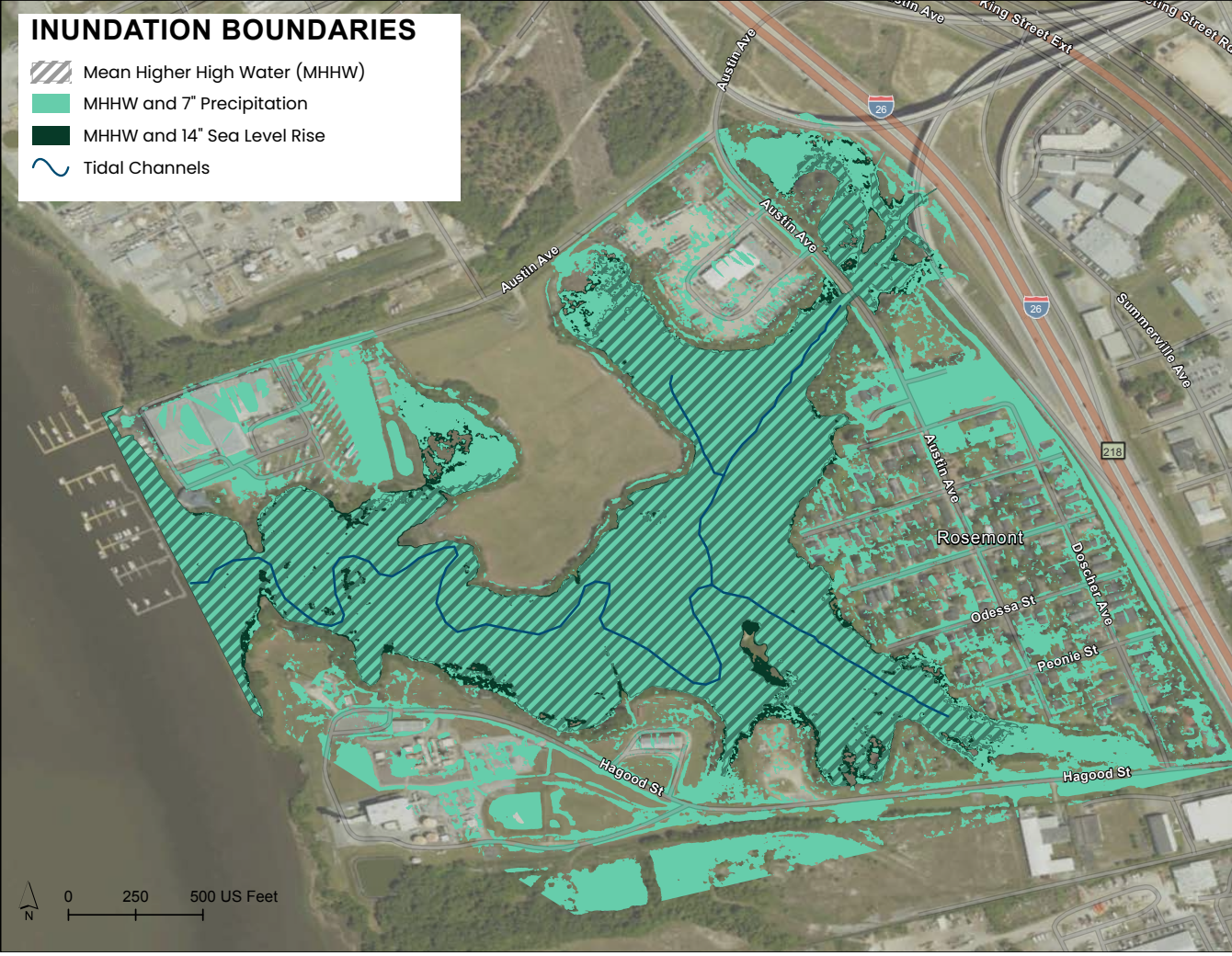
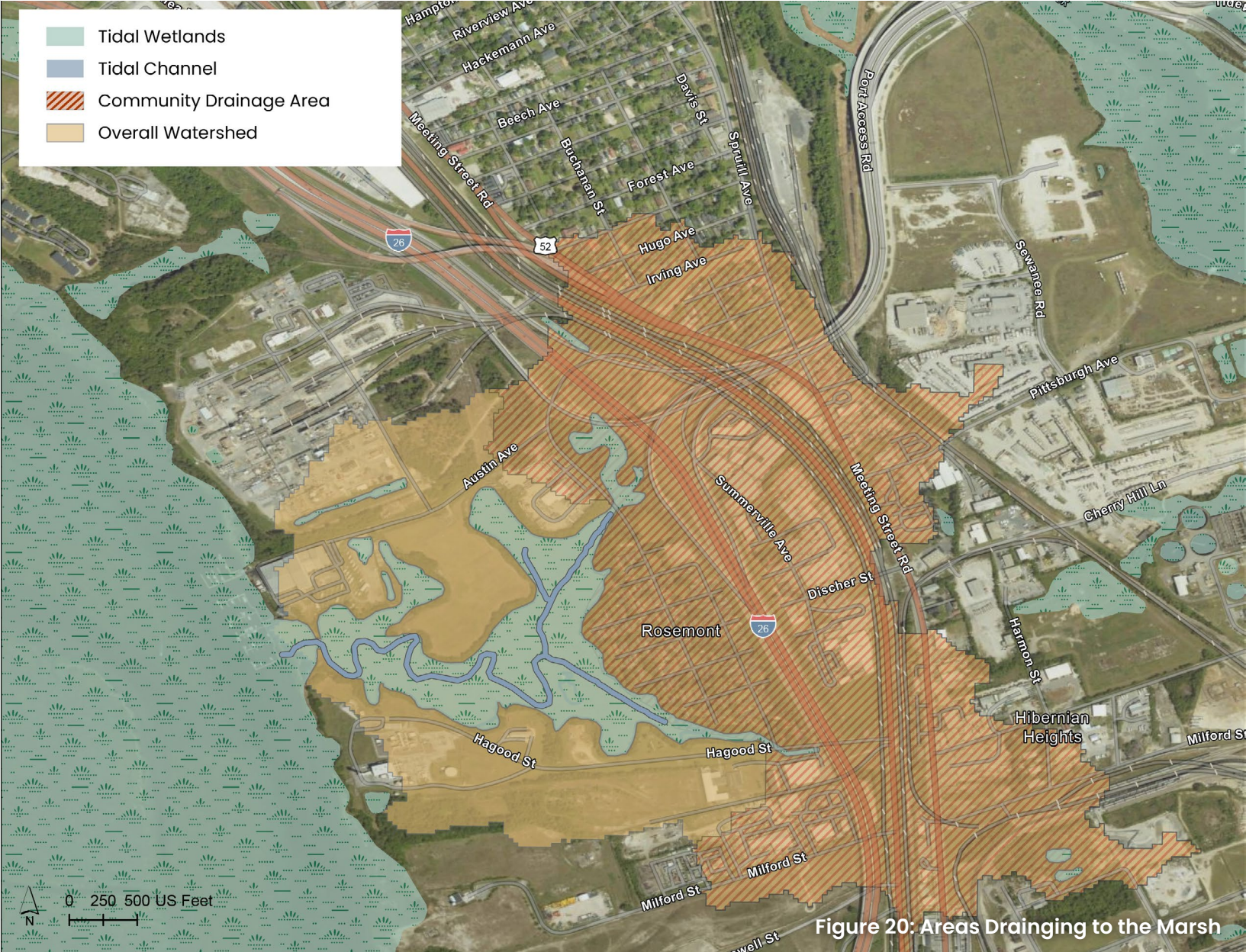


Figure 19: Modeled water footprints for future scenarios during different percipitation events

Maximum Water Surface Elevations for Future Climate Scenarios					
Location	Today's MHHW	Today's MHHW + 14" Future SLR	Major Flood Event + 14" Future SLR	Today's MHHW + 4" rainfall (no change)	Today's MHHW + 7" rainfall (no change)
Austin Ave Bridge	3.79	5.01	6.67	4.02	4.43
Community Center	N/A	5.01	6.67	5.5	6.07
Odessa Street	3.79	5.01	6.67	3.81	4.07
Tributary Confluence	3.79	5.01	6.67	3.81	4.01
Chisolm Park	3.79	5.01	6.67	3.81	4.06
Powerline Easement	N/A	5.01	6.67	4.60	4.71
Ashley River	3.82	5.01	6.67	3.83	3.84

Table 2: Maximum Water Surface Elevation (NAVD88) for present day and future climate change and sea level rise scenarios

Another finding of this modeling exercise was that the upland edges of the marsh receive a lot of freshwater, primarily from rainfall and runoff. In the future, this will continue to degrade water quality and cause flooding at the marsh edge and run the risk of degrading water quality and creating beneficial conditions for invasive species to move in. This runoff doesn't only come from the Rosemont community, but from a much larger area surrounding them.



What the Future Holds for the Marsh

In the future, the marsh will see more water, both from rising tides and increased rainfall. Some areas of the marsh may see plant communities shift in response to longer periods of tidal flooding or larger volumes of freshwater from stormwater runoff. The marsh has very little room to expand to accommodate this change: a few small areas exist where it could migrate inland, mainly in the upper reaches on either side of the Chisolm Park peninsula, but these areas are limited in size, back up against impervious surfaces, and sit within a landscape that otherwise lacks any buffer zone to allow further growth. Current tidal restrictions also limit how much new sediment from the Ashley River can enter the marsh to help replenish it; sediment which the marsh needs to grow vertically and keep pace with rising seas. Some minor sediment accumulation may still occur from upland stormwater runoff and the buildup of organic material within the marsh itself, but this is unlikely to be enough on its own to offset the marsh's long-term elevation needs.

An aerial photograph showing a coastal landscape. In the foreground, a dark body of water borders a marshy area. The marsh is interspersed with green grass and patches of brown, possibly indicating erosion or dry vegetation. Several buildings, including a large white industrial-style building and a smaller white building, are situated near the water's edge. A parking lot with several spaces is visible. In the background, a multi-lane highway with overpasses and ramps runs horizontally across the frame. Beyond the highway, there are more residential or commercial developments with various buildings and parking areas. The overall scene depicts a complex interface between natural coastal features and human-made infrastructure.

05

What We Can Do
Strategies for a
Resilient Marsh

Overview

The strategy menu in this chapter was developed around four goals identified by the Sustainability Institute and community partners:

Goal 1: Protect water quality by improving stormwater management in the watershed that drains to the marsh

Goal 2: Maintain and enhance marsh habitat integrity and ecological function

Goal 3: Reduce exposure of Rosemont to contaminated runoff and flood-borne pollutants

Goal 4: Support the marsh’s ability to filter water, moderate flows, and buffer storm impacts under changing conditions

These strategies are the product of extensive background work including literature review, field work, flood modeling, desktop analysis, and synthesis of existing environmental and planning data. They are presented as a suite of options for the community and project partners to consider as the marsh adapts to future conditions and continues to provide critical ecological and protective functions. These strategies should also be paired with a monitoring and adaptive management framework to respond to new data, emerging threats, and the effectiveness of ongoing management activities.

It’s also important to be realistic about what marsh restoration alone can and cannot achieve. The Rosemont marsh sits in a highly constrained setting, bordered by major roads, industrial land uses, legacy contamination sites, a former landfill, and ongoing development. These conditions limit how much the marsh can be reshaped or expanded. Because of that, not every challenge has an easily attainable solution, but each is included here because it remains within the realm of possibility with enough coordination and funding. The goal of this chapter is to be clear about what is likely achievable, so that effort and resources can be directed toward the actions that offer the greatest benefit for both the marsh and Rosemont’s residents.

How to Read These Strategies

Strategies are organized into three timeframes:

- **Act Now (0–2 years):** Immediate actions with high community benefit.
- **Invest and Build (2–5 years):** Capital investments that require funding and coordination.
- **Adapt Over Time (5–20+ years):** Long-horizon strategies tied to sea level rise scenarios. Some of these will require difficult conversations about land use, managed retreat, and regional policy, and successful implementation will depend on early, frequent, and honest communication between community members and decision-makers.

Note that the timeframes represent time to implementation, but should be viewed more as a continuum with ongoing planning and coordination starting upon plan acceptance. Additionally, some strategies may require initial action and follow-up actions triggered by a monitoring and adaptive management framework.

Within each timeframe, each strategy is also grouped by Responsible Party:

- **Community Actions:** Steps led by or involving Rosemont residents and the Neighborhood Association. Community members would not be navigating these actions alone; nonprofits and community-based organizations, such as the Sustainability Institute, are part of this group and would continue to provide support, coordination, and technical assistance alongside residents. This includes Rosemont Community, The Sustainability Institute, Lowcountry Alliance for Model Communities, AmeriCorps, and other non-profit and community-based partners.
- **City of Charleston Actions:** Steps that fall under the authority, budget, or planning responsibility of the City of Charleston.
- **State/Federal Actions:** Steps that require the involvement of state or federal agencies, given their regulatory authority, large-scale permitting role, or funding sources beyond the City’s jurisdiction. This could include agencies like the SC Department of Environmental Services, U.S. Environmental Protection Agency, SC Department of Natural Resources, and U.S. Army Corps of Engineers.

Cost and benefit information for each strategy is notated as follows in each strategy:

Table 3: Cost and Benefits Legend	
Cost	
\$	\$1,000–\$9,999
\$\$	\$10,000–\$99,999
\$\$\$	\$100,000–\$999,999
\$\$\$\$	\$1,000,000–\$9,999,999
\$\$\$\$\$	>\$10,000,000
Benefit	
	Not Supporting
	Indirectly Supporting
	Directly Supporting

Act Now

Community Engagement & Monitoring (Rosemont Community)

Description: Community engagement and monitoring refers to the ongoing participation of residents in the planning, implementation, and long-term stewardship of a resilience plan. Unlike the technical strategies in this chapter, this is not a single project with a defined design or construction phase. It is a sustained practice: staying informed, showing up to planning meetings, submitting public comments, and helping track conditions in the marsh and neighborhood over time. Community input strengthens technical work by grounding it in lived experience and local knowledge, and it also functions as a form of local monitoring, since residents are often the first to notice changes, whether that is a new odor, a flooded street, or a shift in the wildlife they are used to seeing.

Application: For Rosemont, sustained community engagement is what will keep the other strategies in this chapter moving forward and ensure they reflect what residents actually want and need. Many of the actions recommended here, from tidal restriction removal to landfill remediation, will unfold over years and involve multiple agencies and funding cycles. Community voice at each stage, in planning meetings, public comment periods, and ongoing conversations with the City and project partners, helps ensure the plan does not lose momentum or drift away from community priorities as it moves from recommendation to implementation.

Residents are also well positioned to contribute observational monitoring alongside the more technical, instrument-based monitoring described elsewhere in this report. Noticing and reporting changes such as new flooding patterns, unusual odors, or shifts in local wildlife can help flag emerging problems early, before they show up in formal testing. QR code flood monitoring and programs like Chronolog that encourage structured community participation over time have proven effective in other settings. Continued opportunities for community-led events, like the BioBlitz conducted as part of this study, can also help sustain this kind of engagement over time while building a stronger, shared understanding of the marsh’s condition among residents, the Sustainability Institute, and other project partners.

Cost


\$-\$\$

Benefits

Goal 1

Goal 2

Goal 3

Goal 4



Monitoring and Adaptive Management

(The Sustainability Institute, SCDNR, and Non-Profit/Community Partners)

Description: Monitoring involves assessing key indicators of marsh health over time to determine trends. Adaptive management is a strategy that uses monitoring data to inform actions. The intent of monitoring and adaptive management is to identify and mitigate emerging and ongoing threats to the marsh health early and initiate a natural recovery process before the system degrades.

Application: The strategies outlined in this report are not set-it-and-forget-it fixes. As the marsh responds to sea level rise, changing tidal patterns, and the restoration actions themselves, conditions should be monitored over time so that management can adapt accordingly.

Some key indicators of marsh health include shifts in vegetative communities, increases in ponding on the marsh platform, conversion from vegetative marsh to open water or mudflat, excessive erosion or sedimentation, accretion rate, and water quality. Some key indicators can be assessed rapidly with low altitude un-piloted aerial vehicles (UAV) and photogrammetry (e.g., ponding or loss of vegetation) while some require more detailed field studies (accretion rate). The best monitoring program to assess key indicators is one that can be consistently and realistically implemented with the available funding and/or staff.

An adaptive management framework establishes a set of performance criteria for each key indicator to establish when remedial action is required and which strategies may be applicable. If monitoring is robust, then the framework can likely point to specific remedial strategies, but if monitoring is not robust, the framework may simply point to the need to engage an experienced ecological restoration professional. A preliminary adaptive management framework for Rosemont Marsh is outlined in Appendix H.



Runnels

(The Sustainability Institute, SCDNR, and Non-Profit/Community Partners)

Description: A runnel is a shallow ditch dug to drain water trapped in areas where it's ponded. The goal of runneling is to remove standing water from the root zone, helping marsh plants grow more vigorously while using the excavated material to build up the marsh's elevation nearby, to encourage greater plant diversity and keep pace with rising seas.

Application: Runneling works best in areas where the marsh interior is ponded, and where that ponded area sits at a higher elevation than the nearby tidal channel it would drain into. Shallow channels are dug or compacted into the marsh surface in a way that mimics natural drainage patterns, connecting the ponded area to a tidal channel so water can drain more effectively. Shallower excavation within the root zone may offer a shorter-term fix, while deeper excavation below the root zone tends to be more permanent. Material removed during excavation can be placed nearby in shallow, low-profile mounds, sometimes called hummocks, which should stay inconspicuous and never rise above the highest astronomical tide (HAT) level.

Runneling should be planned in coordination with a restoration practitioner. Permitting pathways should be explored with permitting agencies like South Carolina Department of Environmental Services via a pre-permit meeting early in the full design process. Smaller projects can be completed by hand, with the help of volunteers, while larger or more complex sites would require experienced contractors with the right equipment. Because runneling involves excavation and the placement of material within a federally regulated water body, it is subject to a mix of federal, state, and local permitting requirements.



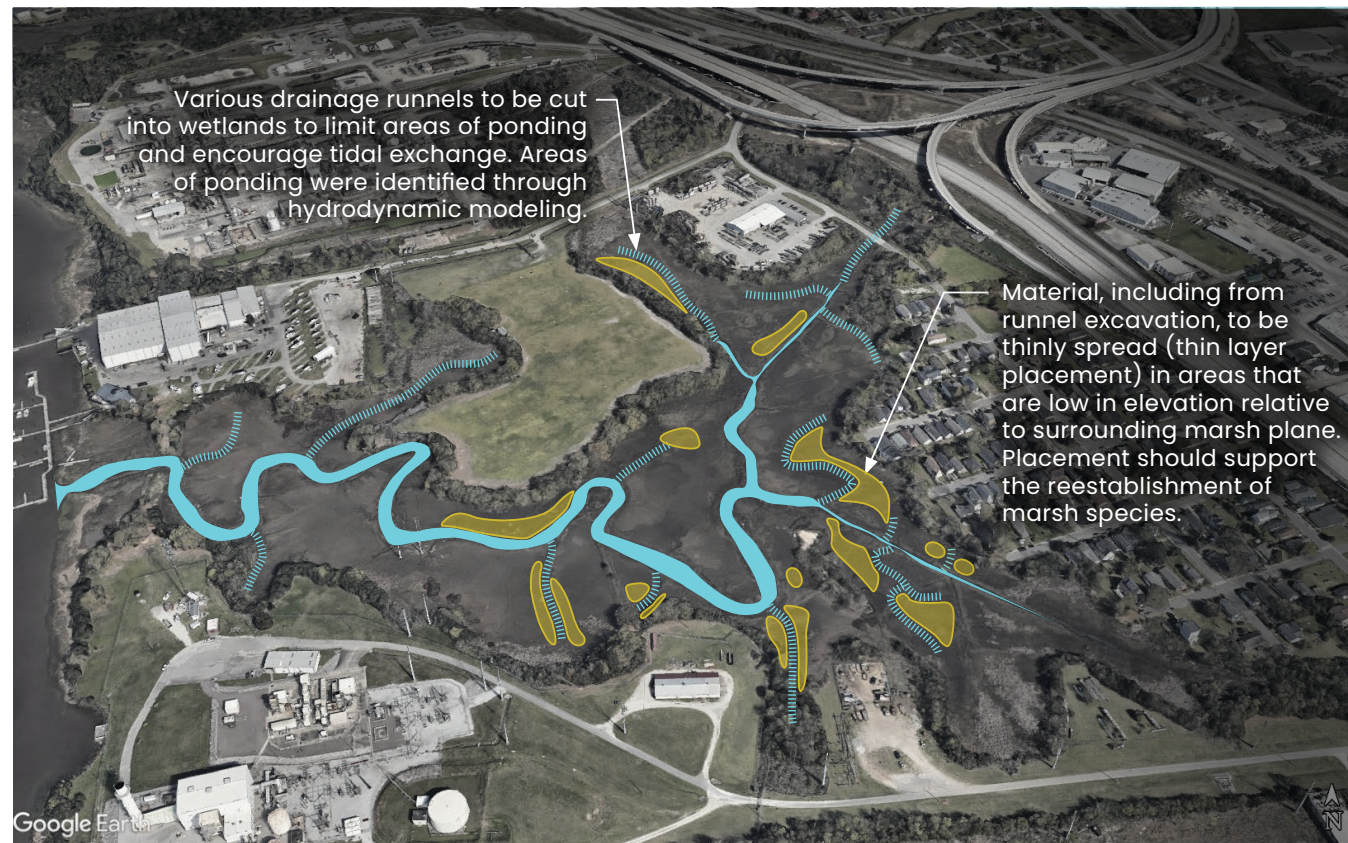


Figure 21: Opportunities for Runnels



Contaminant Source Study
(City of Charleston)

Description: A contaminant source study is an investigative process used to identify, trace, and evaluate the origin of pollutants in an environment. It examines whether contamination is naturally occurring or driven by human activity, such as industrial discharge, leaking underground storage tanks, or aging infrastructure, and works to distinguish between point sources (a single identifiable source, like a specific outfall or tank) and nonpoint sources (diffuse contamination spread across a broader area, like widespread urban runoff). These studies are typically conducted by environmental consultants, hydrogeologists, and public health or regulatory agencies, using a combination of field sampling, geochemical testing, and modeling to pinpoint the location, timing, and scale of contamination.

Application: Water quality testing throughout this study points to several unresolved questions about where Rosemont marsh's pollution is coming from, and a contaminant source study is the tool needed to answer them. Bacteria levels tied to sewage and animal waste were out of compliance at every testing site for nearly the entire monitoring period, a pattern consistent with a watershed-wide nonpoint source rather than a single discharge point, but the exact contributing sources have not yet been identified. DNA testing added an important piece to this picture: at the

Community Center sampling site, a strong human DNA signal was associated with elevated E. coli levels. While the exact source has not been definitively identified, these results suggest a high likelihood that human wastewater, whether from stormwater carrying human waste or leaking septic infrastructure, is contributing to the elevated bacterial levels documented throughout this report.

The water near the Freddie Whaley Community Center stood apart from the other two sites in nearly every measure, including a gasoline smell present at every sampling visit between mid-December and late April, suggesting a distinct, localized source specific to that area that a broader watershed study alone would not capture.

Rosemont's history as a site of industrial land use, along with its proximity to the former landfill beneath Stanley Chisolm Park, means there are multiple plausible legacy and ongoing contamination pathways worth investigating. A contaminant source study would map potential sources within the marsh's contributing area, differentiate between point and nonpoint contributors, and use targeted sampling, including further DNA and geochemical testing, to trace contamination to its origin with more certainty. Just as importantly, any study should come paired with a clear commitment from the responsible party to act on what is found.

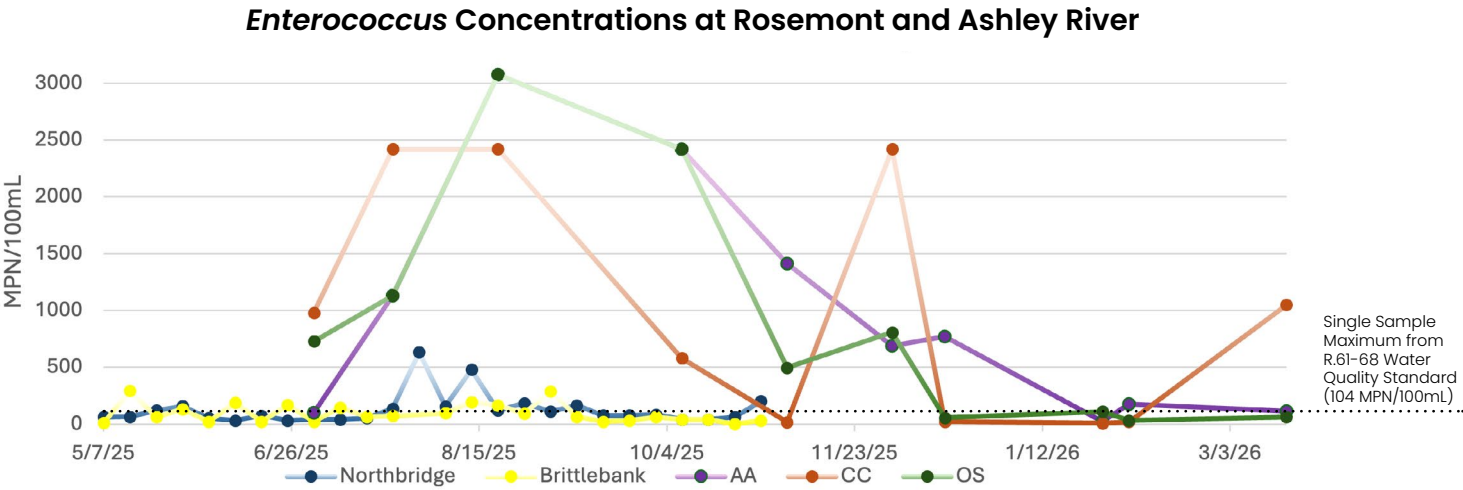


Figure 22: Enterococcus levels at various sampling sites along the Ashley River near Rosemont, and at Rosemont sampling sites. "Northbridge" was sampled by Charleston Waterkeeper to the north of Rosemont. "Brittlebank" was sampled by Charleston Waterkeeper to the south of Rosemont. Water samples taken at Austin Avenue Bridge (AA), Community Center (CC), and Odessa Street (OS) in the Rosemont marsh were consistently well above the South Carolina daily maximum and the single sample maximum. Data is displayed as a line graph for cleaner representation of multiple points, but the lines between points should not be interpreted as conditions during those periods.



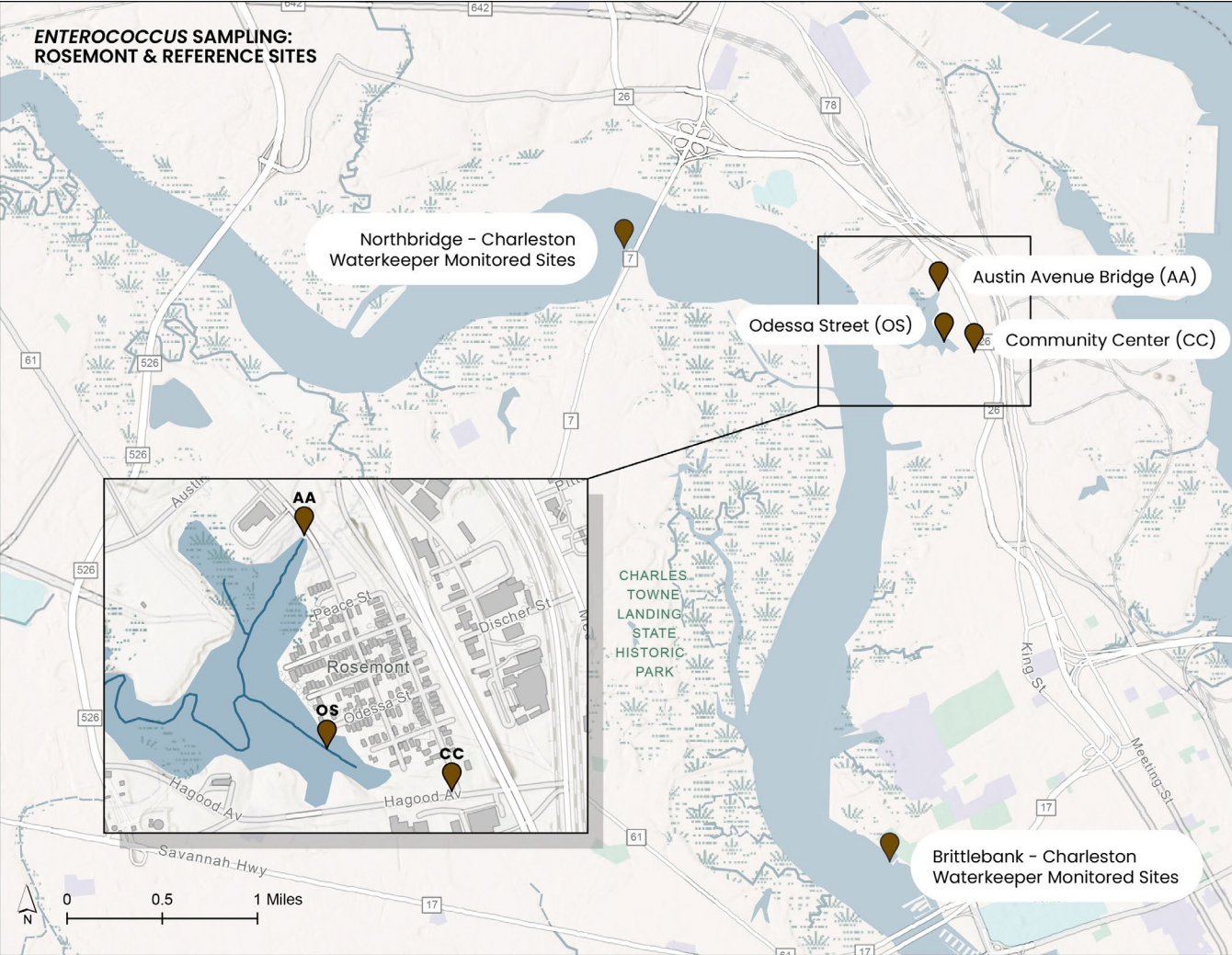


Figure 23: Enterococcus Sampling

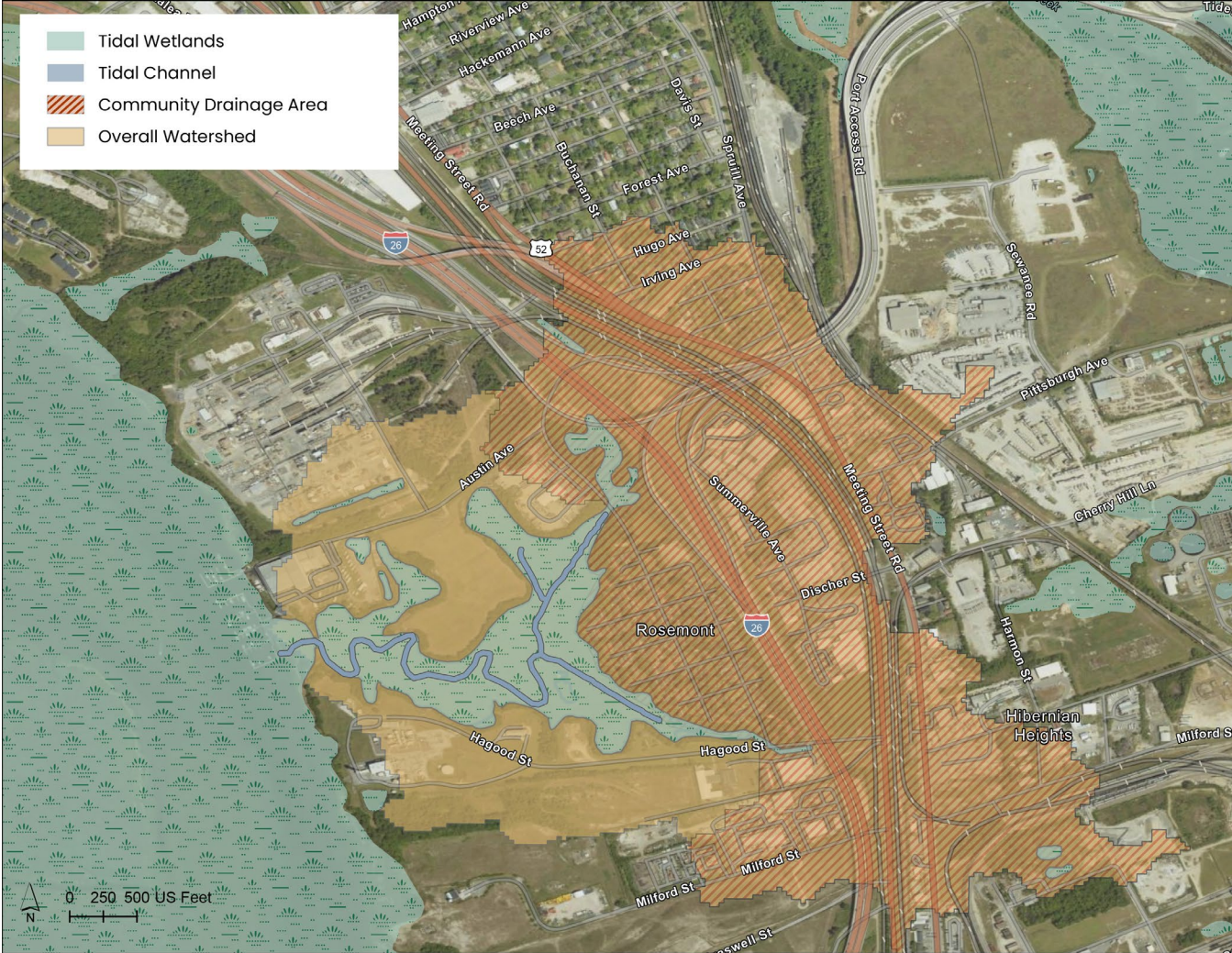


Figure 24: Drainage Area

Watershed Drainage Study

(City of Charleston)

Description: A watershed is the upland area that drains directly to the marsh or its tributaries. A watershed study evaluates the watershed and its land use, comparing current conditions to a natural baseline to identify specific stressors and opportunities to improve watershed function. The intent of watershed management is to strategically implement the findings of the watershed study to support marsh health and resilience goals.

Application: The Rosemont marsh’s water quality is shaped by more than just the marsh itself; it is shaped by everything happening upstream in the surrounding watershed. The local watershed draining into Rosemont extends well beyond the neighborhood, encompassing multiple surrounding neighborhoods, industrial areas, and highways. Water reaches the marsh through a mix of underground piping, ditches, surface sheet flow, and other stormwater infrastructure. A comprehensive watershed study is needed to fully understand this drainage system: where water is coming from, how it moves through the watershed, and what stressors along the way are affecting water quality by the time it reaches the marsh. This study should encompass the full watershed rather than just the neighborhood boundary, and should result in actionable design recommendations, including enhanced water treatment areas, underdrains, and other specific best management practices (BMP) sited where they will have the greatest impact.

Cost



\$\$\$

Benefits

Goal 1

Goal 2

Goal 3

Goal 4

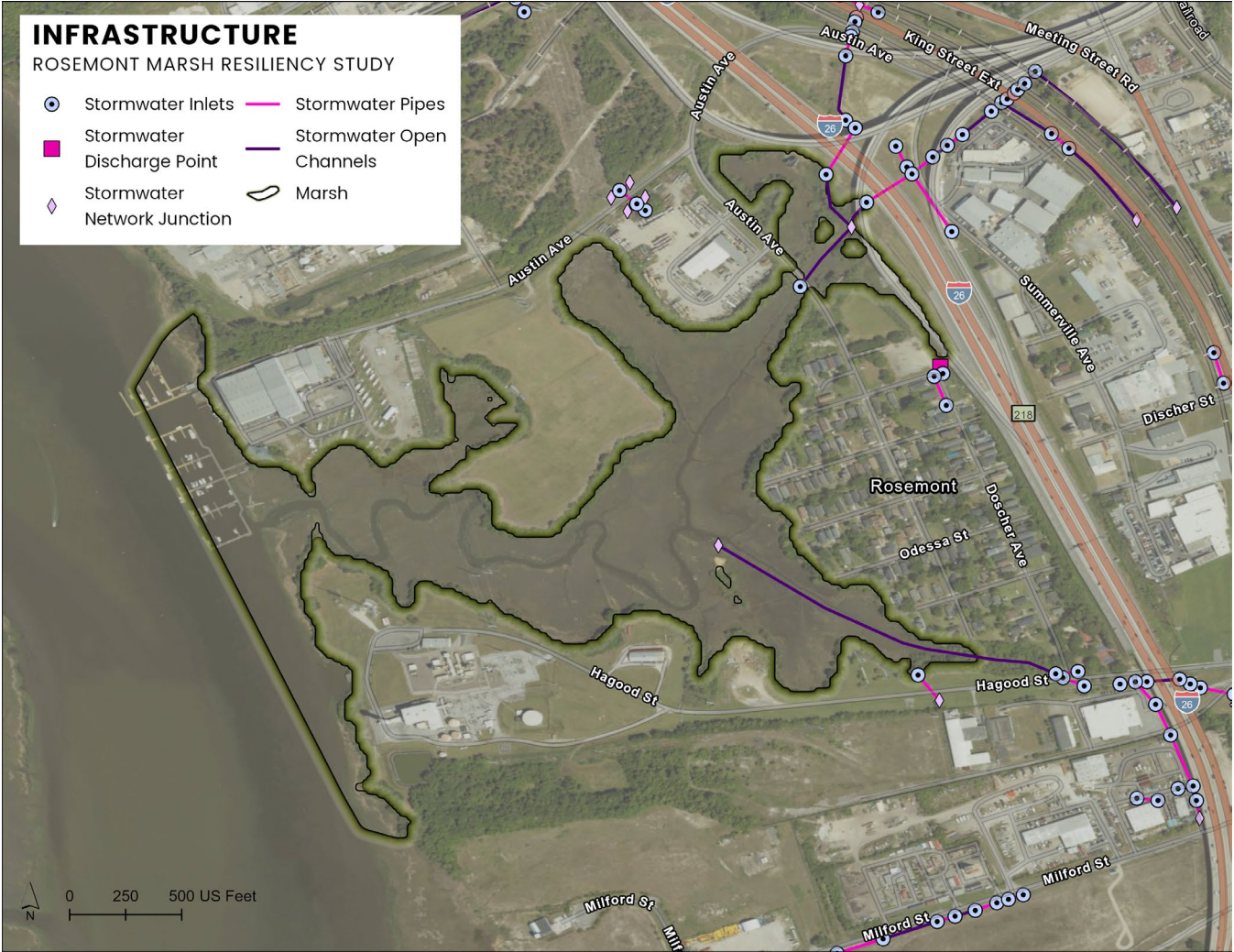


Figure 25: Stormwater Infrastructure

Marsh Buffer Management

(Community Action & City of Charleston)

Description: Buffer management refers to a set of best management practices used to optimize or restore the ecological function of the land bordering the marsh. This strategy is closely linked to Marsh Buffer Establishment, described later in this chapter; while Establishment focuses on acquiring new buffer area over the long term, Buffer Management focuses on improving the condition and function of the areas adjacent to the marsh.

Application: Buffer management for Rosemont would include several possible actions.

- 1. Vegetation management includes controlling non-native invasive species, supplemental planting with native vegetation, and targeted pruning of overhanging vegetation, all aimed at improving existing buffer condition and supporting marsh health.
- 2. Removing impediments includes removing structures and impervious cover to restore the ground’s ability to absorb and filter water.
- 3. Establish a setback line for all properties around the marsh, with future restrictions on building impervious cover or other infrastructure.

Together, these actions allow buffer improvements to happen incrementally and in places where full land acquisition through Marsh Buffer Establishment may not be immediately feasible, while still working toward the same underlying goal of a wider, more functional, and more resilient marsh buffer.

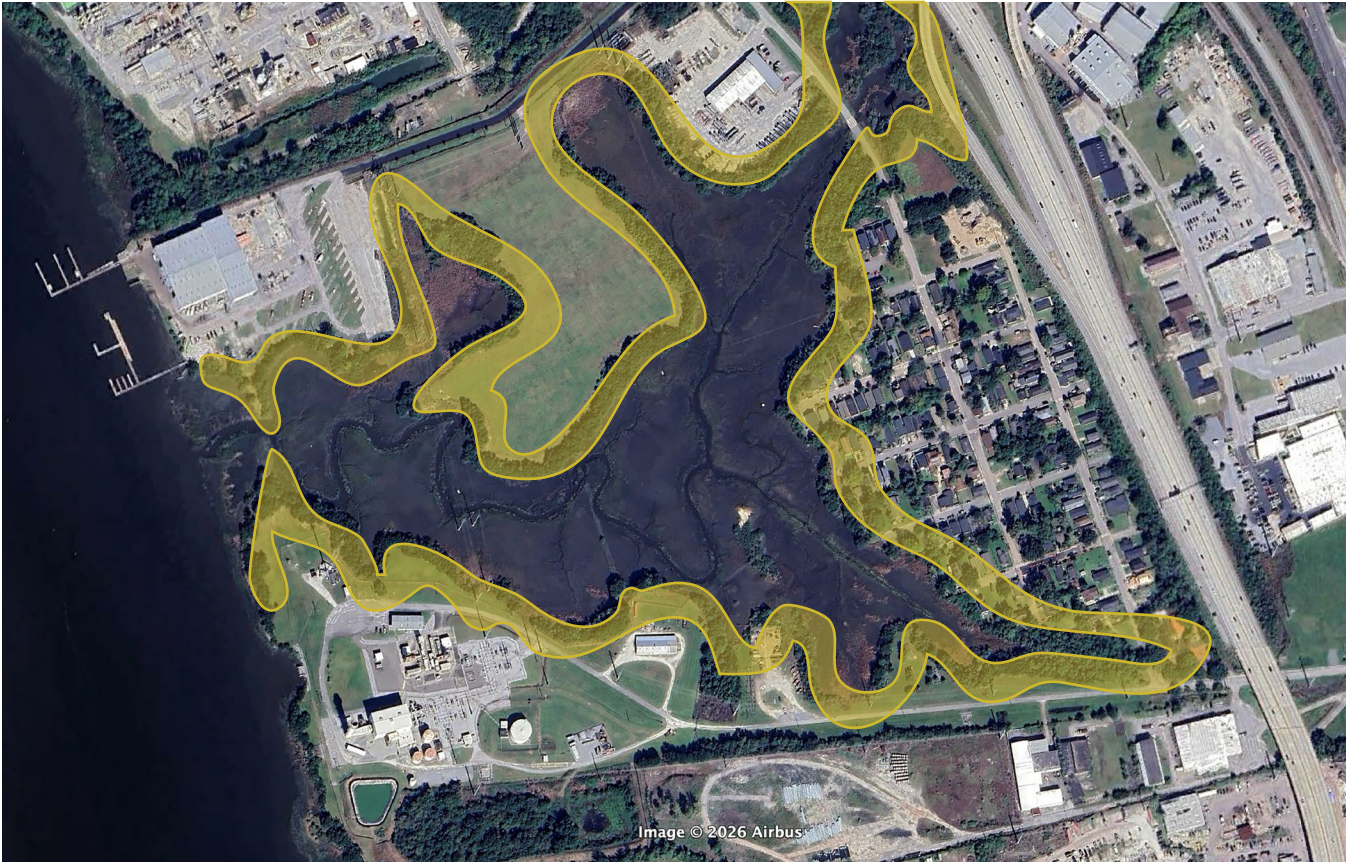


Figure 26: Buffer Management Area around the marsh. This figure depicts a 30 meter buffer from the marsh edge.

Invest and Build

Remove Tidal Restrictions

(City of Charleston)

Description: Tidal restrictions are usually human-made features, such as levees, berms, culverts, and roadways, that alter the natural tidal prism (the volume of water moving in and out with the tide) and, as a result, change patterns of flow and sedimentation throughout the marsh. Limited tidal exchange can trigger a negative feedback loop within the salt marsh ecosystem: salinity decreases, salt marsh plant communities decline, and the marsh transitions toward brackish conditions that are more vulnerable to invasion by undesirable non-native plants like *Phragmites*. Restricted exchange can also alter soil chemistry and may make trapped contaminants like metals more bioavailable. Marshes with poor tidal exchange are especially vulnerable to climate change, since more frequent and intense rainfall introduces additional freshwater into a system that already struggles to flush itself out. The intent of removing tidal restrictions is to restore a tidal prism that supports optimal exchange under both current and future climate conditions.

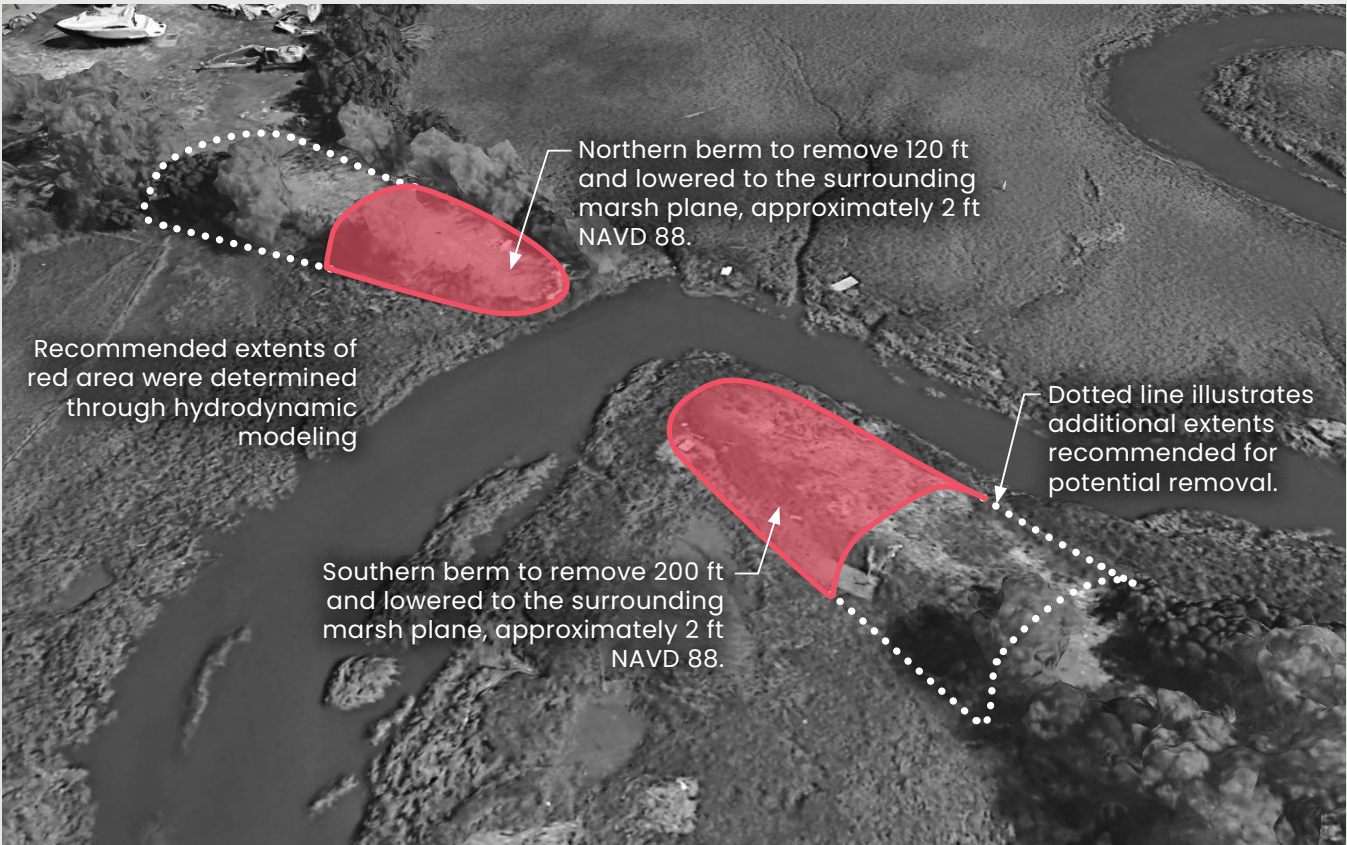


Figure 27: Opportunity to remove tidal restrictions by widening the mouth of the creek

Application:

1. At the mouth of Rosemont Creek, an old berm that was once built to connect the north and south side of the channel restricts tidal flow into the marsh. This creates what is known as a muted tide: by the time high tide in the Ashley River begins to recede, water has not been able to reach as far into the Rosemont marsh as it naturally should. This existing condition is supported by two months of hydrodynamic modeling, which compared current conditions against a scenario in which the berm was removed.

The proposed action at this location is to remove and regrade the berm on the north side of the channel, restoring a more natural tidal prism and allowing both water and sediment to move freely into the marsh. Alternatively, if a wall and tide gate are designed at this location, as was proposed by the Rosemont Flood Resilience Plan in early 2026, restoring the tidal prism should still be a top priority. If a tide gate is determined to be necessary for flood control, a modified, self-regulating tide gate that mimics natural channel depth could be used instead, allowing for continued water and sediment exchange even with the structure in place. Regardless of whether a tide gate is included, the channel itself will need to be widened. Full berm removal remains the preferred approach, and there are numerous precedents across the U.S. where removing a tide gate, rather than retrofitting it, was the chosen path to restoring a salt marsh. If a tide gate is ultimately included in the design, it should be approached cautiously and designed thoughtfully to minimize further restriction to tidal exchange.



Remove Tidal Restrictions (Continued)



Existing Condition



Proposed Condition, Credit: NCDEQ

- 2. A second tidal restriction exists at the Austin Avenue Bridge, on the opposite side of the marsh. The roadway at this crossing was proposed to be elevated as part of the Rosemont Flood Resilience Plan in early 2026. Building on that groundwork, retrofitting this crossing could involve elevating the bridge and redesigning it with either a wider, bottomless culvert or a larger bridge span, allowing more water to move through this part of the creek. Any redesign at this location will also need to preserve safe neighborhood access during flood conditions.

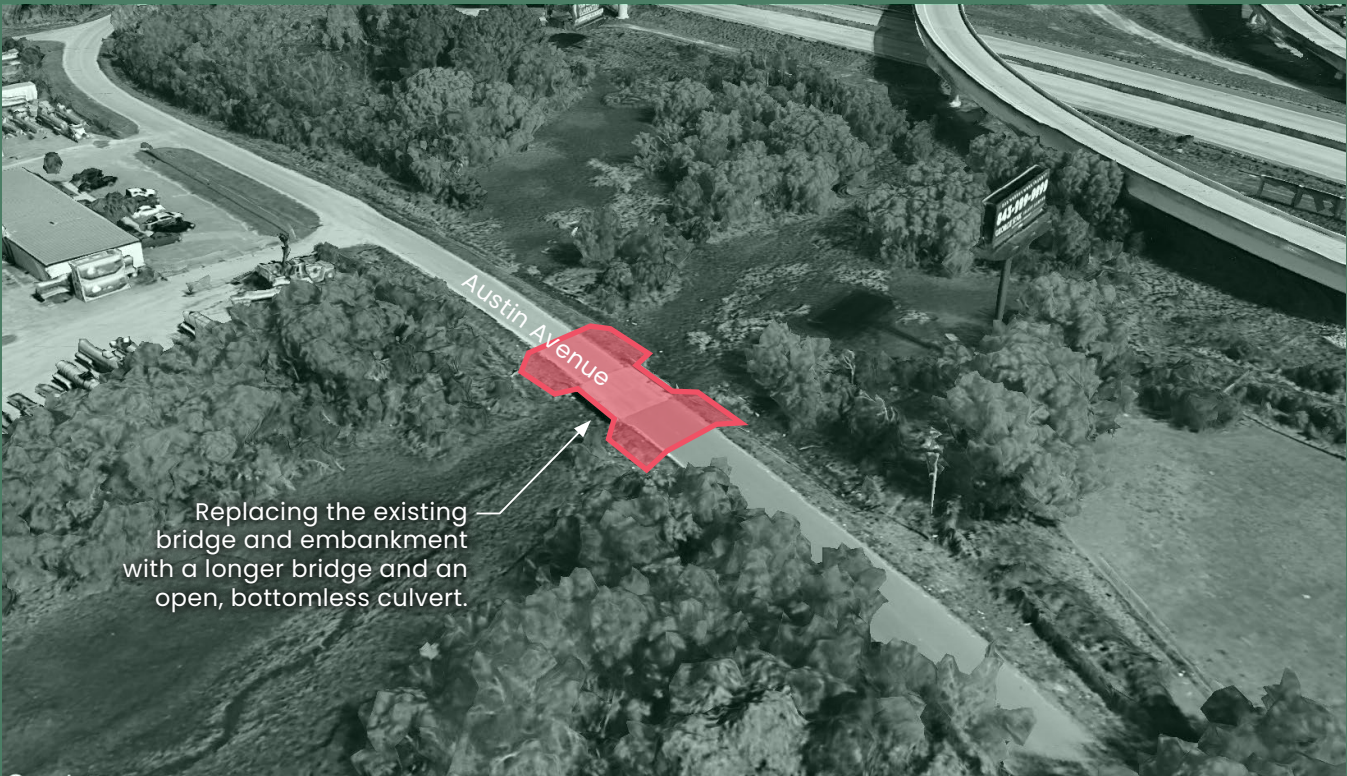


Figure 28: Opportunity to retrofit road crossing to remove tidal restriction.



Both actions represent significant undertakings that will require time to secure funding and complete the necessary assessment, planning, design, and permitting. Early steps should include securing funding for the design of these features and establishing an annual monitoring protocol to track marsh platform elevation and water levels.



Pocket Wetlands

(City of Charleston & Community Action)

Description: A pocket wetland is a small, engineered wetland designed to capture and treat stormwater runoff before it enters a receiving water body, in this case, the Rosemont marsh. Unlike a single centralized treatment facility, pocket wetlands can be distributed in smaller footprints throughout a community, positioned to intercept runoff close to where it originates. As water moves through a pocket wetland, wetland vegetation and soils help filter out pollutants, slow the rate of flow, and reduce the volume of untreated stormwater reaching the marsh.

Application: For Rosemont, pocket wetlands would be sited next to the marsh in the Rosemont community, targeting water quality improvements before runoff ever leaves upland areas and enters the marsh. The City of Charleston already owns a few parcels next to the marsh that could potentially support these installations. Additional sites on private property could also be considered, provided the property is owned or able to be sold to an entity able to properly maintain the pocket wetland over time.

This strategy also builds directly on the Whaley Way concept outlined in the Rosemont Flood Resilience Plan completed earlier in 2026. Implemented together, a network of pocket wetlands along the marsh edge could reduce the volume of untreated runoff reaching the marsh, complementing the larger, watershed-scale water quality improvements identified elsewhere in this chapter.

Cost	Benefits			
 \$\$\$	Goal 1	Goal 2	Goal 3	Goal 4

Oyster-based Living Shorelines

(The Sustainability Institute, SCDNR, and Non-Profit/Community Partners)

Description: An oyster-based living shoreline is a nature-based shoreline that uses oyster reef structures, whether constructed from recycled shell, engineered material, or a combination of both, to reduce wave energy, clean water, trap sediment, and provide habitat along the edge of a marsh or waterway. As oysters colonize the structure and grow over time, the reef becomes increasingly effective at both filtering water (a single oyster can filter many gallons of water per day) and stabilizing the shoreline against erosion, while also building elevation through sediment accretion.

Application: For Rosemont, oyster-based living shorelines should be strategically sited to encourage strong oyster growth and maximize both water quality and sediment accretion benefits. The proposed approach uses a somewhat unique reef shape that has shown success in other regions.

In addition to placement within the main marsh channel, living shoreline or oyster growing material can also be installed along the Ashley River-facing edge of the marsh, where wave energy from the open river is more likely to be actively eroding the marsh edge. In this location, the reef structure would primarily serve to reduce erosion and hold sediment in place, helping protect the marsh's outer boundary while providing many of the same water quality and habitat benefits found elsewhere in the system.

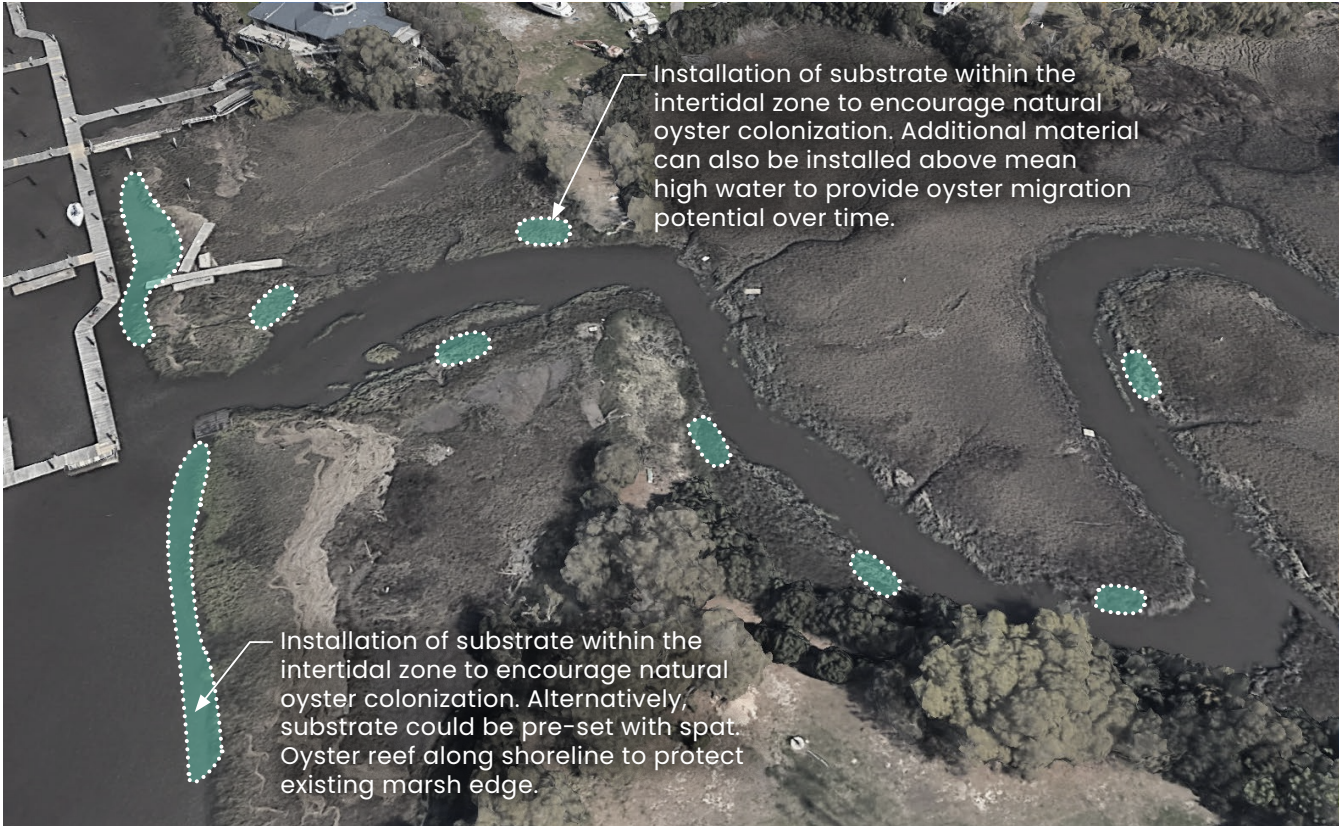


Figure 29: Opportunities for oyster-based living shorelines.

Adapt Over Time

Marsh Buffer Establishment

(City of Charleston & State/Federal Action)

Description: The intent of buffer establishment is to create areas for the marsh to migrate and add to the overall footprint of the marsh now and into the future. A buffer is the area immediately adjacent to the marsh that transitions from the marsh to the adjacent land use. Buffers filter pollutants, provide critical wildlife habitat and space for marshes to adapt to sea level rise, and offer various other ecological functions that collectively support marsh health and resilience. Optimal buffers are wide (greater than 30 meters) and undisturbed, with natural areas, and their function degrades as the buffer width narrows and the level of disturbance increases.

Application: In conjunction with the Marsh Buffer Management strategy previously mentioned in this chapter, there are two major opportunities to establish a more functional buffer around the Rosemont marsh:

1. The first is converting a portion of Coach Stanley Chisolm Park into Chisolm Marsh. This would involve excavating the former landfill beneath the park and converting the site to high marsh or a marsh transition zone. Any redesign of this site should ensure improved recreational access for Rosemont residents and preserve usable, multi-use recreation space, upholding the site's namesake, Coach Stanley Chisolm, even as its function shifts toward marsh restoration.
2. The second action is to establish a buffer of a defined distance around the entire marsh, reclaiming land from all adjacent property owners, including nearby commercial and industrial landholders as well as residents in low-lying, marsh-adjacent areas of the Rosemont community. For homeowners, this could take the form of voluntary buyouts at fair market value. All reclaimed land, whether from commercial, industrial, or residential owners, could then be converted into restored marsh buffer, wetland, or transition zone. It is worth naming directly that the residential component of this action constitutes managed retreat, a deliberate relocation away from areas expected to face escalating flood risk.

Once established, this buffer would be maintained in a highly functioning, undisturbed state through actions such as vegetation management and structure removal.

Cost


\$\$\$\$\$

Benefits

Goal 1

Goal 2

Goal 3

Goal 4

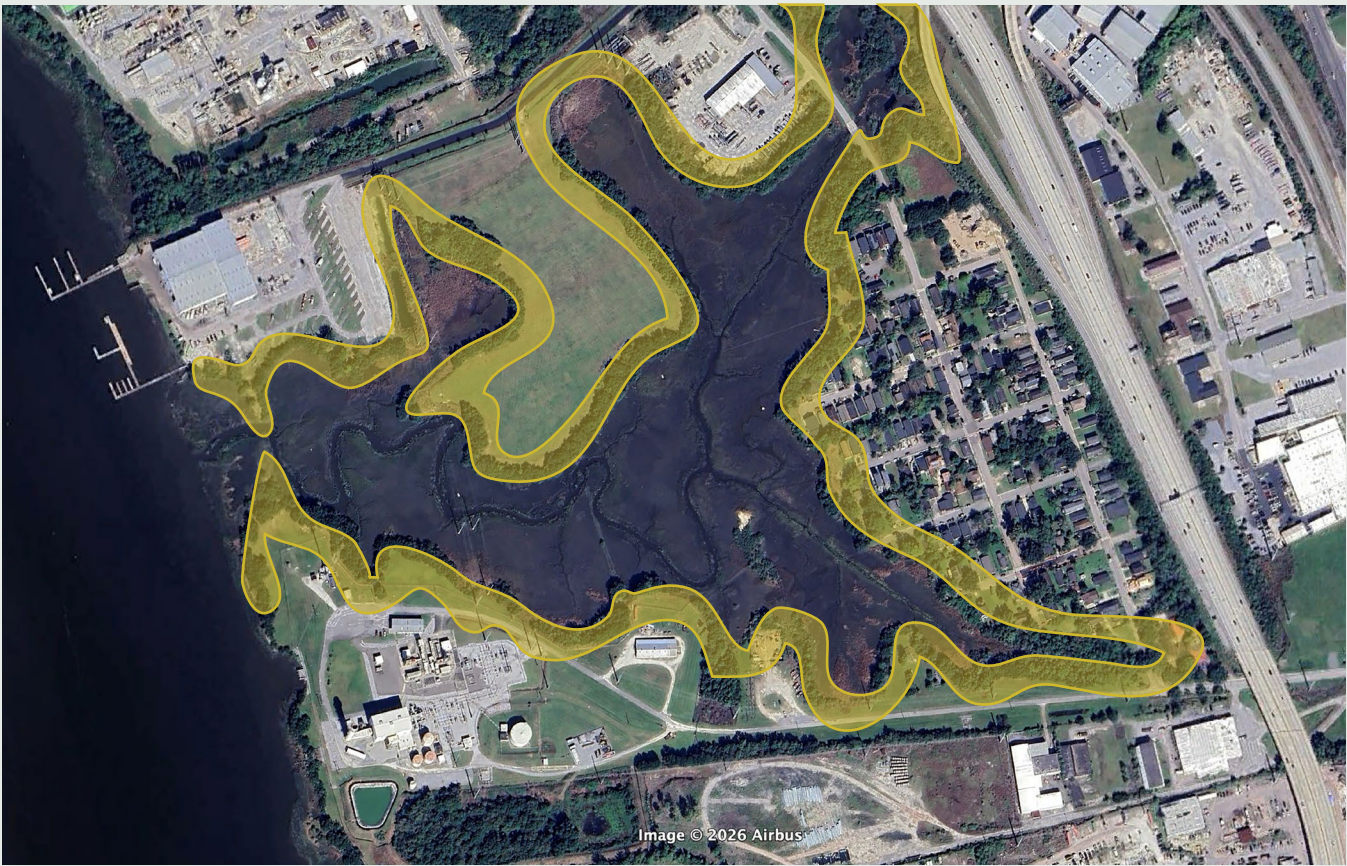


Figure 30 and Figure 31: Opportunities for marsh buffer establishment.

Thin Layer Placement

(USACE, City of Charleston)

Description: Thin layer placement (TLP), also known as marsh elevation enhancement, is the strategic placement of dredge material onto a marsh platform to raise its elevation and make it more resilient to sea level rise. The goal of TLP is to build elevation capital within the marsh, preserving its ecological functions over time, particularly in places like Rosemont where the marsh has little to no room to migrate inland.

Application: Depending on the level of degradation and the specific goals of a project, thin layer placement can involve anywhere from a few inches to a couple of feet of material. Because placing material at this scale is disruptive to the marsh ecosystem, recovery can take several years, so it's important to plan around the site's specific sea level rise threat and expected recovery timeline when setting elevation targets. A common approach is to use a 10-year planning horizon, accounting for roughly 2 to 3 years of recovery followed by about 7 years of stability. To help offset the short-term loss of marsh function during recovery, project teams can also designate management units, tracts of marsh intentionally preserved in a high-functioning state throughout the restoration timeline. Long-term planning also allows a TLP project to be timed around the local availability of suitable dredge material, improving cost efficiency. One strategy for this, called Beneficial Use of Dredge Material (BUDM), aligns TLP projects with already-planned dredging work, so the cost of placing material is covered as part of that separate dredging effort rather than as a standalone expense.



Figure 32: Opportunities for thin layer placement



Because TLP involves placing fill material within a federally regulated water body, it is subject to federal, state, and local permitting. Projects that raise the marsh enough to convert open water into marsh, or marsh into what could be considered upland, require additional agency coordination beyond a standard permit.

Successful implementation of TLP depends on pairing the project with a long-term management plan that tracks the site's recovery and ensures the marsh stays resilient and functional throughout the process. This includes monitoring marsh accretion relative to sea level rise, identifying the most vulnerable areas of the marsh across 5-, 10-, and 20-year horizons, and projecting realistic elevation targets that will keep the marsh functioning well for as long as possible. The key indicators to watch for are changes in vegetation communities and increases in how often, and how long, the marsh floods.

Improve Habitat Connectivity

(City of Charleston, Relevant Federal Agencies, Non-Profit/Community Partners)

Description: A connected landscape allows water and wildlife to move freely between different areas. Habitat connectivity refers to how, and to what degree, distinct patches of habitat remain linked to one another. Could a fish or a bird travel from the Rosemont marsh to other nearby marshes with no barriers in their way? If the answer is no, then improvements can be made. A more connected ecosystem is generally a healthier one, and a healthier ecosystem means more direct and indirect benefits for people. Re-establishing connections between natural areas supports greater biodiversity, healthier wildlife populations, and stronger overall resilience.

Application: The Rosemont marsh has become largely disconnected from other natural areas nearby. Several existing fragmented salt marsh areas, including Halsey Creek and Newmarket Creek, provide some habitat and storm protection value to the peninsula, including Rosemont, but would be much stronger as a connected network. They're currently cut off from one another by roads and existing or planned developments. Improving connections between these areas would strengthen the ecological and protective functions each one provides individually. There are also additional opportunities to restore or better manage nearby sites, such as the Daniel Island dredge material holding areas, which could further support habitat connectivity across the area.

In practice, improving connectivity could involve coordinated regional planning with the City and neighboring jurisdictions, retrofitting road crossings and culverts to allow better tidal and wildlife passage between marsh areas, and a cross-agency collaboration to monitor and manage these key corridors linking currently separated marsh areas across the peninsula. This strategy is also tied to the marsh migration constraints identified elsewhere in this report; since the Rosemont marsh itself has very limited room to migrate inland as seas rise, strengthening its connection to nearby marsh systems with greater migration potential may help support the broader coastal ecosystem's ability to adapt over time.

Cost



\$\$\$\$-
\$\$\$\$\$

Benefits

Goal 1

Goal 2

Goal 3

Goal 4



Figure 33: Opportunities for improved habitat connectivity.



06

Acknowledgements,
Community Voices,
and Partners

This project was only possible because of the dedication, expertise, and generosity of many people and organizations who gave their time, knowledge, and trust to see it through. We want to take a moment to recognize them here.

The team is also deeply grateful to the Rosemont community for welcoming this research into their neighborhood. Some of the most meaningful moments of this project came from residents who stopped to talk with the team along the way, conversations that were always sincere, warm, and welcoming. Thanks also to the Rosemont Property Owners Association, represented by Chris Buggs, who shared this warmth and worked collaboratively with The Sustainability Institute, LAMC, CCRAB, Biohabitats, and all the partners. The team hopes this report proves useful to the community that made it possible.

Holly Blair, of the Sustainability Institute, led this project from start to finish. Beyond bringing in the funding and staff time that made this work possible, Holly led community engagement throughout the project, attending and speaking at every community meeting, building relationships with community leaders in Rosemont, and managing grant coordination and reporting. She was an invaluable thought partner and collaborator at every stage, and this project reflects her leadership throughout.

Jessica Palmer, an AmeriCorps member, dedicated a full day nearly every week to fieldwork in Rosemont, collecting the bulk of the water quality data that forms the backbone of this report. Beyond sampling, Jess distributed flyers to the community, attended community meetings, and participated in the BioBlitz. She quickly mastered every field method used in this project and became an invaluable member of the team.

Inka Bogdanski and Rodly Millet of the Lowcountry Alliance for Model Communities (LAMC), worked hand in hand with Jess throughout the data collection process, overseeing her fieldwork and serving as a dedicated field partner and collaborator on the project.

Thank you to the many local experts and volunteers, both from within and outside the Rosemont community, who came out for the BioBlitz. Nearly everyone gave up the bulk of a day, including an early morning start, to help document the local ecology of Rosemont.

Thank you to the City of Charleston, and to Kaylan Koszela and the City's Recreation Department staff in particular, for providing access to tide data, city property, and the Coach Stanley Chisolm Park. Kaylan helped coordinate the many moving pieces of this project throughout, always ready to pick up the phone and help however she could. Her genuine care for the Rosemont community, and the City's investment in what happens there, did not go unnoticed, and the team is grateful for her partnership.

Thank you to Moffatt & Nichol, and to Jared Bramblett and Jeremy Smithheart in particular, for sharing their community modeling data, which served as a foundation for the model built as part of this study.

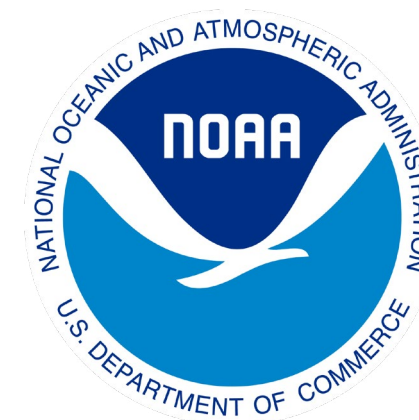
Thank you to Norm Levine and AJ Meola for their efforts to create a digital elevation model of Rosemont using drone imagery. While the team was ultimately unable to use this model for its own modeling purposes, their effort is sincerely appreciated.

Thank you to Andrew Tweel, of the South Carolina Department of Natural Resources, and to Vijay Vulava, of the College of Charleston, for their guidance in refining this project's water quality monitoring plan. Vijay's expertise and ongoing research in Rosemont made him a valuable academic resource throughout this project.

Thank you to Najeema Washington, of CCRAB, for her partnership on this project. CCRAB also paid for the heavy metal lab tests run on water samples collected by the team.

The team also wants to recognize Charleston Waterkeeper, whose staff volunteered their time and boat access to help transport scientists to sample at the mouth of Rosemont Creek, a location otherwise difficult to reach. Charleston Waterkeeper's own Swim Alert Enterococcus testing program also provided valuable context for this study, allowing the team to compare water quality data from Rosemont against nearby Swim Alert monitoring sites.

This project was made possible through support provided by the US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), Fisheries Habitat Conservation Program Office (HCPO), and the Sustainability Institute, under the terms of Federal Grant Agreement # NA25NMF463C0033-TI-01. The statements, findings, conclusions, recommendations, content and opinions expressed herein are those of the author(s) and do not necessarily reflect the views, position or the policy of such agency or the Sustainability Institute, and no official endorsement should be inferred.



Appendix A

Rosemont Water Quality Monitoring Plan

As part of the Rosemont Marsh Resilience Study (2025–2026), led by The Sustainability Institute in partnership with a network of collaborators and funded by NOAA, Biohabitats prepared the following water quality monitoring plan at the start of data collection in June 2025 to outline monitoring parameters, determine appropriate sampling sites and frequencies, establish data collection and analysis methods and address reporting and communication protocols.

Water Quality Project Partners

- The Sustainability Institute (SI)
- AmeriCorps Personnel (overseen by SI)
- Rosemont Community
- Charleston Community Research to Action Board (CCRAB)
- Lowcountry Alliance for Model Communities (LAMC)
- Charleston Waterkeeper (CW)
- Background Rosemont Tidal Wetland

The Rosemont community is located in the “Neck” area of Charleston, South Carolina, within the Santee watershed and part of the Southern Coastal Plain ecoregion. It is a historically under-resourced and marginalized neighborhood that experiences persistent flooding issues. Residents have well-founded concerns about the quality of water in the tidal wetlands surrounding their community.

There are several metrics that could be monitored to gauge the health of the marsh and measure for contaminants. This water quality monitoring plan aims to outline the highest priority water quality parameters and create a plan to collect data on those parameters for use by Biohabitats, SI, and Americorps personnel.

Several research documents contributed to the selection of the priority parameters outlined in this plan:

- The South Carolina Department of Environmental Services (SC DES, formerly DHEC) “[Regulation 61-68 Water Classifications and Standards](#)” document, established under the authority of the South Carolina Pollution Control Act (S.C. Code Sections 48-1-10 et seq.) provides a framework for managing and protecting the quality of the state’s surface and groundwater resources. It defines classified water uses, sets forth general rules, and specifies both numeric and narrative criteria aimed at safeguarding water quality. For Rosemont, these classifications define the acceptable water quality limits for the surrounding tidal wetlands. They serve as benchmarks for assessing current conditions and determining the actions needed to protect or improve water quality in the area. The SC Watershed Atlas classifies the Rosemont marsh as a saltwater (SA) stream, which is regulated by the rules in Regulation 61-68.
- An interagency assessment of South Carolina’s coastal zone titled “[The Condition of South Carolina’s Estuarine and Coastal Habitats during 2021-2022](#)” puts forth a sampling design that aims to strike a balance between using the same methods over a long-term multi-decade to produce comparable data, while also incorporating new methods and measures as they are developed and proven. This document defines suitable water quality parameters to collect data on while also providing results from other areas of South Carolina to compare Rosemont data to.
- NatureServe, a non-profit organization dedicated to understanding and conserving biodiversity through science and data, published a set of documents that outline ecological resilience indicators for various ecosystems in the Gulf of Mexico. There is no comparable publication specifically for the southeast United States, however, Chapter 2. Titled “[Ecological Resilience Indicators for Salt Marsh Ecosystems](#)” provides some applicable guidance that outlines important water quality monitoring parameters.
- Charleston Waterkeeper, a non-profit organization dedicated to protecting, defending, and restoring the health and integrity of Charleston’s waterways for people and nature, monitors Enterococcus bacteria levels throughout Charleston as part of their “[Swim Alert](#)” program. That publicly available data will provide a benchmark to compare Rosemont water quality samples to.

Aligning monitoring efforts with the water quality standards outlined in these scientific publications and related monitoring efforts will make for a robust study of the Rosemont tidal wetland. The following parameters were selected not only for regulatory compliance but also to safeguard community health and to help inform long-term resilience.

Monitoring Parameters

To better understand the quality of water in the Rosemont tidal wetland, and to align with South Carolina’s regulatory standards, this monitoring plan focuses on a set of core water quality parameters that reflect both public health risks and ecological function. These parameters were selected based on regulatory thresholds, community concerns, and the environmental context of Rosemont, where residents frequently encounter tidal wetland waters during flood events. The following parameters will be used:

- *Enterococcus* Bacteria (Ent)
- Fecal Coliform Bacteria (Fec)
- Dissolved oxygen (DO)
- Potential of Hydrogen (pH)
- Total Nitrogen (TN)
- Total Phosphorous (TP)
- Temperature (Temp)
- Conductivity (Cond)
- Salinity (Sal)
- Turbidity (Turb)
- Total Suspended Solids (TSS)
- Qualitative observations (litter, dead plants, visible oil sheen, etc.)
- Heavy metals (HM)

A primary parameter of concern is fecal indicator bacteria, which will be measured using *Enterococcus* bacteria levels. *Enterococcus* is saltwater-tolerant, persists longer than other bacteria in marine environments, and is generally more specific to human sources. These traits make it particularly relevant for the tidal wetland setting surrounding Rosemont. In addition, Charleston Waterkeeper uses *Enterococcus* in their Swim Alert monitoring program, allowing Rosemont’s results to be compared to other sites across the region. This alignment helps identify whether elevated levels are isolated or part of broader trends, providing essential context for interpreting results.

Fecal coliform bacteria levels will also be tested, as these are also an indicator of potential human pathogens and are part of the state’s water quality standards. Fecal coliform is an umbrella term that includes *Enterococcus* and other species like *E. coli*. South Carolina Department of Natural Resources and South Carolina Department of Environmental Services both report overall fecal coliform bacteria levels in their regular water quality reports, which will provide another benchmark to compare Rosemont tidal wetland water quality results against.

Total nitrogen (sum of nitrate/nitrite and total Kjeldahl nitrogen [TKN]), total phosphorous, and total suspended solids are all additional lab tests that will be collected to gain an understanding of nutrient load in the waterways around Rosemont.

DO, pH, temperature, and turbidity are standard water quality parameters that will help assess baseline ecological health. DO is necessary for aquatic organisms to survive, but levels outside of certain thresholds might indicate pollution and create suitable conditions for harmful organisms. pH and temperature influence chemical and biological processes and must stay within specific thresholds to support wetland function and meet regulatory water quality criteria. Overall turbidity can also lead to a better understanding of all the dynamics affecting Rosemont’s tidal wetland.

Salinity is also a critical parameter that will be tracked. Rosemont lies at the intersection of tidal saltwater influence and heavy freshwater input from stormwater infrastructure that channels substantial rainfall runoff through the community and into the wetland. Measuring salinity will lead to a better understanding of the dynamic balance between saltwater tidal influence and freshwater flushing. Paired with other parameters like bacteria levels, salinity can also help locate the source of possible contaminants affecting the tidal wetland by indirectly indicating how stormwater drainage, rainfall, and possible leaky pipes interact with tidal inputs. Salinity affects species composition—both plant and animal—and determines the overall ecological character and resilience of the marsh.

Interactions between tidal fluctuations, precipitation, evapotranspiration, and soil properties all affect groundwater movement and, by extension, surface salinity. These forces determine how saltwater moves into or is diluted within the marsh platform and adjacent soils. Rising sea levels can further alter this dynamic by pushing saline groundwater inland and upward, reducing the freshwater buffering capacity of soils. As salinity increases in areas that were historically brackish or freshwater, shifts in marsh vegetation may be observed, with salt-tolerant species replacing those that require less saline conditions. These vegetation changes can impact erosion rates, habitat structure, and nutrient cycling—ultimately influencing the health and function of the wetland system.

In addition to quantitative data, we will collect qualitative observations at each sampling location, including visual signs of pollution such as litter, oil sheen, or unusual odors. These observations will provide important context.

Finally, CCRA B will fund additional sampling and laboratory analysis for toxic substances, such as heavy metals. These samples will be collected alongside *Enterococcus* samples and sent to a commercial laboratory for analysis. This effort is vital in an urban context like Rosemont, where industrial and transportation-related runoff may introduce contaminants into the wetland. This coordinated sampling effort adds a broader layer of insight into environmental health and risks in the community.

Collectively, these parameters will offer a comprehensive view of water quality and wetland function, guiding future restoration, infrastructure, and resilience planning for Rosemont.

Sampling Sites and Frequencies

Marsh Monitoring Locations



Samples will be taken from three, possibly four (pending landowner approval for access), locations around Rosemont, as identified on Map 1:

- Austin Avenue bridge (Site 1)
- Freddie Whaley Community Center culvert (Site 2)
- Odessa Street (Site 3)
- Boat Sampling Site

This monitoring plan includes multiple field sampling locations in and around the Rosemont tidal wetland. Map 1 at the beginning of this section shows the distribution of water quality sampling locations, as well as the locations of existing and newly installed (as of 2025) groundwater wells and tide level loggers. While groundwater level and tide level data are not part of this water quality monitoring effort, those instruments are noted here because data will be downloaded during the same field visits for logistical efficiency.

All new water quality sampling sites and well placements are located on City-owned property. During site selection, efforts were made to ensure that new installations do not interfere with existing underground infrastructure or conflict with other ongoing environmental monitoring efforts, including old landfills, utilities, or data collection being conducted by project partners.

The sampling strategy combines field-based measurements with laboratory analysis. All samples will be collected by hand on a weekly basis at the same day and time.

- *Enterococcus*, fecal coliform, total phosphorous, total nitrogen, and total suspended solids: Grab samples will be collected and delivered to a commercial lab within 4 hours.
- Heavy metals: Collected at the same time and frequency as *Enterococcus*. These samples are funded by CCRAB.
- DO, pH, temperature, conductivity, and salinity: An instantaneous reading will be recorded in the field using a YSI ProQuatro Polarographic DO pH Quatro 4 Meter.
- Turbidity: Measured using a transparency tube with Secchi disk in the bottom. Transparency readings will be converted to turbidity.
- Qualitative field observations: Noted at every visit, these include visual or olfactory signs of contamination, algal blooms, trash, or unusual water conditions.

Samples will be collected at the same day and time every week, but not every parameter will be tested for during every visit due to lab costs. Although weekly water quality sampling would yield higher-resolution data and better capture variability across tidal cycles and rainfall amounts, the cost of laboratory analyses at that frequency exceeds the available grant budget funding this work. As such, alternative sampling intervals are proposed that balance scientific rigor with fiscal constraints, while still providing sufficient data to draw informed conclusions about the site's water quality. For the less frequent sampling events, efforts will be made to target dry weather conditions to better characterize baseline water quality in the absence of storm-driven variability. While understanding the influence of rainfall and runoff is important, those effects will be captured through more frequently monitored parameters.

Parameter	Frequency	Surface H ₂ O	Ground H ₂ O
Fec	Every 3 Months	X	
TN	Every 3 Months	X	
TP	Every 3 Months	X	
TSS	Every 3 Months	X	
Ent	Every 3 Weeks	X	
DO	Weekly	X	X
pH	Weekly	X	X
Temp	Weekly	X	X
Cond	Weekly	X	X
Sal	Weekly	X	X
Turb	Weekly	X	
Qualitative Observations	Weekly	X	N/A
HM	TBD by CCRAB	(X)	(X)

To enable direct comparison with data collected by CW from across the region, all samples should be collected on Wednesday mornings delivered to Trident Labs within four hours of collection. The maximum hold time for *Enterococcus* samples is six hours from collection to lab analysis.

Data Collection and Analysis Methods

Each sampling event will include both field observations and laboratory analyses. Field observations will be gathered following the data sheet attached at the end of this Water Quality Sampling Plan, adapted from the SC Adopt-a-Stream Saltwater Data Form. A digital photo and digitized version of completed data forms should be uploaded to the [shared project google drive](#) and Biohabitats notified via email for processing and storage.

Laboratory Analyses

Enterococcus

Enterococcus is a widely recognized indicator of environmental health and water safety. While naturally found in the guts of humans and some wildlife, and in small amounts in healthy tidal marshes, high concentrations may suggest contamination from sewer overflows or runoff. This metric helps determine how safe the water is for recreational contact. From Regulation R. 61-68, the legal limit for Enterococci is “not to exceed a geometric mean of 35/100 mL based on at least four (4) samples collected from a given sampling site over a 30-day period; nor shall more than ten percent (10%) of the samples exceed a single sample maximum of 104/100 mL during any 30-day period. Additionally, for beach monitoring and notification activities for CWA Section 406 only, samples shall not exceed a single sample maximum of 104/100 mL.”

Measured via lab analysis at Trident Labs.

Fecal Coliform

Fecal coliform (FC) bacteria are a broad class of microorganisms found in the intestines of warm-blooded animals and are used as an indicator of potential contamination from sewage or animal waste. In South Carolina, fecal coliform levels are used in water quality assessments, including shellfish harvesting standards, and are included in SC DES Regulation R. 61-68. While *Enterococcus* is the preferred indicator for saltwater recreation and swimming risks, monitoring fecal coliform alongside *Enterococcus* offers a more complete picture and enables comparison to state datasets and reports. Samples will be collected via grab sampling and delivered to Trident Labs for analysis.

Measured via lab analysis at Trident Labs.

Total Phosphorous

Total phosphorous (TP) includes all forms of phosphorus—both particulate and dissolved—that contribute to nutrient loading in water bodies. In excess, phosphorous can drive eutrophication, leading to algal blooms, low dissolved oxygen levels, and ecosystem imbalance. TP monitoring in the Rosemont tidal wetland will help assess nutrient inputs from stormwater runoff, surrounding development, and potential sewage leaks.

Measured via lab analysis at Trident Labs.

Total Nitrogen

Total nitrogen (TN) is a measure of all nitrogenous compounds in water, including nitrate, nitrite, total Kjeldahl nitrogen (TKN). Like phosphorous, nitrogen is an important nutrient in tidal wetlands but can contribute to eutrophication and degrade water quality if present in high concentrations. Measuring TN provides insight into watershed-scale nutrient inputs and helps identify areas with potential wastewater or fertilizer influence. Samples will be collected in tandem with other nutrient and bacteria indicators to allow for a holistic interpretation.

Measured via lab analysis at Trident Labs.

Total Suspended Solids

Total suspended solids (TSS) represent the concentration of particulate matter suspended in the water column, including sediment, organic material, and pollutants bound to particles. High TSS levels can reduce light penetration, disrupt aquatic life, and indicate erosion or runoff events. Monitoring TSS in the Rosemont tidal wetland will provide a better understanding of sediment transport dynamics and the impact of upland development and stormwater flows.

Measured via lab analysis at Trident Labs.

Supplemental analyses funded by CCRAB

Contaminants of Concern

The presence of legacy pollutants, such as those from nearby chemical plants, is a key concern for the Rosemont community. According to previous research by CCRAB and CC, contaminants such as lead, zinc, chromium, and arsenic may be present. Silver, cadmium, copper, nickel, and mercury are also of concern. These samples may be collected by Biohabitats in coordination with the enterococcus sampling at Trident Labs and funded by CCRAB grant funds.

Field Data Collection

Weather

Cloud coverage, tide stage, and rain were collected as baseline measurements for each sampling location and day of sampling.

Air temperature

Collected to establish a baseline for comparison with water temperature and other metrics.

Measured using a thermometer.

Water temperature

Has a substantial influence on biological activity, including ecosystem health and bacterial growth. It affects water levels and the speed and likelihood of chemical reactions in the water. It also correlates with other parameters like dissolved oxygen.

Measured using a YSI ProQuatro Polarographic DO pH Quatro 4 Meter.

Dissolved oxygen (DO)

A key measure of water quality. Aquatic life requires a certain level of DO to survive. Low levels may indicate high levels of organic matter, such as sewage or runoff, being broken down by bacteria. From Regulation R. 61-68, the “daily average [shall] not [be] less than 5.0 mg/L with a low of 4.0 mg/L.”

Measured using a YSI ProQuatro Polarographic DO pH Quatro 4 Meter.

pH

A fundamental indicator of water quality. It affects chemical reactions in water, including the solubility of nutrients and heavy metals, and it plays a role in the ability of aquatic life to survive and reproduce. From Regulation R. 61-68, the legal limit for pH “shall not vary more than one-half (1/2) of a pH unit above or below that of effluent-free waters in the same geological area having a similar total salinity, alkalinity, and temperature, but not lower than 6.5 or above 8.5.”

Measured using a YSI ProQuatro Polarographic DO pH Quatro 4 Meter.

There is no relationship between surface and groundwater pH.

Channel Depth

Channel depth as a function of tide is (below) is as might be expected for Odessa Street, with a progressively deeper channel with higher tides. The Austin Avenue and Community Center locations are not as cleanly proportional, with little difference between low and medium tides for Austin Avenue, and surprisingly lower average channel depths at high tide for the Community Center.

There was no apparent relationship between rainfall in the prior 24 hours and channel depth (not shown).

Conductivity / Salinity

Important for understanding the influence of saltwater and freshwater inputs, which impact the types of species present and the overall function of the marsh. Tracking salinity also provides insight into stormwater drainage and rainfall influence.

Measured using a YSI ProQuatro Polarographic DO pH Quatro 4 Meter.

Turbidity

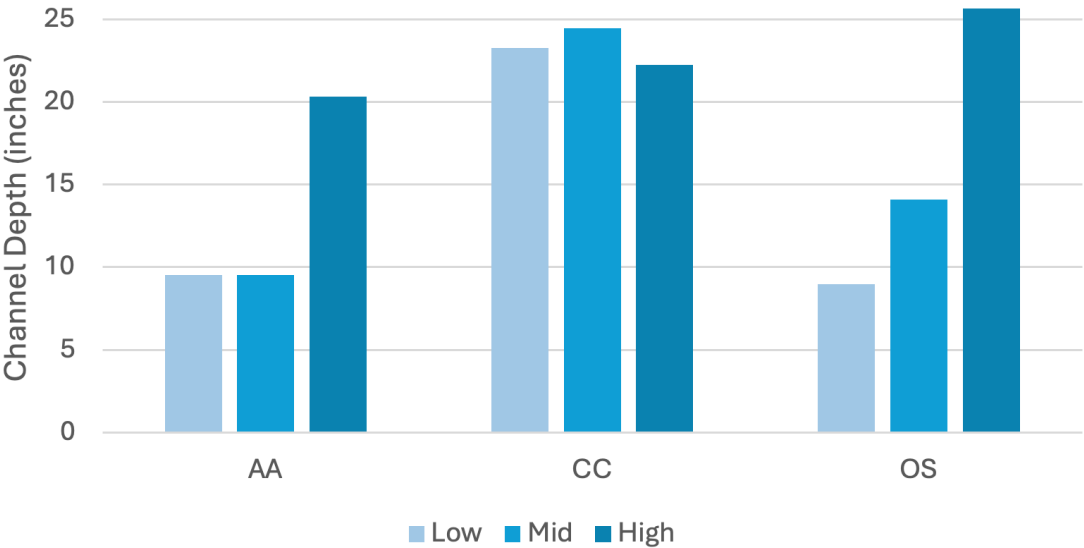
Turbidity is measured via conversion from water transparency. Transparency reflects the amount of light penetration in the water column which is influenced by sediment in the water, which is often related to runoff and sedimentation. It serves as an indirect indicator of water quality and possible upstream disturbance.

Measured using a transparency tube (Secchi disk) and converted to Nephelometric Turbidity Units (NTU) using [Thompson et al. \(2025\)](#).

Qualitative Observations

During each sampling event, observers will document visual and sensory indicators of water and marsh conditions. This includes the presence of trash or debris, oil sheen, water discoloration, algal blooms, unusual odors, and recent rainfall or flooding. Observers will also note any nearby human activity and record whether Clapper Rails (Rallus crepitans) or Marsh Wren (Cistothorus palustris) are seen or heard, as their presence can reflect marsh health. All qualitative parameters are outlined in the data form.

Channel Depth by Tide Level



Data collection steps

1. Record Rainfall

On the morning of data collection, navigate to cocorahs.org and locate the closest local rain gauge to Rosemont and record the rainfall amount.

2. Locate the Sampling Site

- Begin sampling at the community center sampling location.
- Find a spot with at least 12 inches of water depth, or as deep as possible, that can be safely accessed. This should be the same spot used every time.
- Ideally, the sampler should not touch the water with anything other than the sensor probe or a gloved hand and a sampling jar.
- If entering the water is necessary, stand downstream of the collection point to avoid contaminating the sample and any sediment that is kicked up needs to settle before data collection continues. Consider if the tide is falling, rising, or still.

3. Record Date, Time, and Tide

- Refer to [NOAA Station 8665099 I-526 Bridge, Ashley River](#) to determine the tidal stage.
- On data collection field form, record basic information about location, tide, participants, time, date, weather etc.

4. Record Air Temperature

Use a thermometer to measure air temperature.

5. Lab Sample Collection

- If lab samples such as enterococcus are being collected during this field visit, collect them first.
- Fill the Trident Labs-provided test tube(s) with water from the site. You will fill one vessel for each sample that is scheduled for collection during this visit. Fill sample water up to the marked fill line and seal the vessel.
- Label each tube with:
 - Site name (follow standard naming protocol)
 - Date
 - Time

- Fill out a physical [chain of custody form](#) for each sample with its corresponding location name. Sample names should follow this naming convention: [Location abbreviation]-[test type]-[date]. Example: a water sample collected at Austin Ave. Bridge on June 5th, 2025, to be tested for *Enterococcus* would be labeled as “AA-ENT-06052025” and a water sample collected at the Community Center to be tested for heavy metals on the same date would be labeled as “CC-MET-06052025.”
- Store samples in an insulated cooler with an ice pack immediately after collecting them.
- **Deliver to Trident Labs promptly**, within a few hours of sampling, once all samples are collected. The hold time is six hours from sample collection to test, and they need to be kept in a cooler.

6. Conduct Transparency/Turbidity Test

- Use a transparency tube (or a Secchi disk if applicable to the depth).
- Watch this video for technique: [Transparency Testing \(YouTube\)](#)

7. Use YSI meter to collect Water Quality Parameters

- Dip YSI meter into water, allow readings to equilibrate to the water temperature, waiting about 1-2min. per sample, and record readings from the screen.
- For groundwater wells, carefully open the well, pull out the level logger, and lower the secured YSI sensor into the well to collect data.

8. Qualitative Observations

Spend at least 2min. observing the area and record qualitative observations on the data collection field form.

9. QA/QC

Prior to leaving each site, each team member should review the collected data and forms to ensure all the required fields are filled out, legible, and make sense (for example pH ranges should be around 6-8). After 3-4 sampling events, team members will have more familiarity with what normal ranges are for each site. If anything is extremely out of range, it should be retested.

Monitoring Timeline

Monitoring will begin on July 2, 2025 and end on June 24, 2026. Biohabitats will begin data collection and assist with troubleshooting during the first few weeks of the 12-month monitoring period. Starting July 7, 2025 after AmeriCorps members begin their service with SI, they will take over most of the data collection for the remainder of the study period.

Additional Resources

For backup protocols and the significance of each water quality metric, refer to: [SC Adopt-a-Stream Water Quality Monitoring Manual \(PDF\)](#)

Reporting and Communication Protocols

All water quality data collected throughout the Rosemont monitoring project will be systematically compiled and stored in a shared project Google Drive folder. Field observers are responsible for uploading digital versions of completed data sheets, photographs from the site visit, and any relevant notes immediately following each sampling event. Each entry should be labeled with the date and sampling location to maintain consistent recordkeeping and facilitate retrieval.

To ensure transparency, collaboration, and continuity across project partners, Biohabitats will review uploaded files regularly and maintain a central archive of field and lab results. Any anomalies or urgent findings, such as extremely elevated bacteria levels or signs of contamination, will be communicated to Biohabitats via email within 24 hours of discovery.

Formal data visualizations and summaries will be developed after the completion of the full 12-month monitoring cycle. These graphics will help communicate patterns over time and support community discussions, presentations, and resilience planning. Final visualizations and interpretations will be shared in a comprehensive report that includes recommendations based on observed trends and any exceedances of regulatory thresholds. This report will be made available to Rosemont residents, City of Charleston staff, and other relevant stakeholders through a public link.

Regular check-ins—either quarterly or as needed—will provide opportunities for project partners and community members to discuss preliminary findings, coordinate logistics, and share feedback on monitoring efforts. These meetings will also serve as a mechanism to adjust sampling strategy or communication methods as needed.

Data Collection Field Form

Rosemont Marsh Resilience Study					
Data Collection Form					
Site ID Austin Ave. = AA Community Center = CC Odessa St = OS		Participants		Date	
Start Time		End Time		Air Temp	C
Tide Level	Low	Weather	Sunny		
	Mid		Partly Cloudy		
	High		Full Cloud Cover		
Tide Phase	Rising		Intermittent Rain		
	Falling		Steady Rain		
	Slack				
Rainfall (in last 24 hours)	Inches	(read nearest measurement at cocorahs.org)			
Lab Sample Collection					
	(Only surface water - circle each)				
Enterococcus sample	Collected	Total Nitrogen sample	Collected	Total Suspended Solids	Collected
	Not this visit		Not this visit		Not this visit
Fecal Coliform sample	Collected	Total Phosphorous	Collected	Heavy Metals	Collected
	Not this visit		Not this visit		Not this visit
Parameters					
	Surface Water				
Channel Depth	Temperature	C	Conductivity	ms/cm	TDS
	Dissolved Oxygen	% mg/L	Salinity	ppt	
	pH		Transparency	cm	mg/L
	Ground Water				
Well Water Depth	Temperature	C	Conductivity	ms/cm	TDS
	Dissolved Oxygen	% mg/L	Salinity	ppt	
ft (engineer)	pH		Transparency	N/A	mg/L
Qualitative Observations					
Water Color (from tube)	No color	Water Odor	Natural/None	Water Clarity	Clear/Transparent
	Brown/Muddy		Gasoline		
	Green		Sewage		Cloudy/Somewhat Turbid
	Milky/White		Fishy		
	Tannic		Chlorine		
	Other:		Other:		
Trash Cleanup	Site is Clean	Is water moving? What direction?	Stagnant	Other species heard/seen	
	I cleaned site		Downstream flow		
	Needs organized cleanup		Upstream flow		
	Concern of illegal dumping?		No water		
Clapper Rail heard/seen	Yes	Marsh Wren heard/seen	Yes	Other Observations (dead plants etc.)	
	No		No		

Appendix B

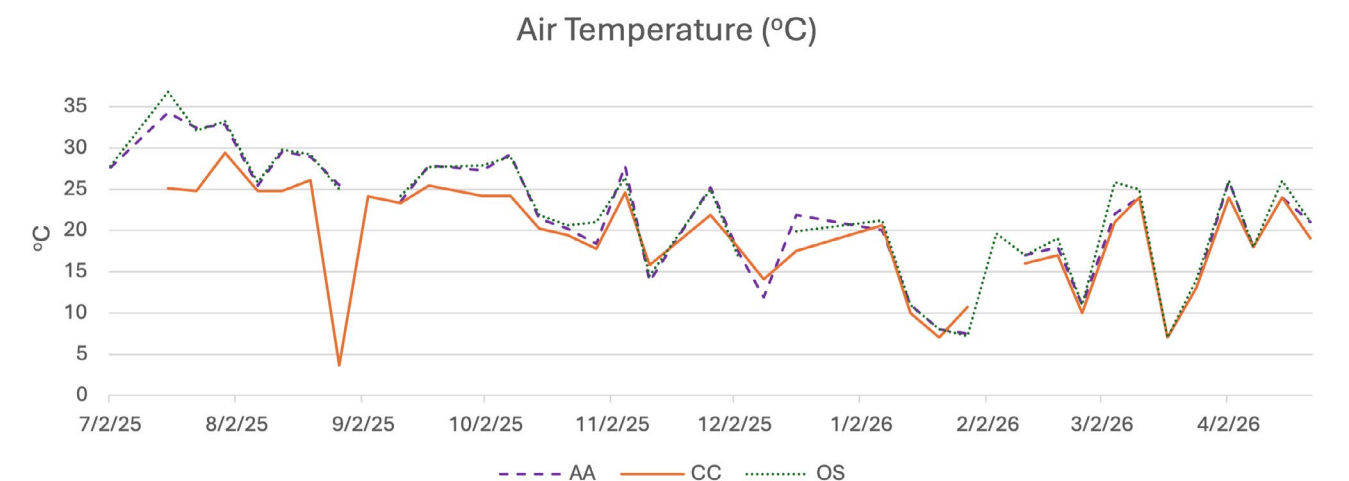
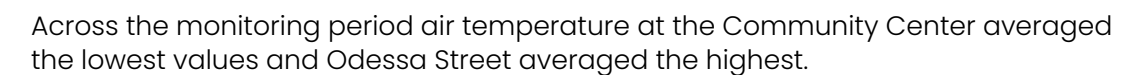
Water Quality Results

Note: Many of the graphs in this section are line graphs, which were chosen for their cleaner representation of multiple points (than bar graphs) and visual connection between points, but the lines between points should not be interpreted as conditions during those periods.



Weather

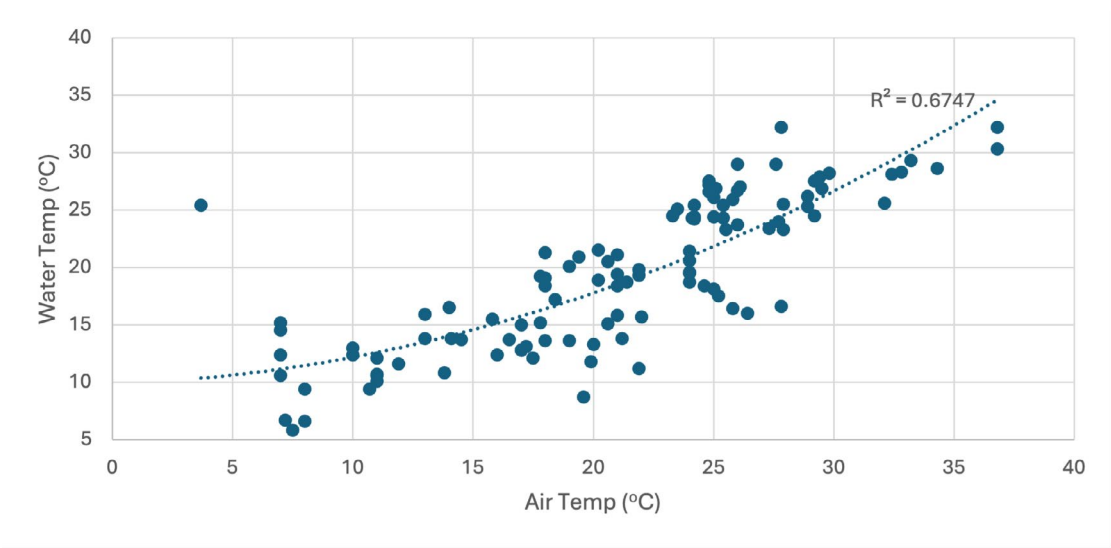
Last 24 Hours' Rainfall



Water Quality

Temperature

The relationship between air and water temperature is shown below. The best order of fit (r2, or how closely the water temperature is related to the air temperature) is r2=0.67. (This is a 2nd-order polynomial relationship, which seems appropriate given the high energy capacity of water and delayed responses to ambient conditions compared to air temperature. The linear order of fit is 0.64.)

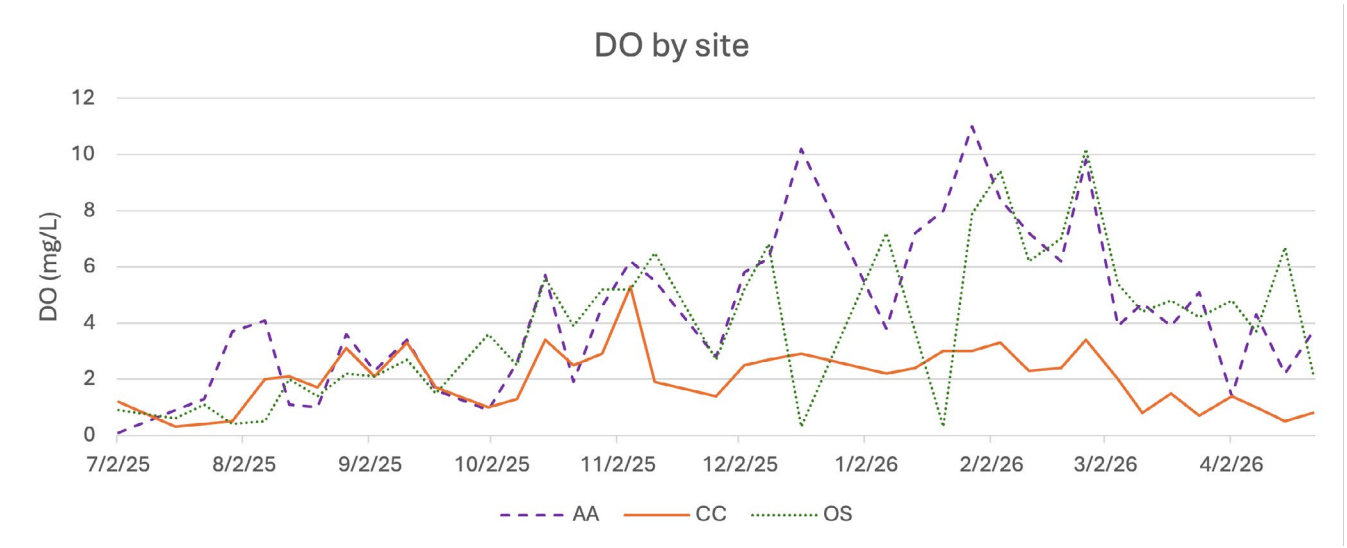


Water temperature at the Community Center location has generally lower temperatures than the other two sites, with an overall average of 19.2oC compared to 21.4oC at Austin Avenue and 22.0oC at Odessa Street.

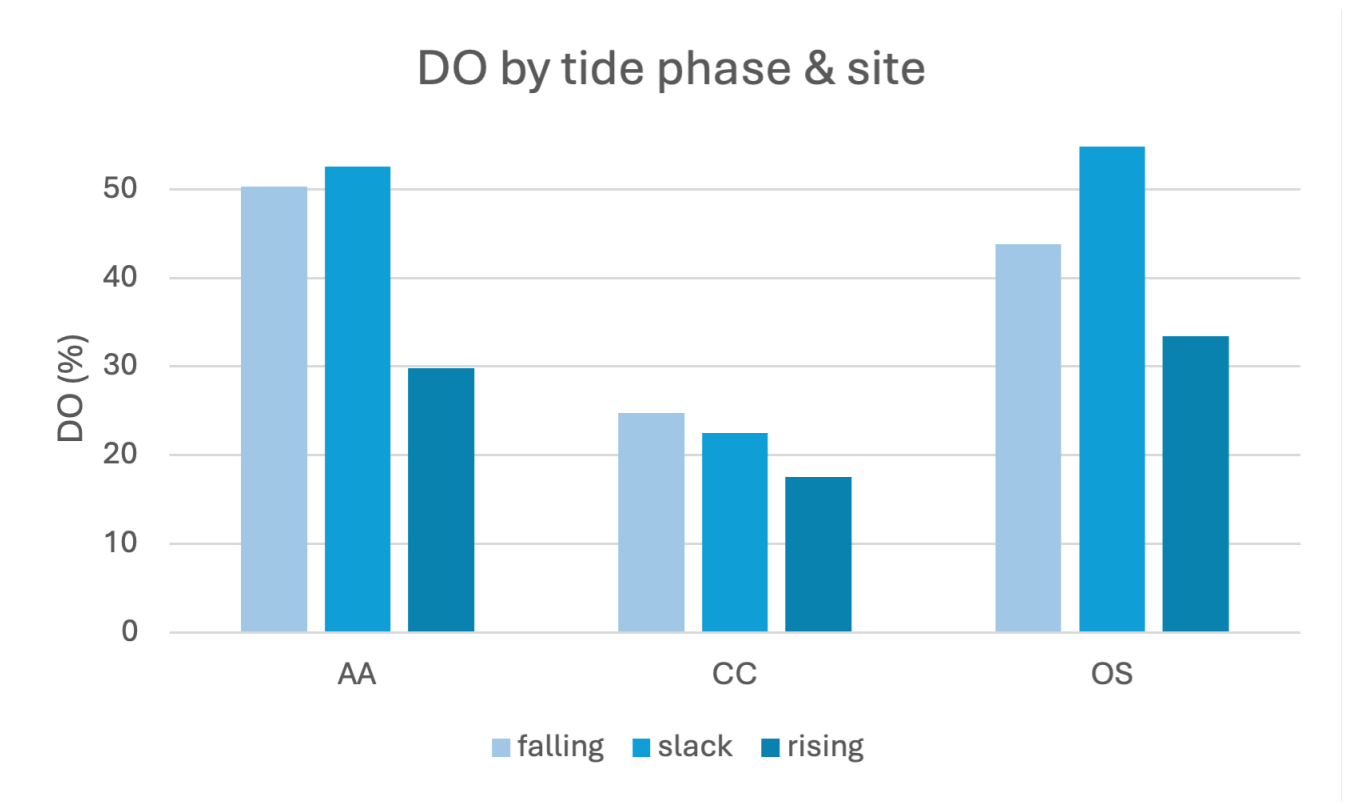


Dissolved Oxygen (DO)

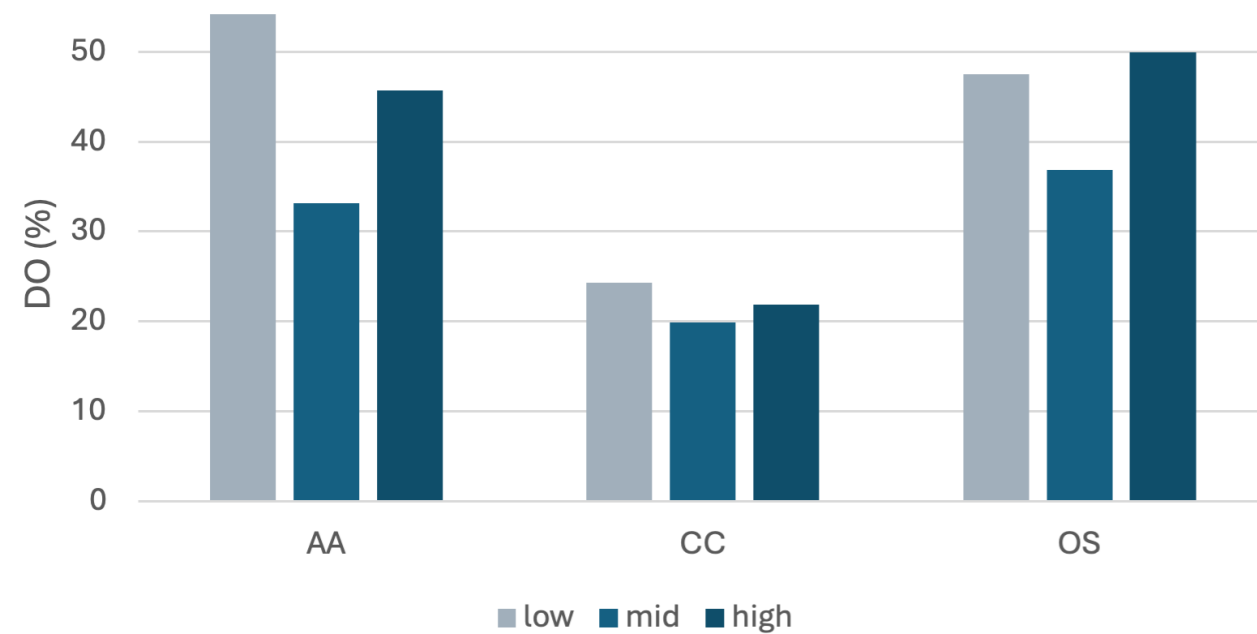
DO at the Community Center site was almost consistently lower than the other two; its overall average was 2.0 mg/L, compared to 4.4 mg/L at Austin Avenue and 4.0 mg/L at Odessa Street. Regulation R. 61-68 states that the “daily average [shall] not [be] less than 5.0 mg/L with a low of 4.0 mg/L.” This was violated at the Community Center on every sampling day except November 5 and at the other two sites on 20 of the 40 sampling days, mostly in the summer and fall.



The low DO at the Community Center (above) is shown in the next two graphs in relation to tide phase and level. These indicate that rising and mid-level tides, respectively, are associated with lower DO.

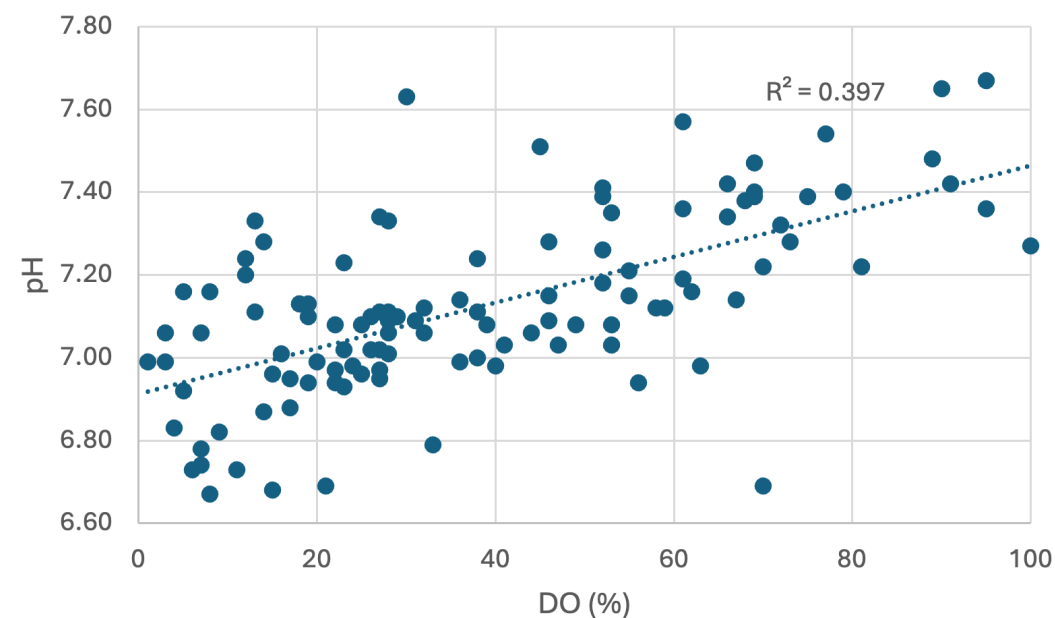


DO by tide level & site



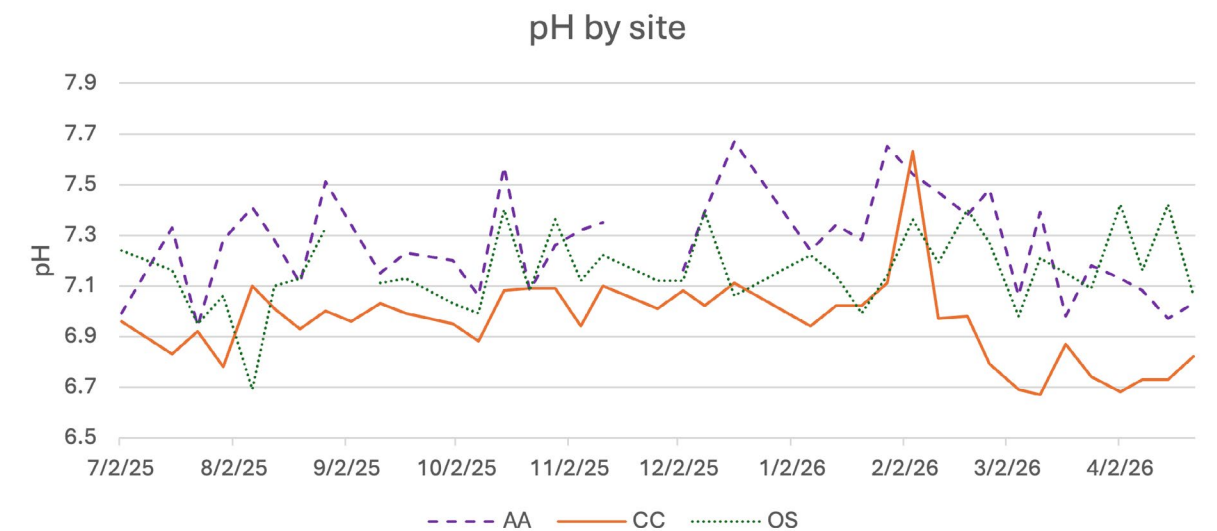
There was no relationship between DO & water temperature or rainfall (even separated by sites).

There is a loose relationship between DO and pH (below), which can be mediated by photosynthesis and respiration in that higher CO₂ lowers pH. Photosynthesis (by plants and algae) consumes CO₂ and releases oxygen, while respiration (by plants and algae but also microbes and fish) does the opposite. The graph illustrates expected relationships, where lower pH implies higher CO₂ (which is acidifying), and this in turn is correlated with lower DO.



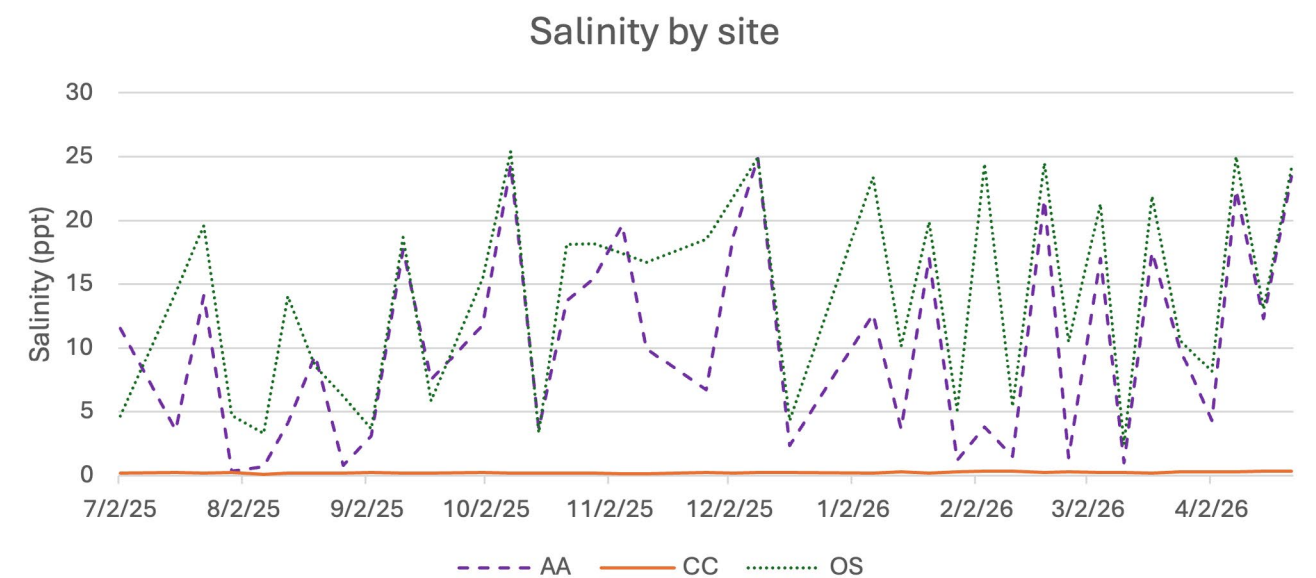
pH and Regulation R. 61-68

Regulation R. 61-68 states that the legal limit for pH “shall not vary more than one-half (1/2) of a pH unit above or below that of effluent-free waters in the same geological area having a similar total salinity, alkalinity, and temperature, but not lower than 6.5 or above 8.5.” There is not an effluent-free comparison site, but **pH at all three study sites stayed within regulated bounds**. Average pH at the Community Center over the study period was significantly lower (6.95) than that at Austin Avenue (7.27) and Odessa Street (7.16).



Salinity

Salinity measured at the Community Center was significantly lower than the other two locations. Austin Avenue and Odessa Street exhibited similar salinity spikes, suggesting similar timing of responses to precipitation.



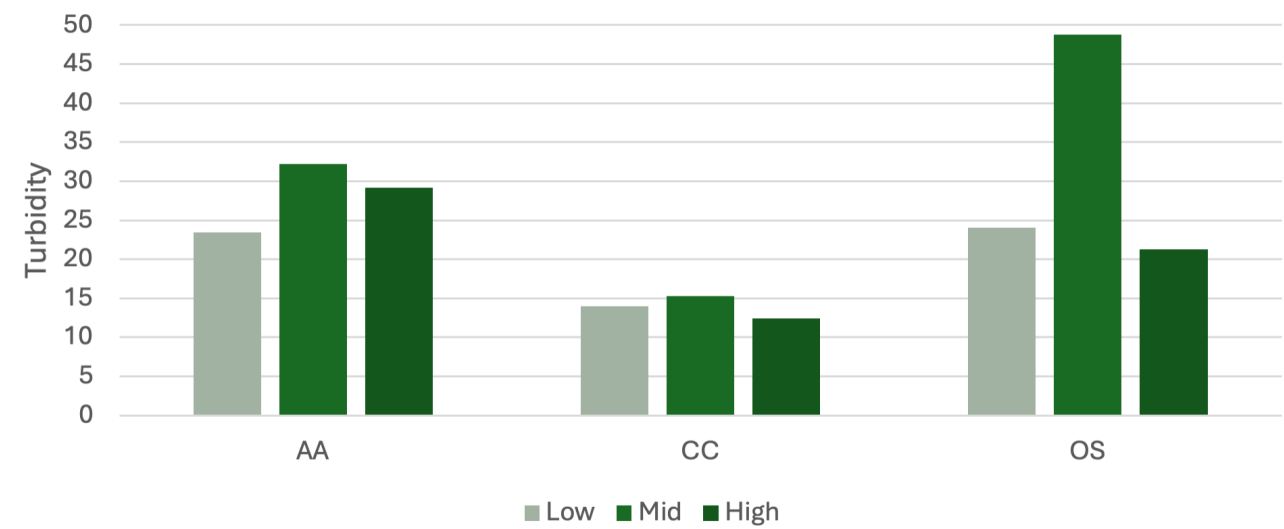
Conductivity and salinity have a strong linear relationship ($r^2 = 0.87$; graph not shown); however, this finding is not significant since salinity is a measure of dissolved salts and conductivity is a measure of the waters ability to carry an electric current and is influenced by dissolved salts and other ions.

Turbidity

Turbidity was lower on average at the Community Center (13.7 NTU, Nephelometric Turbidity Units) than Austin Avenue (23.5 NTU) or Odessa Street (27.6 NTU). All three sites shared the same minimum value of 6.7 NTU. Turbidity values were autogenerated from transparency, suggesting that 6.7 NTU was an assigned value for transparency values >88 cm.

Turbidity at all three sites was highest at mid-level and rising tides (next two graphs). Recall that DO (above) was lowest at the same (mid-level and rising tides), but both DO and turbidity are *lowest* at the Community Center.

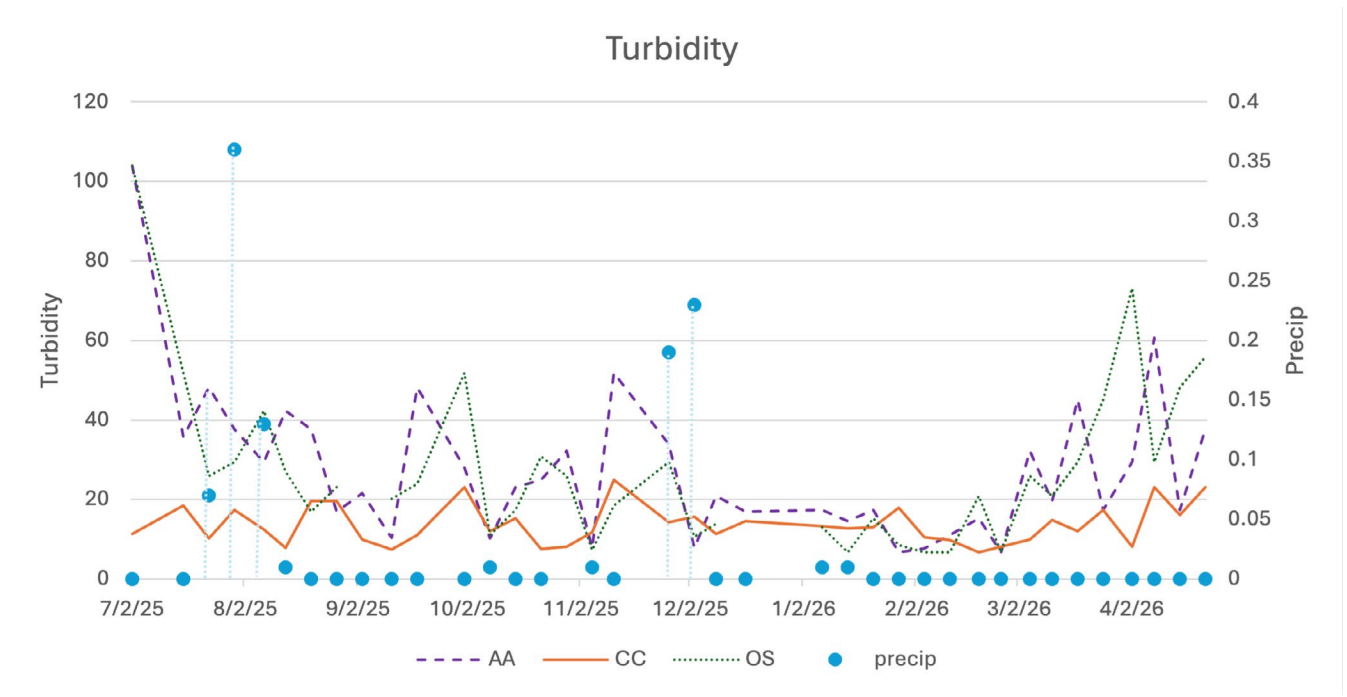
Turbidity by tide level & site



Turbidity by tide phase & site



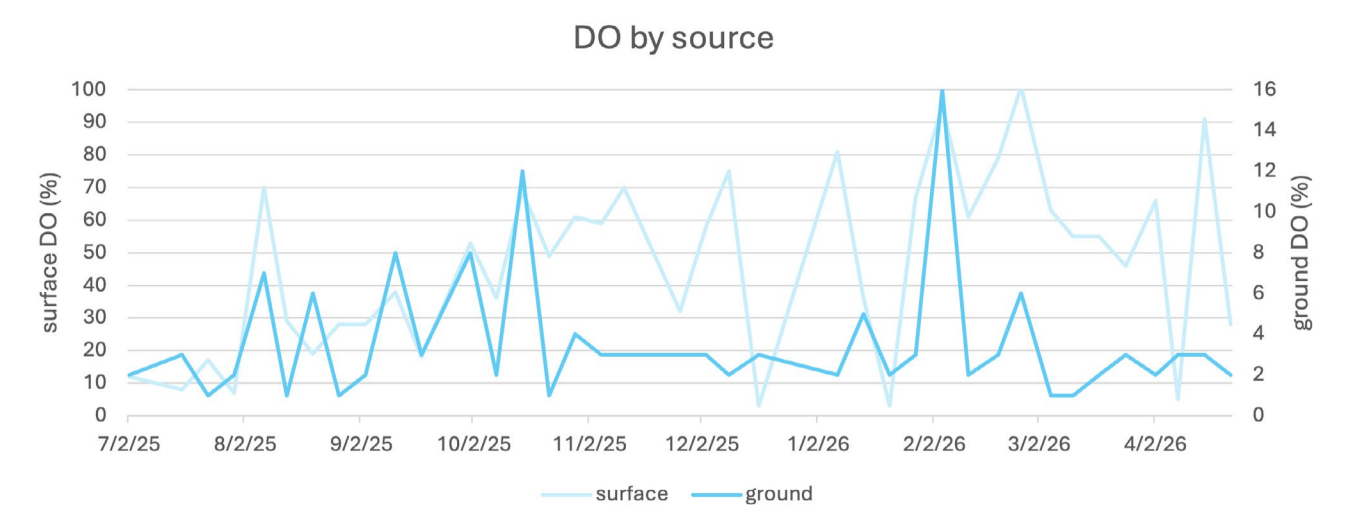
Turbidity relationships with precipitation (graph below) are unclear.



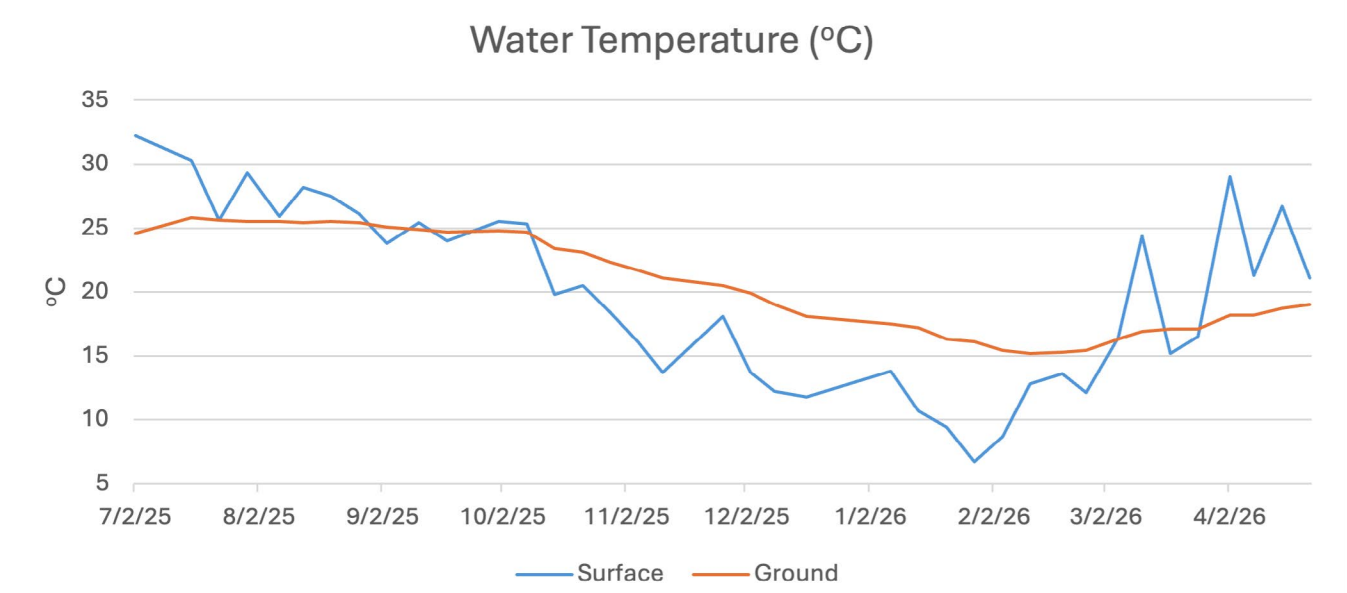
Surface & Groundwater Comparisons (Odessa Street only)

Groundwater metrics were collected at the Odessa Street location, in addition to surface water metrics. Comparisons between surface and groundwater at this sampling site are below.

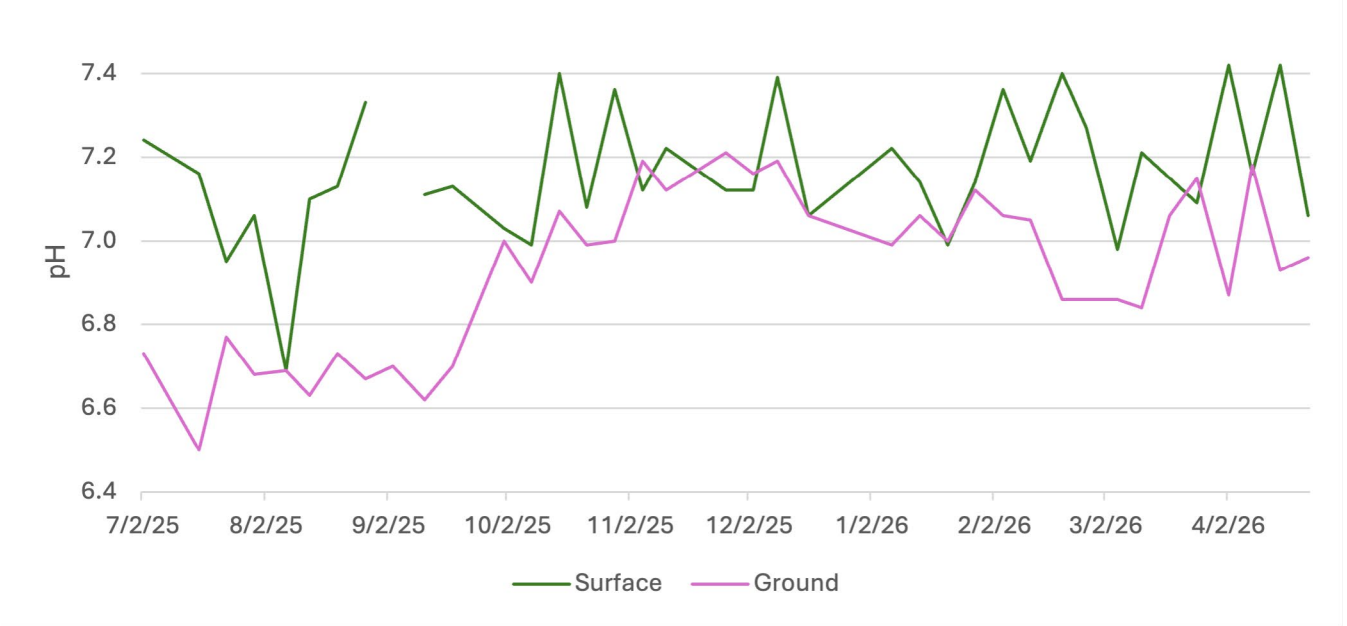
At the Odessa Street location, DO is consistently higher in surface water than ground water (below). Although their dynamics are not tightly connected ($r^2 = 0.18$), some spikes and drops coincide.



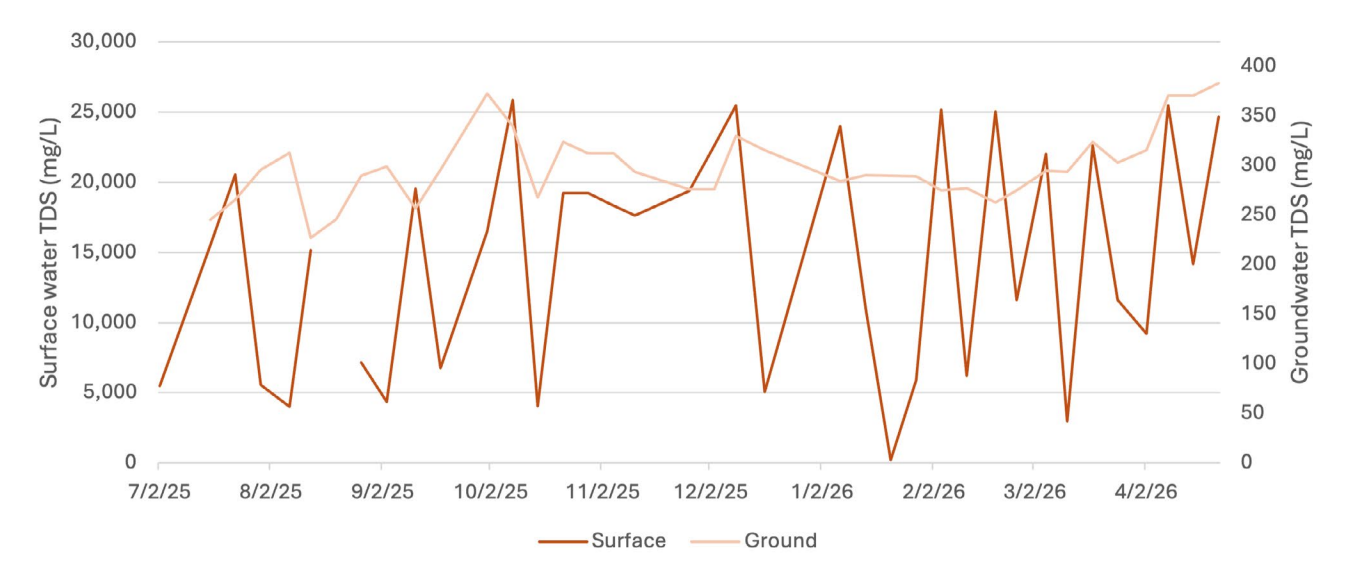
Surface water temperatures were higher than groundwater in the spring and summer, while groundwater temperatures were higher than surface water in the fall and winter. Groundwater temperature fluctuations were also less abrupt than surface water, likely due to having less exposure to atmospheric conditions and greater insulation.



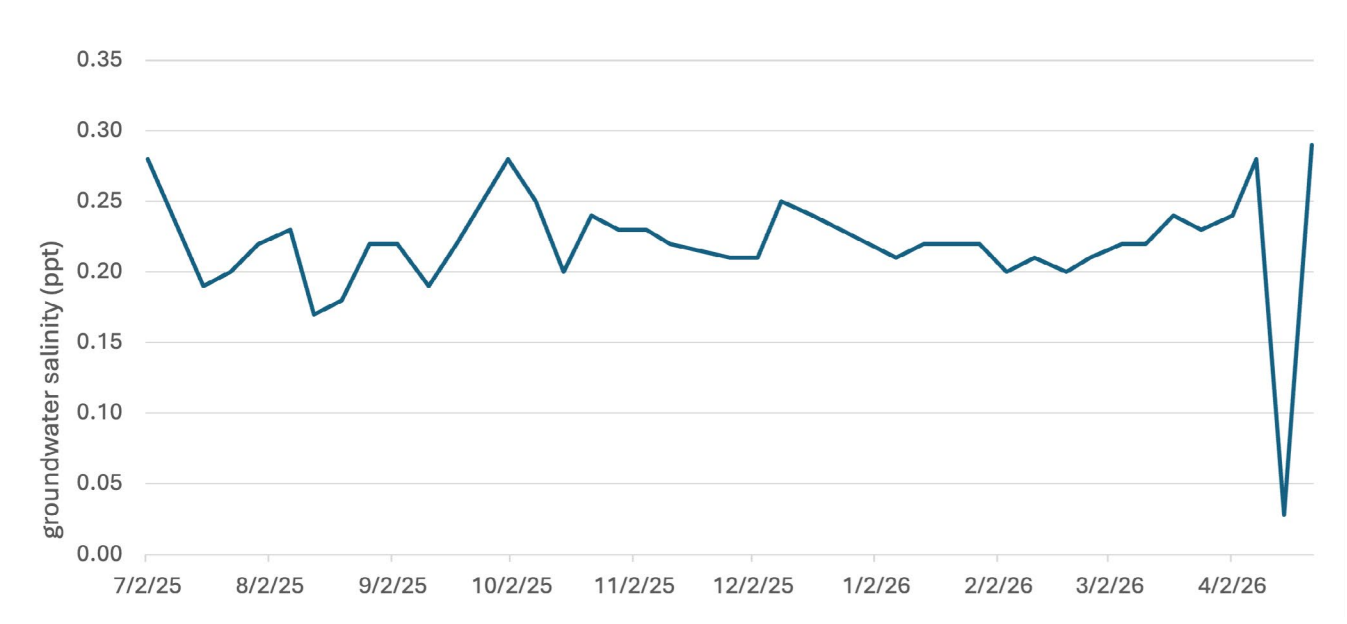
Groundwater pH was generally lower (more acidic) than surface water.



Total dissolved solids (TDS) were two orders of magnitude lower in groundwater than surface water. Additionally, like temperature, TDS fluctuations in groundwater were dampened compared to those of surface water.



Groundwater salinity averaged 0.22 ppt over the study period. This is two orders of magnitude lower than surface water salinity (above). The drop on April 22 is not correlated with a known event and may be a measurement error.



Laboratory Analyses

Samples for laboratory analysis of *Enterococcus* and fecal coliform bacteria, total nitrogen, total phosphorus, and total suspended solids were collected on 10 sampling days throughout the monitoring period: July 2 and 23, August 20, October 8, November 5, December 3 and 17, January 28, February 4, and March 18 (2025 into 2026). These results are reported below.

Enterococcus

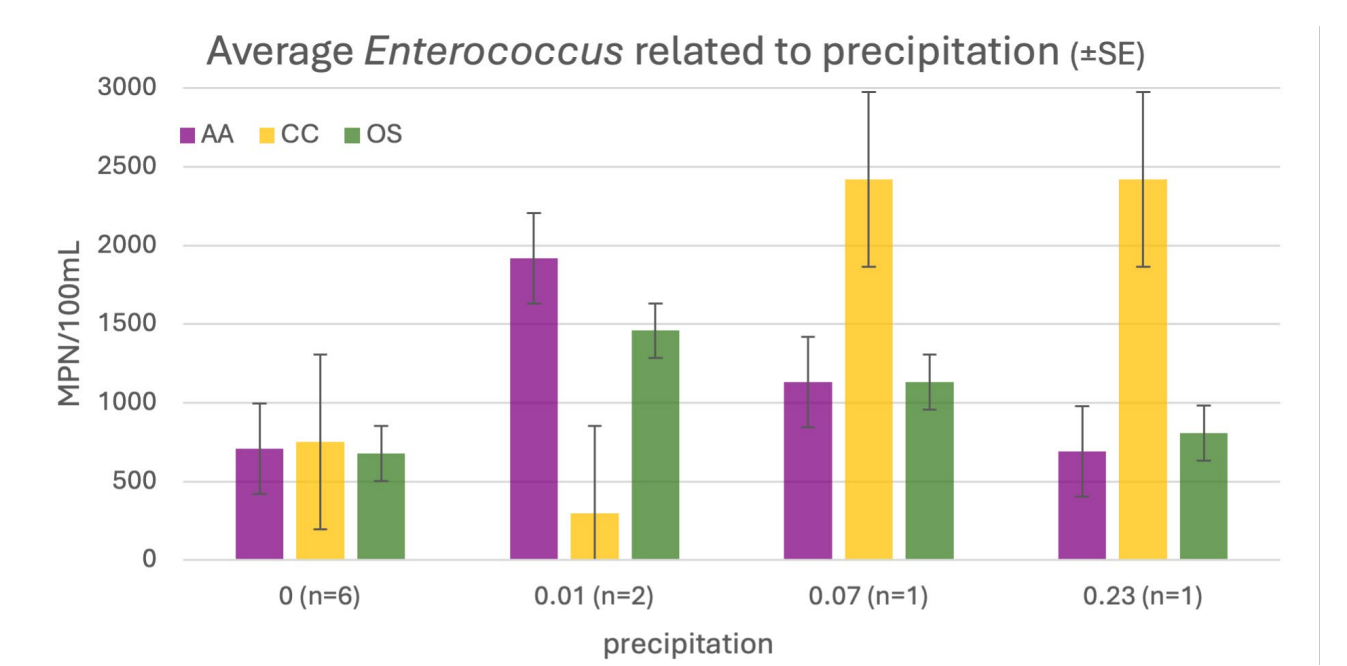
Regulation R. 61-68 has the following requirements for *Enterococci* legal limits, addressed individually. *Enterococci* is:

- “...not to exceed a geometric mean of 35/100 mL based on at least four (4) samples collected from a given sampling site over a 30-day period”: None of the collection locations had more than two samples collected within any 30-day period so this **cannot be evaluated**.
- “more than ten percent (10%) of the samples [shall not] exceed a single sample maximum of 104/100 mL during any 30-day period.” **All sites are out of compliance** with this mandate. Some samples were <104/100mL, but other samples collected in the 30-day window were over this value and crossed the 10% threshold since no more than 2 samples were collected in any 30-day period.

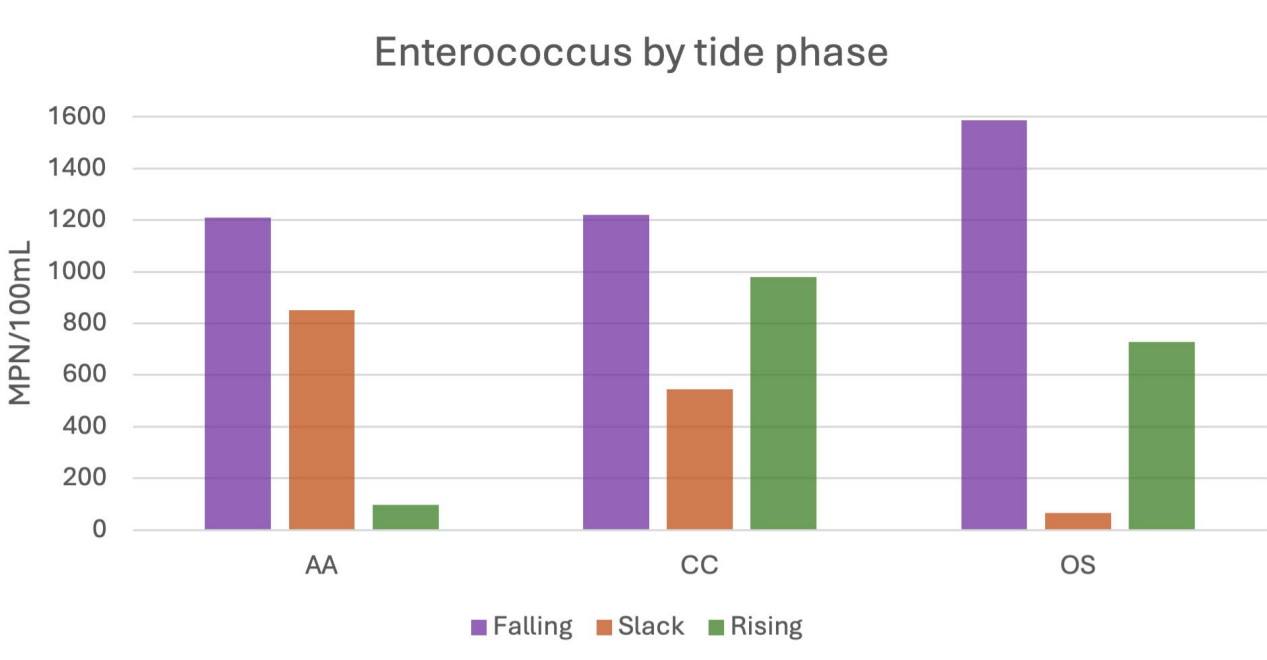
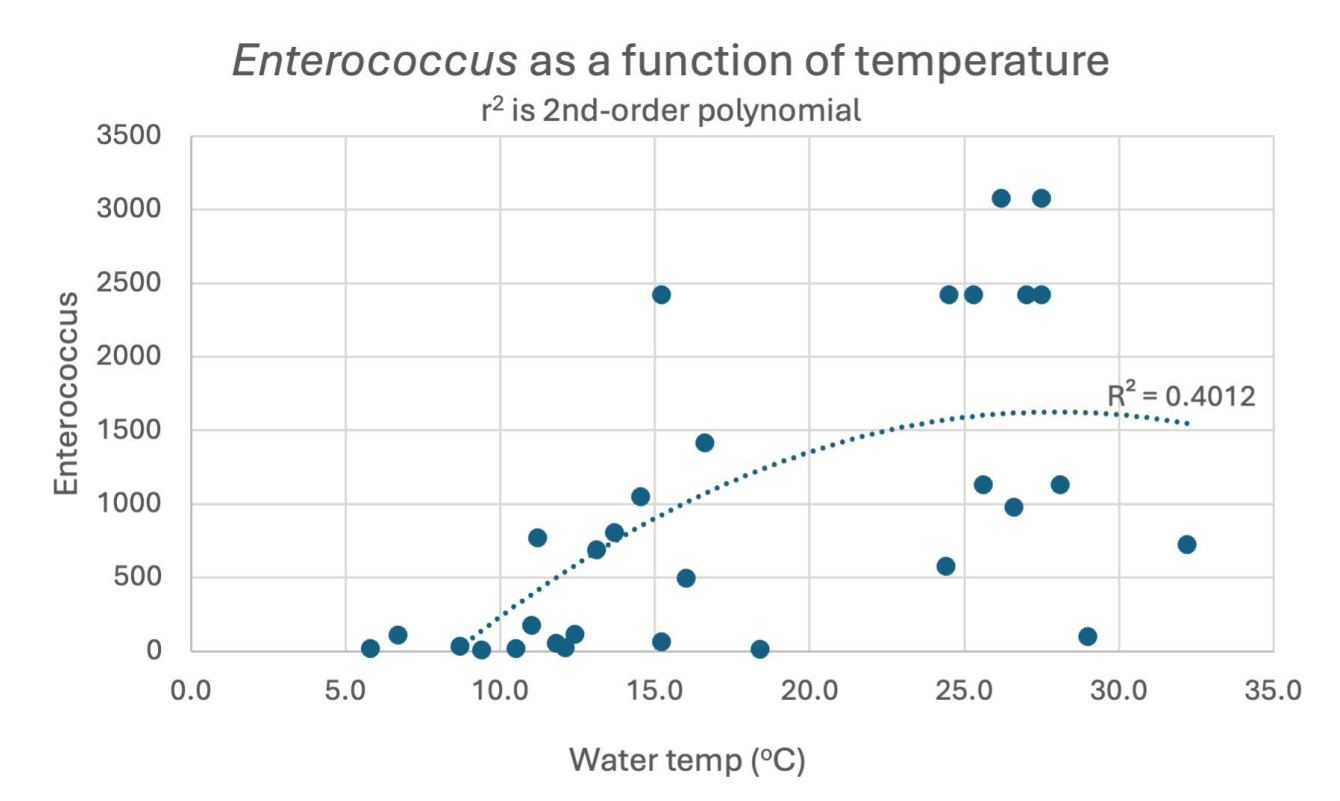
- “Additionally, for beach monitoring and notification activities for CWA Section 406 only, samples shall not exceed a single sample maximum of 104/100 mL.” **Most samples for all three locations exceeded the threshold** of 104/100mL. Austin Avenue had two days (Jul 2 and Jan 28) with *Enterococcus* less than this threshold, the Community Center had four (Nov 5, Dec 17, Jan 28, and Feb 4), and Odessa Street had three (Dec 17, Feb 4, and Mar 18).

Rosemont Marsh appears to be out of compliance with *Enterococcus* regulations. Averages across the sampling period are: Austin Avenue 991, Community Center 993, and Odessa Street 891.

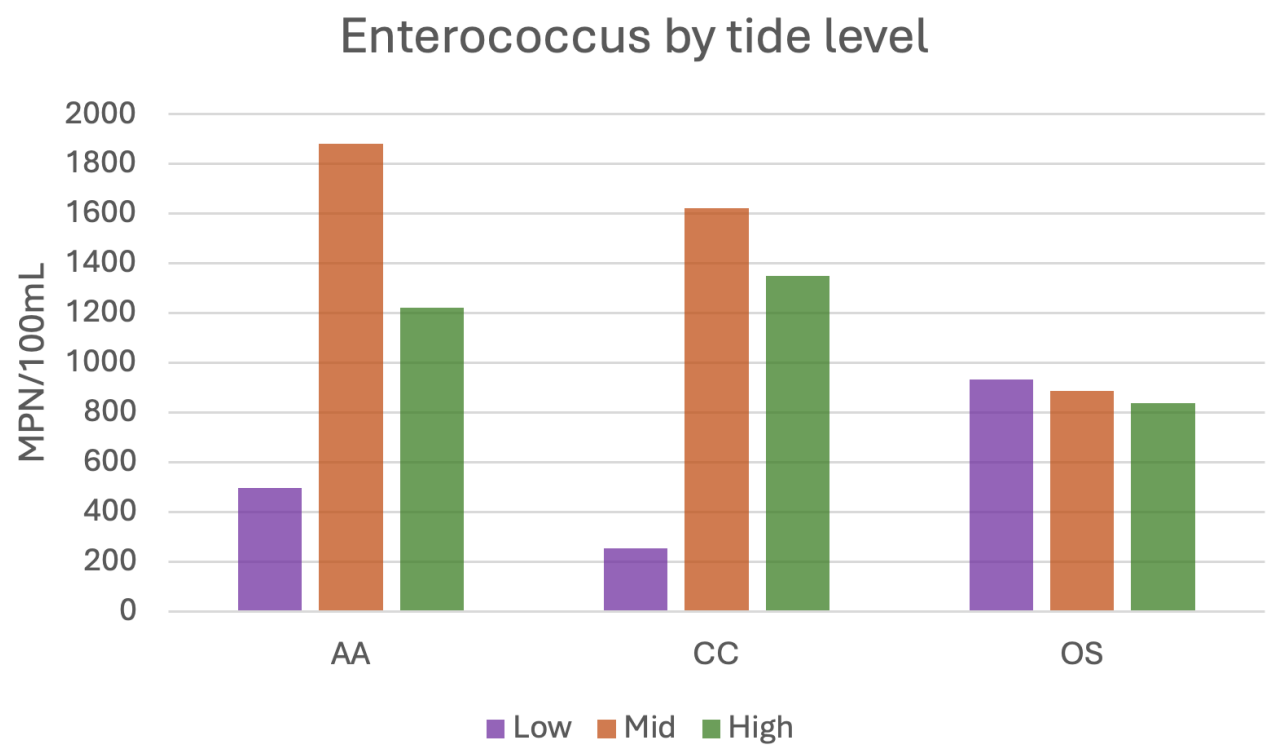
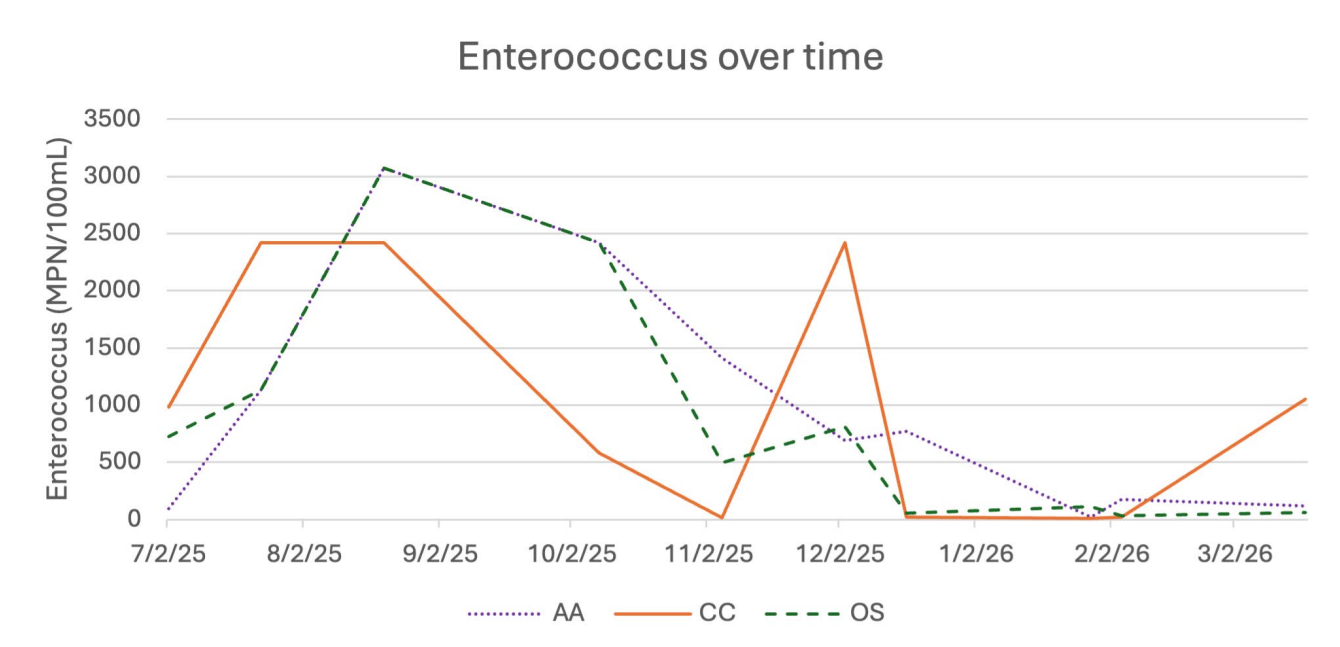
Interpreting a possible relationship between *Enterococcus* and precipitation is limited by the sample number (n=10). The greatest sample number was n=6, when there was no precipitation over the last 24 hours, and all three sampling locations had similar average *Enterococcus* measures (first cluster in graph below). Beyond a precipitation threshold of 0.01”, *Enterococcus* declines with increasing precipitation for Austin Avenue and Odessa Street locations. The Community Center location had higher *Enterococcus* levels when precipitation exceeded 0.01”.



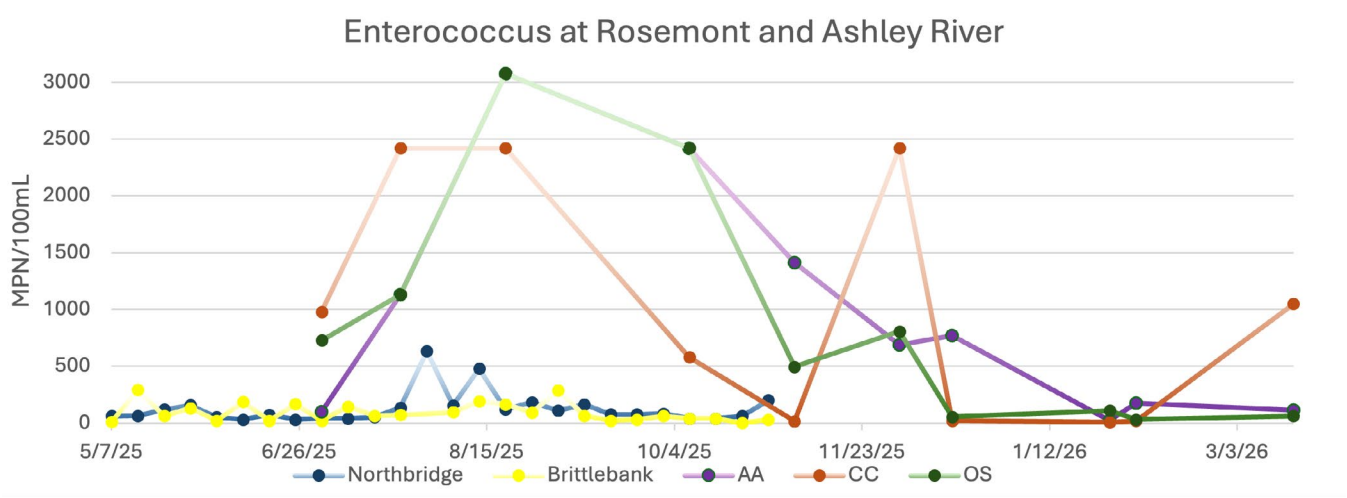
Fewer *Enterococcus* were counted at lower temperatures (below), and vice versa.



Other *Enterococcus* data related to environmental factors are shown below.

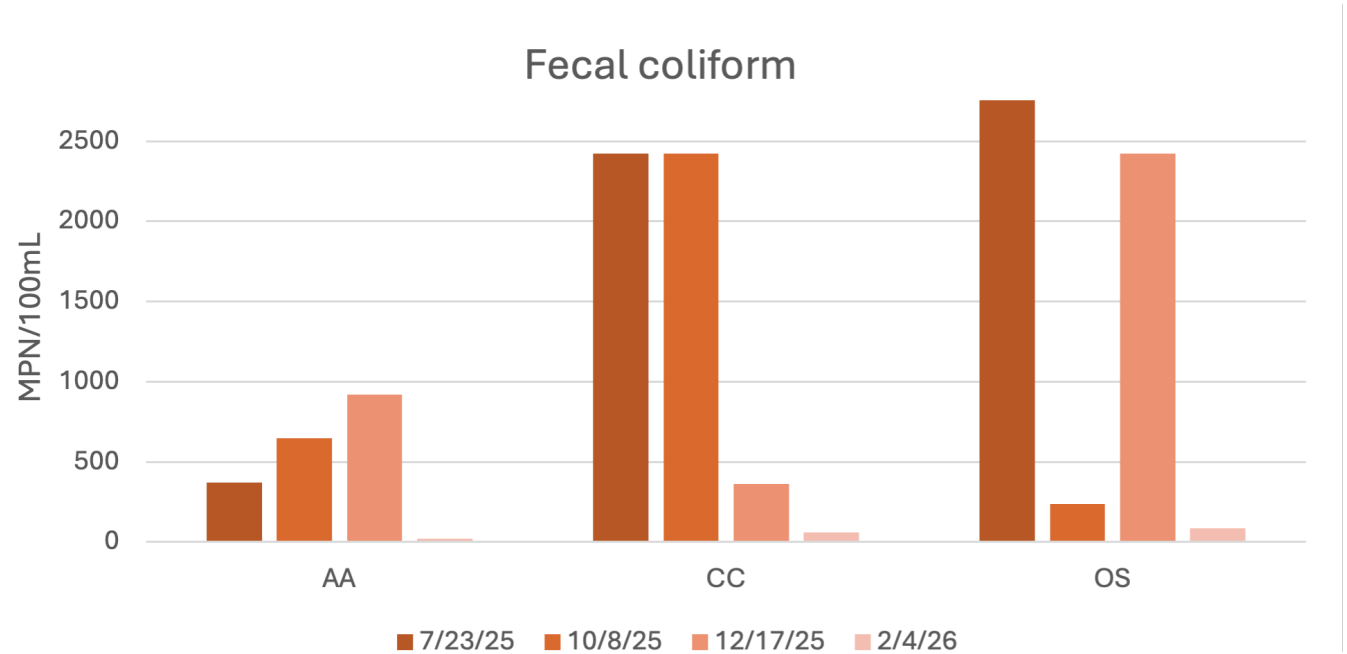


Enterococcus levels were compared to available data from the Brittlebank and Northbridge locations at the Ashley River (in the figure below, data for Austin Avenue and Odessa Street were the same on Jul 16, Aug 20, and Oct 8). Removing one outlier for Brittlebank, their overall averages were: Northbridge 126, Brittlebank 97, Austin Avenue 991, Community Center 993, and Odessa Street 891.



Fecal Coliform

Fecal coliform bacteria averaged lowest values at Austin Avenue (490 MPN/100mL), where it appeared to increase from July to December and then dropped over the winter. The Community Center location (average = 1,316 MPN/100mL) had high levels on the July and October sampling days, then dropped in December and February. Odessa Street (average = 1,375 MPN/100mL) exhibited no trend but matched the other two sites with low levels in February.



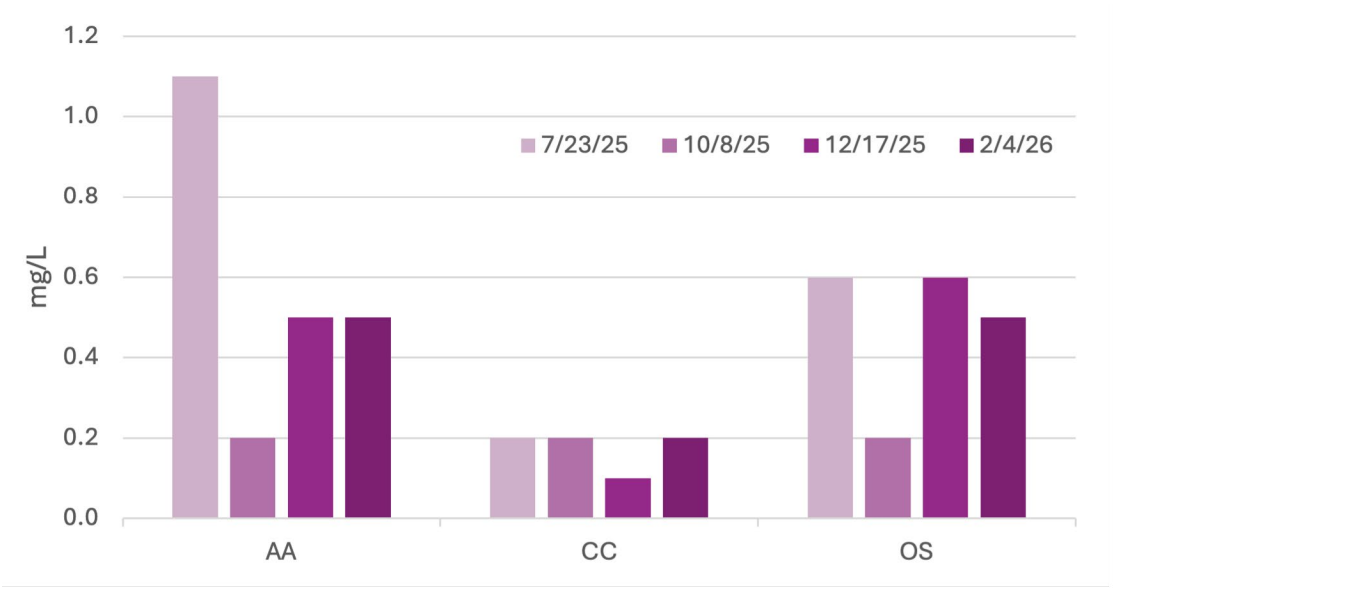
Unlike *Enterococcus*, data indicate a proportional relationship between rainfall and fecal coliform, which was 645 when rain in the last 24h was 0.0" (n=6), 1,102 after 0.01" rain (n=3), and 1,849 after 0.07" rain (n=3).

There was not a detectable relationship between fecal coliform bacteria and temperature.

The state standard for fecal coliform in Class SA water bodies such as the Rosemont marsh is a Daily Maximum of 43 MPN/100mL (which is equivalent to 43 CFU/mL), and a Monthly Average of 14 MPN/100mL (which is equivalent to 14 CFU/100mL) for the protection of shellfish uses. Fecal coliform levels in every sample except one were above the regulatory Daily Maximum.

Total Phosphorous

The Community Center location had lowest average P (0.2 mg/L) across the monitoring period compared to Austin Avenue (0.6 mg/L) and Odessa Street (0.5 mg/L).



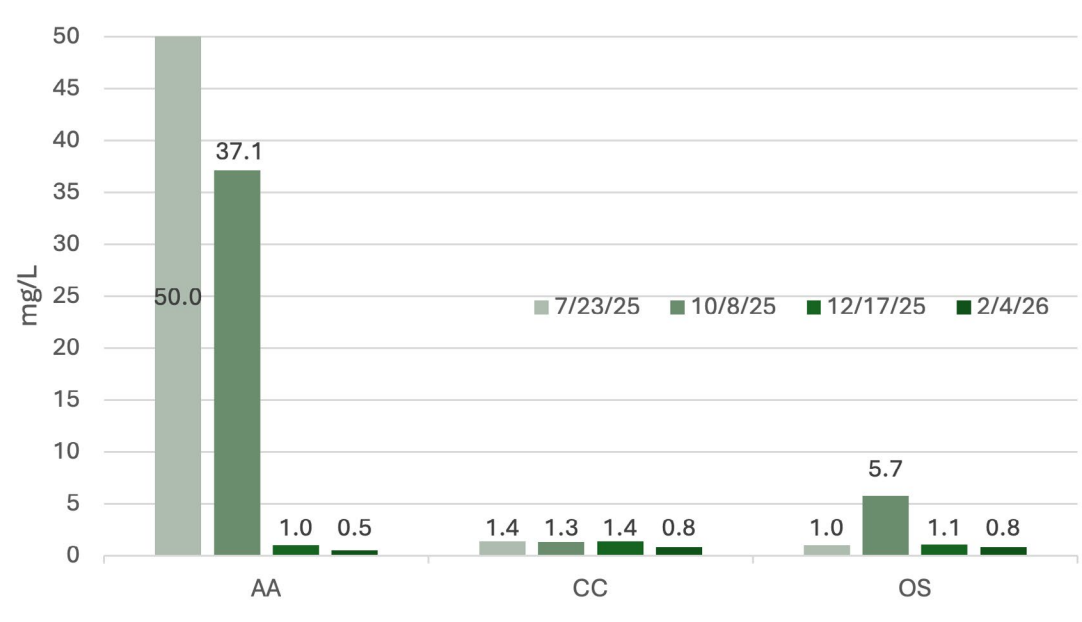
SCDHEC has not established water quality standards.

USEPA also has no published criteria on TP for estuarine waters.

The SCECAP upper threshold for "good" quality is 0.10 mg/L, and the lower threshold for "poor" quality is 0.12 mg/L. The majority of water samples analyzed for TP would be classified as poor quality.

Total Nitrogen

Across the monitoring period, the Austin Avenue site averaged an order of magnitude more total N than the other two locations due to high values on July 23 and October 8. Austin Avenue also had a phosphorus pulse on July 23 (but not on October 8). These were days of measurable rainfall (0.07 and 0.01 inches, respectively), but only Odessa Street showed a slight N pulse on October 8. Austin Avenue average total N was 22.2 mg/L, the Community Center averaged 1.2 mg/L, and Odessa Street averaged 2.2 mg/L. Note that the Community Center averages for both N and P are lowest among the three locations.



SCDHEC has not established water quality standards.

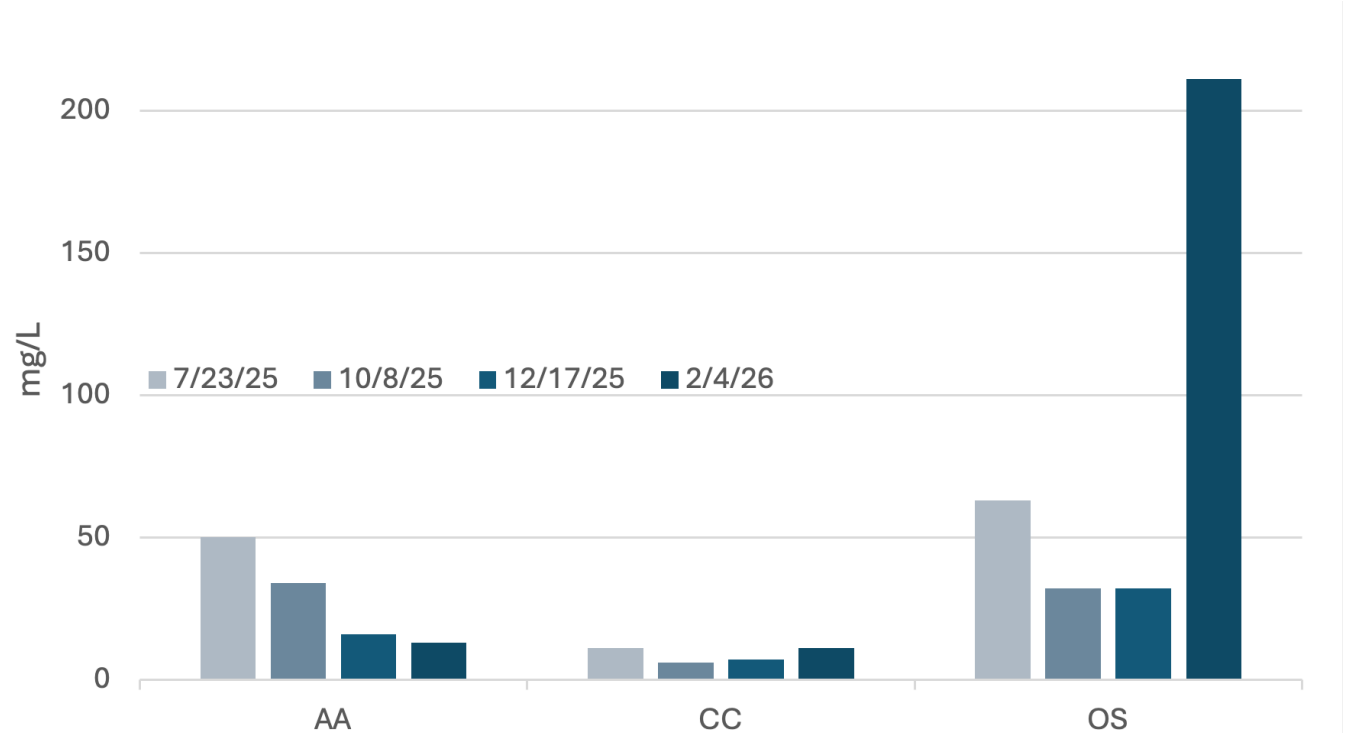
USEPA also has no published criteria on TP for estuarine waters.

The SCECAP upper threshold for “good” is 0.81 mg/L, and the lower threshold for “poor” is 1.05 mg/L. The majority of water samples analyzed for TN would be classified as good quality except for the first two samples collected at the Austin Avenue bridge on 7/23/2025 and 10/8/2025.

Note: for data analysis, N concentration was converted to 0 when under the detection threshold.

Total Suspended Solids

Odessa Street averaged highest TSS even without the exceptionally high reading on February 4 (which had no rain). The Community Center site averaged the lowest TSS.



There is no regulatory standard for TSS in South Carolina, though high TSS levels can reduce light penetration, disrupt aquatic life, and indicate erosion or runoff events.

Summary

Across nearly every measured parameter, air temperature, dissolved oxygen, pH, salinity, turbidity, total phosphorus, total nitrogen, and total suspended solids, the Community Center site consistently stood apart from Austin Avenue and Odessa Street, with lower values across the board. Some of these relationships make sense together: total phosphorus and total nitrogen are often tied to organic material, and dissolved oxygen and pH are connected through natural biological processes. But the consistency and scale of the Community Center’s separation from the other two sites points to something more specific happening at that location, worth investigating through the contaminant source study recommended elsewhere in this report.

Bacteria levels tell a related but distinct story. Further study is still needed to pin down the source of the high bacteria levels found throughout the marsh, but one early observation is worth noting: on a single sampling day, water collected at the mouth of the marsh showed lower Enterococcus and fecal coliform levels than the other sites closer to the community sampled that same day. With only one data point, this can’t be treated as a firm conclusion, but it does raise an encouraging possibility, that the marsh may still be filtering water effectively before it reaches the Ashley River, even while carrying a heavier bacterial load near the community itself.

Supplemental analyses funded by CCRAB

Contaminants of Concern

Metal contaminants were all below detection limits except for chromium on Odessa Street, which was still under the EPA regulatory threshold of 0.1 mg/L. For comparison, the national primary drinking water regulation that established the maximum contaminant level for total chromium is 0.1 mg/l.

Metal	Austin Avenue	Community Center	Odessa Street
Arsenic	<0.13	<0.13	<0.13
Barium	<0.13	<0.13	<0.13
Cadmium	<0.01	<0.01	<0.01
Chromium	<0.01	<0.01	0.01
Lead	<0.05	<0.05	<0.05
Mercury	<0.25	<0.25	<0.25
Selenium	<0.25	<0.25	<0.25
Silver	<0.25	<0.25	<0.25

Qualitative Observations

Water color. Rosemont water had no color on the majority of days, except for a milky/white appearance at Austin Avenue on July 2 and August 7, and a muddy/ brown appearance at Austin Avenue on Sept 18 and Oct 1 (which were sequential sampling days). Austin Avenue also had a brown layer on the surface of the water on Mar 18. The Community Center had a thin layer of film and orange foam on top on Jan 7 and 14. Odessa Street had a muddy/brown appearance on July 2 and 16 (which were sequential), Sept 3, Oct 1 and 15, and April 22.

Water Clarity

Most sampling days the water was clear and transparent. Most exceptions were at Odessa Street where it appeared cloudy/somewhat turbid as summarized below.

	AA	CC	OS
7/2/25	•		•
7/16/25			•
7/23/25			
7/30/25			•
8/7/25	•		•
8/13/25			
8/20/25			
8/27/25			
9/3/25			•
9/11/25			
9/18/25	•		
10/1/25	•		
10/8/25			
10/15/25			•
10/22/25			
10/29/25			
11/5/25			
11/11/25			
11/26/25			
12/3/25		•	
12/9/25			
12/17/25			
1/7/26		•	
1/14/26			
1/21/26			
1/28/26			
2/4/26			
2/11/26			
2/19/26			•
2/25/26			
3/5/26			
3/11/26			
3/18/26	•		•
3/25/26			
4/2/26			•
4/8/26	•		
4/15/26			•
4/22/26			•

Water odor

Rosemont water had no odor on the majority of days, except for a fishy smell at Austin Avenue on Aug 7 and a gasoline smell on April 15. The Community Center location smelled like gasoline on all sampling days between December 17 and April 22 (observers also noted a chemical smell on Dec 9 and Jan 14), and had a fishy smell on Mar 11.

Trash accumulation was the norm for all three sampling sites. On only two days (July 30 and Oct 29) was Austin Avenue clear of trash. A carcass was observed Feb 11-Mar 5. Odessa Street was clean on four days (July 2 and 23, Aug 27, Oct 8); patches of oil/gas were also observed on the water at Odessa Street on Jan 7 and Feb 11 and 19. The Community Center was clean Jul 16-30, Oct 22-29, Nov 11, Jan 21-28, Feb 4, and Mar 18. This is interesting given that water was stagnant at the Community Center throughout the project (below).

Water flow

Water flow dynamics depended on sampling location. Community Center water was stagnant throughout the sampling period. Austin Avenue water flow is summarized in the following table.

Sampling dates	Flow at Austin Ave	Sampling dates	Flow at Austin Ave
Jul 7-Aug 7	Downstream	Jan 14	Downstream
Aug 13-27	Stagnant	Jan 21	Stagnant
Sept 3	Downstream	Jan 28-Feb 4	Downstream
Sept 11	Stagnant	Feb 11	No water
Sept 18	Downstream	Feb 19	Stagnant
Oct 1-8	Stagnant	Feb 25	Downstream
Oct 15	Upstream	Mar 5	Stagnant
Oct 22	Stagnant	Mar 11	Downstream
Oct 29	Upstream (very slow)	Mar 18	Stagnant
Nov 5	Downstream	Mar 25-Apr 2	Downstream
Nov 11-Dec 9	Stagnant	Apr 8	Stagnant
Dec 17	Downstream	Apr 15-22	Downstream
Jan 7	Stagnant		

Odessa Street was stagnant on all sampling dates except July 2; Dec 17; Jan 28; Feb 11 and 25; March 5, 11, and 25; and Apr 2, 8, and 15.

Species observations

Clapper rails were observed at Austin Avenue on Oct 15 and 29 and at Odessa Street on Nov 5 and 11 and Dec 3. Other wildlife/animal and some botanical observations are below.

Sampling Date	AA	CC	OS
7/2/2025	fiddler crabs, little fish	Snapping turtle, Red-tailed hawk, great crested flycatcher, 20-ish tiny fish	Mussels
7/16/2025	fish, perriwinkle snail	dragonflies, minnows, crabs	blue crab, fiddler crabs, snails, spider, red-shouldered hawk, healthy amount of spartina grass
7/23/2025	Painted bunting, Carolina Wren, Spartina grass	fish, dragon fly	healthy spartina grass, periwinkle snails, praying mantis, fiddlers crabs
7/30/2025	fiddler crabs, little fish	Red-tailed hawk, dragonfly, little fish, fiddler crabs	Blue crab, fiddler crab, spartina, periwinkle snails
8/7/2025	Small crabs, periwinkle snails; Dead shark head and fin and ribs? (Possibly sand shark, not entirely certain)	Yellow-bellied slider turtle	Birds, bugs
8/13/2025	Perwinkle snails, cicadas, crabs, water spider (on the water), monarch butterfly, dragonfly; Animal skull, bone fragments	Minnows	Fiddler crabs, cicadas
8/20/2025	Birds	Minnows, butterfly, honeybee	Hornet, fiddler crabs, periwinkle snails
8/27/2025	Periwinkle snails, fiddler crabs, osprey	Fish	Dragonfly
9/3/2025	Cicadas, periwinkle snails	Monarch butterfly, minnows	Periwinkle snails, butterflies, dragonfly, crabs
9/11/2025	Crickets	Hawk, minnows	Red-shouldered hawk, great egret, fishing spider, minnows, fiddler crabs
9/18/2025	Fiddler crabs, gulf fritillary, blue crab	Minnows, dragonfly, fiddler crab	Fiddler crabs, periwinkle snails
10/1/2025		Dragonflies, morning glories, sulphuride butterflies, minnows, grasshopper	Periwinkle snails, spartina, fiddler crabs, wasp?, Osprey call?

Sampling Date	AA	CC	OS
10/8/2025	Periwinkle snails, dragonfly, butterfly, morning glories	Dragonfly, minnows	
10/15/2025		Red-eyed leafhopper, clown weevil, blue jay?	Periwinkle snails, dragonfly, spartina, grasshopper, blue jay?
10/22/2025	Morning glory, aster, periwinkle snails	Monarch butterfly, minnows, caterpillar, ladybug, clown weevils	Dragonfly, periwinkle snails, minnow, butterfly
10/29/2025			Periwinkle snails
11/5/2025		Dragonfly, Leaf-footed bug, minnow	Storks, green butterfly (sulfides), dragonfly, periwinkle snails
11/11/2025		Northern mockingbird	Periwinkle snails
11/26/2025		Minnows	Periwinkle snails
12/17/2025		Minnows	Periwinkles
1/7/2026		Pompas?	Periwinkle; small patches of white growth in mud
1/14/2025	Periwinkle		Egret, periwinkle snails, mussel, white patches in mud
1/21/2026		Crow	
1/28/2026		Woodpecker	Great egret, periwinkle snails
2/11/2026	Turkey vulture, egret, blue heron		Swallows, periwinkle snails, mussel
2/19/2026	Fiddler crab		Periwinkle snails
2/25/2026	Egret, crow		Egret, periwinkle snails, mussels, seagull, hawk
3/5/2026	Periwinkle snails	Minnows	Fiddler crabs, minnows, periwinkle snails
3/11/2026	Fiddler crabs, periwinkle snails, green algae	Minnows, snapping turtle/big fish? (big splash)	Periwinkle snails, fiddler crabs, damselfly
3/18/2025	Periwinkle snails, hawk	Beaver!?, turtle	Periwinkle snails, turkey vulture
3/25/2026	Periwinkle snails, geese, wisteria		Periwinkle snails, woodpecker

Sampling Date	AA	CC	OS
4/2/2026	Periwinkle snails, fiddler crabs	Minnows, 2 yellow-bellied sliders	Periwinkle snails, mussel, fiddler crabs
4/8/2026	Periwinkle snails, carpenter bee	Minnows, beaver, dragonfly	Periwinkle snails
4/15/2026	Fiddler crabs, periwinkles, turtle	Dragonfly, minnows, turtle; Green & orange algae	Periwinkle snails, fiddler crabs, mussels, minnows
4/22/2026	Periwinkle snail, fiddler crabs	Crow, beaver, minnows	Mussels, periwinkle snails, fiddler crabs, butterfly

Appendix C

MarshRAM Full Data and Results

Summary of Key Findings

- The Rosemont marsh received an Index of Marsh Integrity (IMI) score of 6.26, placing it in the intermediately degraded category relative to northeastern United States reference marshes.
- Marsh condition varied spatially, with healthier vegetation and higher Coefficient of Community Integrity (CCI) scores near the Ashley River and in interior areas of the marsh, and declining condition were observed around many of the marsh edges where the marsh abutted grey infrastructure.
- Surrounding land use is heavily altered, with dense urban, industrial, and impervious cover within a 150-meter buffer of the marsh edge, likely contributing to elevated anthropogenic nutrient inputs.
- Tidal connectivity is compromised at multiple points, including a pinch point at the mouth of Rosemont Creek, behind a dredge placement impoundment behind the marina, and localized restrictions throughout the creek.
- A large amount of stormwater drainage is directed into the marsh via ditches under the Austin Avenue bridge and culverts near the Freddie Whaley Community Center, representing a hydrologic stressor despite the absence of direct marsh ditching.
- Localized vegetation dieoff and mud flat formation were observed, particularly on the eastern and northern portions of the marsh, associated with a combination of plausible stressors including poor tidal connectivity, prolonged inundation, freshwater influence, and shading.
- Invasive plant species were present along most marsh edges, with a power line corridor showing a distinct strip of dead vegetation and invasive growth suspected to be associated with herbicide application.
- Migration potential scored 1.0 out of 10.0, with both migration area and replacement ratio at zero percent under existing conditions, indicating the marsh has effectively no capacity to migrate landward as sea levels rise or adapt to changing conditions.

Introduction

The Salt Marsh Rapid Assessment Method (MarshRAM) is a field-based rapid assessment tool developed to characterize salt marsh condition, ecological function, disturbance, and resilience at the site scale. Originally developed and applied in the northeastern United States, MarshRAM integrates field observations and aerial imagery to generate a set of indices describing marsh integrity, surrounding land use, disturbance, and migration potential, allowing for comparisons among marshes within a defined geographic region (Kutcher 2019; Kutcher et al. 2022). The method is designed to be most effective when applied across multiple marshes within a similar landscape, where relative rankings can be established (e.g., identifying higher- and lower-quality marshes within a dataset) (Kutcher 2019; Kutcher et al. 2022).

To date, MarshRAM has been applied primarily in the North Atlantic and the Mid-Atlantic coasts, and there are no known peer-reviewed studies or published applications of this method in the southeastern United States. As such, the application of MarshRAM in Rosemont represents the first use of this method in South Carolina. Because only a single marsh has been assessed using MarshRAM in this region, direct regional comparisons are not yet possible. To address this limitation, the project team compared the MarshRAM scores to published ranges and averages from northeastern applications to provide contextual interpretation (Kutcher et al. 2022; Rogerson et al. 2016).

In addition, modifications were made to portions of the MarshRAM scoring rubric to better reflect ecological conditions and habitat value in southeastern tidal marsh systems and specifically in the Rosemont marsh. These adaptations are described in detail below and are intended to improve the relevance of the method to the South Carolina coastal context while maintaining consistency with the overall MarshRAM framework.

While this application is necessarily limited by the lack of a regional comparison dataset, it establishes an important baseline for future MarshRAM assessments in the southeastern United States. The data and methods presented here provide a rigorous and repeatable framework for characterizing marsh condition in Rosemont and can serve as a reference point for future studies seeking to evaluate marsh health, resilience, and restoration outcomes in similar coastal systems.

Methods

This analysis used methods as described in “MarshRAM User’s Guide” report (Kutcher 2022). Some changes to the 2022 MarshRAM methods were necessary to adapt to South Carolina’s unique marsh environment.

Due to softer sediment, some section lengths (number of steps) had to be estimated from a distance like over water body crossings or segments of a transect with particularly soft muddy substrate where walking was infeasible. Vegetation community types and disturbance indicators are also different in the southeast United States so some coefficient of community integrity (CCI) values were changed to better represent the ecological conditions of this region of the world. Southeastern salt marshes differ substantially from their northeastern counterparts in tidal range, sediment type, and the prevalence of certain disturbance regimes. For example, southeastern marshes are typically dominated by *Spartina alterniflora* across a larger expanse while northeastern marshes tend to have narrow bands of low marsh (Sanger & Parker, 2016).

To address these differences, the following targeted modifications were made to the MarshRAM community composition scoring rubric for this study. These adaptations were designed to better reflect the structure and function of southeastern marsh systems while maintaining consistency with the overall MarshRAM framework and intent.

Key modifications include:

Refinement of titles for marsh cover type

- The “Salt Shrub” category from the original MarshRAM was changed to “Salt Shrub Thicket” to match regional literature describing this habitat typology (Nelson, 1986). Similarly, “Brackish Marsh Native” was changed to “Brackish Marsh” and “Natural Panne” was changed to “Salt Panne” because that is how existing regional literature references these natural communities (Nelson, 1986; Hosier, 2018). “Phragmites” was changed to “Invasives” because there was no phragmites in the study area and this title change captures a wider range of invasive vegetation. “Sa High Marsh” was split into two categories called “Sa High Marsh” and “Sa Med Marsh” to capture additional granularity in a system that consists mostly of monoculture *Spartina alterniflora*. “Dieoff Bare Depression” was changed to Dieoff/Dead Vegetation because the Rosemont marsh had no bare depressions but did have an area of dead vegetation underneath a powerline. Dieback Denuded Peat was excluded because this typology did not occur in the Rosemont marsh, but this section could be reintroduced for future studies. “Bare Sediments” was changed to “Intertidal Mud/Sand Flat” to capture areas without vegetation and to better represent that mud flats do have ecological value in the southeast. Lastly, an “Infrastructure” category was added because one transect intersected with a pipe and an bridge.

Adjustment of scoring

- Several Marsh Cover Type CCI scores were changed to better represent the ecological communities of the southeast.

Original MarshRAM		Rosemont MarshRAM		Reason for Score Change
MarsH Cover Type	CCI	MarsH Cover Type	CCI	
Salt Shrub	9	Salt Shrub Thicket	9	no change
Brackish Marsh Native	10	Brackish Marsh	10	
Phragmites	3	Invasives	3	no change
Meadow High Marsh	10	Meadow High Marsh	10	no change
Mixed High Marsh	7	Mixed High Marsh	7	no change
Sa High Marsh	5	Sa High Marsh	5	Short-form spartina dominates healthy saltmarsh systems, deserving of a slightly higher score.
		Sa Med Marsh	6	Medium-form spartina grass is closer to the main waterway and receives more nutrients.
Dieoff Bare Depression	1	Dieoff/Dead Vegetation	1	here was one section of dead vegetation in Rosemont but no dieoff bare depression; no change to score
Low Marsh	8	Low Marsh	8	no change
Dieback Denuded Peat	0			removed
Natural Panne	8	Salt Panne	8	no change
Natural Pool	6	Natural Pool	6	no change
Natural Creek	8	Natural Creek	8	no change
Ditch	2	Ditch	2	no change
Bare Sediments	4	Intertidal Mud/ Sand Flat	5	Mud flats have more habitat value in the southeast and can be a healthy part of a salt marsh

These modifications are consistent with the broader precedent of adapting rapid assessment methods to regional conditions. Similar approaches have been used in other tidal wetland assessment frameworks, such as the Mid-Atlantic Tidal Wetland Rapid Assessment Method, where metrics and scoring were adjusted to reflect regional ecological gradients and disturbance regimes (Rogerson & Haaf, 2017).

While these adaptations introduce some minor limitations in direct comparability with northeastern MarshRAM datasets, they improve the ecological relevance and interpretability of results for the study area. Importantly, the modified rubric maintains internal consistency within this assessment and provides a transparent framework that can be applied to future MarshRAM analyses in the southeastern United States.

The full suite of Marsh Cover Types and their descriptions are included in Table X:

Salt Marsh Cover Types (modified from Kutcher 2022) and coefficients of community integrity (CCI) used to generate indices of marsh integrity (IMI).		
Marsh Cover Type	Description	CCI
Salt Shrub Thicket	Infrequently flooded shrub community (>30% shrub cover) located at higher elevations on the marsh platform and at the upland interface; typically dominated by <i>Iva frutescens</i> and <i>Baccharis halimifolia</i>	9
Brackish Marsh	Emergent community where freshwater from the watershed dilutes infrequent flooding by seawater; typically dominated by non-halophytic, salt-tolerant vegetation such as <i>Typha latifolia</i> and <i>Juncus roemerianus</i> .	10
Meadow High Marsh	Irregularly flooded emergent high marsh community dominated by any combination of <i>Spartina patens</i> , <i>Distichlis spicata</i> ; <i>Spartina alterniflora</i> absent.	10
Mixed High Marsh	Irregularly flooded emergent high marsh community mostly dominated by <i>Juncus roemerianus</i> but can be comprised of a combination of <i>Spartina patens</i> , <i>Distichlis spicata</i> ; <i>Spartina alterniflora</i> present.	7
Sa High Marsh	Dominated by short-form <i>S. alterniflora</i> . Irregularly flooded emergent high marsh; typically a monoculture of <i>S. alterniflora</i> (>30% cover), although <i>Salicornia</i> sp. may be present.	5
Sa Med Marsh	Slightly taller “medium-form” <i>S. alterniflora</i> . Often closer to main creek channel but not tall-form, and not as short as short-form.	6
Low Marsh	Tall-form <i>S. alterniflora</i> . Regularly flooded emergent community located at typically sloping tidal edges of the marsh surface and dominated by tall-form <i>S. alterniflora</i> .	8
Salt Panne	Shallow, clearly defined depressions on the marsh platform, irregularly flooded and typically dry at low tide. Slow percolation into compacted substrate and prolonged evaporation produce hypersaline soils supporting distinct zones of succulent halophytes and salt-tolerant herbs, with adjacent barren ground; characteristic species include <i>Salicornia</i> sp., <i>Juncus roemerianus</i> , and <i>Aster</i> sp.	8

Salt Marsh Cover Types (modified from Kutcher 2022) and coefficients of community integrity (CCI) used to generate indices of marsh integrity (IMI).		
Marsh Cover Type	Description	CCI
Natural Pool	Shallow steep-sided depression on marsh platform with clearly defined edge; irregularly flooded by tides but typically remaining flooded throughout the tide cycle; organic or sandy substrate lacking emergent vegetation and roots but may support <i>Ruppia maritima</i> .	6
Natural Creek	Narrow, natural, unvegetated, regularly-flooded or subtidal feature cutting into the marsh surface; typically sinuous.	8
Interidal Mud/Sand Flat	No vegetation; subject to some wave action	5
Invasives	Areas where invasive species cover >30%.	3
Ditch	Manmade ditches and associated spoils on the marsh surface; typically linear.	2
Infrastructure	Human-made infrastucture in, through, or over the marsh such as a bridge, pipe, etc.	0
Dieoff/Dead vegetation	Areas with dead vegetation.	1

Interpreting MarshRAM Data

MarshRAM produces a suite of metrics and indices meant to be interpreted comparatively, either across multiple marshes assessed during the same season or, less frequently, across time for a single marsh. The central output is the Index of Marsh Integrity (IMI), which reflects a marsh's structural integrity and its relative susceptibility to inundation stress under accelerating sea-level rise conditions. Because IMI scores are not calibrated against an absolute standard, they are most meaningful when ranked alongside scores from other marshes in the dataset. A sorted ranking of IMI scores allows any individual marsh to be positioned along a condition gradient, and quartile breakpoints can be used to assign general degradation categories: marshes in the upper quartile are considered least degraded, those in the lower quartile most degraded, and those in the middle two quartiles fall within an intermediate range. IMI values can then be cross-referenced with other MarshRAM outputs, including disturbance metrics, marsh migration categories, and ecosystem function assessments, to inform management priorities such as restoration sequencing or regional triage.

The original MarshRAM methodology states that a completely undisturbed marsh would earn a score of a 9.0 IMI. The 9.0 benchmark is retained here as a reference point for contextualizing IMI scores.

ROSEMONT TRANSECT 1				
Marsh Cover Type	CCI	Total Tally	CCIXTT	% Cover
Salt Shrub Thicket	9		0	0
Brackish Marsh	10	7	70	4
Meadow High Marsh	10		0	0
Mixed High Marsh	7	160	0	0
Sa High Marsh	5	7	800	88
Sa Med Marsh	6		42	4
Low Marsh	8		0	0
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8		0	0
Intertidal Mud/Sand Flat	5	5	25	3
Invasives	3	3	9	2
Ditch	2		0	0
Infrastructure	0		0	
Dieoff/Dead Vegetation	1		0	0
Total	88	182	946	100
Index of Marsh Integrity	5.20			

ROSEMONT TRANSECT 2				
Marsh Cover Type	CCI	Total Tally	CCIXTT	% Cover
Salt Shrub Thicket	9		0	0
Brackish Marsh	10	57	570	12
Meadow High Marsh	10		0	0
Mixed High Marsh	7		0	0
Sa High Marsh	5	235	1175	51
Sa Med Marsh	6	54	324	12
Low Marsh	8	37	296	8
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8	3	24	1
Intertidal Mud/Sand Flat	5	14	70	3
Invasives	3			
Ditch	2		0	0
Infrastructure	0	13	0	3
Dieoff/Dead vegetation	1	50	50	11
Total	88	463	2509	100
Index of Marsh Integrity	5.42			

ROSEMONT TRANSECT 3				
Marsh Cover Type	CCI	Total Tally	CCIXTT	% Cover
Salt Shrub Thicket	9		0	0
Brackish Marsh	10		0	0
Meadow High Marsh	10		0	0
Mixed High Marsh	7		0	0
Sa High Marsh	5	71	355	16
Sa Med Marsh	6	214	1284	47
Low Marsh	8	103	824	23
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8	35	280	8
Intertidal Mud/Sand Flat	5	31	155	7
Invasives	3			
Ditch	2		0	0
Infrastructure	0			
Dieoff/Dead vegetation	1			
Total	88	454	2898	100
Index of Marsh Integrity	6.38			

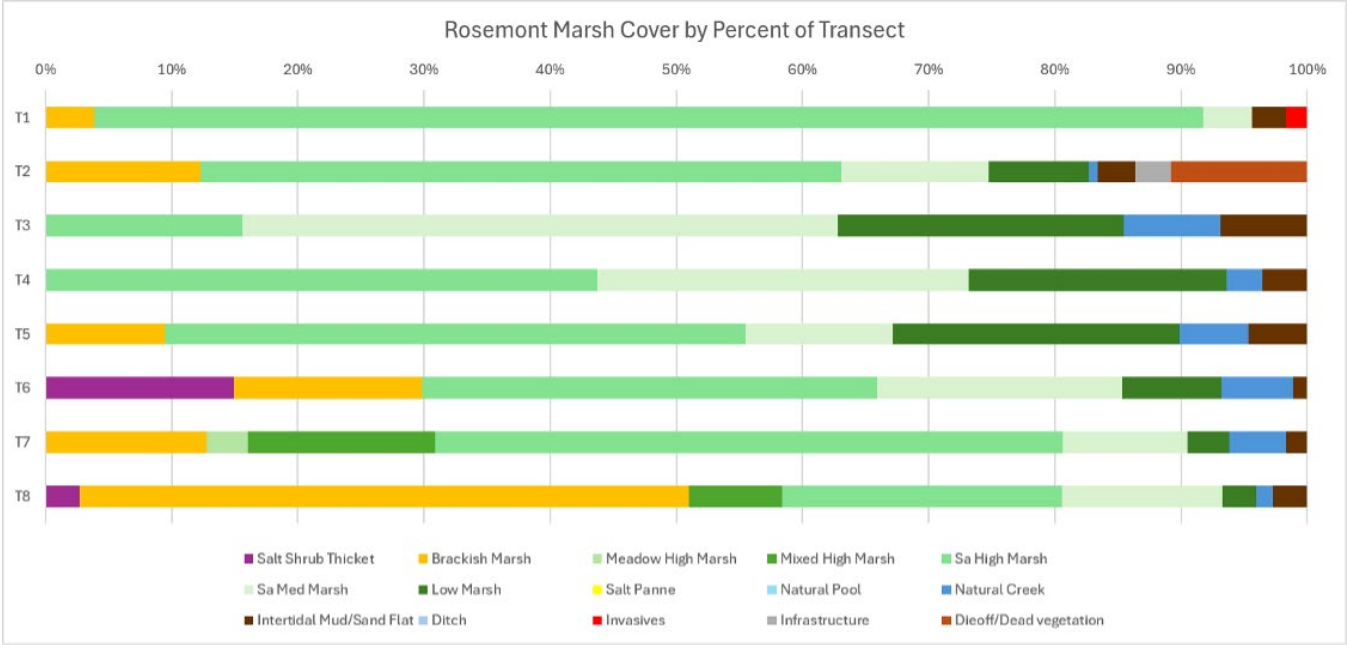
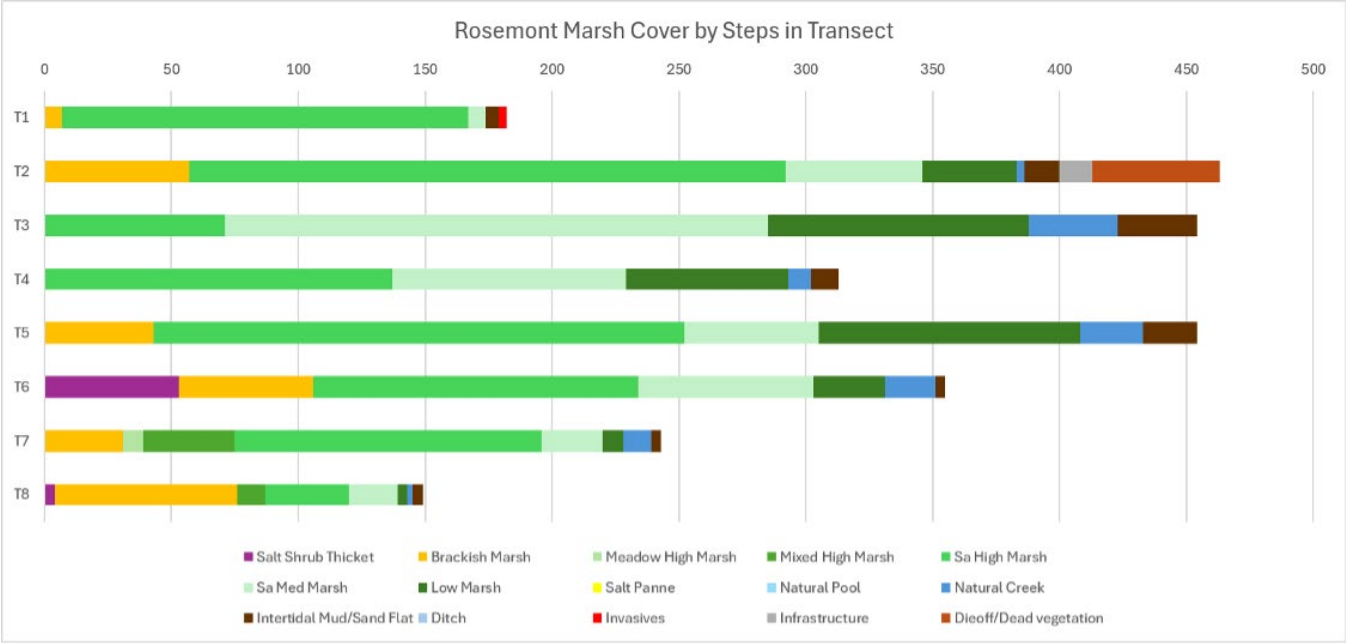
ROSEMONT TRANSECT 4				
Marsh Cover Type	CCI	Total Tally	CCIXTT	% Cover
Salt Shrub Thicket	9		0	0
Brackish Marsh	10		0	0
Meadow High Marsh	10		0	0
Mixed High Marsh	7		0	0
Sa High Marsh	5	137	685	44
Sa Med Marsh	6	92	552	29
Low Marsh	8	64	512	20
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8	9	72	3
Intertidal Mud/Sand Flat	5	11	55	4
Invasives	3			
Ditch	2		0	0
Infrastructure	0			
Dieoff/Dead vegetation	1			
Total	88	313	1876	100
Index of Marsh Integrity	5.99			

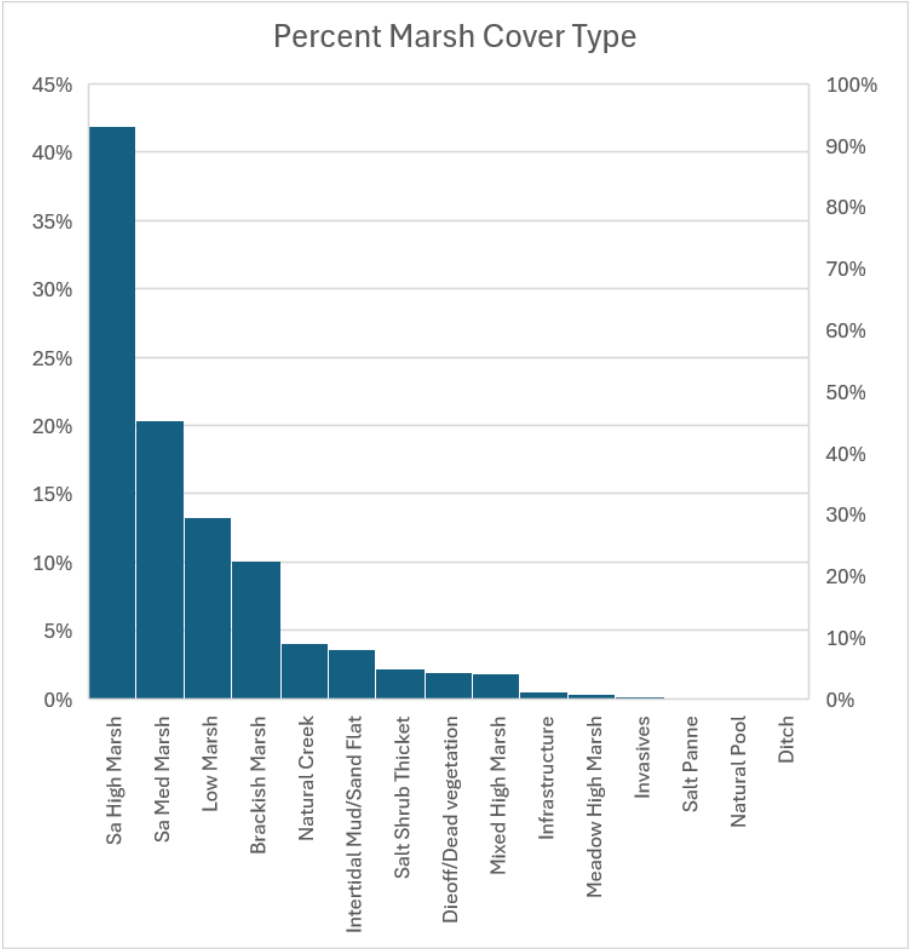
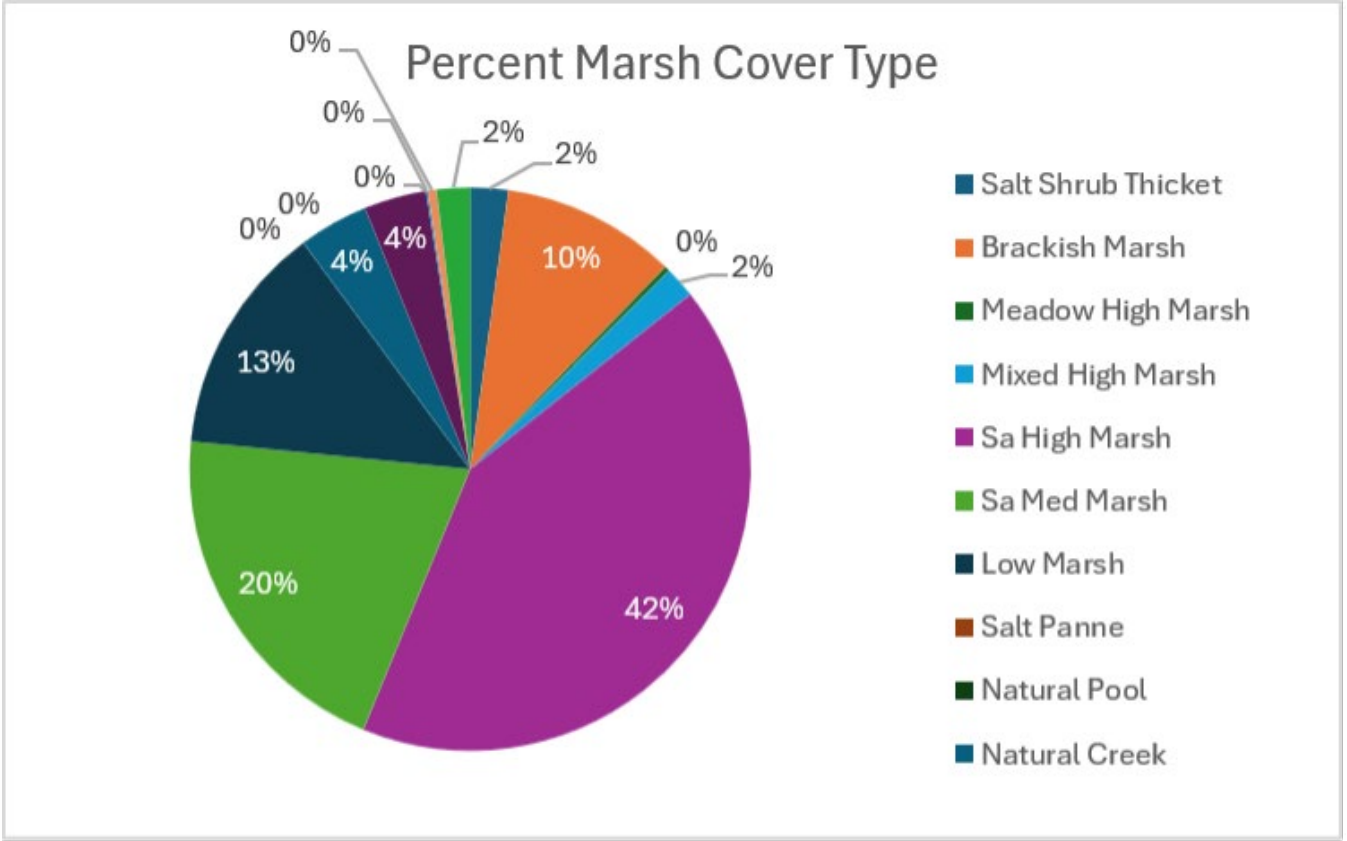
ROSEMONT TRANSECT 5				
Marsh Cover Type	CCI	Total Tally	CCIxTT	% Cover
Salt Shrub Thicket	9		0	0
Brackish Marsh	10	43	430	9
Meadow High Marsh	10		0	0
Mixed High Marsh	7		0	0
Sa High Marsh	5	209	1045	46
Sa Med Marsh	6	53	318	12
Low Marsh	8	103	824	23
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8	25	200	6
Intertidal Mud/Sand Flat	5	21	105	5
Invasives	3			
Ditch	2		0	0
Infrastructure	0			
Dieoff/Dead vegetation	1			
Total	88	454	2922	100
Index of Marsh Integrity	6.44			

ROSEMONT TRANSECT 6				
Marsh Cover Type	CCI	Total Tally	CCIxTT	% Cover
Salt Shrub Thicket	9	53	477	15
Brackish Marsh	10	53	530	15
Meadow High Marsh	10		0	0
Mixed High Marsh	7		0	0
Sa High Marsh	5	128	640	36
Sa Med Marsh	6	69	414	19
Low Marsh	8	28	224	8
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8	20	160	6
Intertidal Mud/Sand Flat	5	4	20	1
Invasives	3			
Ditch	2		0	0
Infrastructure	0			
Dieoff/Dead vegetation	1			
Total	88	355	2465	100
Index of Marsh Integrity	6.94			

ROSEMONT TRANSECT 7				
Marsh Cover Type	CCI	Total Tally	CCIxTT	% Cover
Salt Shrub Thicket	9		0	0
Brackish Marsh	10	31	310	13
Meadow High Marsh	10	8	80	3
Mixed High Marsh	7	36	252	15
Sa High Marsh	5	121	605	50
Sa Med Marsh	6	24	144	10
Low Marsh	8	8	64	3
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8	11	88	5
Intertidal Mud/Sand Flat	5	4	20	2
Invasives	3			
Ditch	2		0	0
Infrastructure	0			
Dieoff/Dead vegetation	1			
Total	88	243	1563	100
Index of Marsh Integrity	6.43			

ROSEMONT TRANSECT 8				
Marsh Cover Type	CCI	Total Tally	CCIxTT	% Cover
Salt Shrub Thicket	9	4	36	3
Brackish Marsh	10	72	720	48
Meadow High Marsh	10		0	0
Mixed High Marsh	7	11	77	7
Sa High Marsh	5	33	165	22
Sa Med Marsh	6	19	114	13
Low Marsh	8	4	32	3
Salt Panne	8		0	0
Natural Pool	6		0	0
Natural Creek	8	2	16	1
Intertidal Mud/Sand Flat	5	4	20	3
Invasives	3			
Ditch	2		0	0
Infrastructure	0			
Dieoff/Dead vegetation	1			
Total	88	149	1180	100
Index of Marsh Integrity	7.92			





Conclusions

The Rosemont marsh IMI score of 6.26 places it in the intermediately degraded category when compared against the 31 northeastern salt marshes analyzed in the original MarshRAM publication (Kutcher et al. 2019). It is worth noting, however, that this study applied regionally adapted CCI scoring in which Sa Med Marsh (CCI 6) was assigned a higher value than the original Sa High Marsh category (CCI 5). Because this cover type accounts for one-fifth of total marsh cover at Rosemont, this adjustment slightly influences the final IMI score. Had the original CCI value of 5 been applied to both short-form and “medium-form” *Spartina alterniflora*, the IMI score would have been 5.96, still within the intermediately degraded range but slightly closer to the most degraded threshold. This distinction is flagged here because it bears on how the Rosemont IMI score should be interpreted relative to the northeastern reference dataset.

Marsh condition across the site was not uniform. Areas closer to the Ashley River, in the interior marsh, and some pockets along the southern edge of the marsh exhibited higher CCI scores, taller and more vigorous spartina, and greater vegetation diversity, likely reflecting better tidal exchange, improved sediment and nutrient delivery, and reduced freshwater influence. Condition declined with increasing distance from the river and proximity to the eastern, community-adjacent portions of the marsh, where tidal connectivity appeared reduced in some pockets, and vegetation was generally less diverse and robust. Cattail (*Typha latifolia*) was observed in several of these interior areas at slightly higher elevations, indicating reduced salinity, limited tidal flushing, or slightly higher ground. Some marsh sections appeared partially disconnected from primary creek channels and showed signs of potential vegetation dieoff, standing water, poor drainage, and shading stress from the adjacent upland canopy (particularly along the outer perimeter of Coach Stanley Chisolm Park).

The land surrounding the Rosemont marsh is heavily altered. Based on field observations and desktop analysis conducted by Biohabitats staff, the surrounding land use would rank poorly under the MarshRAM scoring framework for this metric. Within a 150-meter buffer, the marsh is bordered by dense urban residential development, mowed areas, paved roads including a major highway, planned new residential construction, marina infrastructure, and industrial and chemical plant

facilities. While some natural open water in the Ashley River and scattered wooded areas are present nearby, these are limited in extent. This level of surrounding land use intensity is consistent with elevated anthropogenic nutrient loading, and it is the professional opinion of the project team that nutrient inputs to the Rosemont marsh are likely substantial given the scale of local impervious cover and the drainage area that channels runoff directly into the marsh system.

No direct ditching was observed within the marsh itself, which represents a relatively positive finding within the context of the broader disturbance profile. However, artificial drainage is directed into the marsh from two main ditches that discharge beneath the Austin Avenue bridge, as well as through culverts near the Freddie Whaley Community Center. This concentrated inflow of stormwater represents a meaningful hydrologic stressor, introducing elevated volumes of freshwater, potential pollutants, and sediment into portions of the marsh that may already be experiencing limited tidal flushing.

Tidal connectivity is compromised at several points throughout the marsh. At the mouth of Rosemont Creek, an old bridge connection between the electricity plant and marina, flanked by elevated earthen berms, creates a significant pinch point that likely restricts tidal exchange entering the marsh. A dredge placement area behind the marina property functions as a small impoundment. Additional localized restrictions to tidal flow were observed at various points along the creek, likely reflecting a cumulative legacy of incremental hydrologic alteration over time.

Several areas of localized vegetation dieoff and mud flat formation were documented during the MarshRAM survey, some associated with limited tidal connectivity. In these areas, sediments were extremely soft, and marsh surface lacked stable vegetative cover across both large and small patches. The causes of dieoff in these locations cannot be definitively determined, but plausible contributing stressors include poor tidal connectivity, prolonged inundation, freshwater intrusion, shading from the adjacent upland canopy, and other site-specific factors. These unvegetated areas were categorized as mud flats in the CCI scoring and represent some of the lowest-condition zones identified across the site.

Invasive plant species were present along most marsh edges, though none were observed within the marsh interior. A distinct corridor of dead vegetation and invasive growth was noted beneath a power line right-of-way crossing the marsh, a pattern the project team attributed to routine herbicide application often associated with transmission line maintenance.

Finally, the migration potential of the Rosemont marsh scored 1.0 out of a possible 10.0, with both migration area and replacement ratio calculated at zero percent under existing conditions. This metric reflects the capacity of a marsh to migrate landward as sea levels rise, accounting for the physical, biological, and cultural resistance of surrounding upland areas to support that transition. A score of 1.0 indicates that the Rosemont marsh has effectively no capacity to migrate under current conditions. Given the density of development, infrastructure, and impervious cover surrounding the marsh on all sides, this finding is unsurprising but significant. Without intervention to reduce barriers to landward migration, the marsh platform at Rosemont will face increasing inundation stress with no mechanism for spatial adjustment, compounding the vulnerability already suggested by the IMI score and the suite of disturbance observations documented above.

Appendix D

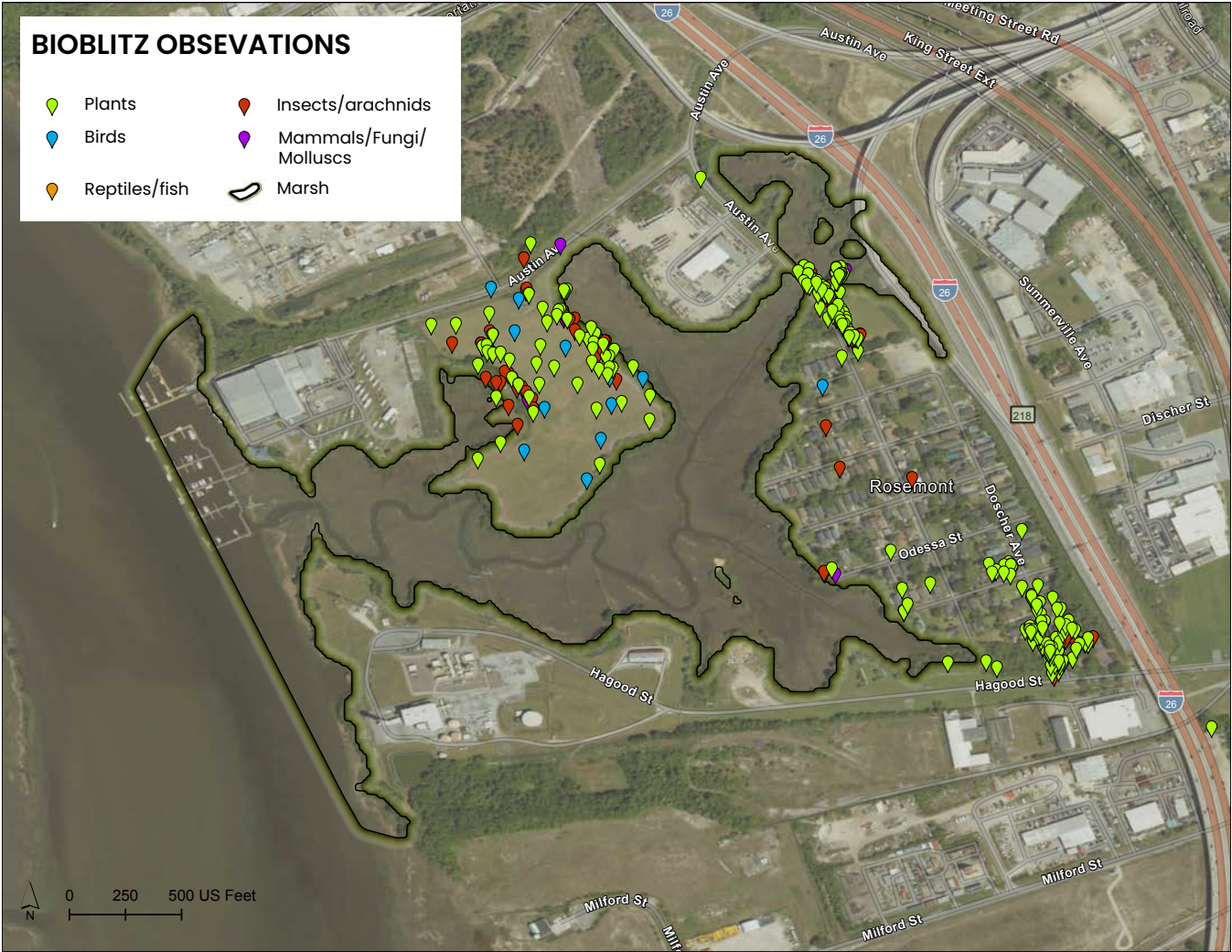
BioBlitz Species Data

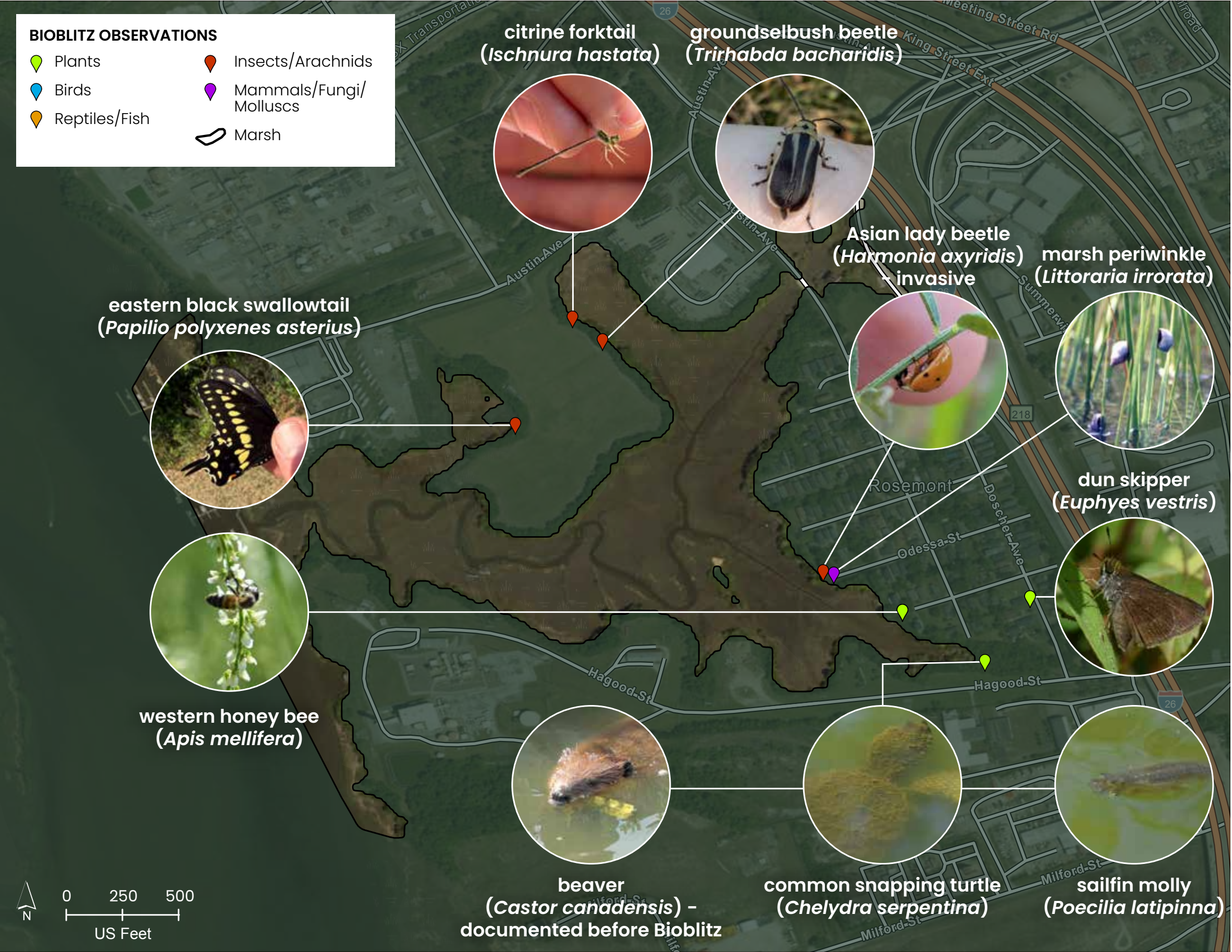
On April 23, 2026, a BioBlitz was conducted in the Rosemont neighborhood to document the diversity of flora and fauna present across the study area. A BioBlitz is an intensive, time-limited biological survey in which participants work collectively to identify and record as many species as possible within a defined area and timeframe. This format combines the expertise of trained naturalists with the local knowledge and enthusiasm of community members, making it particularly well-suited for rapid biodiversity assessment in urban and suburban settings.

Twenty-one participants took part in the event, including local naturalists, researchers with species identification expertise, and community members. The BioBlitz ran from 6:00 a.m. to 1:00 p.m. During an early morning session from 6:00 to 8:00 a.m., participants focused primarily on avian observations, with bird records submitted through eBird. From 9:00 a.m. to 1:00 p.m., the group divided into three smaller teams, each assigned to a distinct section of the neighborhood to maximize spatial coverage and taxonomic breadth.



Sixteen participants submitted observations to iNaturalist, yielding a total of 464 observations representing 170 species, of which 127 achieved "research grade" status through community verification in iNaturalist. Taxonomic coverage spanned multiple kingdoms and phyla, including 100 plant species, 37 insect species, 33 bird species, 8 arachnid species, 3 reptile species, 2 ray-finned fish species, 2 fungal species, and 1 mammal species. The full list of observations is included at the bottom of this appendix, and a subset of observations from each taxonomic group is shown below as well.





Species Observations by Taxonomic Group

Plants

One hundred plant species were recorded during the BioBlitz, reflecting a plant community characteristic of an urban residential environment rather than an intact or high-quality natural ecosystem. While few observations represent remnants of undisturbed native plant communities, a meaningful number of native species were documented, many of which provide important ecological functions for pollinators and wildlife.

Virginia creeper (*Parthenocissus quinquefolia*) was observed throughout the neighborhood and represents one of the highly beneficial native species recorded. This native vine serves as a vital host plant for native sphinx moths and produces berries that support local songbirds, making it a valuable component of urban green space even in disturbed contexts. Carolina crane's-bill (*Geranium carolinianum*), a native flowering annual, was commonly observed sprouting in lawns and disturbed ground. Though its prevalence reflects disturbance rather than habitat quality, it provides a useful early-season nectar resource for native pollinators.

Several other native species of ecological interest were recorded in smaller numbers. Florida hedgenettle (*Stachys floridana*), while technically native to Florida, functions as an aggressive colonizer of disturbed, low-quality soils and its presence further reflects the degraded character of much of the surveyed area. Blue pigroot (*Sisyrinchium micranthum*), Ohio spiderwort (*Tradescantia ohiensis*), and venus's looking-glass (*Triodanis biflora*) are pleasant native wildflowers whose occurrence in small numbers is suggestive of remnant meadow-like or early-successional habitat, particularly in areas that are infrequently mowed or maintained. Southern wax myrtle (*Morella cerifera*), muscadine (*Vitis rotundifolia*), and peppervine (*Nekemias arborea*) are native woody species typical of healthy woodland edges and understories, and their presence offers meaningful cover and foraging resources for resident wildlife.

Several invasive plant species were also documented during the BioBlitz. Chinese tallow (*Triadica sebifera*), Japanese honeysuckle (*Lonicera japonica*), chinaberry (*Melia azedarach*), glossy privet (*Ligustrum lucidum*), and Chinese privet (*Ligustrum sinense*) were all recorded. Each of these species is well-established in the Charleston region and is known to displace native vegetation, reduce habitat quality, and degrade the ecological function of urban green spaces over time.

Birds

Thirty-three bird species were recorded during the BioBlitz and most species observed are consistent with what would be expected in an urban neighborhood adjacent to a marsh and riverfront. Observations spanned resident species, early-season breeders, and late-season migrants.

Among the most notable observations was the painted bunting (*Passerina ciris*), a species that has been the focus of conservation attention in South Carolina, including active banding and nest monitoring programs operating across the state. April represents the tail end of spring migration and the start to breeding season for this species. Painted buntings breed along the South Carolina coast, and singing individuals observed during the BioBlitz may represent early-season territorial males

capable of nesting in the area. Their presence suggests that the neighborhood provides sufficient shrub and tree cover and food resources to support stopover and potentially nesting. This observation speaks to Rosemont's connectivity with the broader coastal plain landscape where bunting populations are actively tracked and reinforces the conservation value of urban green spaces along the Atlantic coast.

Several marsh and wetland-dependent species were also recorded. Green heron (*Butorides virescens*), great egret (*Ardea alba*), and clapper rail (*Rallus crepitans*) were all observed in the marsh. Royal tern (*Thalasseus maximus*) and Caspian tern (*Hydroprogne caspia*) were observed flying over the community, as were chimney swifts (*Chaetura pelagica*) foraging overhead.

Clapper rail deserves particular note as an ecological indicator. This species relies heavily on benthic invertebrates and crabs, many of which are filter feeders, positioning clapper rail near the top of a short trophic chain that is sensitive to marsh water quality and sediment health. As a result, clapper rail presence and abundance can serve as a useful proxy for overall marsh condition. The species also exhibits strong site fidelity, returning to the same marsh territories across seasons and years. While two individuals were heard calling in the Rosemont marsh during the BioBlitz, this represented one of only a few documented detections in this marsh over the course of the last year, suggesting that the local population is small.

Bird Species and Quantity Observed	
Painted Bunting (<i>Passerina ciris</i>)	5
Eastern Kingbird (<i>Tyrannus tyrannus</i>)	1
Green Heron (<i>Butorides virescens</i>)	1
Great Egret (<i>Ardea alba</i>)	7
Pine Warbler (<i>Setophaga pinus</i>)	1
Killdeer (<i>Charadrius vociferus</i>)	2
American Goldfinch (<i>Spinus tristis</i>)	2
Eastern Bluebird (<i>Sialia sialis</i>)	2
Clapper Rail (<i>Rallus crepitans</i>)	2
Canada Goose (<i>Branta canadensis</i>)	1
Mourning Dove (<i>Zenaida macroura</i>)	5
Chimney Swift (<i>Chaetura pelagica</i>)	24
shorebird sp. (<i>Charadriiformes</i>)	4
Laughing Gull (<i>Leucophaeus atricilla</i>)	32
Brown Pelican (<i>Pelecanus occidentalis</i>)	1
Barn Swallow (<i>Hirundo rustica</i>)	1

Bird Species and Quantity Observed	
Downy Woodpecker (<i>Dryobates pubescens</i>)	1
Great Crested Flycatcher (<i>Myiarchus crinitus</i>)	2
Blue Jay (<i>Cyanocitta cristata</i>)	3
American Crow (<i>Corvus brachyrhynchos</i>)	5
Carolina Chickadee (<i>Poecile carolinensis</i>)	1
Tufted Titmouse (<i>Baeolophus bicolor</i>)	1
Carolina Wren (<i>Thryothorus ludovicianus</i>)	5
European Starling (<i>Sturnus vulgaris</i>)	27
Northern Mockingbird (<i>Mimus polyglottos</i>)	9
Cedar Waxwing (<i>Bombycilla cedrorum</i>)	58
House Finch (<i>Haemorhous mexicanus</i>)	4
Brown-headed Cowbird (<i>Molothrus ater</i>)	2
Boat-tailed Grackle (<i>Quiscalus major</i>)	2
Northern Cardinal (<i>Cardinalis cardinalis</i>)	4
Turkey Vulture (<i>Cathartes aura</i>)	2
Royal Tern (<i>Thalasseus maximus</i>)	1
Caspian Tern (<i>Hydroprogne caspia</i>)	1

Insects and Arachnids

Thirty-seven insect species and 8 arachnid species were recorded during the BioBlitz, spanning several functional guilds including pollinators, herbivores, and predators.

Two introduced lady beetle species were documented: the seven-spotted lady beetle (*Coccinella septempunctata*) and the Asian lady beetle (*Harmonia axyridis*). Both species were intentionally introduced to the United States as biological control agents but have since become broadly established and are considered invasive, with documented impacts on native lady beetle populations through competition and predation. The western honey bee (*Apis mellifera*) was also recorded and, while likewise non-native, is widely recognized as a beneficial pollinator and a cornerstone of both managed agriculture and urban pollinator communities.

A number of native insect species of ecological interest were also observed. The eastern black swallowtail (*Papilio polyxenes asterius*) was among the more striking finds, a large and conspicuous butterfly whose larvae feed on plants in the carrot family and whose adults are important nectar-foragers across a wide range of flowering plants. The dun skipper (*Euphyes vestris*) and margined calligrapher (*Toxomerus marginatus*), a small native hoverfly, round out the pollinator observations and suggest at least some capacity in the neighborhood to support native pollinator communities. The citrine forktail (*Ischnura hastata*), a small

damselfly, was also recorded and likely reflects the presence of standing or slow-moving water in or near the neighborhood suitable for larval development.

Two species with notably specific ecological relationships were also documented. The leafy oak gall wasp (*Andricus quercusfoliatus*) induces characteristic leaf galls on oak species and serves as a useful indicator of oak presence and the broader invertebrate community those trees support. The groundselbush beetle (*Trirhabda bacharidis*) feeds exclusively on the foliage of groundselbush (*Baccharis halimifolia*), a common native shrub of coastal marsh edges, and plays a natural regulatory role in keeping groundselbush growth in check.



Eastern black swallowtail (*Papilio polyxenes asterius*) and dun skipper (*Euphyes vestris*) observed during the April 23, 2026 Rosemont BioBlitz.

Reptiles and Fish

Three reptile species were recorded during the BioBlitz: green anole (*Anolis carolinensis*), yellow-bellied slider (*Trachemys scripta scripta*), and common snapping turtle (*Chelydra serpentina*). All three are native to South Carolina and are adaptable generalist species commonly encountered wherever tree cover and water bodies are present. Their occurrence in Rosemont is unsurprising given the neighborhood’s marsh edge setting and reflects a baseline of reptile habitat.

Two fish species were observed in the shallow standing water near the Community Center culverts: eastern mosquitofish (*Gambusia holbrooki*) and sailfin molly (*Poecilia latipinna*). These species share a tolerance for degraded aquatic conditions, including low dissolved oxygen, elevated temperatures, and high or variable salinity. Eastern mosquitofish is a useful indicator of ecosystem condition. When *Gambusia* dominates a fish assemblage, it frequently signals a disturbed or stressed system characterized by low native species diversity, as more sensitive native fishes are typically outcompeted or excluded under degraded conditions. Sailfin molly is similarly resilient, capable of tolerating salinity ranging from freshwater to near-marine conditions and able to exploit the thin oxygen-rich layer just beneath the water surface when dissolved oxygen is otherwise depleted. State studies of fish communities in the region suggest that the absence of sailfin molly from warm marsh habitats would indicate severe pollution, though its presence alone reflects only that water quality remains above a minimum tolerable threshold rather than that conditions are healthy. Both species are characteristic of agricultural ditches, stormwater canals, and other human-modified aquatic environments, and their dominance in the Rosemont fish community is consistent with the broader pattern of ecological stress suggested by the plant and invertebrate observations documented elsewhere in this report.

Mammals, Fungi, and Mollusks

The following taxonomic groups yielded the fewest observations during the BioBlitz and are discussed together here accordingly.

The only mammal evidence documented during the survey was indirect. Small scat with a notable hair content was observed at two separate locations within the neighborhood, the appearance of which was suggestive of bobcat (*Lynx rufus*). Because no direct observation was made, this record does not meet the threshold for research grade status and should be interpreted cautiously. However, the possibility of bobcat presence in and around Rosemont is worth noting and warrants opportunistic monitoring during future surveys.

Outside of the Bioblitz survey, there was a beaver (*Castor canadensis*) observed inside one of the culverts that empties into the Community Center water quality testing location. This species was not observed during the survey but it worth noting.

Two fungal species were recorded, including poison ivy rust (*Pileolaria brevipes*), an autoecious parasitic fungus whose entire lifecycle is dependent on a single host, poison ivy (*Toxicodendron radicans*). Its documentation is a reflection of poison ivy’s presence in the neighborhood rather than an independent indicator of habitat quality, though it offers an interesting example of the specificity of some host-parasite relationships present even in urban landscapes.

Marsh periwinkle (*Littoraria irrorata*) was observed throughout the marsh margin and represents the only mollusc recorded during the BioBlitz. These snails are recognized as indicators of marsh health given their sensitivity to chemical contaminants and toxins. Their presence suggests water and sediment quality in the Rosemont marsh remains within a tolerable range, though periwinkle populations can become detrimental to marsh vegetation if predator populations decline and densities are allowed to increase unchecked. Some blue crabs (*Callinectes sapidus*), a major predator of periwinkle snails, were observed during water quality surveys in 2025 but none were observed during the Bioblitz.

Complete Species List

A complete list of species recorded during the BioBlitz is provided in Appendix D, compiled from iNaturalist observation data. Research grade observations, indicating records verified by at least two independent community identifiers, are noted accordingly.

Krigia cespitosa	weedy dwarf dandelion	Plantae	lyrdjondeweesland	needs_id	https://www.inaturalist.org/observations/3523246473	https://naturalist-open-data.s3.amazonaws.com/photos/643072514/medium.jpg	32.83070514	-79.96141198	Solidago	goldenrods	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/3544105991	https://naturalist-open-data.s3.amazonaws.com/photos/646535948/medium.jpg	32.82738587	-79.95527293
Thoracotremata	Thoracotremata Crabs	Animalia	richarkj	needs_id	https://www.inaturalist.org/observations/352351083	https://naturalist-open-data.s3.amazonaws.com/photos/643090930/medium.jpg	32.83127417	-79.95819167	Angiospermae	Flowering Plants	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354410748	https://naturalist-open-data.s3.amazonaws.com/photos/646536247/medium.jpg	32.82705813	-79.95522624
Thoracotremata	Thoracotremata Crabs	Animalia	richarkj	needs_id	https://www.inaturalist.org/observations/352351358	https://naturalist-open-data.s3.amazonaws.com/photos/643099754/medium.jpg	32.83173333	-79.95819167	Anatherum tenuispatheum	Maritime Bushy Bluestem	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354410840	https://naturalist-open-data.s3.amazonaws.com/photos/646536404/medium.jpg	32.82703607	-79.95526765
Mincunji	American Broad-front Fiddler Crabs	Animalia	richarkj	needs_id	https://www.inaturalist.org/observations/3523520617	https://naturalist-open-data.s3.amazonaws.com/photos/643171615/medium.jpg	32.83173333	-79.95818333	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354410927	https://naturalist-open-data.s3.amazonaws.com/photos/646536566/medium.jpg	32.82711109	-79.95526561
Tradescantia ohienis	Ohio spiderwort	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352396701	https://naturalist-open-data.s3.amazonaws.com/photos/643186955/medium.jpg	32.83165333	-79.95803833	Asteraceae	Sunflowers, Daisies, Asters, and Allies	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411028	https://naturalist-open-data.s3.amazonaws.com/photos/646536737/medium.jpg	32.82714377	-79.95525419
Bolboschoenus robustus	seacoast bulrush	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352396791	https://naturalist-open-data.s3.amazonaws.com/photos/643187159/medium.jpg	32.83164667	-79.95818333	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411138	https://naturalist-open-data.s3.amazonaws.com/photos/646536905/medium.jpg	32.82709257	-79.95531147
Aphididae	Aphids	Insecta	richarkj	needs_id	https://www.inaturalist.org/observations/352420189	https://naturalist-open-data.s3.amazonaws.com/photos/643232244/medium.jpg	32.83161667	-79.95808333	Oenothera	evening primroses, sundrops, and beeblossoms	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411202	https://naturalist-open-data.s3.amazonaws.com/photos/646537110/medium.jpg	32.82706575	-79.95528616
Coccinellini	Black-spotted Lady Beetles	Insecta	richarkj	needs_id	https://www.inaturalist.org/observations/352420440	https://naturalist-open-data.s3.amazonaws.com/photos/643233022/medium.jpg	32.83161167	-79.95809167	Lilopsida	Monocots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411383	https://naturalist-open-data.s3.amazonaws.com/photos/646537388/medium.jpg	32.82698951	-79.95531499
Acrididae	Short-horned Grasshoppers	Insecta	richarkj	needs_id	https://www.inaturalist.org/observations/352420517	https://naturalist-open-data.s3.amazonaws.com/photos/643233211/medium.jpg	32.83151167	-79.95809167	Lilopsida	Monocots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411489	https://naturalist-open-data.s3.amazonaws.com/photos/646537581/medium.jpg	32.82702624	-79.95529897
Rubus trilvialis	southern dewberry	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352420645	https://naturalist-open-data.s3.amazonaws.com/photos/643233413/medium.jpg	32.83157167	-79.95806167	Erigeron	fleabanes and horseweeds	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411617	https://naturalist-open-data.s3.amazonaws.com/photos/646537767/medium.jpg	32.82704886	-79.95539387
Tracheophyta	Vascular Plants	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352420785	https://naturalist-open-data.s3.amazonaws.com/photos/643233748/medium.jpg	32.83135333	-79.95796565	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411737	https://naturalist-open-data.s3.amazonaws.com/photos/646537967/medium.jpg	32.82695006	-79.95532082
Ligustrum lucidum	glossy privet	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352420989	https://naturalist-open-data.s3.amazonaws.com/photos/643234097/medium.jpg	32.831	-79.95806167	Erigeron querifolius	oakleaf fleabane	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411899	https://naturalist-open-data.s3.amazonaws.com/photos/646538240/medium.jpg	32.82721695	-79.95534455
Nothoferrum		Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352421144	https://naturalist-open-data.s3.amazonaws.com/photos/643234375/medium.jpg	32.83116667	-79.95782565	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354411982	https://naturalist-open-data.s3.amazonaws.com/photos/646538417/medium.jpg	32.82719193	-79.95524983
Morus	Mulberries	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352421388	https://naturalist-open-data.s3.amazonaws.com/photos/643234772/medium.jpg	32.83140333	-79.95789895	Rubus	brambles	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412074	https://naturalist-open-data.s3.amazonaws.com/photos/646538551/medium.jpg	32.82716323	-79.9552089
Celtis laevigata	sugar hackberry	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352421959	https://naturalist-open-data.s3.amazonaws.com/photos/643234951/medium.jpg	32.831225	-79.95788333	Sabal minor	Dwarf Palmetto	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412176	https://naturalist-open-data.s3.amazonaws.com/photos/646538719/medium.jpg	32.82748181	-79.95503736
Oenothera	evening primroses, sundrops, and beeblossoms	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352422144	https://naturalist-open-data.s3.amazonaws.com/photos/643235392/medium.jpg	32.83112	-79.95781667	Morella cerifera	Southern Wax Myrtle	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412303	https://naturalist-open-data.s3.amazonaws.com/photos/646538881/medium.jpg	32.82721769	-79.95524041
Erigeron	fleabanes and horseweeds	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352422239	https://naturalist-open-data.s3.amazonaws.com/photos/643235671/medium.jpg	32.831308	-79.95791867	Rubus trilvialis	southern dewberry	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412413	https://naturalist-open-data.s3.amazonaws.com/photos/646538962/medium.jpg	32.82710111	-79.95525929
Rumex	docks and sorrels	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352422775	https://naturalist-open-data.s3.amazonaws.com/photos/643237151/medium.jpg	32.83104667	-79.95771867	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412604	https://naturalist-open-data.s3.amazonaws.com/photos/646539268/medium.jpg	32.82726701	-79.95525677
Sporobolus alterniflorus	Saltmarsh Cordgrass	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352423116	https://naturalist-open-data.s3.amazonaws.com/photos/643237151/medium.jpg	32.83165	-79.95811333	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412724	https://naturalist-open-data.s3.amazonaws.com/photos/646539583/medium.jpg	32.82722986	-79.95531088
Litoraria littorata	Marsh Periwinkle	Mollusca	richarkj	needs_id	https://www.inaturalist.org/observations/352423298	https://naturalist-open-data.s3.amazonaws.com/photos/643237975/medium.jpg	32.83175333	-79.95819167	Animalia	Animals	Animalia	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412812	https://naturalist-open-data.s3.amazonaws.com/photos/646539728/medium.jpg	32.82717973	-79.95531169
Oenothera laiciata	cuteleaf evening primrose	Plantae	richarkj	needs_id	https://www.inaturalist.org/observations/352423383	https://naturalist-open-data.s3.amazonaws.com/photos/643238124/medium.jpg	32.831775	-79.95823	Loniceria japonica	Japanese honeysuckle	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354412930	https://naturalist-open-data.s3.amazonaws.com/photos/646539921/medium.jpg	32.82721719	-79.9553208
Cornus brachythynchos	American Crow	Aves	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435471	https://naturalist-open-data.s3.amazonaws.com/photos/643245586/medium.jpg	32.83187167	-79.95842833	Nekemias arborea	peppervine	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413044	https://naturalist-open-data.s3.amazonaws.com/photos/646540128/medium.jpg	32.82727811	-79.95528851
Plantago lanceolata	riwort plantain	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435473	https://naturalist-open-data.s3.amazonaws.com/photos/643245586/medium.jpg	32.82698154	-79.95524142	Formicidae	Ants	Insecta	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413182	https://naturalist-open-data.s3.amazonaws.com/photos/646540323/medium.jpg	32.82731012	-79.95530728
Anatherum tenuispatheum	Maritime Bushy Bluestem	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435478	https://naturalist-open-data.s3.amazonaws.com/photos/643245586/medium.jpg	https://www.inaturalist.org/observations/352435478	https://naturalist-open-data.s3.amazonaws.com/photos/643245586/medium.jpg	Mymricinae	Mymricine Ants	Insecta	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413365	https://naturalist-open-data.s3.amazonaws.com/photos/646540550/medium.jpg	32.82725835	-79.95530795
Sesbania	Ironwreath	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435481	https://naturalist-open-data.s3.amazonaws.com/photos/643246103/medium.jpg	32.82707249	-79.95526892	Chalcididae	Beetles	Insecta	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413423	https://naturalist-open-data.s3.amazonaws.com/photos/646540686/medium.jpg	32.82725911	-79.95526562
Sesbania vesicaria	Bladder Pod	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435489	https://naturalist-open-data.s3.amazonaws.com/photos/643246103/medium.jpg	32.82707249	-79.95526892	Oenothera	evening primroses, sundrops, and beeblossoms	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413654	https://naturalist-open-data.s3.amazonaws.com/photos/646540846/medium.jpg	32.82727821	-79.95538793
Sesbania vesicaria	Bladder Pod	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435489	https://naturalist-open-data.s3.amazonaws.com/photos/643246103/medium.jpg	32.82733333	-79.954925	Rubus	brambles	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413746	https://naturalist-open-data.s3.amazonaws.com/photos/646541207/medium.jpg	32.82748636	-79.95558533
Ipomoea	morning-glories	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435549	https://naturalist-open-data.s3.amazonaws.com/photos/643246184/medium.jpg	32.82707249	-79.95526892	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413849	https://naturalist-open-data.s3.amazonaws.com/photos/646541363/medium.jpg	32.82751924	-79.95494076
Morus alba	white mulberry	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435506	https://naturalist-open-data.s3.amazonaws.com/photos/643246201/medium.jpg	32.82728545	-79.95543703	Angiospermae	Aroids, Water Plants, Seagrass, and allies	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354413962	https://naturalist-open-data.s3.amazonaws.com/photos/646541528/medium.jpg	32.82740048	-79.95549811
Vitis cinerea	gray/bark grape	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435507	https://naturalist-open-data.s3.amazonaws.com/photos/643246251/medium.jpg	32.82728545	-79.95543703	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354414318	https://naturalist-open-data.s3.amazonaws.com/photos/646542005/medium.jpg	32.82748474	-79.95564847
Symphytotrichum	American asters	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435511	https://naturalist-open-data.s3.amazonaws.com/photos/643246304/medium.jpg	32.82728545	-79.95543703	Angiospermae	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354414412	https://naturalist-open-data.s3.amazonaws.com/photos/646542177/medium.jpg	32.82750191	-79.95560526
Cepidinae	dandelions, hawksbeards, and rattlesnake roots	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435515	https://naturalist-open-data.s3.amazonaws.com/photos/643246313/medium.jpg	32.82620527	-79.95603264	Magnoliopsida	Flowering Plants	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354414541	https://naturalist-open-data.s3.amazonaws.com/photos/646542371/medium.jpg	32.82755534	-79.95542588
Rumex	docks and sorrels	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435517	https://naturalist-open-data.s3.amazonaws.com/photos/643246494/medium.jpg	32.82731012	-79.95539948	Angiospermae	Flowering Plants	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354414727	https://naturalist-open-data.s3.amazonaws.com/photos/646542472/medium.jpg	32.82758434	-79.95547538
Hydrocotyle	water pennyworts	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435518	https://naturalist-open-data.s3.amazonaws.com/photos/643246511/medium.jpg	32.82731012	-79.95539948	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354414814	https://naturalist-open-data.s3.amazonaws.com/photos/646542809/medium.jpg	32.82756904	-79.95541208
Ranunculus	buttercupps	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435521	https://naturalist-open-data.s3.amazonaws.com/photos/643246552/medium.jpg	32.82731012	-79.95539948	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354414891	https://naturalist-open-data.s3.amazonaws.com/photos/646542985/medium.jpg	32.82756493	-79.95541158
Morus alba	white mulberry	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435524	https://naturalist-open-data.s3.amazonaws.com/photos/643246652/medium.jpg	32.82731012	-79.95539948	Insecta	Insects	Insecta	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354415014	https://naturalist-open-data.s3.amazonaws.com/photos/646543199/medium.jpg	32.82757373	-79.95544292
Polistes	Umbrella Paper Wasps	Insecta	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435540	https://naturalist-open-data.s3.amazonaws.com/photos/643247083/medium.jpg	32.82741473	-79.95550408	Angiospermae	Flowering Plants	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354415118	https://naturalist-open-data.s3.amazonaws.com/photos/646543347/medium.jpg	32.82756065	-79.95543703
Syrinchium	blue-eyed grasses	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435541	https://naturalist-open-data.s3.amazonaws.com/photos/643247113/medium.jpg	32.82741473	-79.95550408	Smilax toxa-nox	saw greenbrier	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354415210	https://naturalist-open-data.s3.amazonaws.com/photos/646543523/medium.jpg	32.82758943	-79.95540805
Solidago	goldenrods	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435544	https://naturalist-open-data.s3.amazonaws.com/photos/643247166/medium.jpg	32.82741473	-79.95550408	Mela azedarach	Chinaberry	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354415303	https://naturalist-open-data.s3.amazonaws.com/photos/646543685/medium.jpg	32.82758547	-79.9554533
Veronica	vervains	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435548	https://naturalist-open-data.s3.amazonaws.com/photos/643247179/medium.jpg	32.82741473	-79.95550408	Youngia	Youngia	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354415417	https://naturalist-open-data.s3.amazonaws.com/photos/646543854/medium.jpg	32.82776508	-79.95550372
Polystichum kunitzii	Wetland Maidén Fern	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435551	https://naturalist-open-data.s3.amazonaws.com/photos/643247403/medium.jpg	32.82741473	-79.95550408	Chenopodiales	Lettuce, Chicory, Dandelion and Salsify Tribe	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354415519	https://naturalist-open-data.s3.amazonaws.com/photos/646544044/medium.jpg	32.82778631	-79.95550118
Carya	hickories	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435560	https://naturalist-open-data.s3.amazonaws.com/photos/643248257/medium.jpg	32.82741473	-79.95550408	Tridactylea	Spiderworts	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354415639	https://naturalist-open-data.s3.amazonaws.com/photos/646544203/medium.jpg	32.8278968	-79.95557178
Oenothera	evening primroses, sundrops, and beeblossoms	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435573	https://naturalist-open-data.s3.amazonaws.com/photos/643247812/medium.jpg	32.82741473	-79.95550408	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354416063	https://naturalist-open-data.s3.amazonaws.com/photos/646544672/medium.jpg	32.82825284	-79.95580793
Erigeron querifolius	oakleaf fleabane	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435577	https://naturalist-open-data.s3.amazonaws.com/photos/643247955/medium.jpg	32.82741473	-79.95550408	Angiospermae	Flowering Plants	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354416153	https://naturalist-open-data.s3.amazonaws.com/photos/646544829/medium.jpg	32.82852581	-79.95580134
Oxalis	Woodsorrels	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435584	https://naturalist-open-data.s3.amazonaws.com/photos/643248362/medium.jpg	32.82787902	-79.95557666	Elaeagnus	oleasters	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354416472	https://naturalist-open-data.s3.amazonaws.com/photos/646545378/medium.jpg	32.82826202	-79.95584357
Verbenaea		Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435588	https://naturalist-open-data.s3.amazonaws.com/photos/643248442/medium.jpg	32.82787902	-79.95557666	Elaeagnus pungens	thorny olive	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354416569	https://naturalist-open-data.s3.amazonaws.com/photos/646545570/medium.jpg	32.82827703	-79.95590657
Nephtoria carolina	Carolina snailseed	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435593	https://naturalist-open-data.s3.amazonaws.com/photos/643248646/medium.jpg	32.82620527	-79.95603264	Magnoliopsida	Dicots	Plantae	chloe_ayo	needs_id	https://www.inaturalist.org/observations/354416654	https://naturalist-open-data.s3.amazonaws.com/photos/646545744/medium.jpg	32.82821303	-79.9560047
Smilax toxa-nox	saw greenbrier	Plantae	sharteen_ao	needs_id	https://www.inaturalist.org/observations/352435597	https://naturalist-open-data.s3.amazonaws.com/photos/643248754/medium.jpg	32.82620527	-79.95603264	Erictobotrya japonica	Loquat	Plantae	chloe_ayo	needs_id				

Appendix E

Rare, Threatened, and Endangered Species

Federal and state databases were reviewed to identify records of rare, threatened, and endangered (RTE) species at or near the project site. Reviewed databases include the Information for Planning and Consultation (IPaC) system, maintained by the U.S. Fish & Wildlife Service (USFWS), and occurrence records from the South Carolina Department of Natural Resources (SCDNR) Natural Heritage Program (NHP). These databases identify species with documented records or potential habitat near the project area. Those results are outlined in this appendix and detailed results and best management practices for avoiding impacts to identified species are included in the reports from USFWS and SCDNR included at the end of this appendix.

Based on the habitat requirements of the species below, the black rail (*Laterallus jamaicensis*), tri-colored bat (*Perimyotis subflavus*), and diamondback terrapin (*Malaclemys terrapin*) are the only Species of Greatest Conservation Need (SGCN) that would have a primary association with habitats in and around the Rosemont marsh.

RTE species are vital indicators of ecosystem health and biodiversity. These species often occupy specialized niches or require intact high-quality habitat to survive, making them particularly sensitive to environmental changes and human disturbance. Any resilience strategies that are pursued in the Rosemont marsh should consider impacts to these species and improve their habitat.

Minimizing harm and designing to benefit RTE species contributes to broader conservation goals and supports regional biodiversity. Because these species are protected under federal and/or state law, their presence also triggers regulatory review and may influence permitting conditions, project design, and construction timing. Identifying and accounting for RTE species early in the planning process allows project teams to avoid or reduce ecological impacts while minimizing regulatory risk.

The IPaC report lists each species by its federal status. Definitions for the referenced statuses are as follows:

Proposed Threatened: Any species the Service has determined is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and the Service has proposed a draft rule to list as threatened. Proposed threatened species are not protected by the take prohibitions of section 9, consistent with any protective regulations finalized under section 4(d) of the ESA, until the rule to list is finalized. Under section 7(a)(4) of the ESA, Federal agencies must confer with the Service if their action will jeopardize the continued existence of a proposed species.

Threatened: Any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Threatened species are protected by the take prohibitions of section 9, consistent with any protective regulations finalized under section 4(d) of the ESA.

Proposed Endangered: Any species the Service has determined is in danger of extinction throughout all or a significant portion of its range and the Service has proposed a draft rule to list as endangered. Proposed endangered species are not protected by the take prohibitions of section 9 of the ESA until the rule to list is finalized. Under section 7(a)(4) of the ESA, Federal agencies must confer with the Service if their action will jeopardize the continued existence of a proposed species.

Endangered: Any species which is in danger of extinction throughout all or a significant portion of its range. Endangered species are protected by the take prohibitions of section 9 under the ESA.

USFWS IPaC Listed Species Potentially In or Near Rosemont Marsh		
Common Name	CCIXTT	% Cover
Mammals		
Tricolored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered
West Indian Manatee	<i>Trichechus manatus</i>	Threatened
Birds*		
Eastern Black Rail	<i>Laterallus jamaicensis</i> ssp. <i>jamaicensis</i>	Threatened
Piping Plover	<i>Charadrius melodus</i>	Threatened
Red-cockaded Woodpecker	<i>Dryobates borealis</i>	Threatened
Rufa Red Knot	<i>Calidris canutus rufa</i>	Threatened
Reptiles		
Green Sea Turtle	<i>Chelonia mydas</i>	Threatened
Southern Hognose Snake	<i>Heterodon simus</i>	Proposed Threatened
Insects		
Monarch Butterfly	<i>Danaus plexippus</i>	Proposed Threatened
Flowering Plants		
American Chaffseed	<i>Schwalbea americana</i>	Endangered
Canby's Dropwort	<i>Oxypolis canbyi</i>	Endangered
Pondberry	<i>Lindera melissifolia</i>	Endangered

It is unlikely that these species will be significantly impacted by any proposed strategies and they are not guaranteed to be present in the Rosemont marsh, but a repeat of this initial review as well as an initial consultation with the USFWS should be completed during design and implementation of any resilience strategies to ensure compliance with federal regulations and to include targeted habitat uplift for RTE species where possible.

The SCDNR NHP uses a ranking system developed by NatureServe, a widely recognized non-profit source for biodiversity information across North America. There are three main geographic tiers of rankings: Global (G), National (N) and Sub-national, or State (S) level of resolution. Associated with these tier ranks are modifying numbers which are defined as follows:

1. **Critically Imperiled:** At very high risk of extinction or collapse due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
2. **Imperiled:** At high risk of extinction or collapse due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
3. **Vulnerable:** At moderate risk of extinction or collapse due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
4. **Apparently Secure:** At fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
5. **Secure:** At very low risk of extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

Full definitions of each NatureServe conservation status rank type can be found here: <https://help.natureserve.org>

Federal Status acronyms are as follows:

- LT: Listed Threatened – Protected federally under the Endangered Species Act of 1973.
- MBTA: Migratory Bird Treaty Act – Protected federally under the Migratory Bird Treaty Act of 1918

State Status acronyms are as follows:

- SE: State Endangered
- ST: State Threatened
- R: Regulated (restrictions on take)

The State Wildlife Action Plan (SWAP) developed by SCDNR identifies “species of greatest conservation need” and then prioritizes them into 3 categories: Highest, High and Moderate with numerical rankings of 1-3 respectively. A 0 SWAP ranking means that it is ranked by NatureServe but is not listed in the SWAP.

The table below lists the species that have been found within the Rosemont marsh footprint based on SCDNR NHP records along with their rank in each level of resolution. The following tables are taken from the NHP report, utilizing both federal and state ranking systems to describe the vulnerability of each species listed and the level of protection provided by federal and state regulations.

Species Observed Within the Rosemont Marsh: from SCDNR NHP Report							
Common Name	Species Name	Federal Status	State Status	G Rank	S Rank	SWAP	Date Last Observed
Florida Manatee	<i>Trichechus manatus latirostris</i>	LT	SE	G2G3	S2	2	2023
Least Tern	<i>Sternula antillarum</i>	MBTA	ST	G4	S2B	1	2019
Winter Grapefern	<i>Sceptridium lunarioides</i>	NA	NA	G4?	S1	2	1850
Tall Dropseed	<i>Sporobolus compositus</i> var.	NA	NA	G5T5	S1	2	1855

The next table shows RTE species found within two miles of the Rosemont marsh, arranged in order of protection status and species name.

Species Observed Within Two Miles of the Rosemont Marsh: from SCDNR NHP Report							
Common Name	Species Name	Federal Status	State Status	G Rank	S Rank	SWAP	Date Last Observed
Florida Manatee	<i>Trichechus manatus latirostris</i>	LT	SE	G2G3	S2	2	2023
Least Tern	<i>Sternula antillarum</i>	MBTA	ST	G4	S2B	1	2019
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
Carolina Diamond-backed Terrapin	<i>Malaclemys terrapin centrata</i>	NA	R	G4T4	S3	2	2022
Rafinesque’s Big-eared Bat	<i>Corynorhinus rafinesquii</i>	NA	SE	G3	S2	2	1933
Winter Grapefern	<i>Sceptridium lunarioides</i>	NA	NA	G4?	S1	2	1850
Tall Dropseed	<i>Sporobolus compositus</i> var.	NA	NA	G5T5	S1	2	1855



United States Department of the Interior

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In Reply Refer To:
Project Code: 2026-0065179
Project Name: Rosemont Marsh Resilience Plan

03/19/2026 18:51:26 UTC

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological

Project code: 2026-0065179

03/19/2026 18:51:26 UTC

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see <https://www.fws.gov/program/migratory-bird-permit/what-we-do>.

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Marine Mammals
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

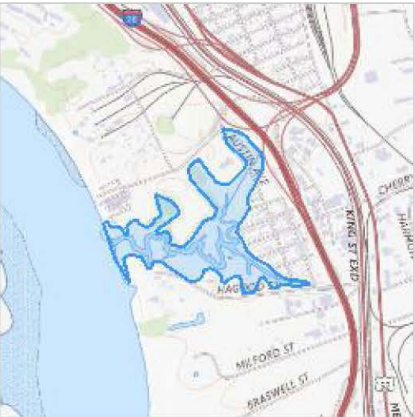
This species list is provided by:

South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558
(843) 727-4707

PROJECT SUMMARY

Project Code: 2026-0065179
Project Name: Rosemont Marsh Resilience Plan
Project Type: Management Plans Land Management/Restoration
Project Description: This study will characterize the tidal marsh, tidal creeks, and riparian lands surrounding the Rosemont community to serve as a baseline for better understanding the marsh’s capacity to protect the community from storm surge, sea level rise, and flooding. The study will also provide nature-based marsh resilience & flood reduction strategies that compliment, inform, and support the Rosemont Flood Resiliency Plan (RFRP) being prepared by the city.

Project Location:
The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@32.8301433,-79.95922703144477,14z>



Counties: Charleston County, South Carolina

ENDANGERED SPECIES ACT SPECIES

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPIBLPA3P34SPOKYHCE/documents/generated/9721.pdf	Proposed Endangered
West Indian Manatee <i>Trichechus manatus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. <i>This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.</i> Species profile: https://ecos.fws.gov/ecp/species/4469 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPIBLPA3P34SPOKYHCE/documents/generated/11601.pdf	Threatened

BIRDS

NAME	STATUS
Eastern Black Rail <i>Laterallus jamaicensis jamaicensis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10477 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPIBLPA3P34SPOKYHCE/documents/generated/9786.pdf	Threatened
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red-cockaded Woodpecker <i>Dryobates borealis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Threatened
Rufa Red Knot <i>Calidris canutus rufa</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

REPTILES

NAME	STATUS
Green Sea Turtle <i>Chelonia mydas</i> Population: North Atlantic DPS	Threatened

NAME	STATUS
There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6199	
Southern Hognose Snake <i>Heterodon simus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3248 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPJBLPA3P34SPOKYHCE/documents/generated/11603.pdf	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPJBLPA3P34SPOKYHCE/documents/generated/11602.pdf	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
American Chaffseed <i>Schwalbea americana</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1286 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPJBLPA3P34SPOKYHCE/documents/generated/9753.pdf	Endangered
Canby's Dropwort <i>Oxypolis canbyi</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7738 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPJBLPA3P34SPOKYHCE/documents/generated/9753.pdf	Endangered
Pondberry <i>Lindera melissifolia</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1279 General project design guidelines: https://ipac.ecosphere.fws.gov/project/7QMUYUYUXPJBLPA3P34SPOKYHCE/documents/generated/9753.pdf	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act ² and the Migratory Bird Treaty Act (MBTA) ¹. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

1. The [Bald and Golden Eagle Protection Act](#) of 1940.
2. The [Migratory Birds Treaty Act](#) of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your [project](#) area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the [National Bald Eagle Management Guidelines](#). You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#).

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

If disturbance or take of eagles cannot be avoided, an [incidental take permit](#) may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the [Do I Need A Permit Tool](#). For assistance making this determination for golden eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

Ensure Your Eagle List is Accurate and Complete

If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

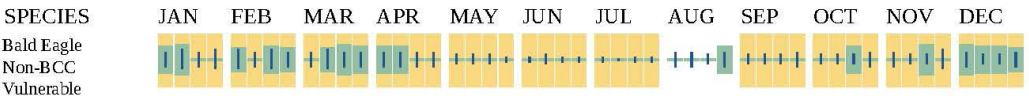
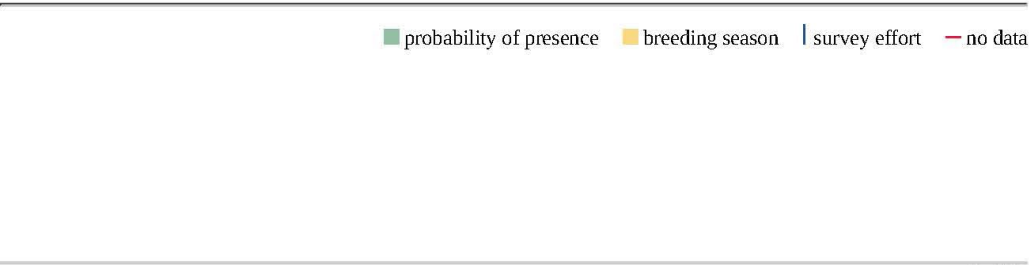
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA)¹ prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

- The [Migratory Birds Treaty Act](#) of 1918.
- The [Bald and Golden Eagle Protection Act](#) of 1940.
- 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Kestrel <i>Falco sparverius paulus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
American Oystercatcher <i>Haematopus palliatus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Black Skimmer <i>Rynchops niger</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Brown-headed Nuthatch <i>Sitta pusilla</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9427	Breeds Mar 1 to Jul 15
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Chuck-will's-widow <i>Antrostomus carolinensis</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9604	Breeds May 10 to Jul 10
Coastal (waynes) Black-throated Green Warbler <i>Setophaga virens waynei</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11879	Breeds May 1 to Aug 15
Grasshopper Sparrow <i>Ammodramus savannarum perpallidus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Gull-billed Tern <i>Gelochelidon nilotica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9501	Breeds May 1 to Jul 31
Least Tern <i>Sternula antillarum antillarum</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/11919	Breeds Apr 25 to Sep 5
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere

NAME	BREEDING SEASON
Marbled Godwit <i>Limosa fedoa</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Painted Bunting <i>Passerina ciris</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9511	Breeds Apr 25 to Aug 15
Pectoral Sandpiper <i>Calidris melanotos</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Prairie Warbler <i>Setophaga discolor</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler <i>Protonotaria citrea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Ruddy Turnstone <i>Arenaria interpres morinella</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Saltmarsh Sparrow <i>Ammospiza caudacuta</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9719	Breeds May 15 to Sep 5
Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere

NAME	BREEDING SEASON
Short-billed Dowitcher <i>Limnodromus griseus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Swallow-tailed Kite <i>Elanoides forficatus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Whimbrel <i>Numenius phaeopus hudsonicus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11991	Breeds elsewhere
Willet <i>Tringa semipalmata</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10669	Breeds Apr 20 to Aug 5
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

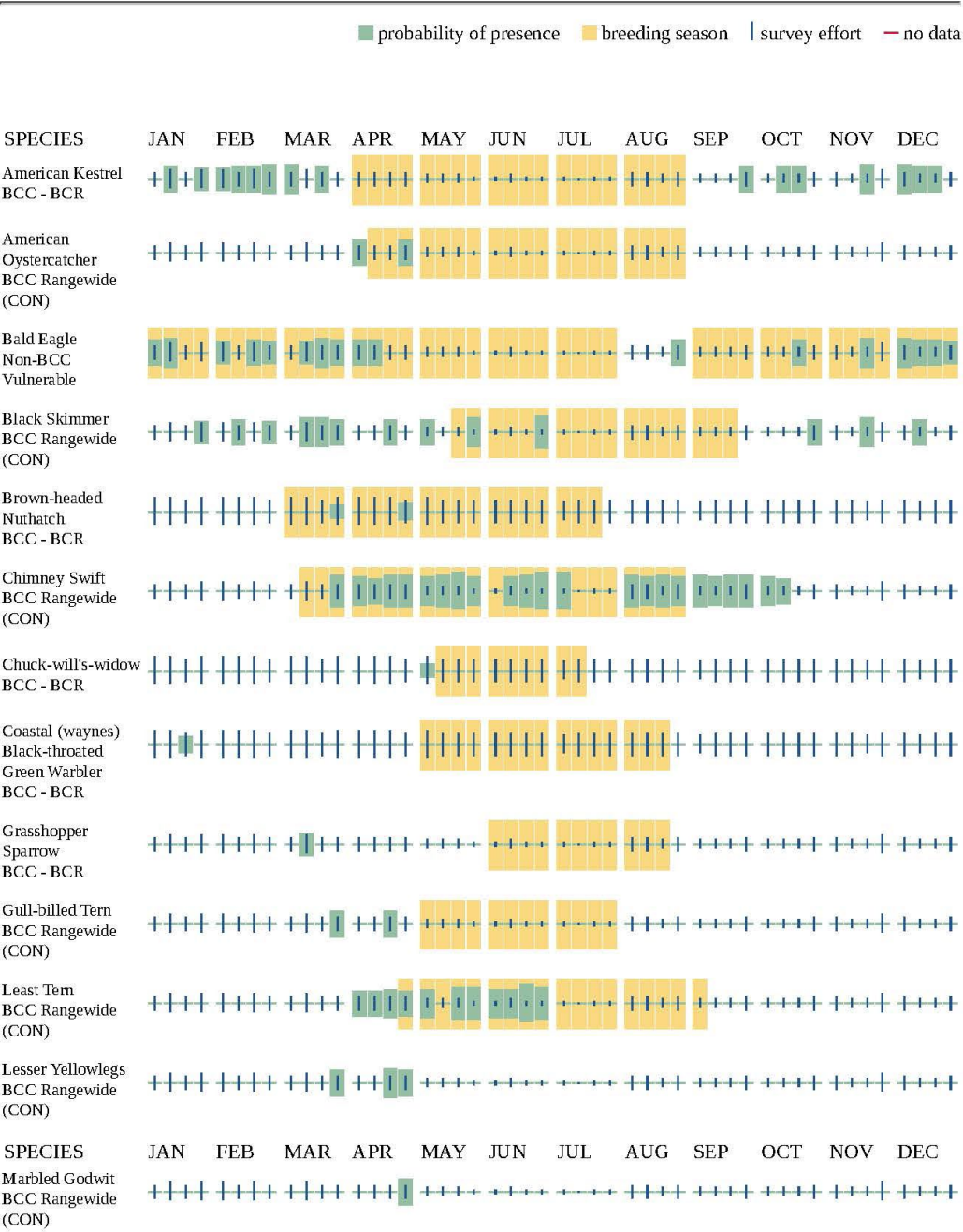
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

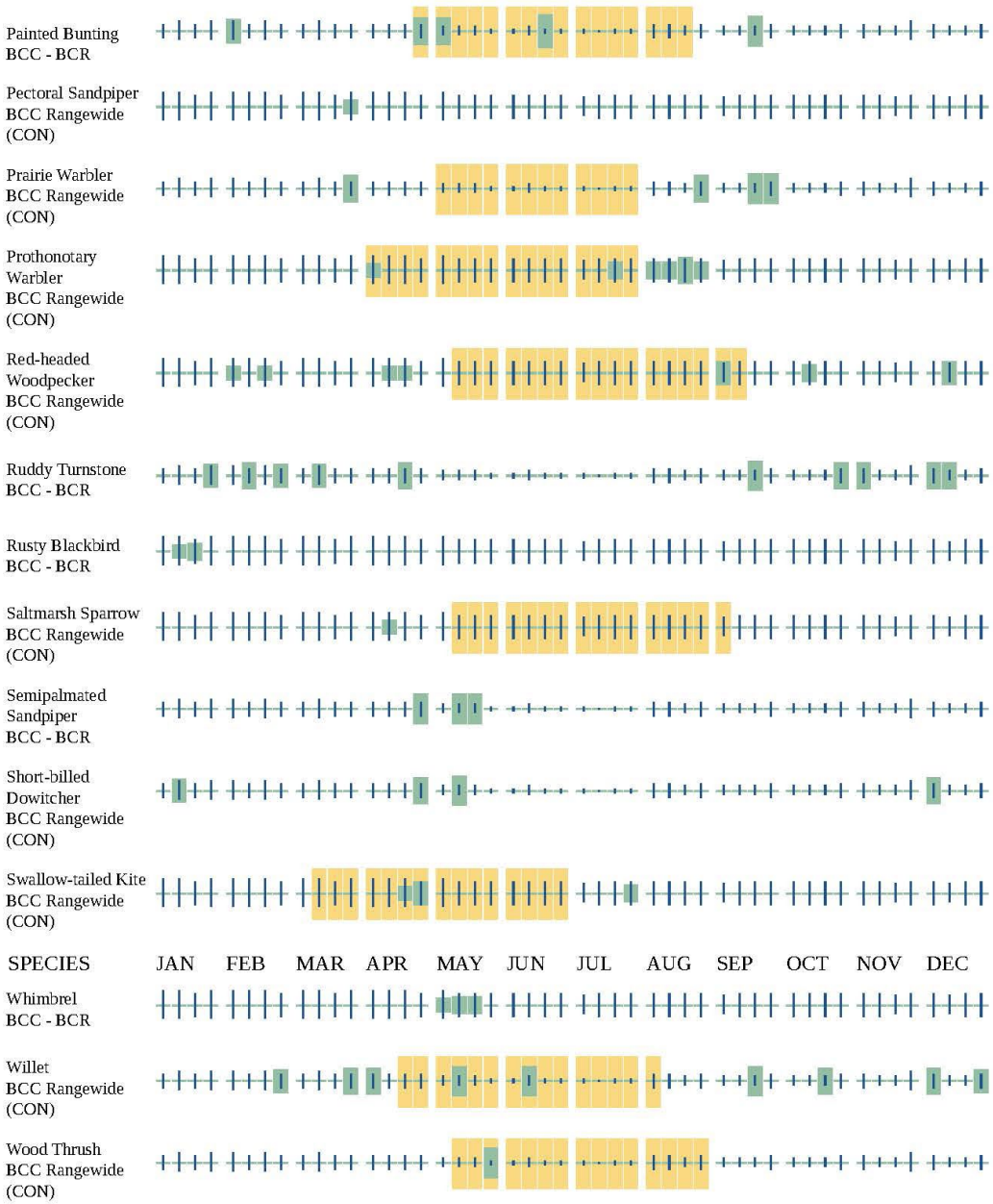
Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.





Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>

- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

MARINE MAMMALS

Marine mammals are protected under the [Marine Mammal Protection Act](#). Some are also protected under the Endangered Species Act¹ and the Convention on International Trade in Endangered Species of Wild Fauna and Flora².

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries³ [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the [Marine Mammals](#) page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

- The [Endangered Species Act](#) (ESA) of 1973.
- The [Convention on International Trade in Endangered Species of Wild Fauna and Flora](#) (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
- [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

NAME

West Indian Manatee *Trichechus manatus*
Species profile: <https://ecos.fws.gov/ecp/species/4469>

WETLANDS

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1R
- PSS1R
- PFO4R

ESTUARINE AND MARINE WETLAND

- E2EM1N
- E2US2P
- E2USP
- E2SS3P
- E2EM1P

ESTUARINE AND MARINE DEEPWATER

- E1UBL

RIVERINE

- R5UBH

IPAC USER CONTACT INFORMATION

Agency: Biohabitats
Name: Nolan Schillerstrom
Address: 4287 Spruill Ave
Address Line 2: Suite 201
City: North Charleston
State: SC
Zip: 29405
Email: nschillerstrom@biohabitats.com
Phone: 8436428180



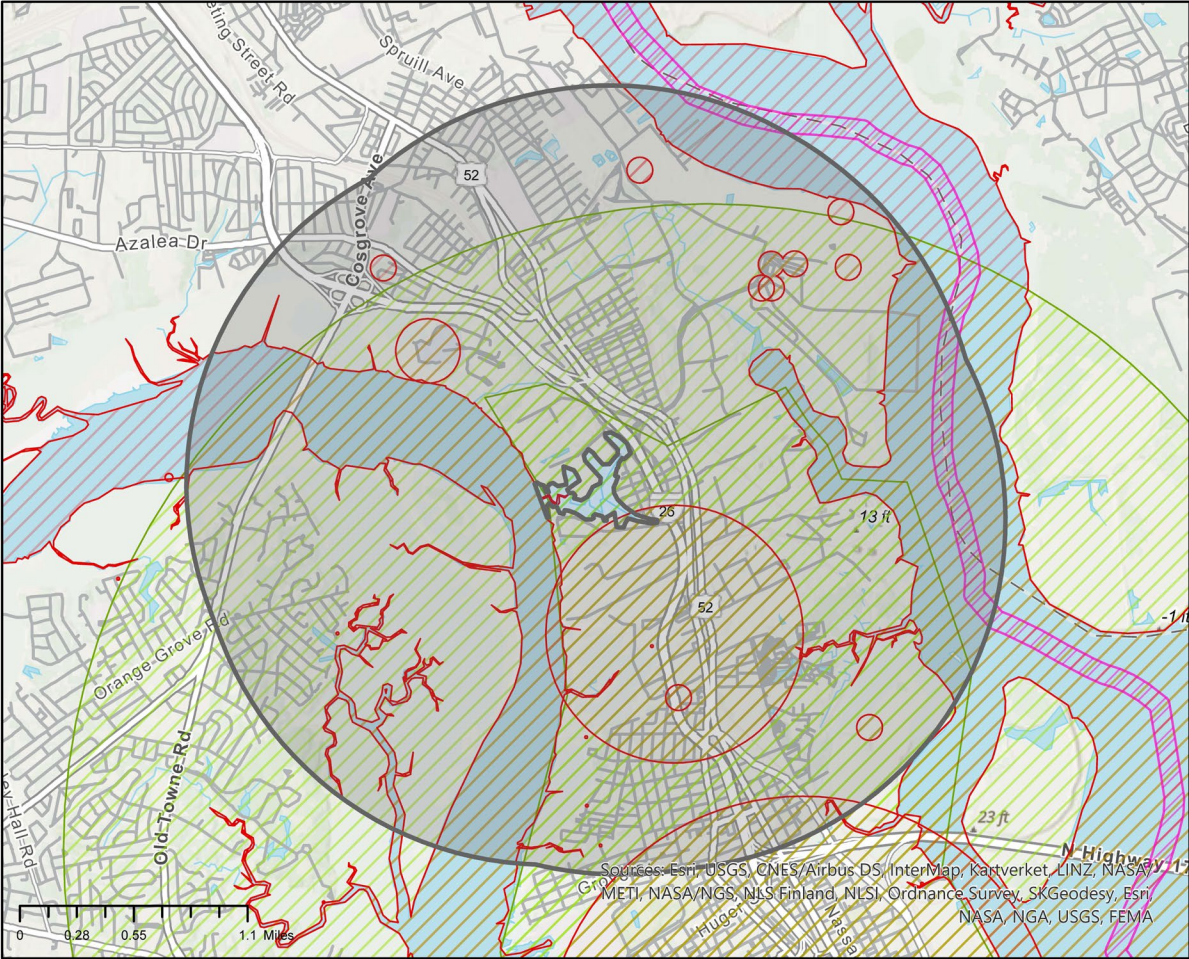
Thomas S. Mullikin, PhD, JD, Director
James W. Dillman, Deputy Director,
Wildlife and Freshwater Fisheries

PO Box 167
Columbia, SC 29202
(803) 734-1396
speciesreview@dnr.sc.gov

Requested on Thursday, March 19, 2026 by Nolan Schillerstrom.

Re: Request for Threatened and Endangered Species Consultation
Nolan Schillerstrom - Rosemont Marsh Resilience Plan - Land Protection - Charleston County, South Carolina

The South Carolina Department of Natural Resources (SCDNR) has received your request for threatened and endangered species consultation of the above named project in Charleston County, South Carolina. The following map depicts the project area and a 2 mile buffer surrounding:



Thomas S. Mullikin, PhD, JD, Director
James W. Dillman, Deputy Director,
Wildlife and Freshwater Fisheries

This report includes the following items:

- A - A report for species which intersect the project area
- B - A report for species which intersect the buffer around the project area
- C - A list of best management practices relevant to species near to or within the project area
- D - A list of best management practices relevant to the project type
- E - A list of state & federally listed species within the county of the project area
- F - Other important information on conservation status, listed species, and how to submit observations to the program.

Please be advised:

The contents of this report, including all tables, maps, recommendations, and various other text, are produced as a direct result of the information a user provides at the time of submission. The SCDNR assumes that all information submitted by the user represents the project scope as proposed, and recommends that additional reports be requested should the scope deviate from how the project was initially represented to the SCDNR.

The technical comments outlined in this report are submitted to speak to the general impacts of the activities as described through inquiry by parties outside the South Carolina Department of Natural Resources. These technical comments are submitted as guidance to be considered and are not submitted as final agency comments that might be related to any unspecified local, state or federal permit, certification or license applications that may be needed by any applicant or their contractors, consultants or agents presently under review or not yet made available for public review. In accordance with its policy 600.01, Comments on Projects Under Department Review, the South Carolina Department of Natural Resources, reserves the right to comment on any permit, certification or license application that may be published by any regulatory agency which may incorporate, directly or by reference, these technical comments.

Interested parties are to understand that SCDNR may provide a final agency position to regulatory agencies if any local, state or federal permit, certification or license applications may be needed by any applicant or their contractors, consultants or agents. For further information regarding comments and input from SCDNR on your project, please contact our Office of Environmental Programs by emailing environmental@dnr.sc.gov or by visiting www.dnr.sc.gov/environmental. Pursuant to Section 7 of the Endangered Species Act, requests for formal letters of concurrence with regards to federally listed species should be directed to the USFWS.

Should you have any questions or need more information, please do not hesitate to contact our office by email at speciesreview@dnr.sc.gov or by phone at 803-734-4080.

Sincerely,

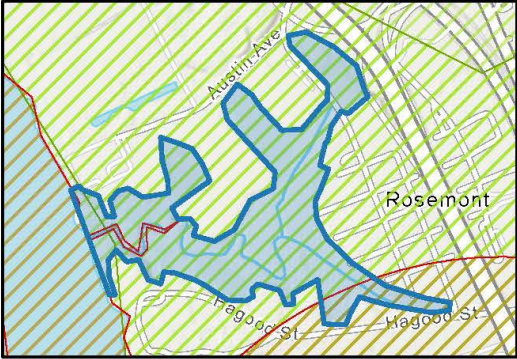
Megan Levinson
Heritage Trust Program
SC Department of Natural Resources

A. Project Area - Species Report

There are 4 tracked species records found within the project foot print. The following table outlines occurrences found within the project footprint (if any), sorted by listing status and species name. Please keep in mind that this information is derived from existing databases and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. You can find more information about global and state rank status definitions by visiting Natureserve's web page. Please note that certain sensitive species found on site may be listed in this table but are not represented on the map. Please contact speciesreview@dnr.sc.gov should you have further questions related to sensitive species found within the project area.



Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SKGeodesy, Esri, NASA, NGA, USGS, FEMA



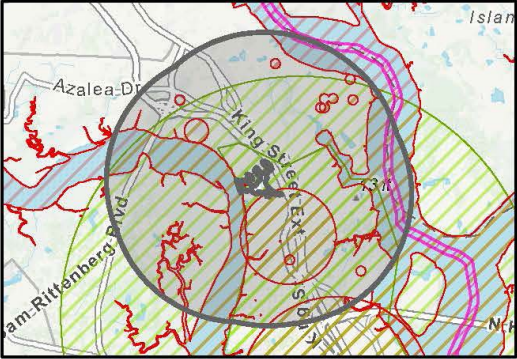
Scientific Name	Common Name	Federal Status	State Status	G Rank	S Rank	SWAP Priority	Last Obs. Date
<i>Trichechus manatus latirostris</i>	Florida Manatee	LT	SE	G2G3	S2	2	2023
<i>Sterna antillarum</i>	Least Tern	MBTA	ST	G4	S2B	1	2019-06-03
<i>Sceptridium lunarioides</i>	Winter Grapefern	NA	NA	G4?	S1	2	1850
<i>Sporobolus compositus</i> var.	Tall Dropseed	NA	NA	G5T5	S1	2	1855-09-28

B. Buffer Area - Species Report

The following table outlines rare, threatened or endangered species found within 2 miles of the project footprint, arranged in order of protection status and species name. Please keep in mind that this information is derived from existing databases and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. You can find more information about global and state rank status definitions by visiting Natureserve's web page. Please note that certain sensitive species found within the buffer area may be listed in this table but are not represented on the map.



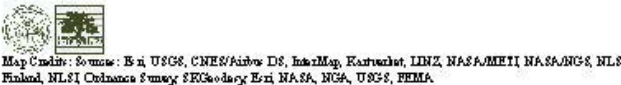
Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SKGeodesy, Esri, NASA, NGA, USGS



Scientific Name	Common Name	Federal Status	State Status	G Rank	S Rank	SWAP Priority	Last Obs. Date
<i>Trichechus manatus latirostris</i>	Florida Manatee	LT	SE	G2G3	S2	2	2023
<i>Sterna antillarum</i>	Least Tern	MBTA	ST	G4	S2B	1	2019-06-03
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
Waterbird Colony	Waterbird Colony	NA	NA	GNR	S3	0	1995
<i>Malaclemys terrapin centrata</i>	Carolina Diamond-backed	NA	R	G4T4	S3	2	2022-08-07
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	NA	SE	G3	S2	2	1933-08-17
<i>Sceptridium lunarioides</i>	Winter Grapefern	NA	NA	G4?	S1	2	1850
<i>Sporobolus compositus</i> var.	Tall Dropseed	NA	NA	G5T5	S1	2	1855-09-28

C. Species Best Management Practices (1 of 2)

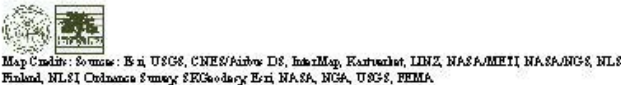
SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to species of concern which may be found on or near to the project area. Please contact speciesreview@dnr.sc.gov should you have further questions with regard to survey methods, consultation, or other species-related concerns.



One or more occurrences of state listed species are found within or near to your project area. Please note that take of these species are prohibited under S.C. Code of Laws §50-15-30.
A river near to your project area is designated critical habitat for Atlantic sturgeon under the Endangered Species Act. SCDNR recommends consultation with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) to determine if construction activities are likely to negatively impact spawning or foraging sturgeon. They may be reached at 727-824-5312.
Three listed species of bats have been known to occur in the coastal plain ecoregions of South Carolina, including the state-endangered Rafinesque's big-eared bat (<i>Corynorhinus rafinesquii</i>); the federally endangered northern long-eared bat (NLEB) (<i>Myotis septentrionalis</i>); and the federally at-risk & proposed endangered tricolored bat (<i>Perimyotis subflavus</i>). Please note that take of a state endangered species is prohibited under S.C. Code of Laws §50-15-30. Prior to any land clearing activities in the proposed project area, the SCDNR recommends a threatened and endangered species assessment be conducted to identify suitable habitat and provided to SCDNR for review.
Regarding Rafinesque's big-eared bat: Suitable habitat for Rafinesque's big-eared bat is defined as swamp forests, hardwood or mixed mature bottomlands, maritime forests and black gum (<i>Nyssa sylvatica</i>) and water tupelo (<i>Nyssa aquatica</i>) stands (Cochran 1999, Hofmann et al. 1999, Lance et al. 2001, Gooding and Langford 2004, Trousdale and Beckett 2005). If suitable habitat exists within the project, the SCDNR recommends assumption of presence of Rafinesque's big-eared bat within areas of forested wetlands and to further protect these areas, surround them with a 1000-foot buffers and avoid tree clearing from May 1st to July 31st to minimize disturbance and destruction of habitat that may be used by females during gestation or maternal care for pups. All other tree clearing outside of the forested wetlands and its associated buffer may occur in areas that are not wetlands or other aquatic resources in non-Rafinesque's big-eared bat maternity roosting habitat anytime. Where wetlands occur that are not Rafinesque's big-eared bat habitat, but they are spotted turtle habitat, tree clearing should only occur August to December to prevent impacts to spotted turtles during reproduction. However, if wetlands are dry January to June, they may be cleared, but they must be completely dry (no surface water present). For future right-of-way management (if applicable), use heavy equipment and herbicide treatment for right-of-way vegetation management in wetlands only during the months of July to November. If wetlands are completely dry (no surface water present), heavy equipment may be used January to June, but the wetlands must be completely dry.
Please note that tricolored bat was proposed for listing by the U.S. Fish and Wildlife Service on September 13, 2022. Therefore, due to the conservation concerns surrounding this species, the SCDNR strongly suggests acoustic surveys be conducted by a qualified individual during the summer months to assess the use of the area to be cleared by tricolored bats. Should the species occur in the proposed area slated for clearing, coordination should occur with SCDNR and USFWS regarding avoidance and minimization measures. Tricolored bat utilize caves, rock crevices, tree foliage and basal cavities, Spanish moss and man-made structures, such as houses, barns and culverts, as maternity roosts during the summer months and they will use more than one roost location. If this species are found on-site, please contact the U.S. Fish & Wildlife Service and SCDNR. The SCDNR recommends the assumption of presence of the the species and abide by a clearing moratorium from May 1st to July 31st if suitable habitat for the species is likely or are explicitly identified within the project footprint.
In the interest of preserving plant diversity, the South Carolina Plant Conservation Alliance performs native plant rescues in order to protect and preserve our diversity of native plants. If you are interested in assisting with this important endeavor please contact the SCDNR Botanist at botany@dnr.sc.gov before any development occurs onsite. There may be plants of interest on the project site that the Alliance would like to preserve.

C. Species Best Management Practices (2 of 2)

SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to species of concern which may be found on or near to the project area. Please contact speciesreview@dnr.sc.gov should you have further questions with regard to survey methods, consultation, or other species-related concerns.



Species in the above table with SWAP priorities of High, Highest or Moderate are designated as having conservation priority under the South Carolina State Wildlife Action Plan (SWAP). SWAP species are those species of greatest conservation need not traditionally covered under any federal funded programs. Species are listed in the SWAP because they are rare or designated as at-risk due to knowledge deficiencies; species common in South Carolina but listed rare or declining elsewhere; or species that serve as indicators of detrimental environmental conditions. SCDNR recommends that appropriate measures should be taken to minimize or avoid impacts to the aforementioned species of concern.
Please note your project may be located near shellfish resources. Activities in the eight coastal counties, may require additional water quality requirements to comply with the Department of Health and Environmental Control (DHEC) Office of Ocean and Coastal Resource Management (OCRM) Stormwater Management Guidelines, specifically S.C. Code of Regulations 72-307C(5)(g). Per DHEC OCRM's Coastal Zone Consistency Stormwater Management Policies and Procedures, Policy Group XIII A.a, if the project is within 1000ft of shellfish beds, the applicant must demonstrate that the first one and a half inches of runoff from the built upon portion of the property is retained onsite. Please see DHEC OCRM's Coastal Zone Consistency Policies and Procedures for more information: https://scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/OCRM_Policies_Procedures.pdf

D. Project Best Management Practices (1 of 1)

SCDNR offers the following comments and best management practices (BMPs) regarding this project's potential impacts to natural resources within or surrounding the project area. Please contact our Office of Environmental Programs at environmental@dnr.sc.gov should you have further questions with regard to best management practices related to this project area.



Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS, Finland, NLSI, Ordnance Survey, SKGeodesy, Esri, NASA, NGA, USGS, FEMA



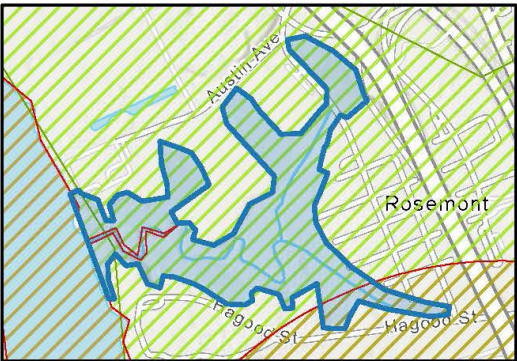
- All necessary measures must be taken to prevent oil, tar, trash and other pollutants from entering the adjacent offsite areas/wetlands/water. Once the project is initiated, it must be carried to completion in an expeditious manner to minimize the period of disturbance to the environment.
 - Upon project completion, all disturbed areas must be permanently stabilized with vegetative cover (preferable), riprap or other erosion control methods as appropriate.
 - The project must be in compliance with any applicable floodplain, stormwater, land disturbance, shoreline management guidance or riparian buffer ordinances.
 - Prior to beginning any land disturbing activity, appropriate erosion and siltation control measures (e.g. silt fences or barriers) must be in place and maintained in a functioning capacity until the area is permanently stabilized.
 - Materials used for erosion control (e.g., hay bales or straw mulch) will be certified as weed free by the supplier.
 - Inspecting and ensuring the maintenance of temporary erosion control measures at least:
 - a. on a daily basis in areas of active construction or equipment operation;
 - b. on a weekly basis in areas with no construction or equipment operation; and
 - c. within 24 hours of each 0.5 inch of rainfall.
 - Ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this time frame would result in greater environmental impacts.
 - Land disturbing activities must avoid encroachment into any wetland areas (outside the permitted impact area). Wetlands that are unavoidably impacted must be appropriately mitigated.
 - Your project may require a Stormwater Permit from the SC Department of Health & Environmental Control, please visit <LINK><https://www.scdhec.gov/environment/water-quality/stormwater></LINK>
- Your project area includes a FEMA special flood hazard area and may require a permit from the County National Floodplain Insurance Program Manager before impacts occur to aquatic resources and the associated floodplains on site. Please refer to <https://www.dnr.sc.gov/water/flood/documents/nfipadmindexdirectory.pdf> to find your appropriate contact information.
- Your project boundary lies within a coastal county in South Carolina which means you may also need a Coastal Zone Consistency Certification for your project from the SC Department of Health and Environmental Control. For more information, visit: <https://www.scdhec.gov/environment/your-water-coast/ocean-coastal-management/beach-management/coastal-permits/coastal-zone> • If your project could affect coastal waters, tidelands, beaches and beach/dune systems, you may also need a critical area permit from the SC Department of Health and Environmental Control. For more information, visit: <https://www.scdhec.gov/environment/your-water-coast/ocean-coastal-management/beach-management/coastal-permits/critical-1>

E. State & Federally Listed Species in Charleston County (1 of 2)

The South Carolina Department of Natural Resources' Heritage Trust Program organizes a database that captures and tracks element of occurrence data for rare, threatened and endangered species, both federal and state. Please keep in mind that this information included within this report is derived from existing databases, and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. If your project requires the assessment of potential threatened or endangered species that could be within the project area, the SCDNR asks that you include a review of the state listed species within the county or watershed in addition to those that may be within the report as being within the project footprint or within 1-mile of the proposed project area. Consideration should be given to the occurrence of suitable habitat onsite, species movement and connectivity of habitat when assessing the likelihood of a state listed species on the project area.



Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS, Finland, NLSI, Ordnance Survey, SKGeodesy, Esri, NASA, NGA, USGS, FEMA



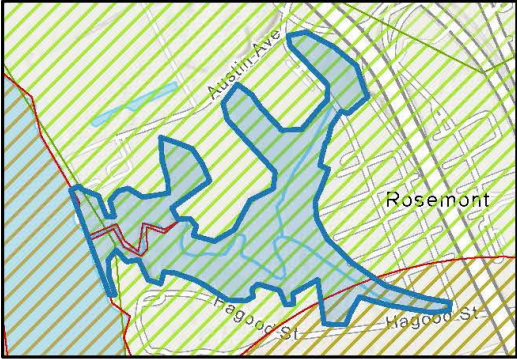
County	Scientific Name	Common Name	G Rank	S Rank	Federal Status	State Status	Group Type
Charleston	<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	G3	S3	LE: Federally Endangered	SE: State Endangered	Zoological
Charleston	<i>Acipenser oxyrinchus oxyrinchus</i>	Atlantic Sturgeon	G3T3	S3	LE: Federally Endangered	Not Applicable	Zoological
Charleston	<i>Amaranthus pumilus</i>	Seabeach Amaranth, Dwarf Amaranth	G2	S1	LT: Federally Threatened	Not Applicable	Botanical
Charleston	<i>Ambystoma cingulatum</i>	Frosted Flatwoods Salamander	G2	S1	LT: Federally Threatened	SE: State Endangered	Zoological
Charleston	<i>Bombus fratermus</i>	Southern Plains Bumble Bee	G3G4	SNR	ARS: At-Risk Species	Not Applicable	Zoological
Charleston	<i>Bombus pensylvanicus</i>	American Bumble Bee	G3G4	SNR	ARS: At-Risk Species	Not Applicable	Zoological
Charleston	<i>Calidris canutus rufa</i>	Red Knot	G4T2	S2N	LT: Federally Threatened	Not Applicable	Zoological
Charleston	<i>Callophrys irus</i>	Frosted Elfin	G3	S2S3	ARS: At-Risk Species	Not Applicable	Zoological
Charleston	<i>Caretta caretta</i>	Loggerhead Sea Turtle	G3	S3	LT: Federally Threatened	ST: State Threatened	Zoological
Charleston	<i>Carex lutea</i>	Golden Sedge	G2	S1	LE: Federally Endangered	Not Applicable	Botanical
Charleston	<i>Charadrius melodus</i>	Piping Plover	G3	S2N	LT: Federally Threatened	SE: State Endangered	Zoological
Charleston	<i>Charadrius wilsonia</i>	Wilson's Plover	G5	S3	MBTA: Migratory Bird Treaty Act	ST: State Threatened	Zoological
Charleston	<i>Chelonia mydas</i>	Green Sea Turtle	G3	S1	LT: Federally Threatened	ST: State Threatened	Zoological
Charleston	<i>Clemmys guttata</i>	Spotted Turtle	G5	S2	ARS: At-Risk Species	ST: State Threatened	Zoological
Charleston	<i>Coreopsis integrifolia</i>	Chipola Dye-flower; Ciliate-leaf	G1G2	S1	ARS: At-Risk Species	Not Applicable	Botanical
Charleston	<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared Bat	G3G4	S2	Not Applicable	SE: State Endangered	Zoological
Charleston	<i>Crotalus adamanteus</i>	Eastern Diamond-backed Rattlesnake	G3	S2	ARS: At-Risk Species	Not Applicable	Zoological
Charleston	<i>Danaus plexippus</i>	Monarch Butterfly	G4	S4	C: Candidate	Not Applicable	Zoological
Charleston	<i>Dermochelys coriacea</i>	Leatherback Sea Turtle	G2	S1	LE: Federally Endangered	SE: State Endangered	Zoological
Charleston	<i>Dryobates borealis</i>	Red-cockaded Woodpecker	G3	S2	LT: Federally Threatend	SE: State Endangered	Zoological
Charleston	<i>Elanoides forficatus</i>	Swallow-tailed Kite	G5	S2	MBTA: Migratory Bird Treaty Act	SE: State Endangered	Zoological
Charleston	<i>Eurycea chamberlaini</i>	Chamberlain's Dwarf Salamander	G4	S3	ARS: At-Risk Species	Not Applicable	Zoological
Charleston	<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5	S3B,S3N	Bald & Golden Eagle Protection Act	ST: State Threatened	Zoological
Charleston	<i>Heterodon simus</i>	Southern Hog-nosed Snake	G2	S1	Not Applicable	ST: State Threatened	Zoological
Charleston	<i>Lasiurus cinereus</i>	Hoary Bat	G3G4	S2	ARS: At-Risk Species	Not Applicable	Zoological
Charleston	<i>Laterallus jamaicensis</i>	Black Rail	G3	S1	LT: Federally Threatened	Not Applicable	Zoological
Charleston	<i>Lepidochelys kempii</i>	Kemp's Ridley Sea Turtle	G1	S1N	LE: Federally Endangered	SE: State Endangered	Zoological
Charleston	<i>Lindera melissifolia</i>	Southern Spicebush, Pondberry	G3	S2	LE: Federally Endangered	Not Applicable	Botanical
Charleston	<i>Lithobates capito</i>	Carolina Gopher Frog	G2G3	S1	ARS: At-Risk Species	SE: State Endangered	Zoological
Charleston	<i>Lobelia boykinii</i>	Boykin's Lobelia	G1G2	S2?	ARS: At-Risk Species	Not Applicable	Botanical
Charleston	<i>Mycteria americana</i>	Wood Stork	G4	S2	LT: Federally Threatened	SE: State Endangered	Zoological
Charleston	<i>Myotis lucifugus</i>	Little Brown Bat	G3G4	S2	ARS: At-Risk Species	Not Applicable	Zoological
Charleston	<i>Myotis septentrionalis</i>	Northern Long-eared Bat	G2G3	S1	LE: Federally Endangered	Not Applicable	Zoological
Charleston	<i>Numenius borealis</i>	Eskimo Curlew	GH	SX	MBTA: Migratory Bird Treaty Act	SE: State Endangered	Zoological
Charleston	<i>Perimyotis subflavus</i>	Tricolored Bat	G3G4	S3	LEP: Federally Endangered (Proposed)	Not Applicable	Zoological
Charleston	<i>Pseudobranchius striatus striatus</i>	Broad-striped Dwarf Siren	G5T1T3	S1	Not Applicable	ST: State Threatened	Zoological

E. State & Federally Listed Species in Charleston County (2 of 2)

The South Carolina Department of Natural Resources' Heritage Trust Program organizes a database that captures and tracks element of occurrence data for rare, threatened and endangered species, both federal and state. Please keep in mind that this information included within this report is derived from existing databases, and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. If your project requires the assessment of potential threatened or endangered species that could be within the project area, the SCDNR asks that you include a review of the state listed species within the county or watershed in addition to those that may be within the report as being within the project footprint or within 1-mile of the proposed project area. Consideration should be given to the occurrence of suitable habitat onsite, species movement and connectivity of habitat when assessing the likelihood of a state listed species on the project area.



Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SKGeodesy, Esri, NASA, NGA, USGS, FEMA

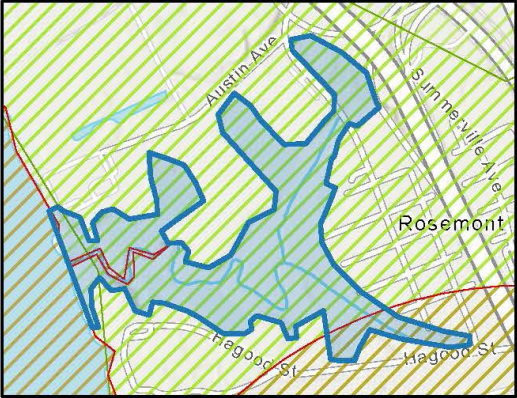


County	Scientific Name	Common Name	G Rank	S Rank	Federal Status	State Status	Group Type
Charleston	<i>Trichechus manatus</i>	Florida Manatee	G2G3	S2S3	LT: Federally Threatened	SE: State Endangered	Zoological
Charleston	<i>Vermivora bachmanii</i>	Bachman's Warbler	GX	SX	Not Applicable	SE: State Endangered	Zoological

F. Important Information & Instructions for Submitting Species Observations

The SC Natural Heritage Dataset relies on continuous monitoring and surveying for species of concern throughout the state. Any records of species of concern found within this project area would greatly benefit the quality and comprehensiveness of the statewide dataset for rare, threatened and endangered species. Below are instructions for how to download the SC Natural Heritage Occurrence Reporting Form through the Survey123 App.

Map Credits: Sources: Esri, USGS, CNES/Airbus DS, InterMap, Kartverket, LINZ, NASA/METI, NASA/NGS, NLS Finland, NLSI, Ordnance Survey, SKGeodesy, Esri, NASA, NGA, USGS, FEMA



Conservation Ranks & SWAP Priority Status

The SC Natural Heritage Program assigns S Ranks for species tracked within the state of South Carolina based on ranking methodology developed by NatureServe and its state program network. For information conservation rank definitions, please visit <https://explorer.natureserve.org/AboutTheData/Statuses>

The SCDNR maintains and updates it's State Wildlife Action Plan (SWAP) every 10 years. This plan categorizes species of concern by Moderate, High, and Highest Priority. Please visit <https://www.dnr.sc.gov/swap/index.html> for more information about the SC SWAP.

Important Information Regarding Element Occurrence Data:

The South Carolina Department of Natural Resources' Heritage Trust Program organizes a database that captures and tracks element of occurrence data for rare, threatened and endangered species, both federal and state. Please keep in mind that this information included within this report is derived from existing databases, and do not assume that it is complete. Areas not yet inventoried may contain significant species or communities. If your project requires the assessment of potential threatened or endangered species that could be within the project area, the SCDNR asks that you include a review of the state listed species within the county or watershed in addition to those that may be within the report as being within the project footprint or within 1-mile of the proposed project area. Consideration should be given to the occurrence of suitable habitat onsite, species movement and connectivity of habitat when assessing the likelihood of a state listed species on the project area. To view these lists please visit our county and watershed dashboards at our website: <https://natural-heritage-program-scdnr.hub.arcgis.com/#track>

State-listed Species Guidance

The South Carolina Department of Natural Resources has released a document to provide clarity for the avoidance of a take of a state listed species and what may be needed from permit applicants, for each species listed as threatened or endangered under SC Code of Regulations 123-150 and 123-150.2. Please review this document for information on species-habitat requirements, survey protocol, and other information regarding environmental review: <https://dnr.sc.gov/environmental/docs/SCDNRStateListedSpeciesProtectionGuidance.pdf>

Instructions for accessing the SC Natural Heritage Occurrence Reporting Form

- 1) Follow <https://arcg.is/1a0jzC0> or use the QR code here.
- 2) Select 'Open in browser' or 'Open in the Survey123 field app' depending on your preference. The browser option will only work when connected to the internet.
- 3) If using in the Survey123 field app, be sure to download the app from your app store beforehand.



Appendix F

HEC-RAS 2D Hydrodynamic Modeling

Modeling Program

To support our restoration approach, Biohabitats adapted a two-dimensional (2D) model in HEC-RAS 6.6; the original model was created by Moffatt & Nichol as part of the Rosemont Flood Resilience Plan completed in early 2026 to provide detailed flood analysis for the upland (neighborhood) portion of the watershed. HEC-RAS 6.6 is model software developed by the United States Army Corp of Engineers (UASCE) to compute channel hydraulic variables such as velocity, shear stress, and water surface elevations within the riverine environment. The 2D capabilities of HEC-RAS were utilized to provide detailed modeling of the stream channel and floodplain. A traditional one-dimensional (1D) model uses a series of cross-sections to define the stream and floodplain, limiting the user's evaluation of hydraulic elements to these cross-section locations. A 2D model uses a digital elevation model (DEM), a topographic surface extending across the entire potential flow area, to define the channel and floodplains, allowing the user to evaluate hydraulic elements at any location within the project reach. HEC-RAS allows users to route storm flow using non-time dependent steady state value (i.e. a peak flow rate) or a time-dependent series of values (i.e. a flow or stage hydrograph). A traditional 1D model can use either method, however a 2D model requires a time-dependent series. Therefore, in a 2D model storm flow is routed across the surface, allowing for flow in both the X- and Y- dimensions for the duration of the design storm event. Given these factors, the 2D model is well suited for streams with a variable planform, unconfined streams, wetlands, urban streams with "flashy" hydrology, and systems where quantifying floodplain attenuation is desired.

The modeled area encompasses the entire Rosemont watershed: from the uplands on the east side of I-26 to the outlet at the mouth of the Ashley River.

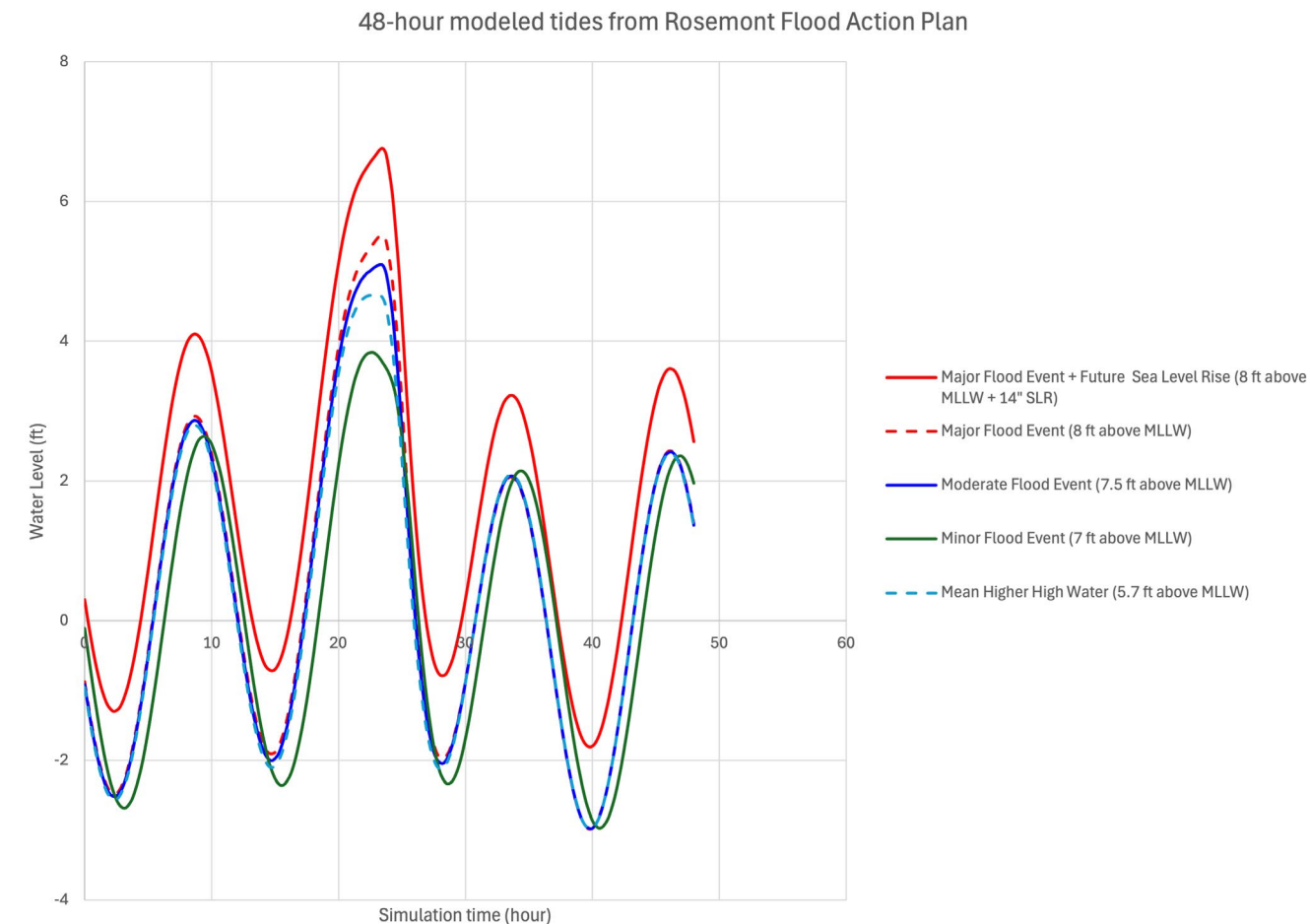
Methods

This HEC-RAS model was a modified version of the one created for the 2026 Rosemont Flood Resilience Plan. Adjustments were made to the model to shift the focus and level of detail from the neighborhood to the marsh. The backbone of the model is built on top of a digital elevation model (DEM) created from the 2025 Charleston County Light Detection and Ranging (LiDAR) data collected at low tide to create a current conditions surface that extended across the entire potential flow area. This digital elevation model was overlain in the HEC-RAS model with a computational mesh grid. Each cell in the grid serves as a computational unit. The default cell dimensions of 50-feet by 50-feet were adjusted to increase the density of cells within the tidal creek channels (5-feet by 5-feet) and wetland areas (15-feet by 15-feet). Having multiple cells within the channel and overbank cross-section flow areas ensures that any major variability will be captured and are in-line with recommendations from the model developers and stream restoration professionals.

Remotely sensed data (e.g. land cover/land use) and field observations were used to assign Manning's roughness values corresponding to specific conditions of the neighborhood, marsh, and creek channels identified throughout the project limits. Manning's n values were assigned to each feature type, including estuarine emergent wetland (0.07), scrub/shrub (n=0.13), and grassland/herbaceous (n=0.035).

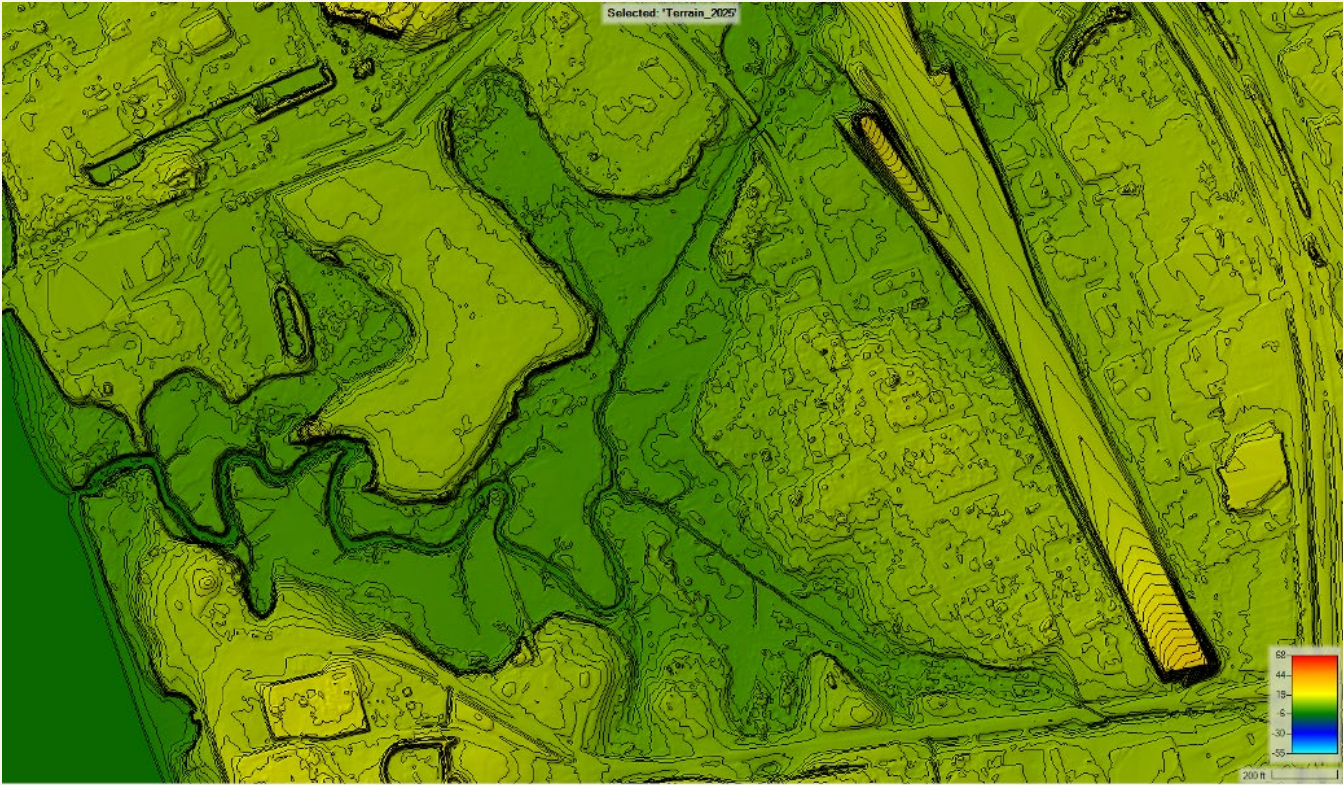
Different types of tidal hydrographs and precipitation hydrographs were applied to the model as downstream boundary conditions and rain on grid, respectively. The first type of flow hydrographs came from continuous

monitoring data collected at the USGS gauge (USGS-021720869) at the Ashley River near North Charleston. These hydrographs have a timestep of 15 minutes and were used in the calibration/validation process as described below. The second type of flow hydrographs were for discreet, 48-hour synthetic tides. These tides varied based solely on specified tidal amplitudes (e.g. MHHW, Major Flooding) and started at time 0 on a falling tide which was followed by 4 cycles of low and high tide. The higher high tide occurred 24 hours after the hydrograph period began.

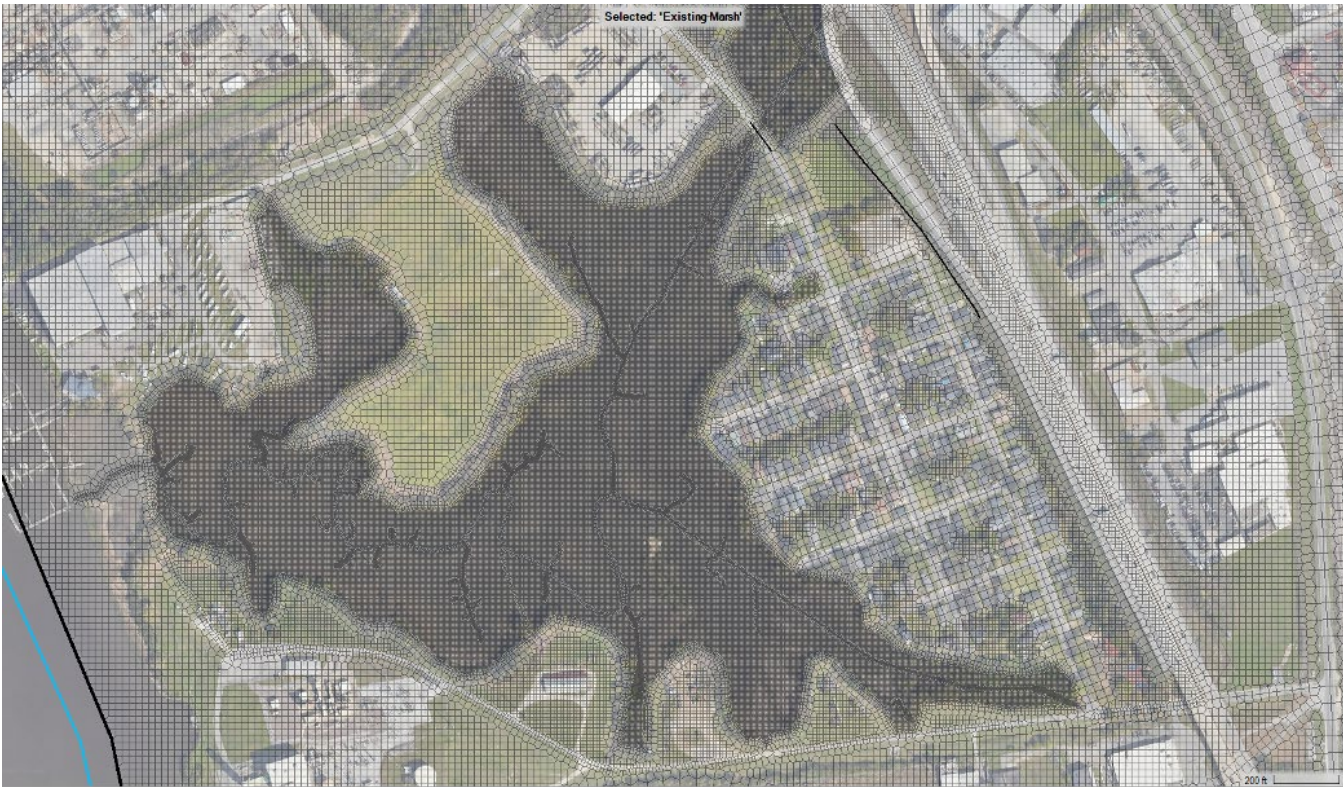


To improve model stability across all tidal and precipitation events, the time step adjustment option was used to allow the model to refine the computational time step to satisfy a range of Courant conditions.

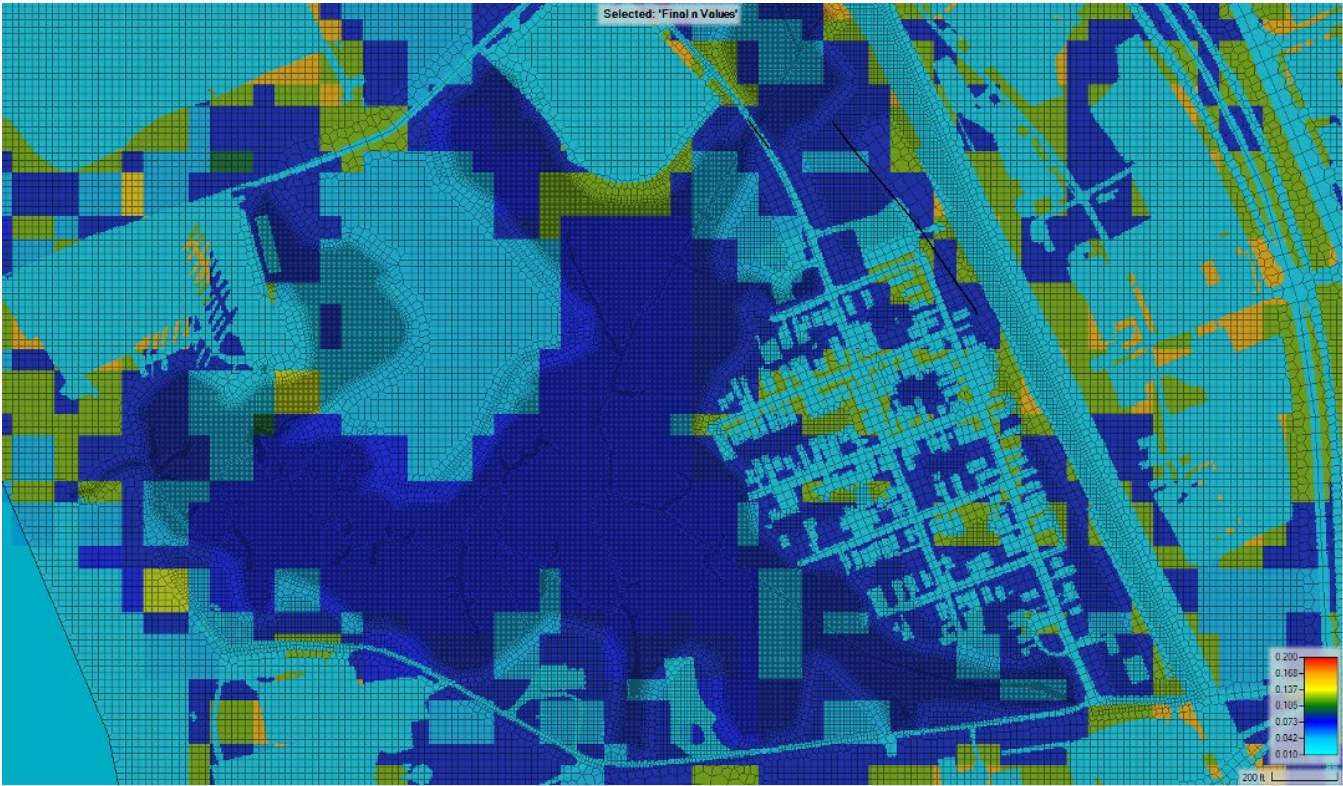
The analysis included investigating the impacts of different durations and amplitudes of tides on the Rosemont marsh. The first set of scenarios was based on observed tidal gauge elevations from the Ashley River NOAA station and spanned approximately two full lunar cycles during a very high spring tide (August – October 2025) and a typical neap tide (November – December 2025). The existing conditions for the terrain were based on the current Charleston County LiDAR for this area. In order to see how the marsh would behave if the restriction point near the mouth of the creek and the Ashley River was opened to allow for more water to flow into the system; this involved modifying the terrain in HEC-RAS.



HEC-RAS terrain created for Rosemont marsh



2D mesh created for Rosemont marsh

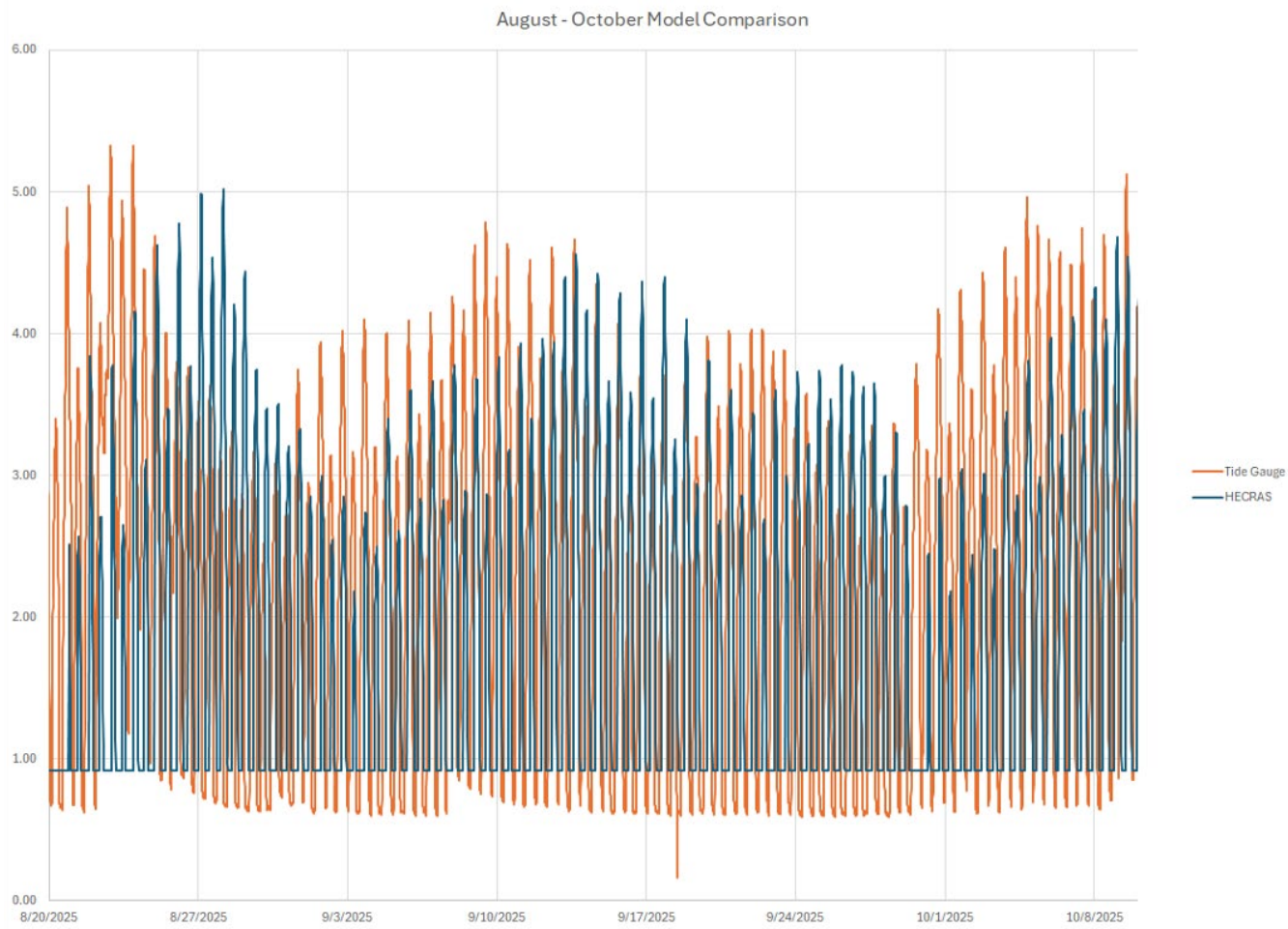


HEC-RAS Manning's n values

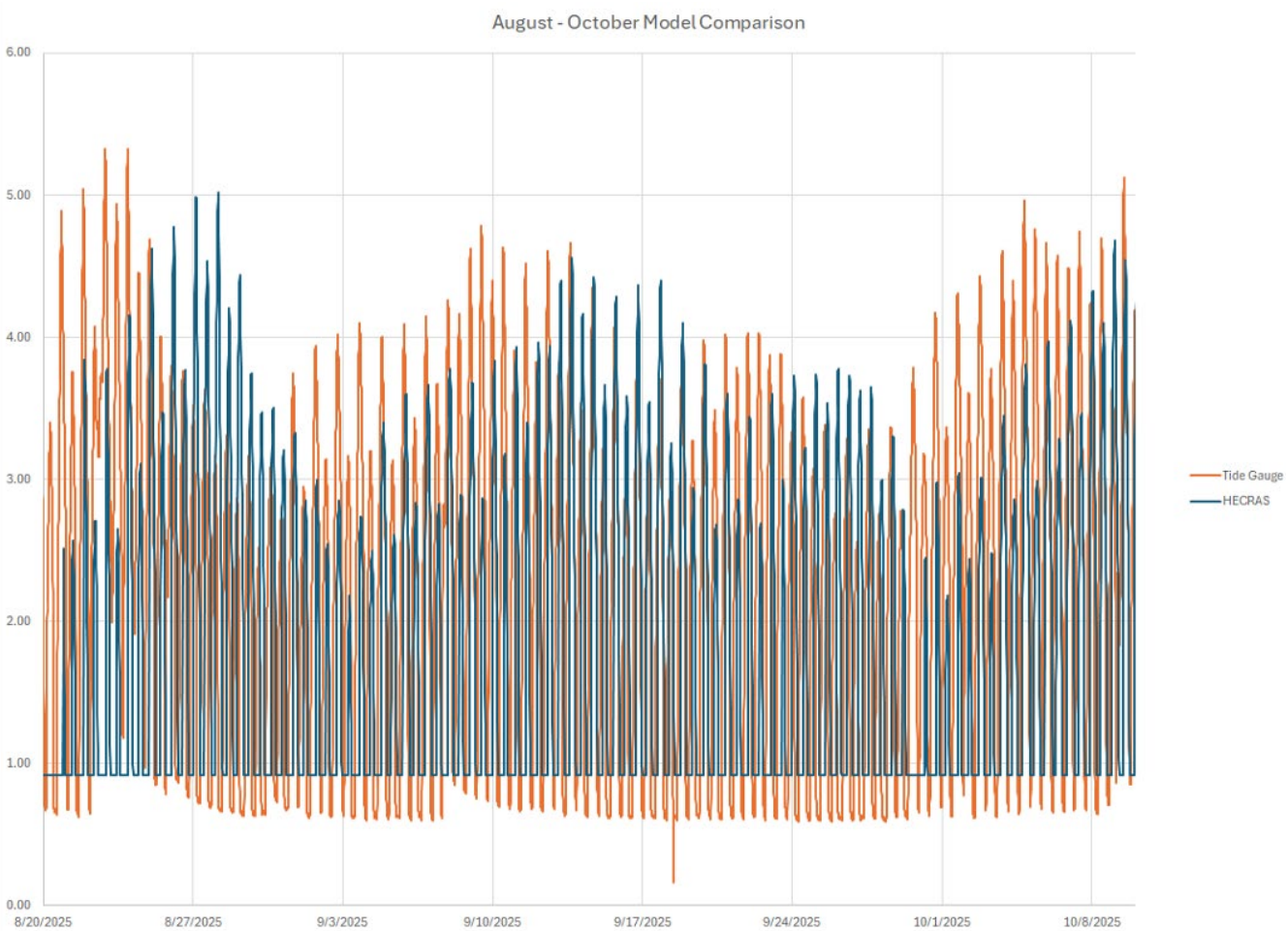
Validation and Verification

The existing condition HEC-RAS model was compared with the depth recorded by the tide gauge that was installed near Odessa St. The model was set up so that the downstream boundary utilized actual recorded tide levels from the USGS station located near the I-526 bridge, which is about a mile upstream of the mouth of the Rosemont creek.

Results showed similar frequency and amplitude of the high tide peaks and low tide troughs on the graph. Differences in the water surface elevation between the model and the recorded data is generally less than 6 inches; given the resolution of the LiDAR data (2 ft by 2 ft rasters), we feel that this is accurate enough. Both the modeled results and the monitored data show that there is approximately 12 hours and 20 minutes between each high tide (or between two consecutive low tides). The actual timing in these peaks appears to show the HEC-RAS output to be lagging or shifting in time a few hours behind the timing of when peaks were recorded, which may reflect differences in how each dataset was recorded and lag associated with the time difference between when the tide reaches Odessa Street compared to when it reaches the Ashley River gauge.



Comparison of monitored tide gauge data with modeled water levels in HEC-RAS based on data for August-October 2025.



Comparison of monitored tide gauge data with modeled water levels in HEC-RAS based on data for November-December 2025.

Results

Water Surface Elevation (WSE)

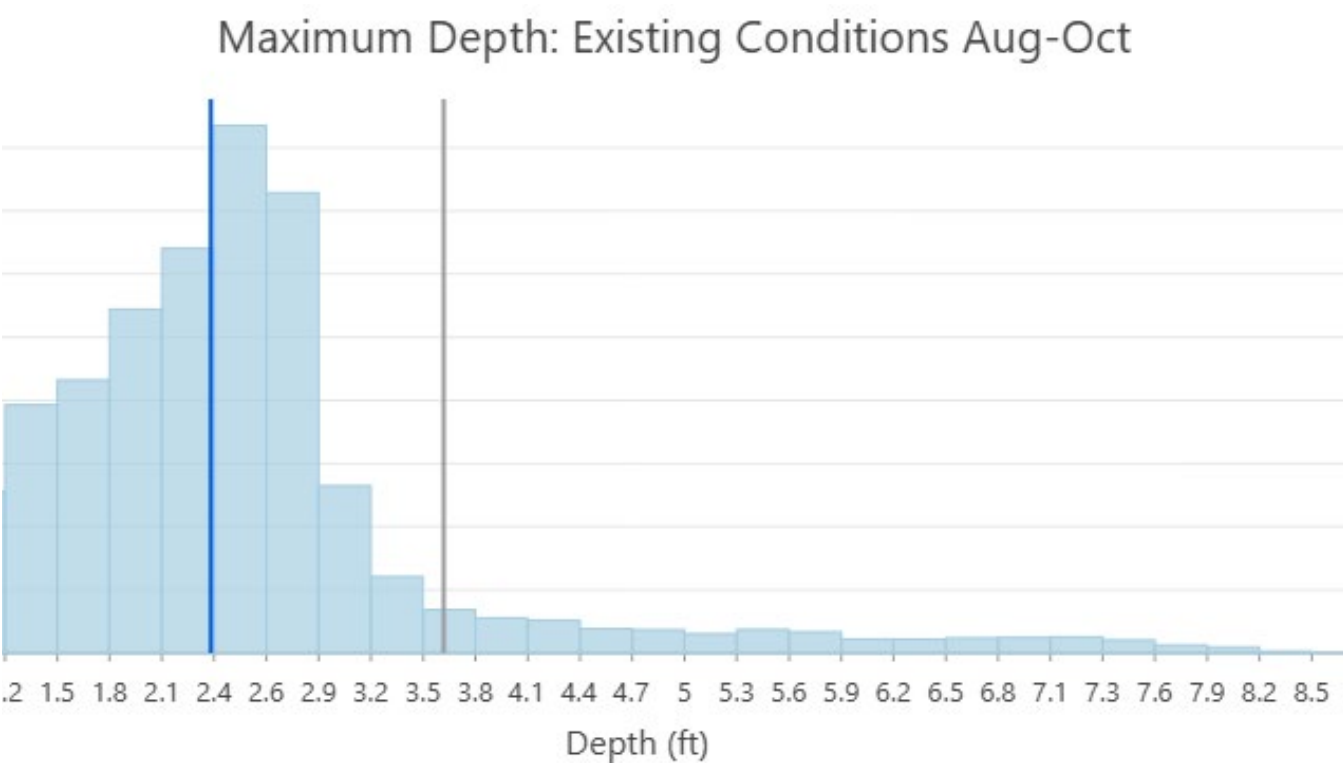
The maximum water surface elevation (WSE) occurs when the water level is highest during the simulations. The extent and depth are factors of the tidal conditions and terrain. As expected, with additional tide levels the inundation area also increases. The largest modeled tide (Major flood + SLR, 5.08 ft NAVD88) also has the largest inundation area (acres). Note that the max WSE for the existing conditions modeled for August-October 2025 (5.09 ft NAVD88) are close to the WSE for the MHHW + SLR scenarios (5.09 ft NAVD88), which indicates that future sea level rise may present similarly to current king tides in Rosemont. The 1-year storm event does not create a significant rise in WSE; however, the 10-year storm event adds an additional 5.5 inches to the MHHW WSEL. Note that the two precipitation events cover the most area, due to the combined effects of rain on grid which permits rainfall to pond on the surface of the ground outside of the marsh. Not surprising the greatest WSE is associated with the Major flooding event and an additional 14” of SLR; this is concerning because that level does not include any precipitation. The high WSEL prevents stormwater runoff from efficiently flowing from the uplands into the marsh, as reflected in many residents’ experiences with combined flooding in the neighborhood.

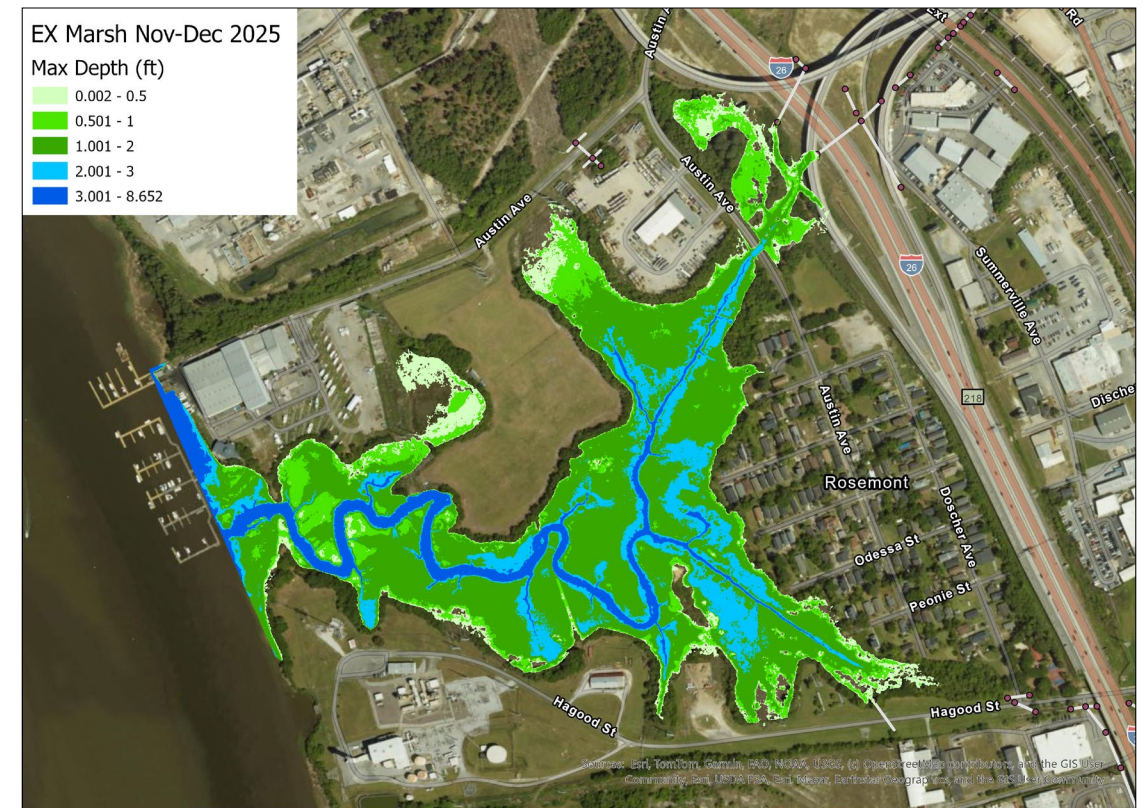
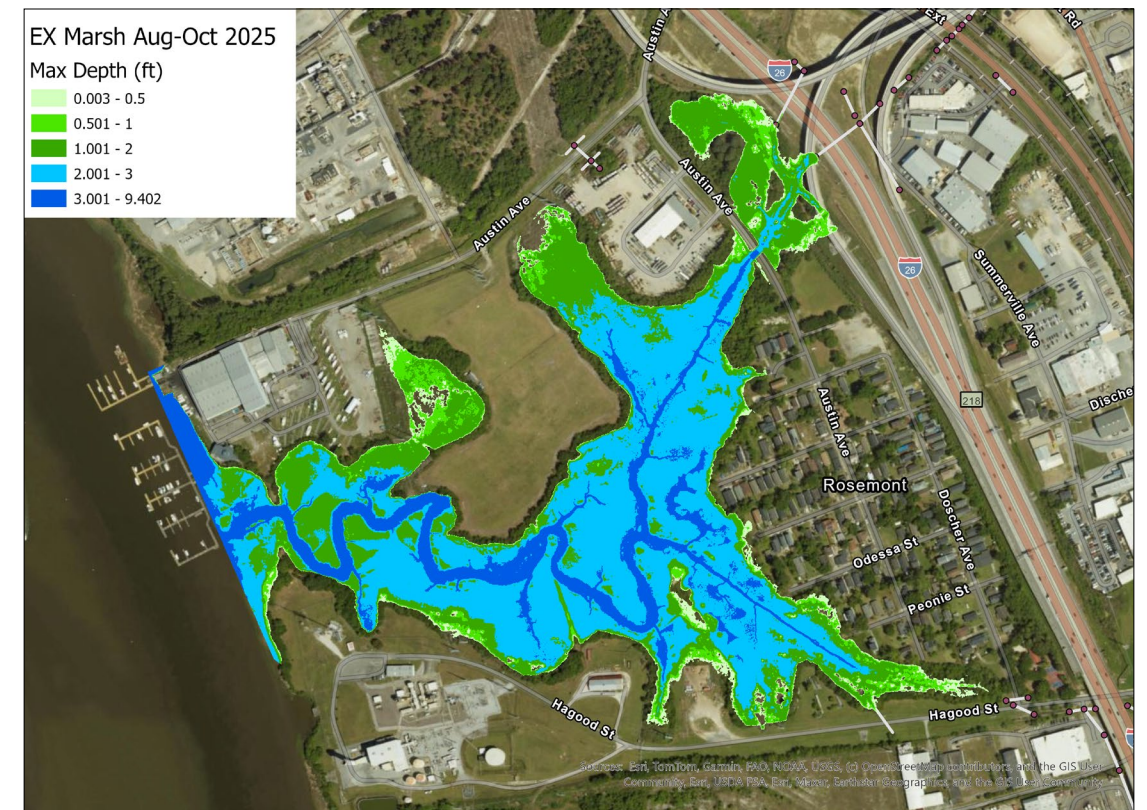
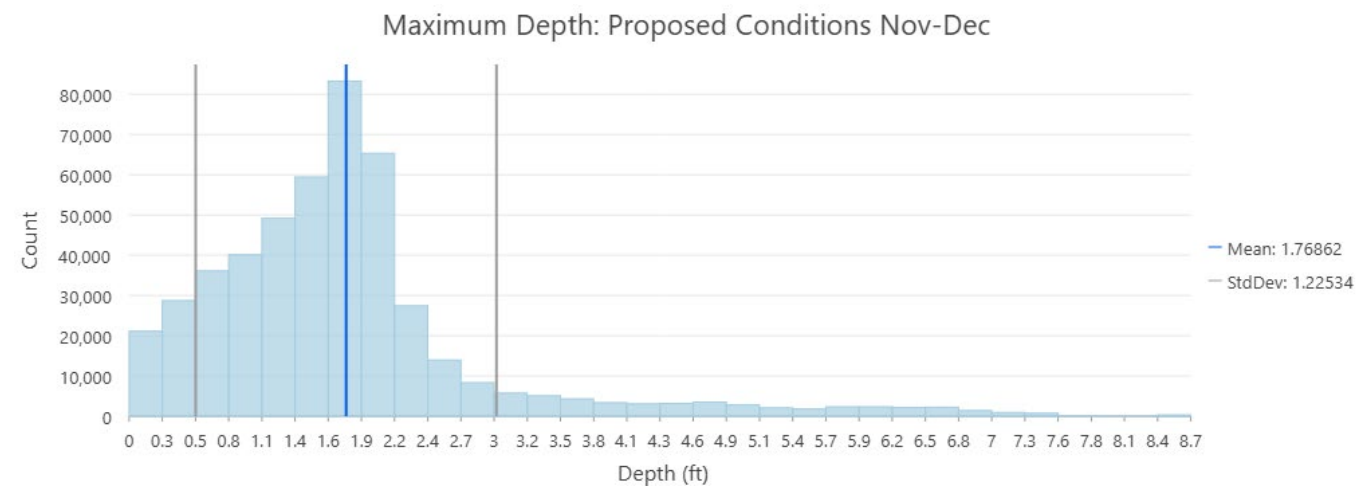
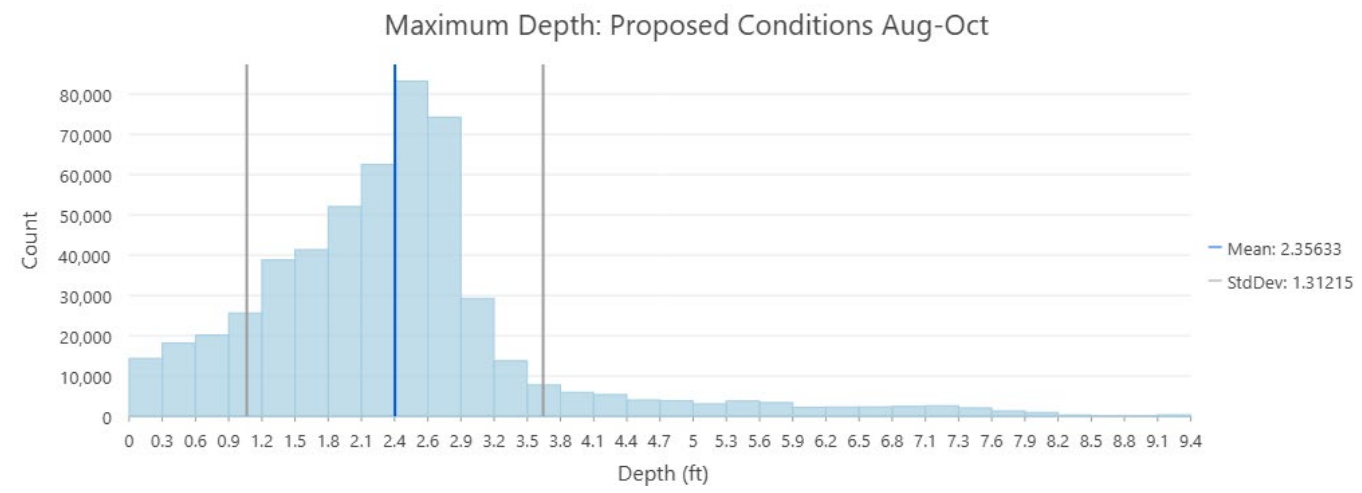
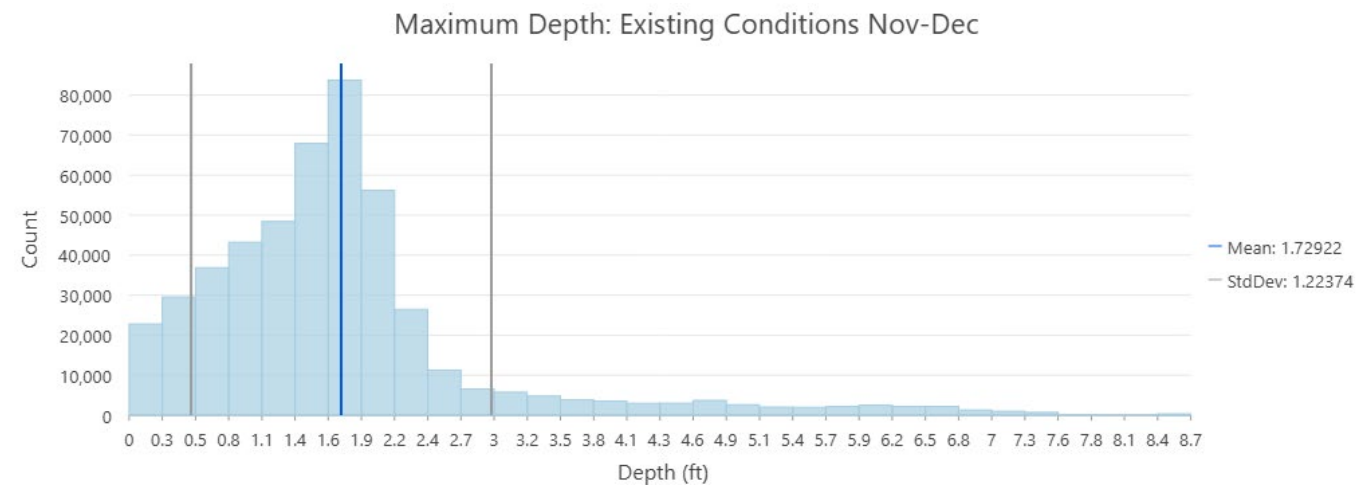
Scenario	Max WSE (NAVD88)	Max Inundation Area (acres)
EX Marsh Aug-Oct 2025	5.09	48.36
EX Marsh Nov-Dec 2025	4.29	44.00
PR Marsh Aug-Oct 2025	5.09	48.46
PR Marsh Nov-Dec 2025	4.31	44.15
EX MHHW (synthetic 48-hr)	3.79	39.01
EX MHHW + SLR (synthetic 48-hr)	5.01	48.01
EX Major + SLR (synthetic 48-hr)	6.76	61.62
PR MHHW (synthetic 48-hr)	3.81	39.21
PR MHHW + SLR (synthetic 48-hr)	5.01	48.10
PR Major + SLR (synthetic 48-hr)	6.76	61.68
EX MHHW + 1yr storm	3.81	66.22
EX MHHW + 10yr storm	4.26	74.69

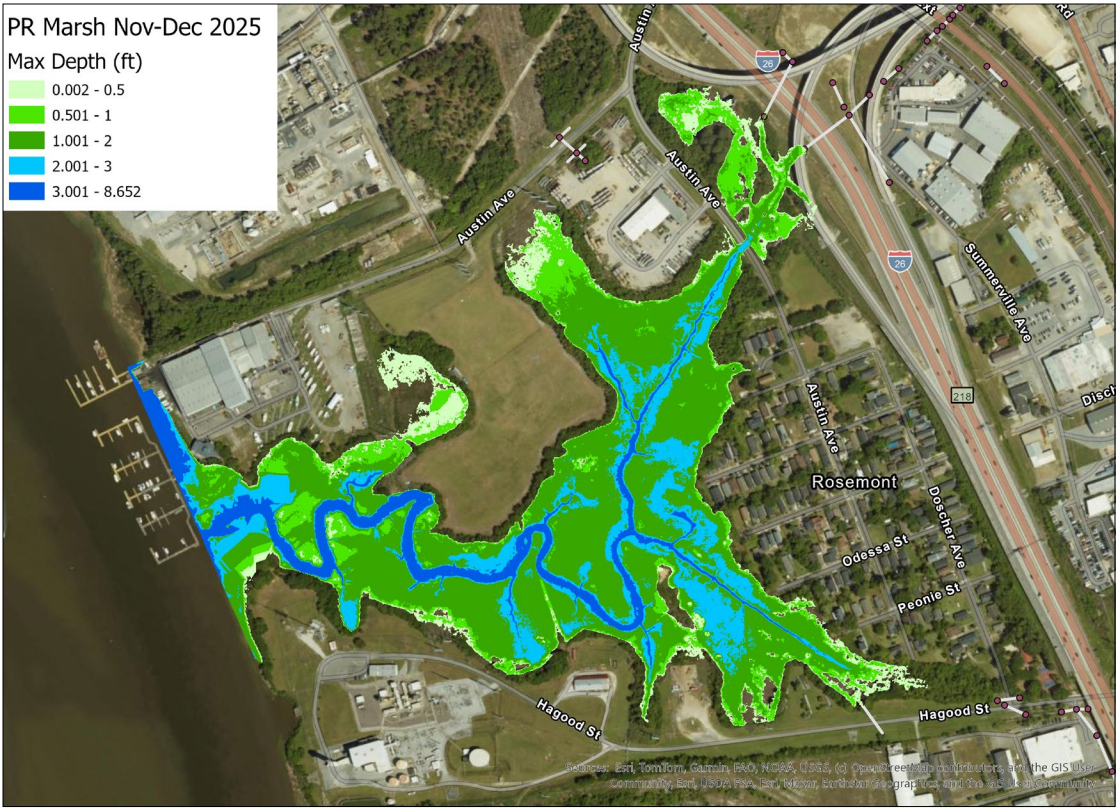
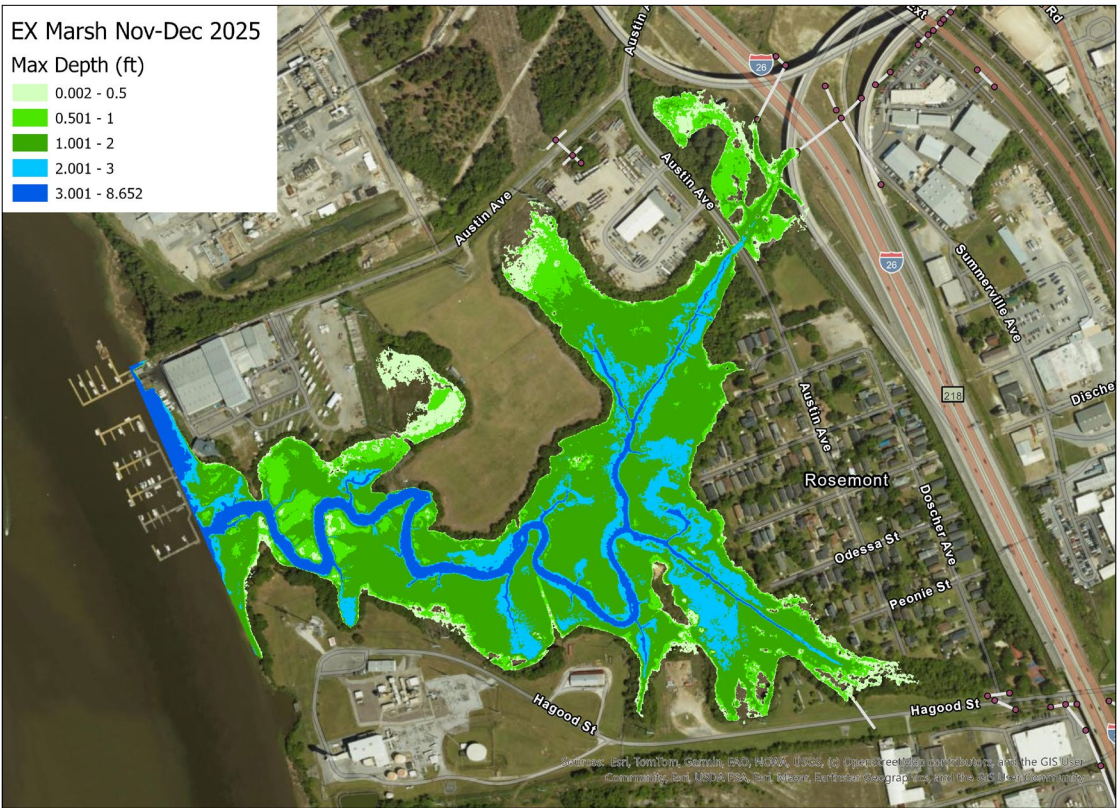
Depth

Related to the water surface elevation is the maximum depth. While the WSEL is constant across the marsh, the depth varies because it is the difference between the WSEL and the ground elevation. For each of the scenarios evaluated in the HEC-RAS model, the maximum depth was output as a raster – a grid of many square cells. Instead of reporting an area in acres, the number of cells included in the raster include the number cells in the model that were inundated at any point during the model run. As shown in the table below, a larger number of inundated cells represents a larger area in Rosemont that was flooded. Note that the two scenarios that included rainfall events had the largest number of inundated cells – this reflects that the model was set up to calculate rain on grid, which applies the precipitation across the entire 2D mesh. In comparison, the tide only scenarios are only applied to the tidal creek (with some higher tide scenarios flooding the uplands beyond the marsh).

The table below also summarizes the mean maximum depth value for the entire 2D mesh. This creates a potentially misleading statistic that shows that the two precipitation events had the lowest mean maximum depth. Again this is because the rainfall can be in very shallow depths across more cells than the relatively deeper marsh inundation from the precipitation. As a way to compare maximum depths among the different scenarios, the point of the tide gauge at Odessa Street was selected. Notice that at this area the EX MHHW max depth (2.48) is only slightly lower than the EX MHHW with the 1-year storm event (2.50 ft); however, the EX MHHW and 10-year storm event increases the maximum water depth at the gauge site another three inches. Note also that the tidal events without precipitation are not significantly different in the existing versus proposed conditions at the tide gauge, for both the synthetic tides and actual observed tides. This indicates that the effects of removing the berms at the mouth of the Rosemont Creek are not likely to increase flooding in the surrounding neighborhood.







Scenario	Number of cells Inundated	Mean value (ft)	Standard Deviation	Depth at Odessa Street Tide Gauge
EX Marsh Aug-Oct 2025	526,002	2.33	1.31	3.77
EX Marsh Nov-Dec 2025	479,288	1.73	1.22	2.98
PR Marsh Aug-Oct 2025	527,026	2.36	1.31	3.77
PR Marsh Nov-Dec 2025	480,572	1.77	1.22	2.99
EX MHHW (synthetic 48-hr)	517,240	2.31	2.47	2.48
EX MHHW + SLR (synthetic 48-hr)	618,824	3.06	2.47	3.70
EX Major + SLR (synthetic 48-hr)	774,557	3.99	2.75	5.47
PR MHHW (synthetic 48-hr)	517,996	2.34	2.45	2.49
PR MHHW + SLR (synthetic 48-hr)	619,751	3.10	2.46	3.70
PR Major + SLR (synthetic 48-hr)	775,269	4.01	2.75	5.45
EX MHHW + 1yr storm	1,148,992	1.27	1.96	2.50
EX MHHW + 10yr storm	1,347,681	1.26	1.85	2.75

Percent Inundation

Another metric the HEC-RAS model evaluated was how much of the marsh was inundated over a given period of time. Each of the thousands of cells in this raster data set was inundated for a certain percentage of the time of each scenario. The EX Aug-October scenario appeared to have a similar mean percent time inundated value (35%) as the EX MHHW 48-hour tidal cycle (33%). The mean percent time inundated value for the EX & PR Nov-Dec data were the lowest of the modeled scenarios. This makes sense, as this was a neap tide cycle that had low tidal amplitude and smaller inundation area. The proposed removal of the berms near the mouth of the creek increases the mean percent time inundated for all scenarios, indicating that this mitigation measure could potentially allow water to move more slowly through the creek and marsh platform. Interestingly, the PR MHHW + SLR has a larger mean percent time inundated than the PR Major + SLR; perhaps this reflects that more areas are being inundated, but for shorter periods of time, such as at the interface between the marsh and uplands (or neighborhood). Additionally, the EX MHHW plus 10-year storm event has a lower mean percent time inundated than either the PR MHHW + SLR or PR Major + SLR scenarios. Again, this is likely due to the widespread shallow ponding created by the rain on grid; the rainfall inundates both the marsh and the uplands, but the stormwater runoff moves relatively quickly off of the uplands.

Scenario	Number of cells	Mean value (%)	Standard Deviation
EX Marsh Aug-Oct 2025	527,033	34.82	29.38
EX Marsh Nov-Dec 2025	479,288	21.94	30.10
PR Marsh Aug-Oct 2025	527,026	40.38	33.14
PR Marsh Nov-Dec 2025	480,572	28.56	35.16
EX MHHW (synthetic 48-hr)	517,245	33.22	34.04
EX MHHW + SLR (synthetic 48-hr)	618,874	43.76	30.78
EX Major + SLR (synthetic 48-hr)	774,706	41.59	30.67
PR MHHW (synthetic 48-hr)	518,015	36.89	34.57
PR MHHW + SLR (synthetic 48-hr)	619,801	47.03	31.42
PR Major + SLR (synthetic 48-hr)	775,444	44.14	31.71
EX MHHW + 1yr storm	1,130,360	38.37	34.86
EX MHHW + 10yr storm	1,327,420	37.73	34.71

Inundation Boundary

EX Marsh Aug-October 2025

Inundation Boundary

PR Marsh Aug-Oct 2025



Inundation Boundary

EX Marsh Aug-October 2025



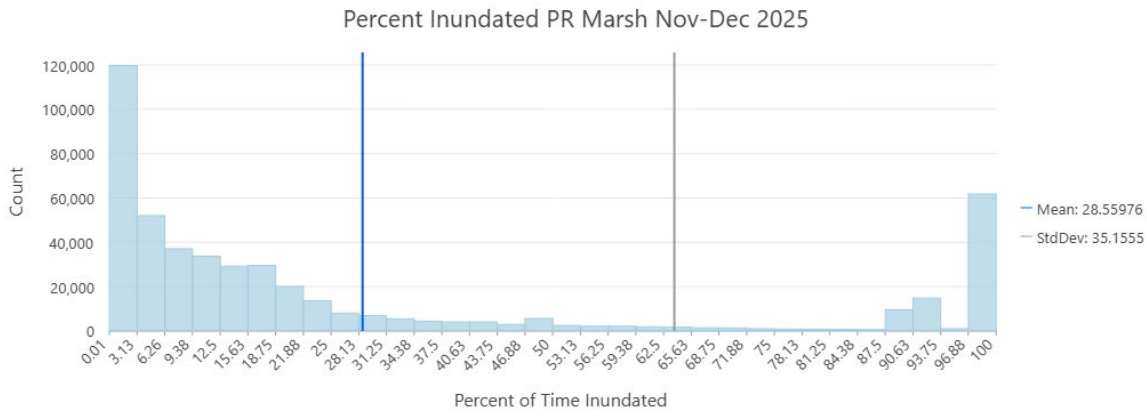
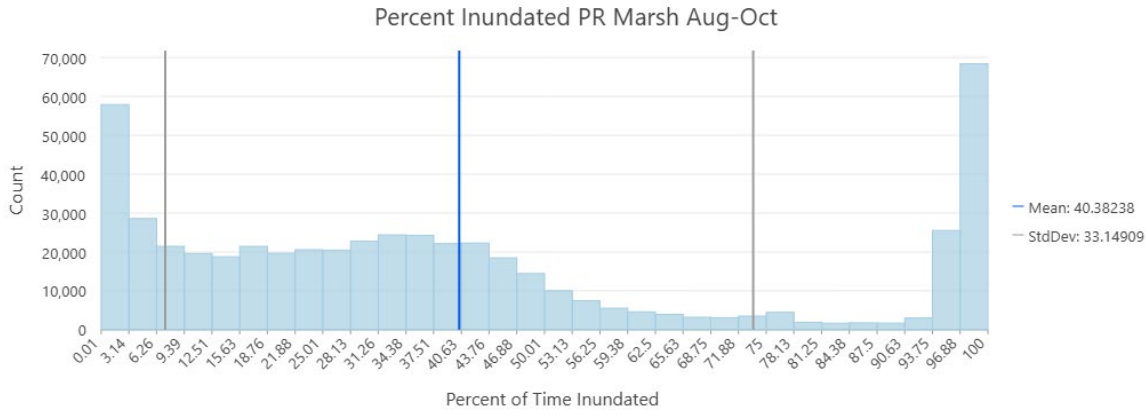
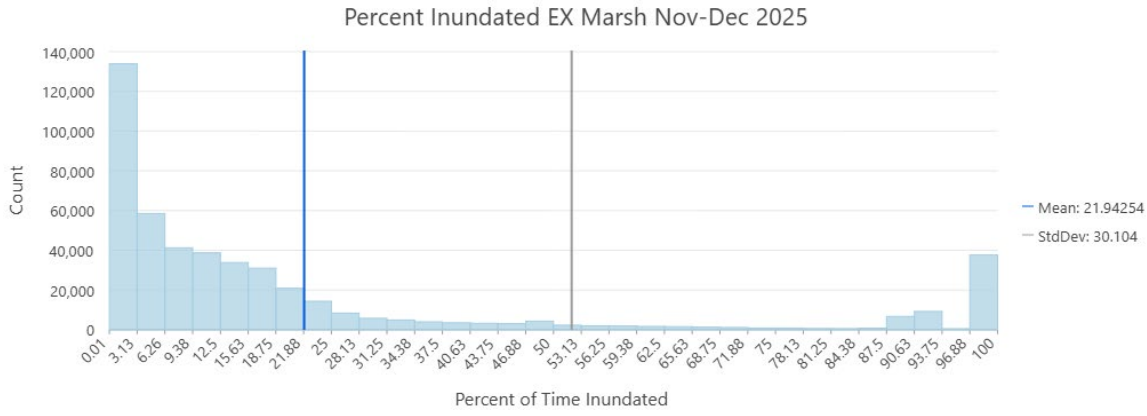
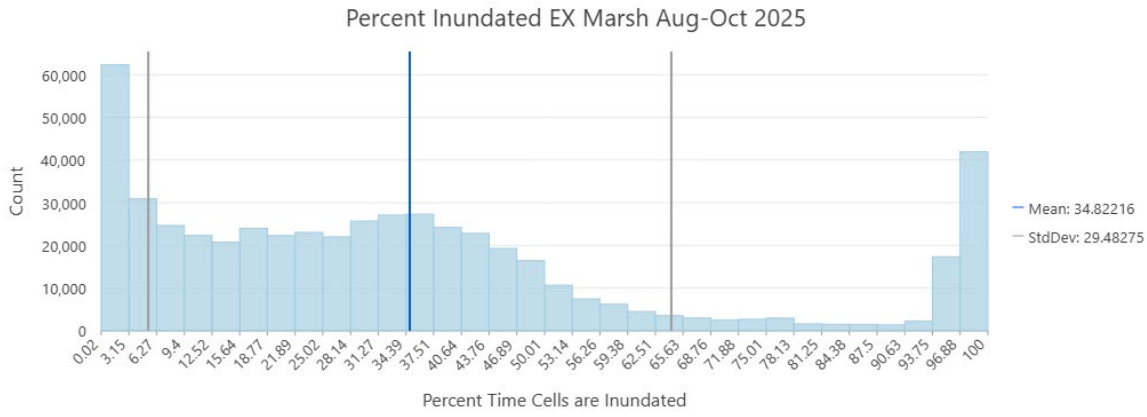
Inundation Boundary

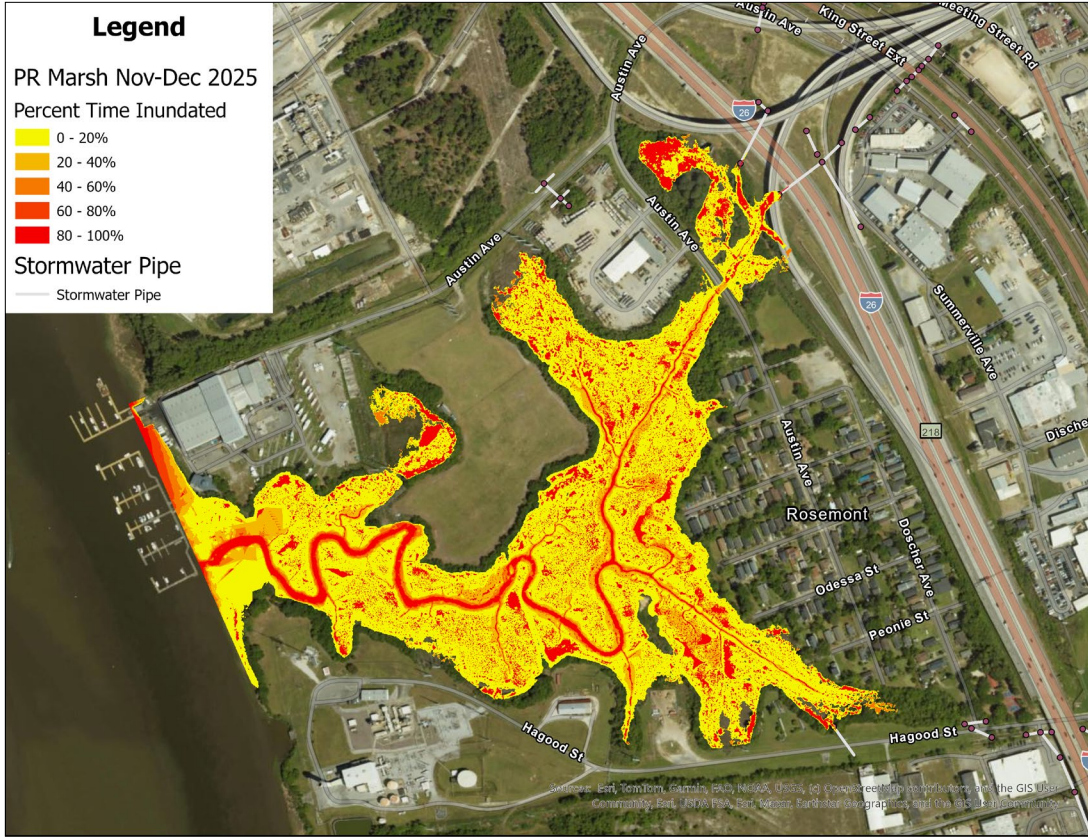
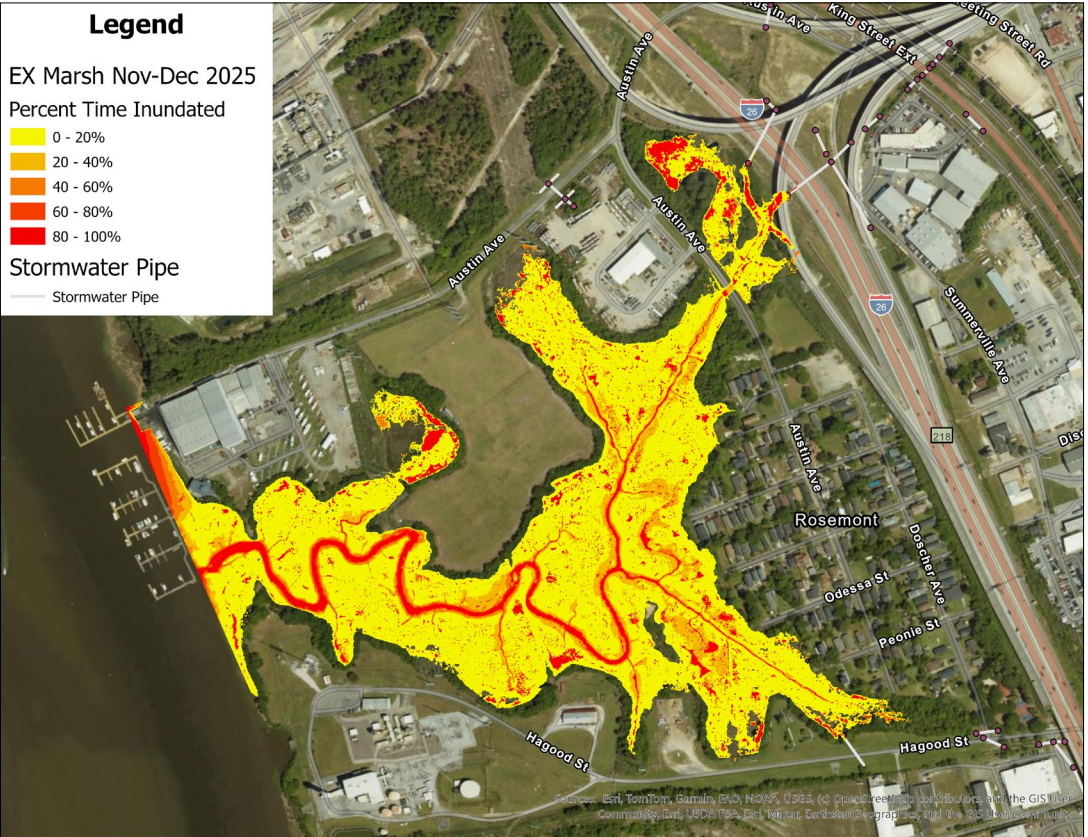
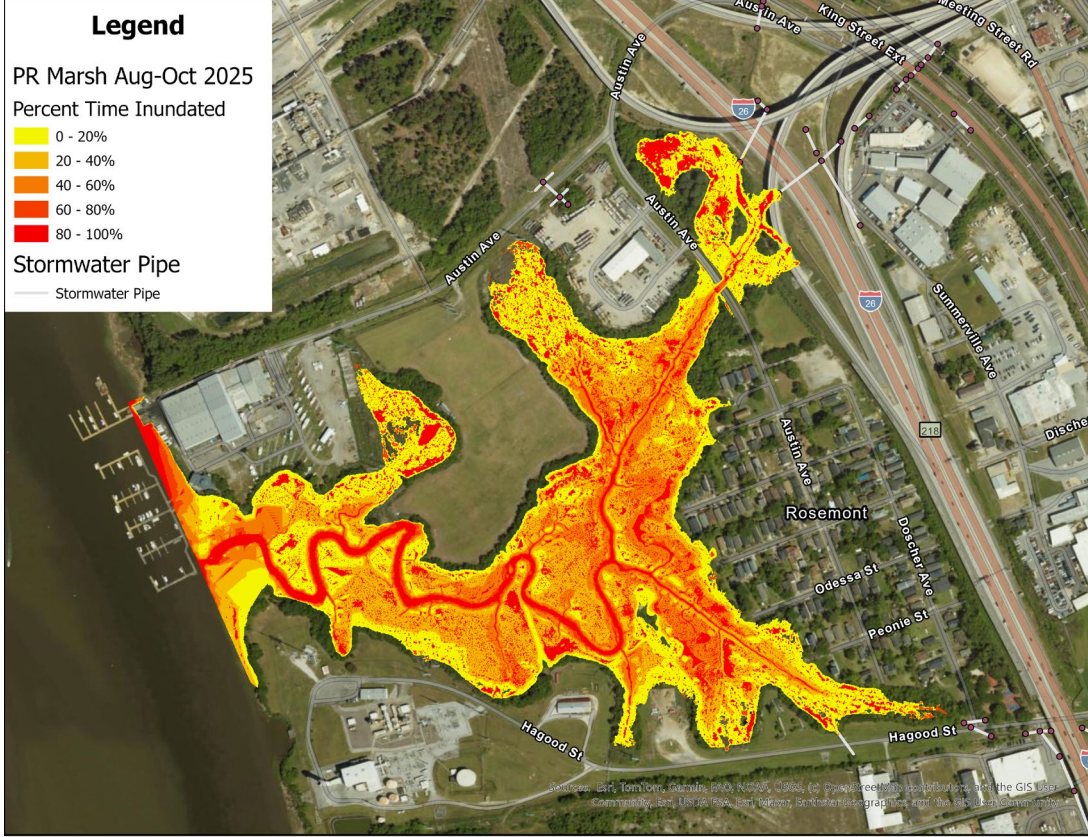
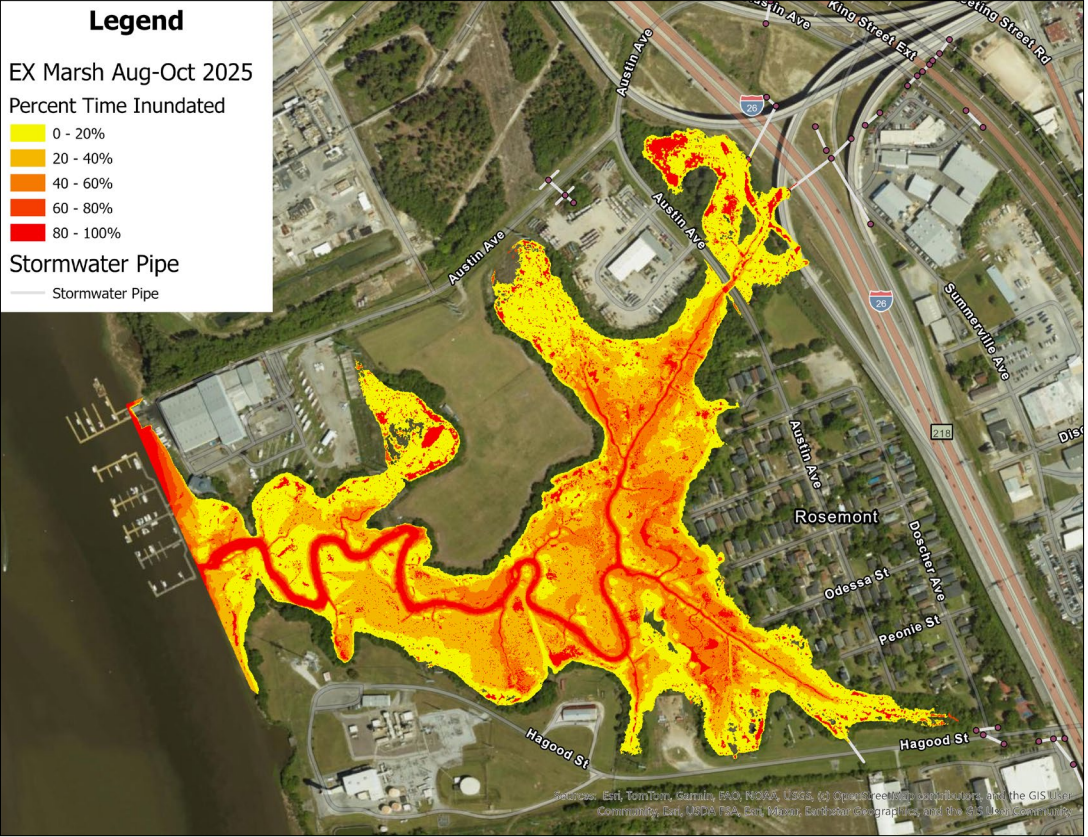
EX Marsh Nov-Dec 2025

Inundation Boundary

PR Marsh Nov Dec 2025







Volume

Another way we can visualize the effect of stormwater input into different areas of the marsh is to compare the volume accumulation. Flow is represented differently for the flood and ebb portions of the tidal cycle. Flow towards the Ashley River on an ebb tide is illustrated with positive numbers; flow on the flood tide towards the Rosemont Community is represented by negative numbers. The volume of water that passes any given cross section in the model represents the flow multiplied by the amount of time. This figure shows how five different scenarios of tide and precipitation affect the net volume and direction of water flow that passes by each cross section.

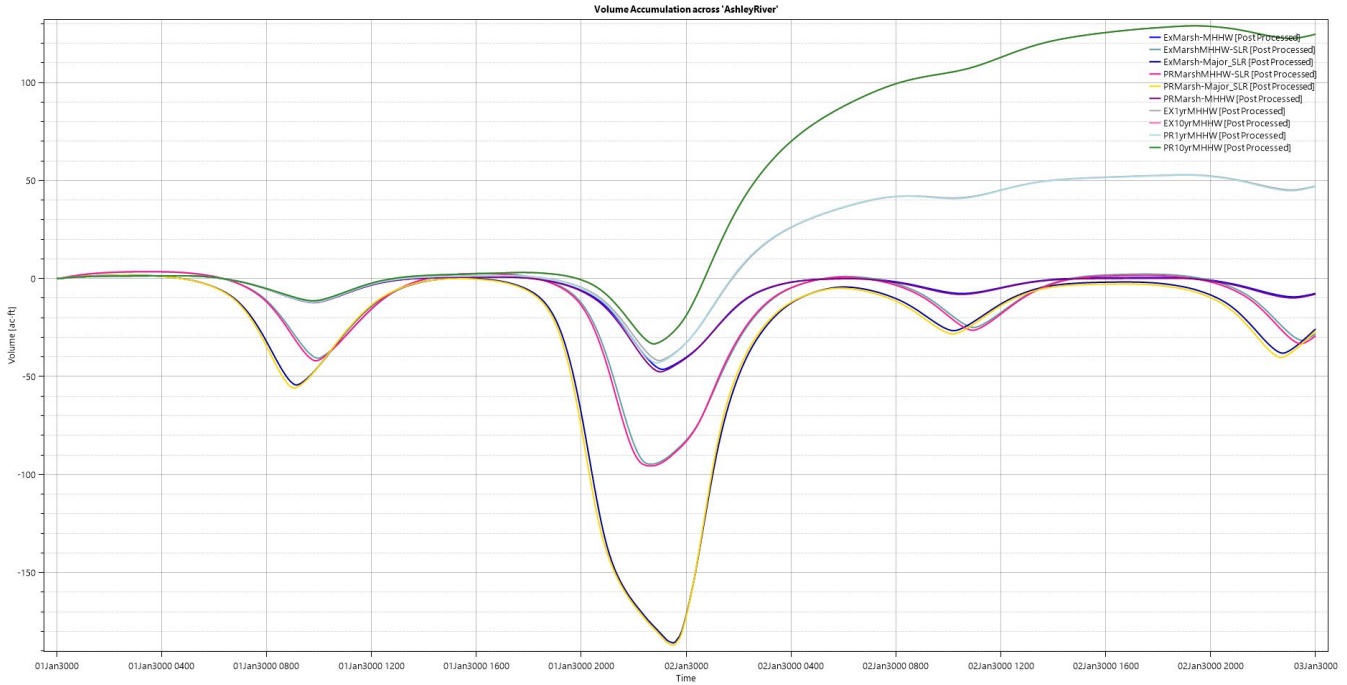
If the tides are equal, then the total volume on the ebb tide would equal the flow on the flood tide. If the total is positive, this indicates that more water is flowing towards the Ashley River. If the volume is negative at the end of the simulation, this indicates that the flow into the marsh towards the Rosemont Community is greater.

Notice that for the cross-section listed in the table below, the net flow is negative when only tide is applied to the model. When the two precipitation events are added, note that the cumulative volume increases and flows in the opposite direction, indicating that more water is leaving the uplands than enters on the flood tides.

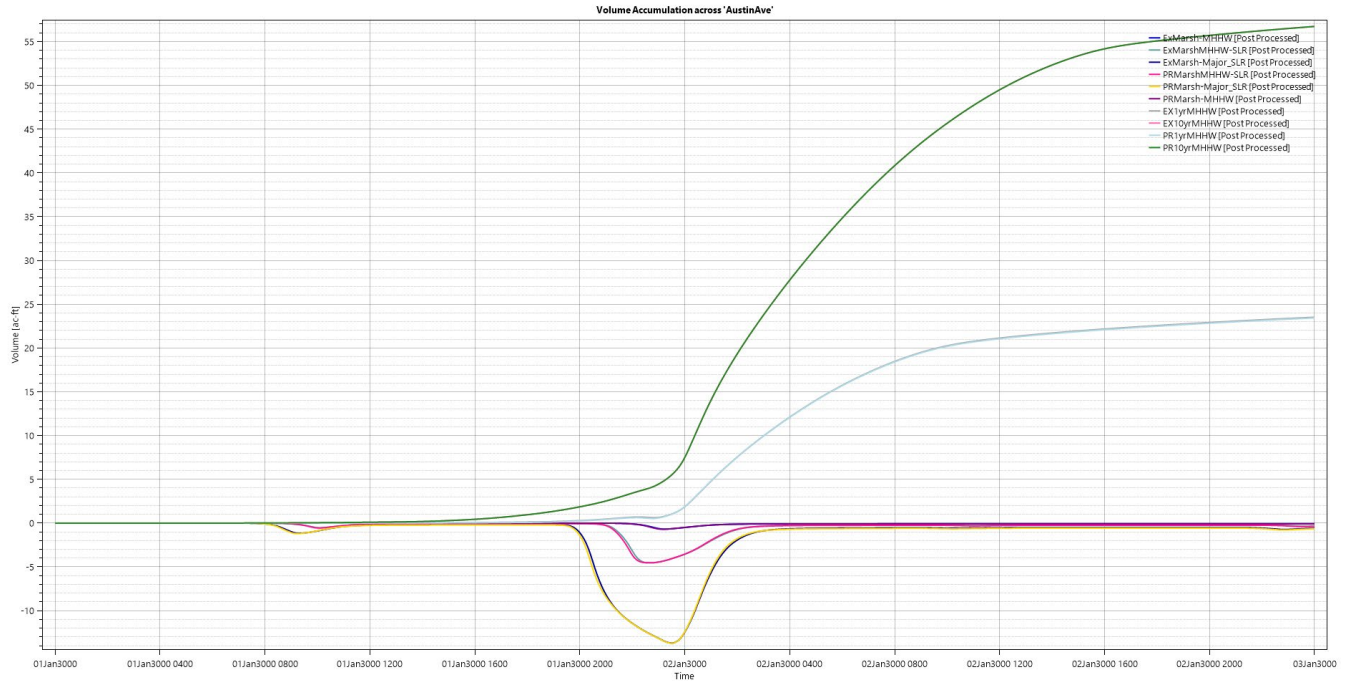
Also notice that the volumes are greatest closer to the Ashley River; the upstream areas (Austin Ave and Community Center ditch) have the lowest volume for all scenarios. These relationships are shown in the figures below. Note that at the Ashley River and the tributary confluence, the tidal pulses are still visible (as shown as the u-shaped curves under the zero volume volume; however, in all scenarios, when the precipitation is added, the tidal pulses become smaller and the end of the volume curves trends upward in positive volume accumulation (more water flowing towards the Ashley River).

Location	MHHW	MHHW + SLR	Major + SLR	MHHW + 1yr storm	MHHW + 10-year storm
Ashley River	-7.54	-28.12	-25.67	47.25	124.69
Tributary Confluence	-1.91	-13.89	-12.25	45.23	111.71
Austin Ave	-0.07	-0.318	-0.58	23.53	56.74
Community Center	0	-0.002	-0.039	13.54	30.67

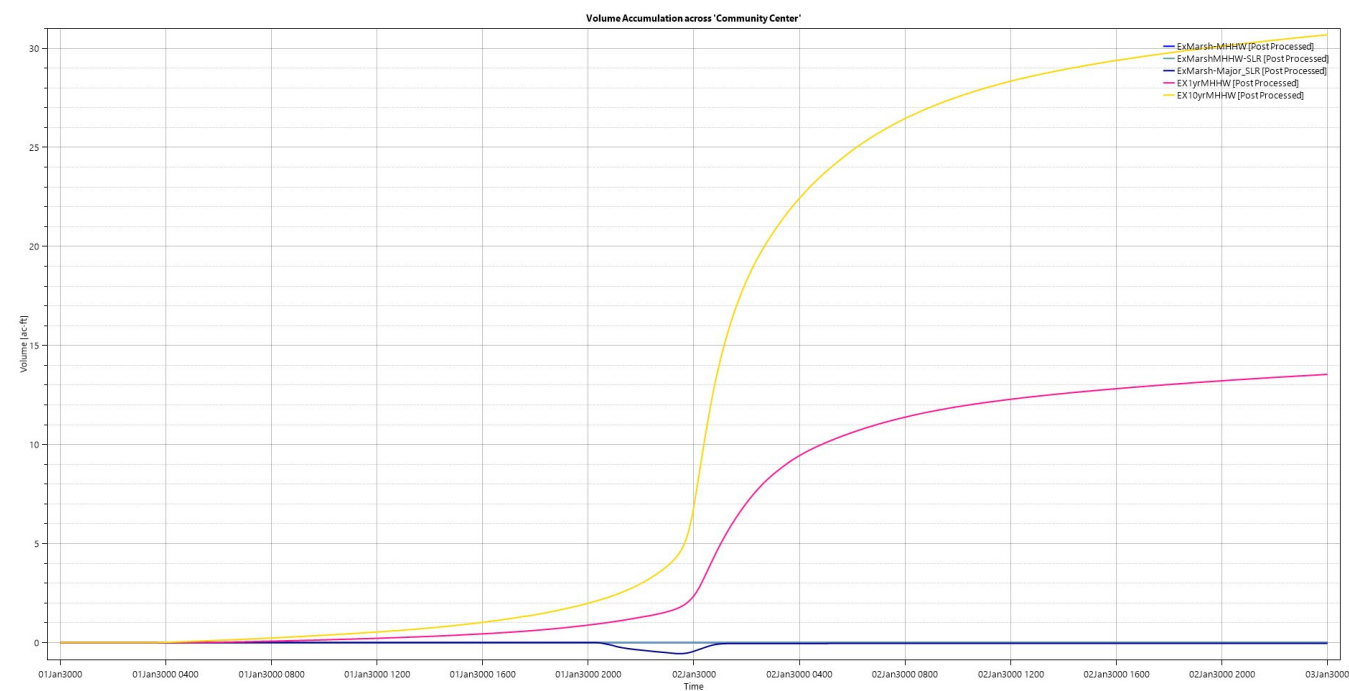
*volume accumulation in units of acre-feet



Volume accumulation over time in the creek cross section closest to the Ashley River



Volume accumulation over time in the creek cross section near the confluence of the two creek tributaries



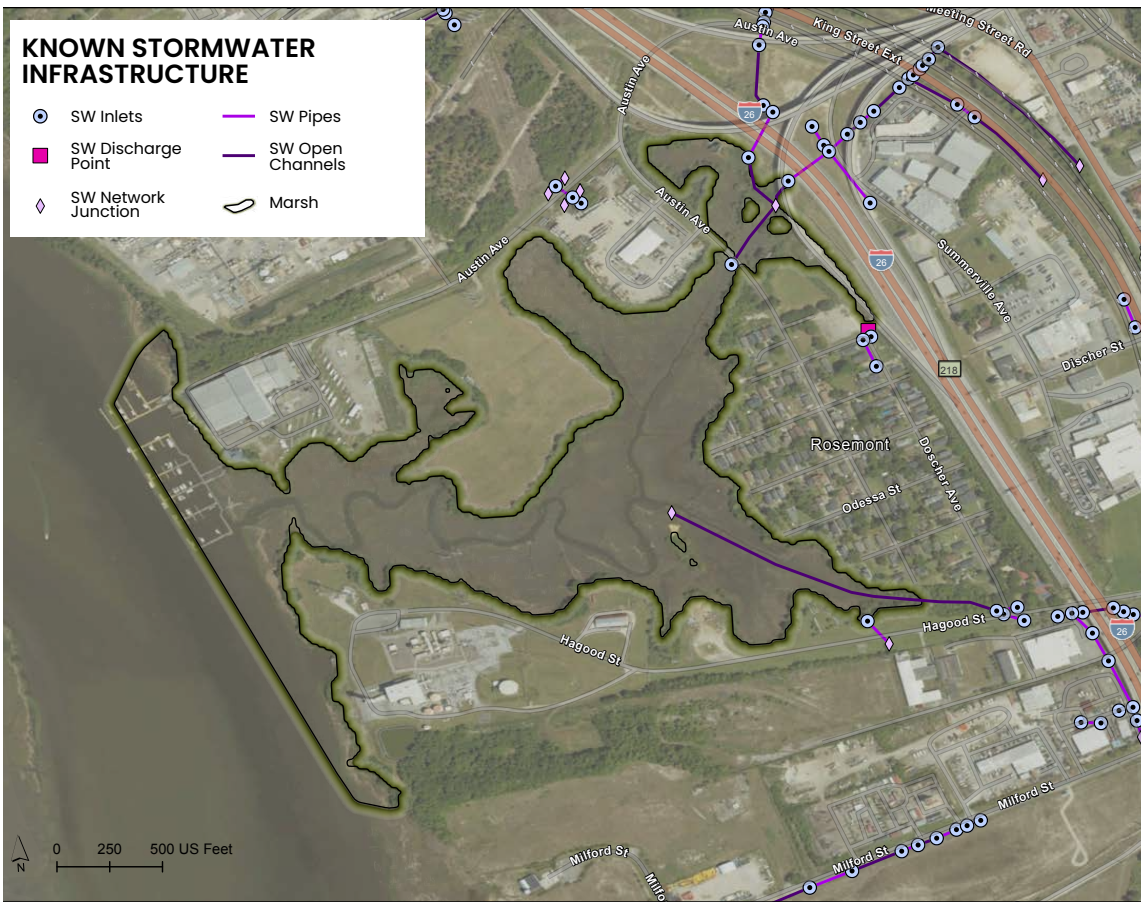
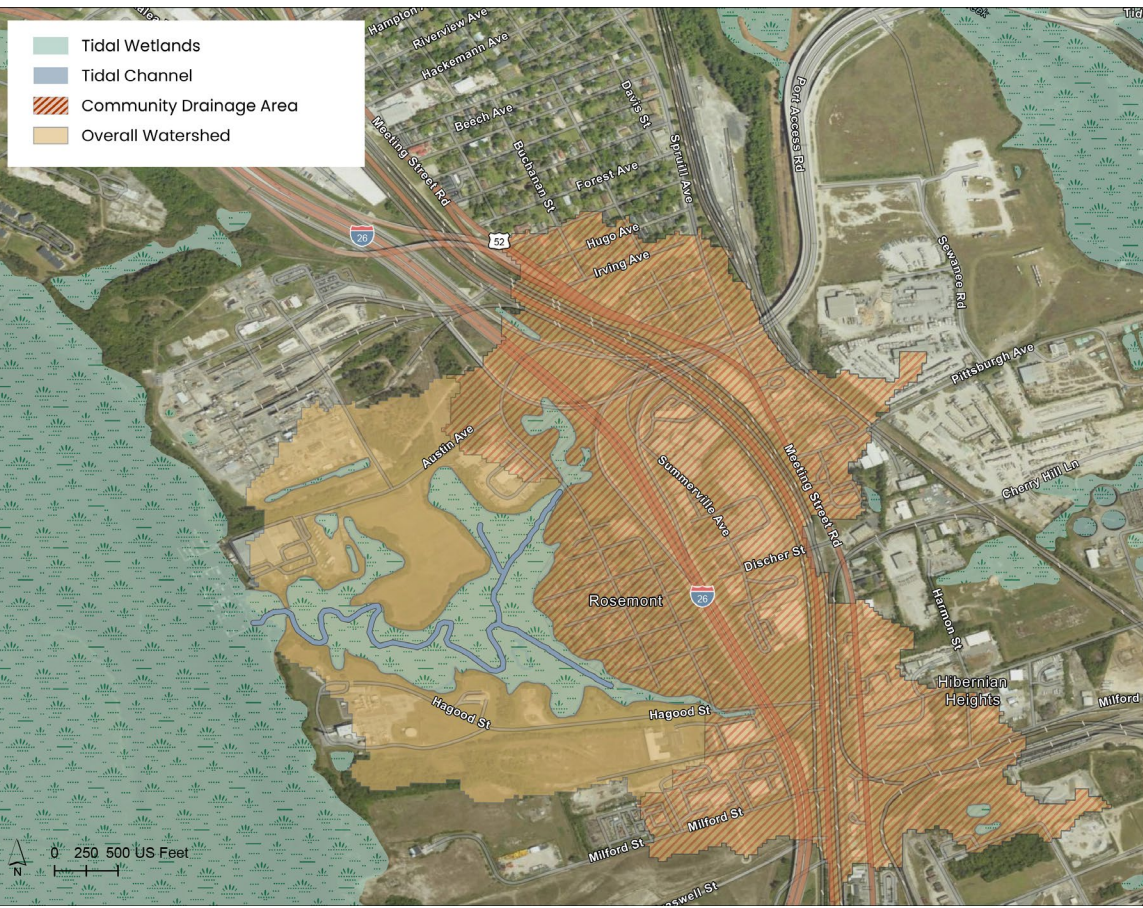
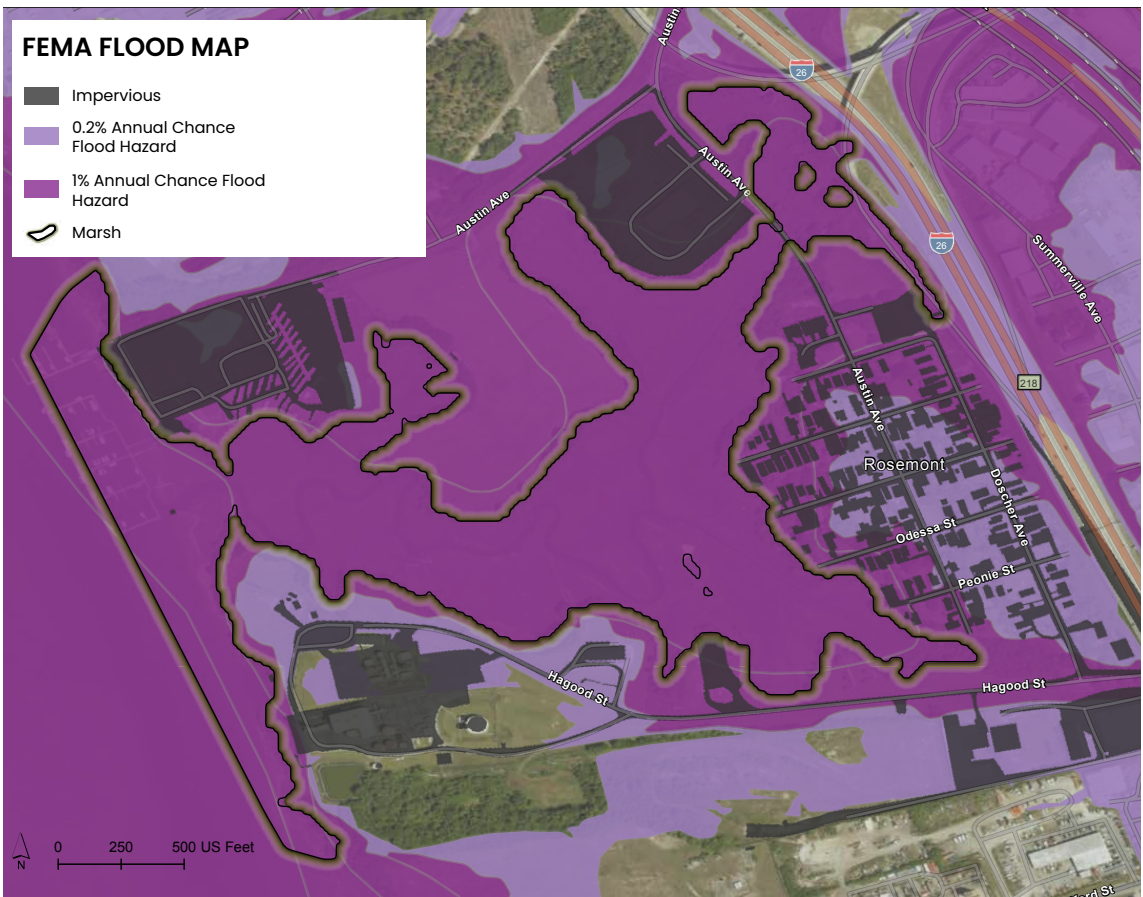
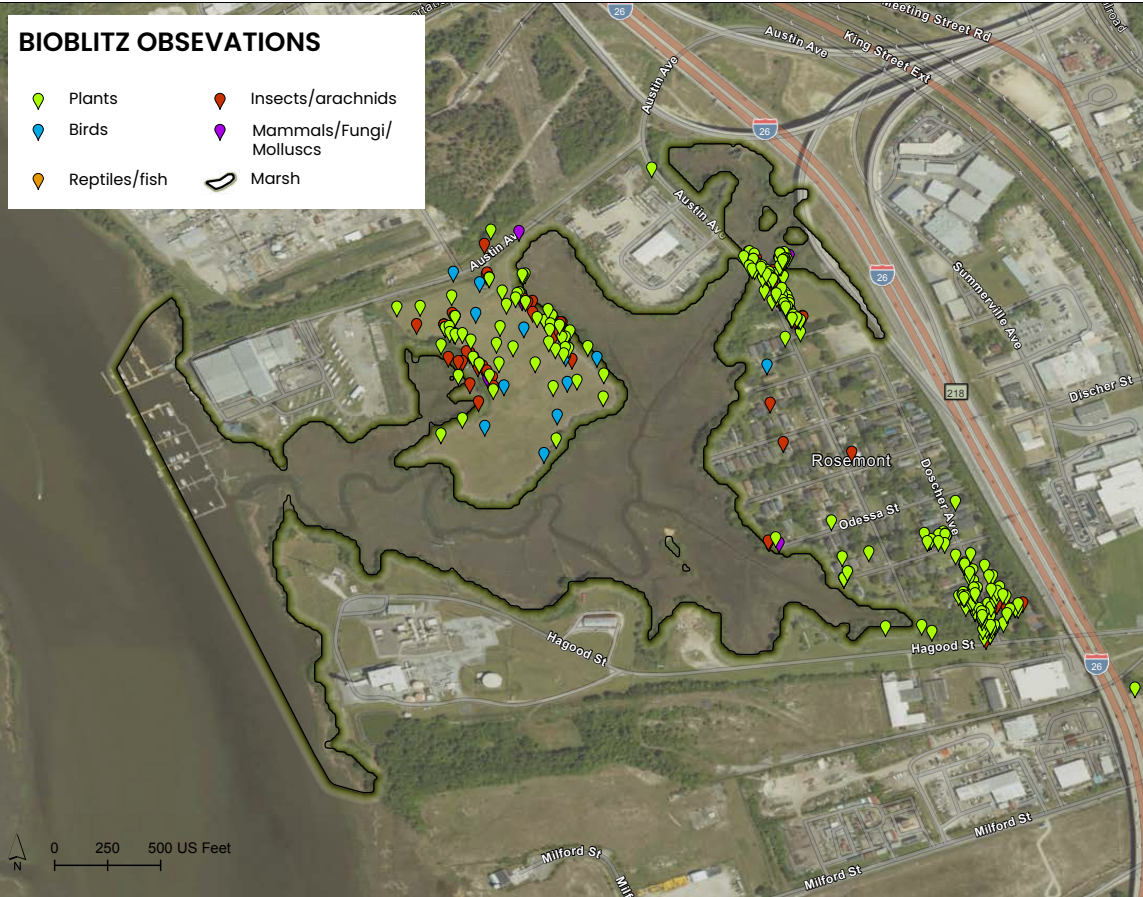
Volume accumulation over time in the creek cross section in the ditch near the Community Center

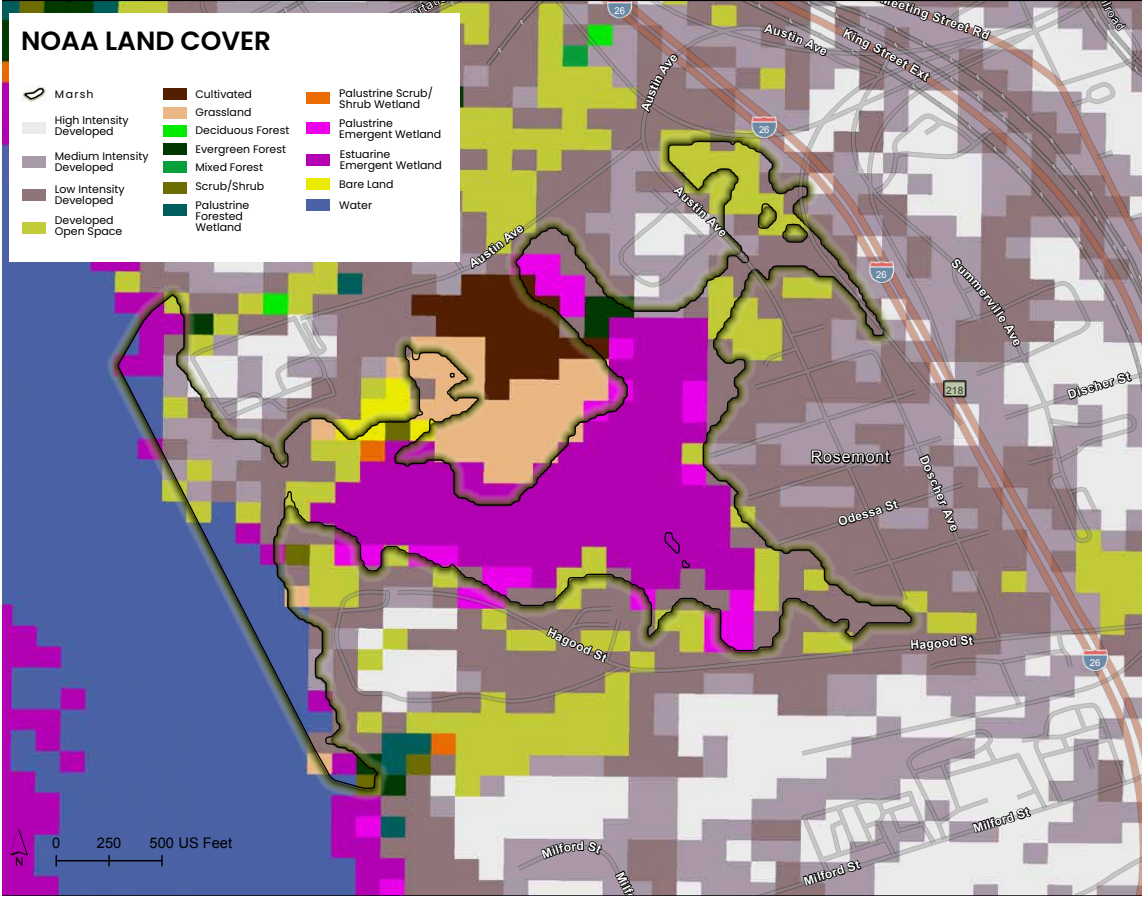
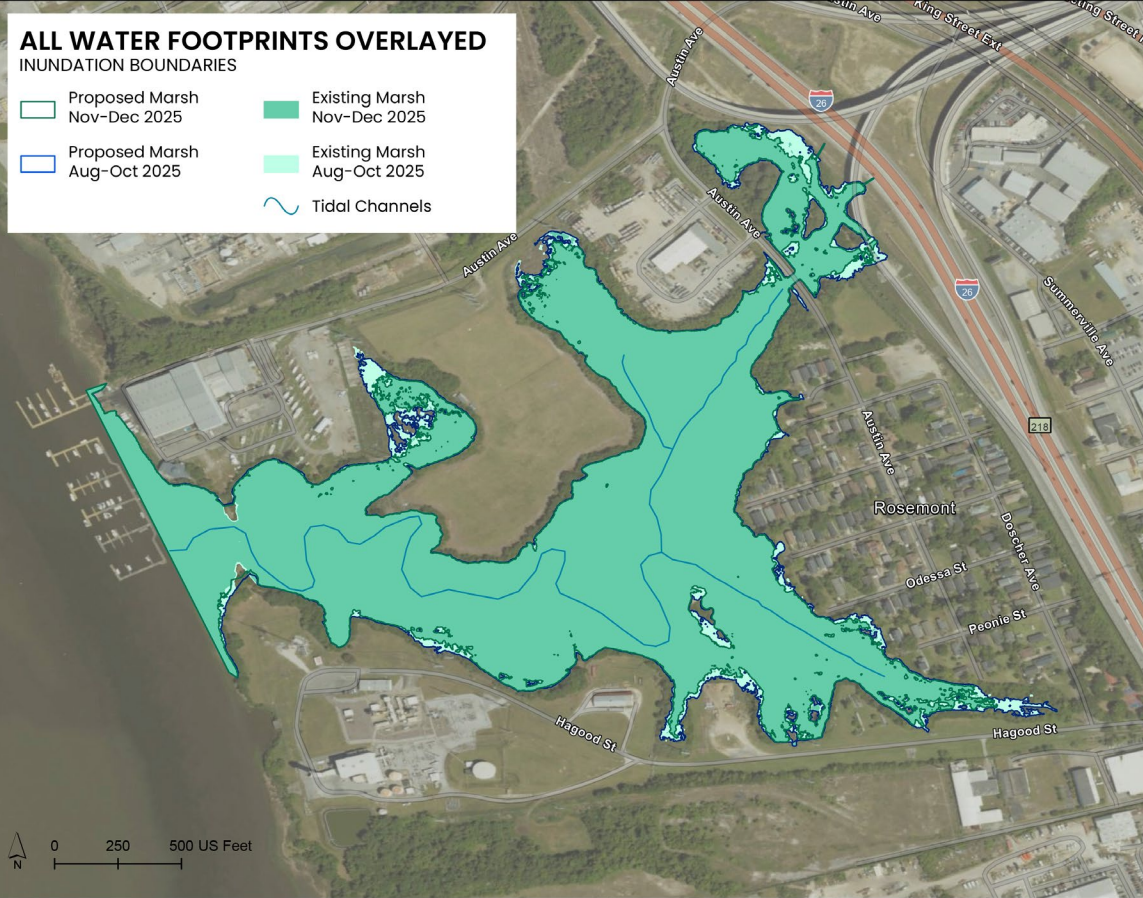
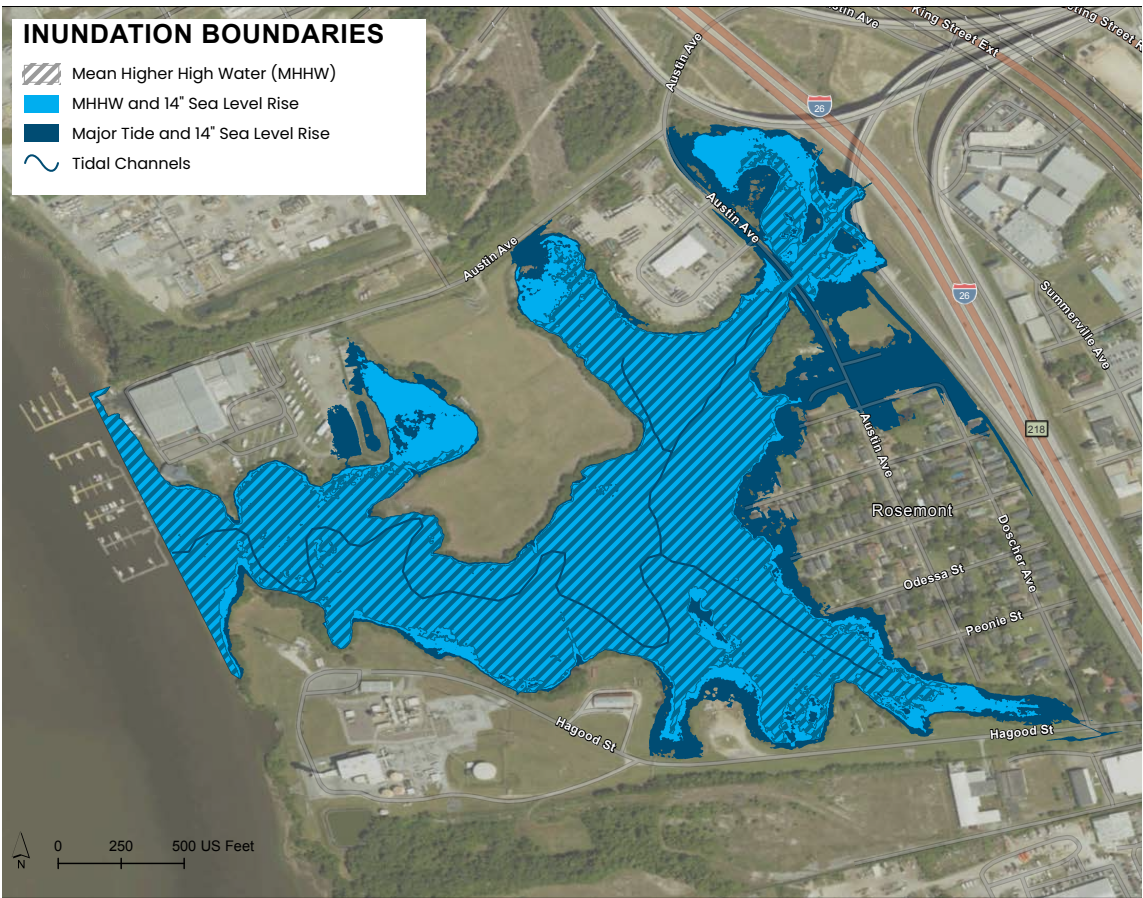
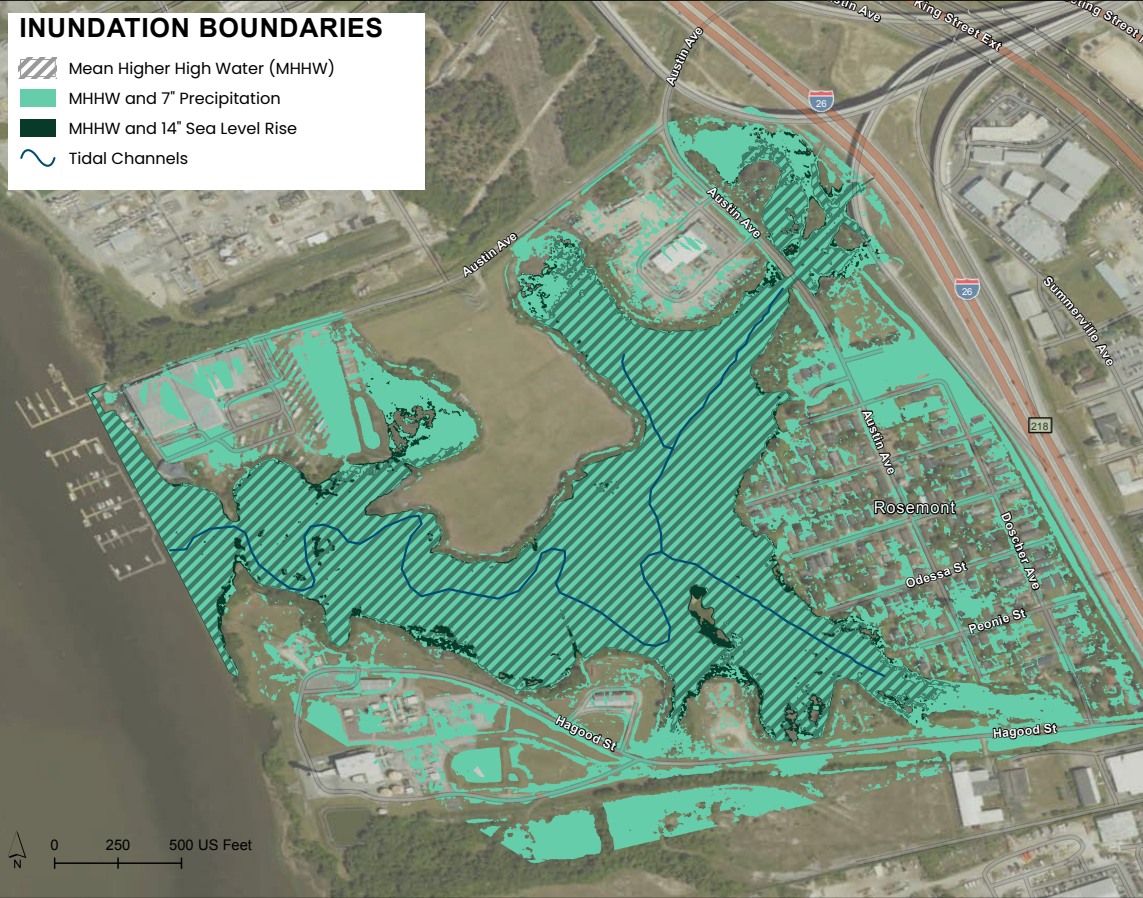
Conclusions

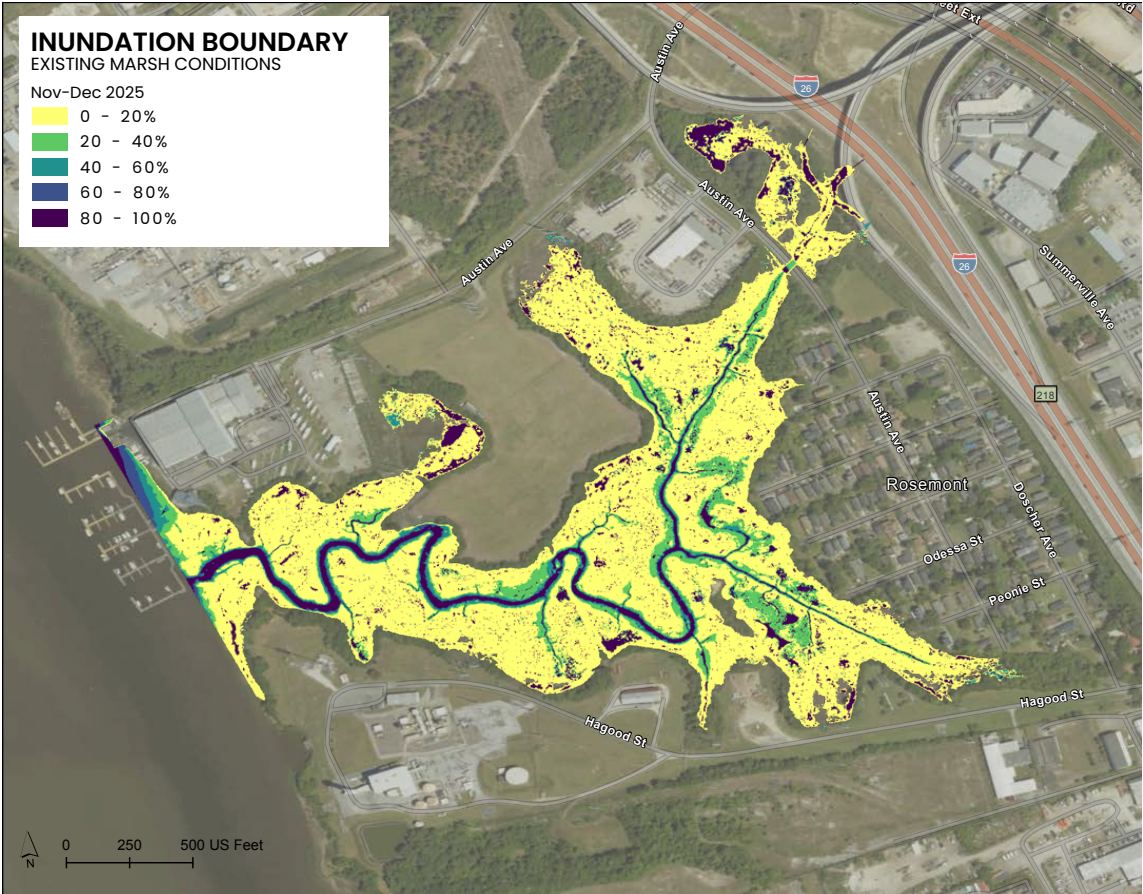
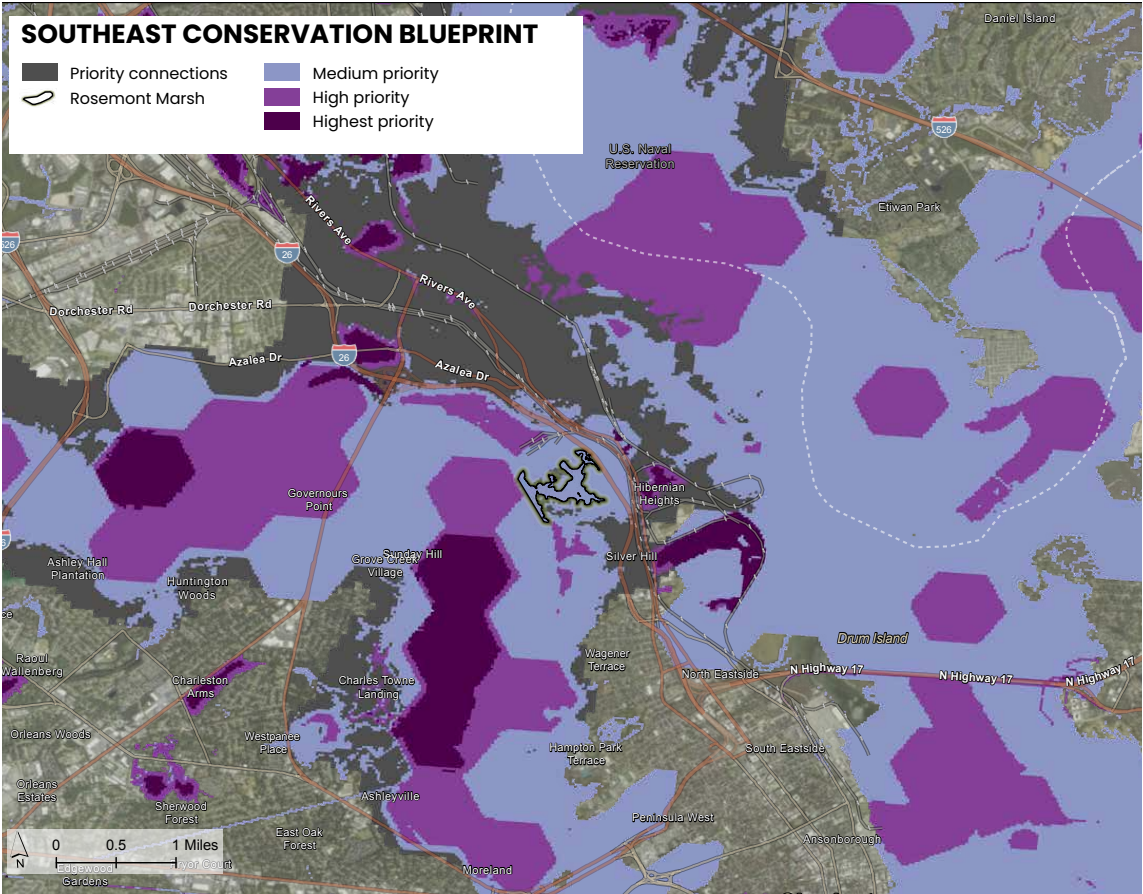
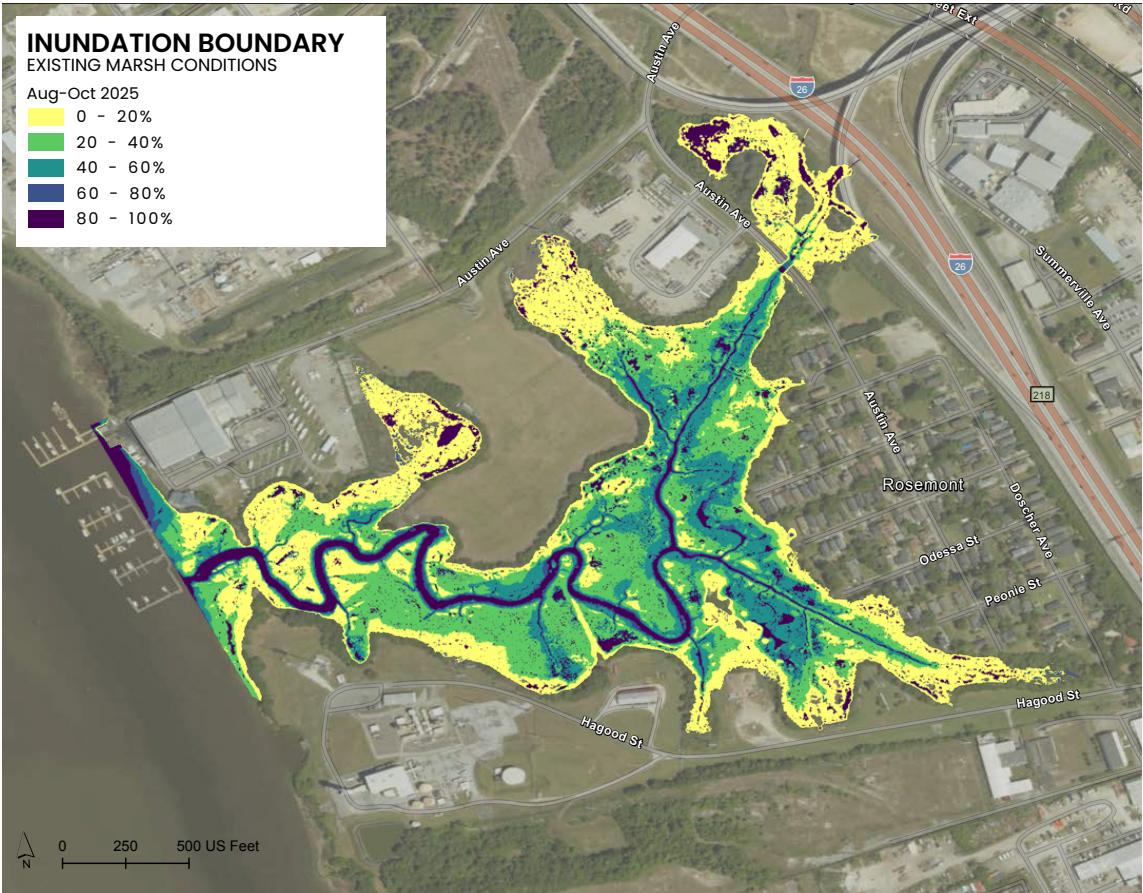
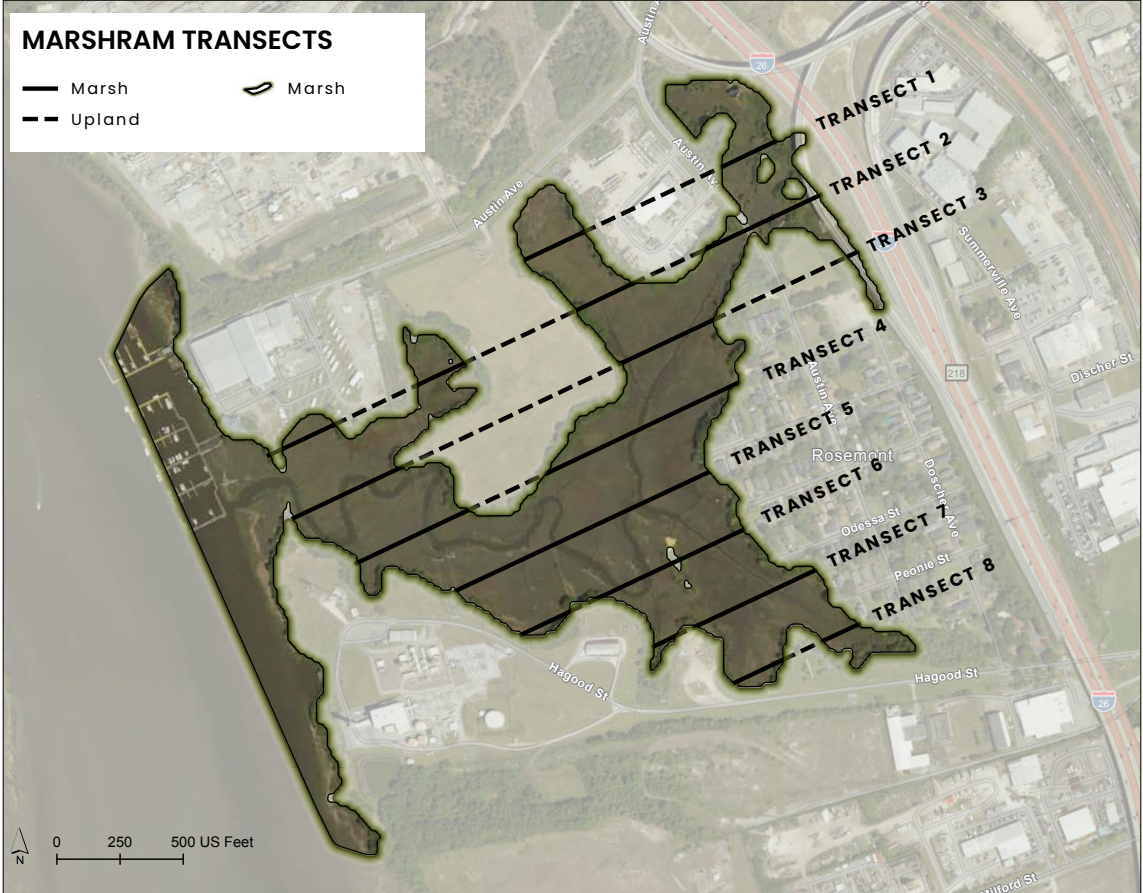
- Tidal influence decreases with distance from the mouth of the Rosemont Creek from its mouth at the Ashley River. At the bridge on Austin Avenue or the ditch near the community center there is limited tidal signal. It appears that in these areas especially, stormwater runoff has a significant impact on the volume of water moving through the channels. This may support the findings discussed in other sections of this report and appendices pertaining to water quality impairments in these two areas.
- Removing a section of a historic berm that constricts the mouth of the creek appears to enhance the ability of tidal water to enter the creek and move upstream into the marsh. The HEC-RAS model shows that there is a small increase in the percent time inundation as a result of this proposed modification; however, the inundation area and depth does not appear to increase.

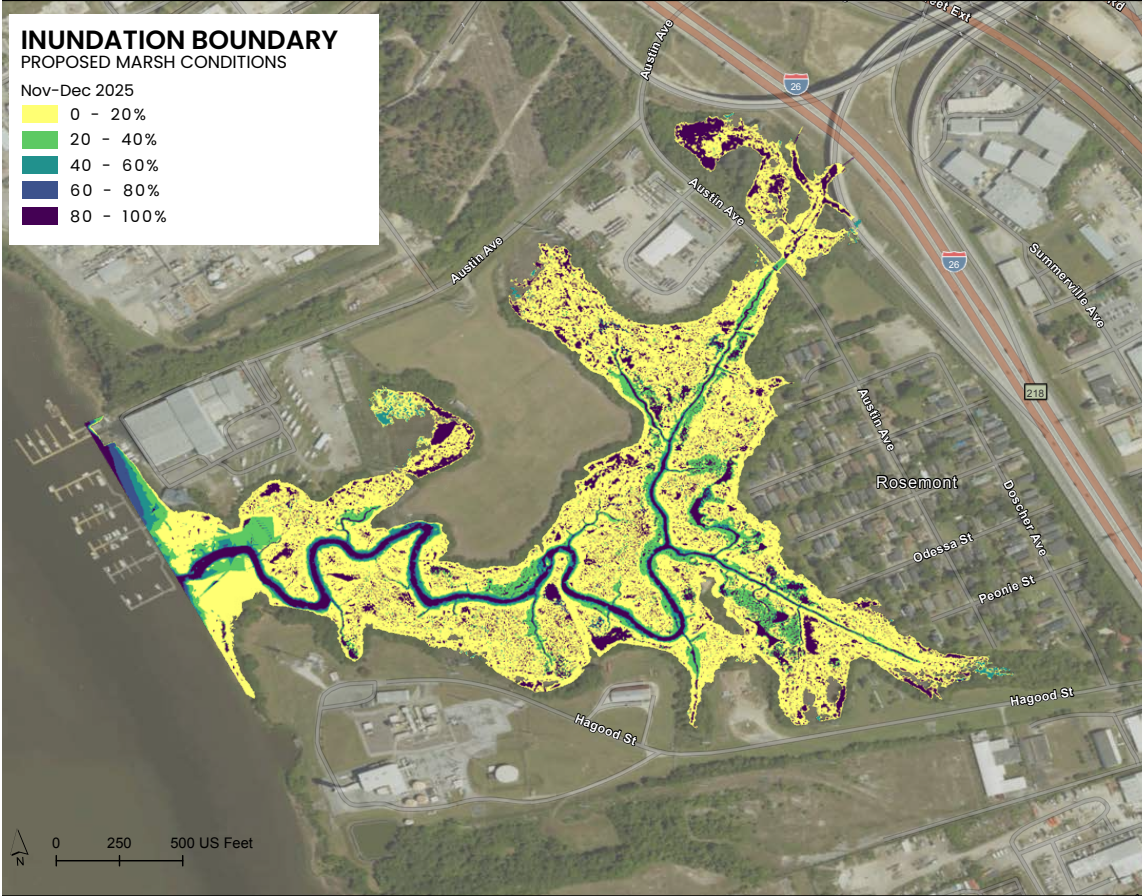
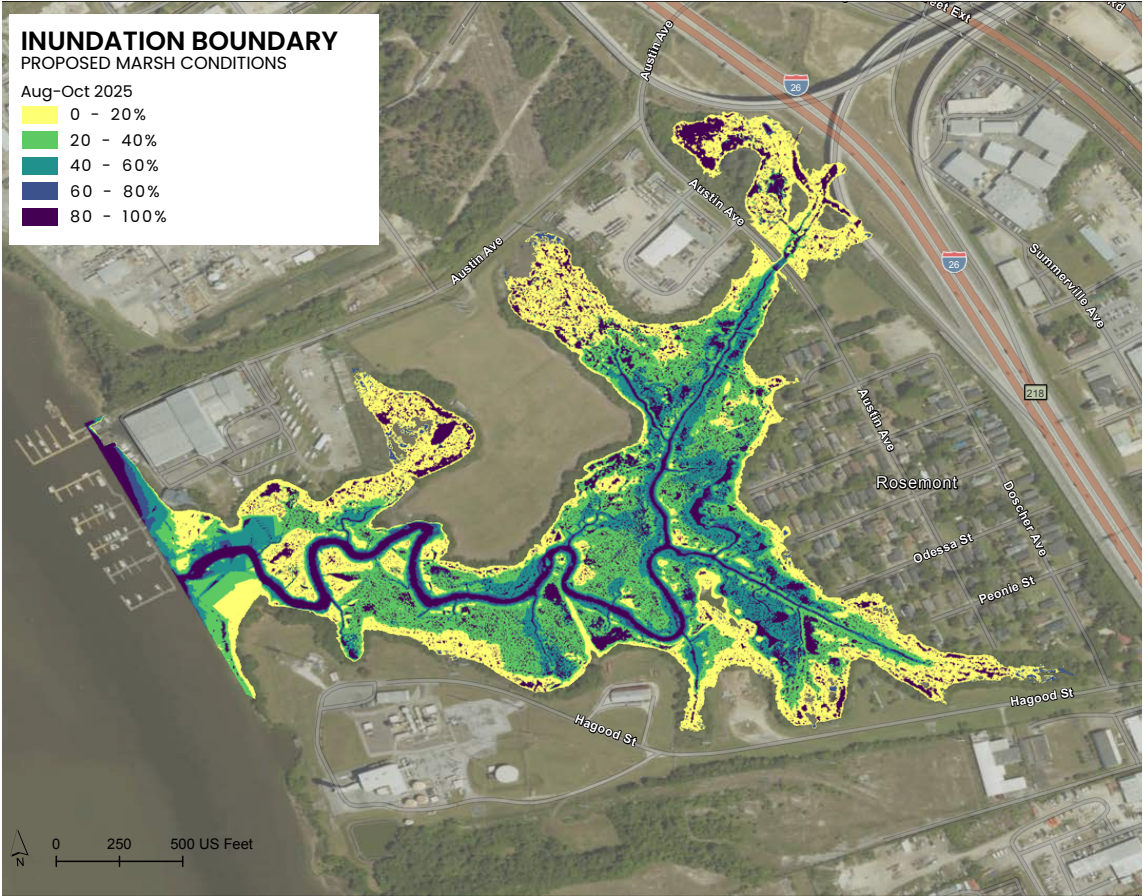
Appendix G

GIS Map Atlas











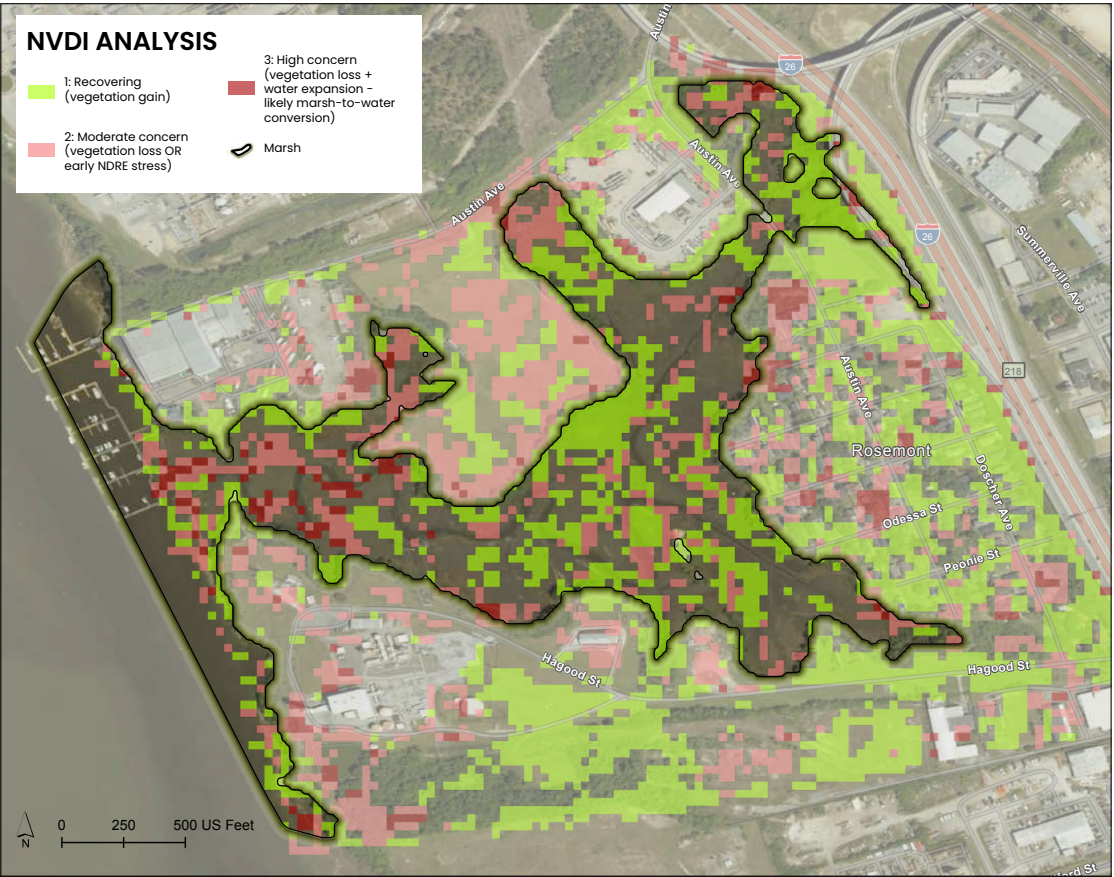
Normalized Different Vegetation (NDVI) Analysis:

The team conducted a NDVI mapping analysis on ArcGIS Pro to visualize historic patterns of vegetation gain or loss in the Rosemont marsh. This marsh condition analysis was conducted using Sentinel-2 satellite imagery to identify current degradation and restoration targets. Sentinel-2 provides 10-meter resolution, enabling analysis of individual creek edges and small degraded patches that would be invisible at coarser scales. Comparing 2018–2020 and 2022–2024 growing seasons in Google Earth Engine, the analysis combines measured Normalized Difference Vegetation Index (NDVI) change, Normalized Difference Red Edge Index (NDRE) stress, and water expansion into a single 0–3 restoration priority score per pixel:

- 0 = No significant change (stable)
- 1 = Recovering/gaining vegetation
- 2 = Moderate concern (vegetation loss or early NDRE stress)
- 3 = High concern (vegetation loss + water expansion)

Change is only flagged where it exceeds typical year-to-year variation at that specific location, reducing false positives at dynamic creek edges and tidal margins. NDVI captures overall canopy greenness during peak growing season, while NDRE uses the red-edge wavelength to detect chlorophyll stress earlier — meaning a pixel can begin declining in NDRE before showing any visible loss in NDVI. This makes Class 2 (Moderate Concern) particularly actionable: these areas have not yet been lost but are showing early warning signs, making them prime candidates for pre-emptive intervention. Class 3 (High Concern) pixels likely represent areas where marsh is actively converting to open water and are the most urgent restoration targets.

As the analysis is based on summer growing-season composites only, it reflects peak-biomass conditions rather than year-round marsh state.



Appendix H

Adaptive Management, Monitoring, and Data Gaps

No study can answer every question, and this project is no exception. This appendix outlines some of the key data gaps and uncertainties identified over the course of the study, areas where more information would strengthen future decision-making, refine the strategies recommended in this report, and help guide ongoing monitoring efforts. It also includes a rough outline of an adaptive management decision tree, since any of the strategies proposed in this report should be paired with an adaptive management framework once implemented that allows the approach to be adjusted over time in response to what monitoring reveals.

One notable gap is the rate of sediment accretion, or erosion, occurring in the marsh today. This is directly relevant to several of the strategies recommended in this report, and closing this gap through future monitoring will be important for understanding whether the marsh is keeping pace with sea level rise or losing ground over time.

The study also developed a general understanding of how freshwater runoff enters Rosemont Creek, but a more detailed picture is still needed of exactly how and where water from within the community, and from the broader local watershed beyond it, is reaching and affecting the marsh.

On the community side, several data gaps remain, including renter-to-owner ratios, long-term residency patterns, and a fuller understanding of community attachment to the neighborhood and marsh.

The hydrodynamic modeling completed for this study also carries some limitations worth noting. Because the College of Charleston’s existing digital elevation model could not be used, the team relied on LiDAR data instead to build the elevation surface underlying the model, an approach that comes with its own margin of uncertainty.

Finally, some species were not able to be surveyed as part of this study, most notably fish, meaning the biodiversity findings presented in this report should be understood as mostly complete, but missing that part of the full picture.

Monitoring and Adaptive Management

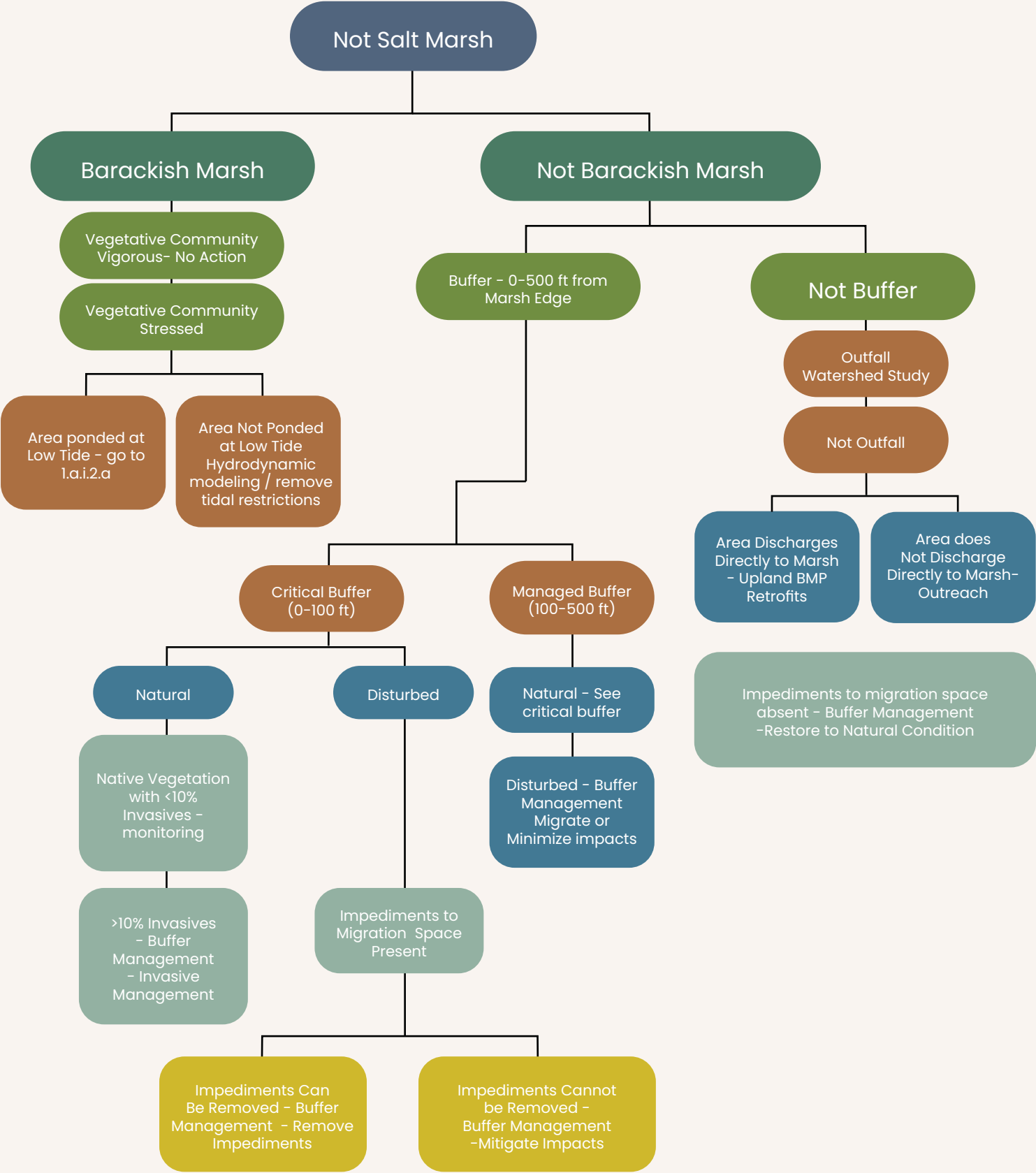
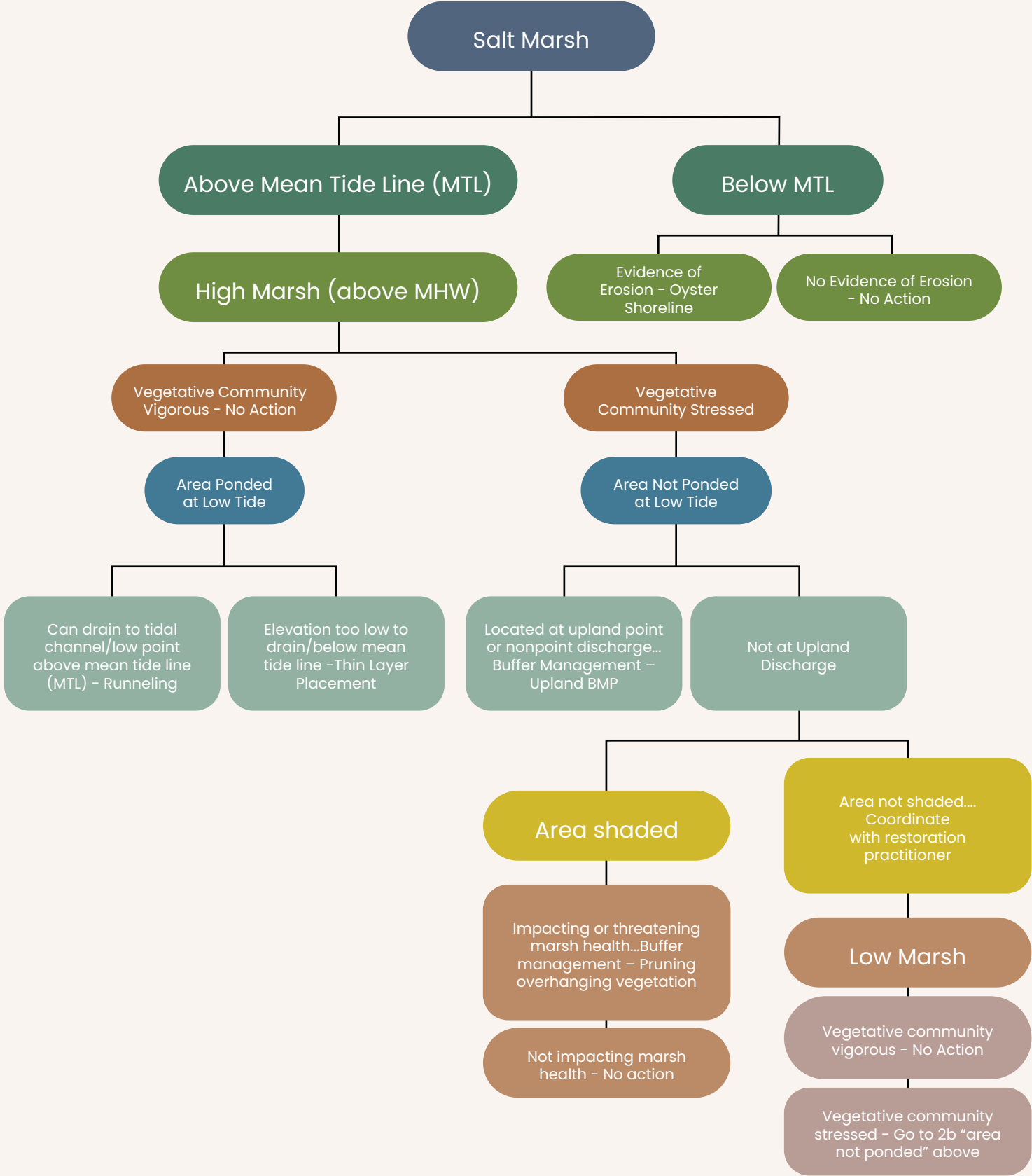
Monitoring and adaptive management is a strategy that allows resource managers to address uncertainty and close data gaps by using routine monitoring data to inform management actions. The strategies outlined in the marsh resilience plan are representative of actions that may be necessary to sustain and restore a diverse, functional and more resilient marsh ecosystem in response to a changing climate and other landscape and site level stressors. Implementation of the prescribed strategies needs to be timely to prevent widespread degradation. Monitoring and adaptive management are means of ensuring timely and effective interventions by using the monitoring results to inform future actions.

The following tables and charts outline a rough adaptive management framework for consideration in developing a formal monitoring and adaptive management program for Rosemont Marsh. Table 1 outlines some assessment methods that could yield useful qualitative, semi-quantitative and/or predictive data that can be used to track key indicators of marsh condition. Table 2 relates these key indicators to some preliminary thresholds for action and the Flow Chart provides guidance on what strategies to engage to address indicators of stress to the marsh.

Measurement	Frequency	Relative Cost	Key Indicators
UAV imagery at low tide during the growing season and visual inspection	Annually	\$	Extent of ponding
			Unvegetated areas
			Limits of vegetative communities or condition
			Condition of vegetative communities
			Sedimentation
			Erosion
			Buffer condition
Vegetation transects	5 years	\$\$	Unvegetated areas
			Limits of vegetative communities or condition
			Condition of vegetative communities
Surface elevation tables (SETs) ¹	Annually	\$\$	Marsh accretion rates – high precision
LIDAR survey	5 years	\$\$	Marsh accretion rates – low precision
			Marsh elevation
			Marsh migration space
Hydrodynamic modeling (coupled with LIDAR survey)	5 – 10 years	\$\$	Tidal exchange
			Barriers to marsh migration
1. MassMarsh Standard Operating Procedure Salt Marsh Accretion and Elevation Monitoring			

Key indicators	Action threshold	Actions
Extent of ponding	Individual ponded area expands by >20%	Runneling Thin layer placement
	Number of notable ponded areas increases by >20%	
Unvegetated areas	Individual unvegetated area expands by >20%	
	Number of notable unvegetated areas increases by >20%	
Vegetative community shifts	High marsh community decreases by >20%	Thin layer placement
Condition of vegetative communities	Number of high marsh communities decreases by >20%	
	Brackish community expands by >20%	Hydrodynamic modeling Remove tidal restrictions Thin layer placement
	Number of brackish communities increases by >20%	
Sedimentation	Debris or sediment impedes tidal channels or runnels	Source control – repair erosion Clear debris
	Excessive debris or sediment accumulates on marsh platform	Remove tidal restrictions Source control – repair erosion
Erosion	Progressive downcutting of tidal channels or runnels	Placing sills (e.g., coir or hay bale plugs)
	Erosions of marsh sills or banks of tidal channels	Oyster shoreline
Marsh Accretion	Accretion rate outpaced by SLR	Thin layer placement
Marsh Elevation	20% of marsh projected to be >50% below MHW in 10 years.	Thin layer placement
Marsh migration space	Vegetated marsh loss projected to be >20% within 10 years.	Buffer expansion Thin layer placement
Tidal exchange	In adequate flushing degrades water quality or results in vegetation loss of >20% within 10 years.	Remove tidal restrictions
barriers to marsh migration	Vegetated marsh loss projected to be >20% within 10 years.	Buffer expansion Thin layer placement

Action Flow Chart



Appendix I

Community Engagement Summary

This appendix summarizes the community engagement efforts undertaken throughout this project, along with lessons learned that may be useful for future work in Rosemont. The Sustainability Institute, with partners, took leadership of community engagement for this marsh study.

Lessons Learned

Organizing community events in Rosemont provided several important insights. Community organizers and local leadership are already stretched thin, and additional events can lead to unrealistic time commitments. The high volume of concurrent grant-funded projects in Rosemont affected overall turnout. Consequently, community engagement during this first phase did not align with the Sustainability Institute’s initial projections. A conscious decision was made to accelerate community involvement once restoration activities are fully outlined, maximizing residents’ time and enthusiasm. Maintaining momentum during these environmental stewardship practices is critical. Although the intensity of community outreach was adjusted, successful engagement and trust-building were achieved, laying a strong foundation for future phases.

Engagement Activities

Over the course of this project, the team’s engagement efforts included:

- A series of community litter sweeps
- A BioBlitz community science event
- Sustainability Institute representation at monthly Neighborhood Association Owners’ meetings
- A series of stakeholder meetings, Board Leadership and Governance Trainings (requested by the Rosemont Board of Directors)
- Outreach to a neighboring development to explore opportunities for coordinated engagement

Coordination with Concurrent Efforts

To maximize efficiency and impact, the project team actively coordinated with other simultaneous initiatives in and around Rosemont, including:

- Community Health and Leadership (formerly EJ Strong Academy)
 - The College of Charleston’s Digital Elevation Model and Resilience Dashboard Project
 - Air and water quality monitoring by the Charleston County Research to Action Board (CCRAB)– Rosemont Flood Action Plan– SC Beacon Disaster Relief Planning
- Maintaining a continuous presence in Rosemont during these concurrent efforts fosters trust and strengthens the relationships necessary to serve as true partners in building community resilience.

Community Feedback and Influence on Recommendations

[Placeholder: A summary of feedback received on the draft plan, and a discussion of how community input shaped the final recommendations in this report, will be added once a final draft is available for community review.]

