A Green Infrastructure Plan

to Restore, Connect, and Protect South Carolina's Habitats

Planning for Green Infrastructure involves protecting and connecting the natural and cultural assets of the Waccamaw region.

Green Infrastructure Center

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

SOUTH CAROLINA FORESTRY COMMISSION

WACCAMAW REGIONAL COUNCIL OF GOVERNMENTS

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Executive Summary

The Waccamaw Council of Governments (COG) region contains diverse cultural and natural resources, from beaches and scenic rivers to Native American sites and lighthouses. Growth in the region continues, with new residents and tourists drawn to the beautiful beaches and vibrant towns. Collaboration between the counties and municipalities on strategies for managing growth and development, sea level rise, and storm surge are of vital importance for the region's resilience. Continuation of local efforts to conserve land, create regional partnerships, and establish both ordinances and planning guidance for growth that protects green infrastructure will ensure the beauty and culture of the Waccamaw landscape for future generations.

The Waccamaw COG region is in the easternmost corner of the state, located on the northern coast between Wilmington, NC, and Charleston, bounded on the southwest by the Santee River and on the northeast by the North Carolina state line. It encompasses the counties of Horry, Georgetown, and Williamsburg. The Waccamaw region includes beaches, dunes, sea islands, salt marsh, wetlands, forests, blackwater rivers, agricultural fields, and historic plantations with moss draped live oaks. Horry and Georgetown counties' natural beauty and vibrant coastal towns attract tourists and new residents, while Williamsburg remains a predominantly rural county. Historic lighthouses, gardens, and Native American sites, along with the living Gullah Geechee culture contribute to a unique sense of place. Approximately 13% of the land in the Waccamaw COG region is protected in several state parks, national wildlife refuges, wildlife management areas, and other open spaces.

This region is the ancestral home of the Sewee, Waccamaw, Chicora, Catawba, Lumbee, Pee Dee, Winyah, and Cape Fear Native Peoples.* The Catawba Nation is the only federally recognized tribe currently in South Carolina and has a reservation in the Catawba COG region. The Waccamaw Indian People and Chaloklowa Chickasaw Indian People are state recognized native groups living in this region today.

The Waccamaw region includes Atlantic beaches, dunes, sea islands, salt marsh, wetlands, forests, blackwater rivers, agricultural fields, and historic plantations with moss draped live oaks.

Green Infrastructure Planning Process

This Green Infrastructure Plan comprises a set of maps and strategies for conserving and restoring a connected landscape in the state. GIC led the Waccamaw COG and local stakeholders though GIC's Six-Step Green Infrastructure Planning Process with a series of four workshops from 2021-22. This process involved mapping habitats cores and corridors, as well as existing natural and cultural assets, followed by risk analysis to inform strategies for action. With these data, local stakeholders determined priority areas for conservation in the region, as well as strategies to ensure a connected landscape into the future. GIC followed regional COG workshops with state agency engagement. The resulting statewide plan is informed by and includes the COG's regional priorities.

This COG chapter will appear as a separate document, distinct from the full report, since it is one of ten COG chapters that have been included in the statewide assessment. The full report can be found here: https://scgiplan-gicinc.hub.arcgis.com/ or at www.gicinc.org or https://www.scfc.gov/management/urban-forestry/

The statewide scale of this project did not allow GIC to drill down to the level of county and city green infrastructure plans, but did establish important priorities for each region.

1. In the first workshop, GIC presented an overview of the project and shared a map of the region's ranked habitat cores. Feedback on the accuracy of the map and areas of development were noted and incorporated.

2. In the second workshop, GIC presented themed overlay maps that showed the region's agricultural soils, water resources, recreation, and cultural assets and asked workshop attendees to add their local input on additional assets, such as shell rings or cultural corridors. The final Waccamaw asset maps and dataset included new data recommended by participants.

Waccamaw FAST FACTS

1,874,560 acres– total COG area (2,929 mi²)

1,086,080 acres– of habitat cores (1,697 mi²)

58% of COG land area is habitat cores

225,280 acres– of protected cores (352 mi²)

21% of habitat cores are protected

244,480 acres– area of protected land (cores and other) (382 mi²)

21% of total area are protected land

27,520 acres– area of public parkland (43 mi²)

1% of total land is public parkland

505,600 acres– area of habitat cores with known cultural/archaeological resources (790 mi²)

435,200 acres– area of habitat cores with highest value ranking (top 5th) (680 mi²)

394,880 acres– area of habitat cores that intersect a groundwater protection zone (617 mi²)

438,400 acres– area of prime agricultural soils on open land (685 mi²)

97,280 acres of wetlands (152 mi²)

1,920 mi of 2,486 mi (772%)– miles of streams that flow within a habitat core

152 of 1,006 (15%)– of habitat cores support cultural or recreational assets

159 of 1,006 (16%)– habitat cores that support known rare, threatened, or endangered species

Waccamaw COG

3. In the third workshop, GIC presented draft maps of risks to habitat cores in the region, including development, utility-scale solar development, and impaired waters. Stakeholder feedback about these risks was used to update and finalize the risk maps.

4. In the fourth and final workshop, GIC shared a strategy map that showed ranked habitat cores, protected lands, and regional corridors. The stakeholders then considered priority habitats and risks to those assets and recommended strategies to reduce or prevent impacts to high-value resources.

6-Step Green Infrastructure Planning Process

1. Set Your Goals What does your community value?

2. Review Data What do we know or need to know, to map identified values? Combine the state modeled data with local data.

3. Map Your Community's Ecological and Cultural Assets Based on the goals established in Step 1 and data from Step 2.

4. Assess Risk What assets are most at risk and what could be lost, if no action was taken?

5. Rank Assets and Determine Opportunities Based on those assets and risks you have identified, which ones should be restored or improved?

6. Implement Opportunities Include natural asset maps in both daily and long-range planning (park planning, comp plans, zoning, tourism and economic development, seeking easements etc.)

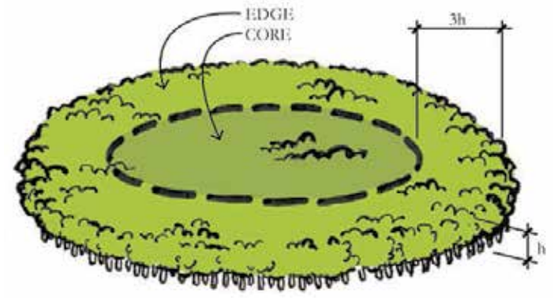
Habitat Cores

Habitat cores are intact areas of the landscape that provide adequate habitat to support native species and were modeled using source data from the 2019 National Land Cover Dataset. Habitat cores are forests, forested wetlands, and marshes at least 100 acres or more in size and are ranked using additional attributes such as water richness, topography, and the presence of rare, endangered, or threatened species. This size is large enough to provide adequate foraging and nesting habitat for interior forest dwelling birds and to support a range of other wildlife species.

Habitat cores encompass 58% of Waccamaw COG land area.

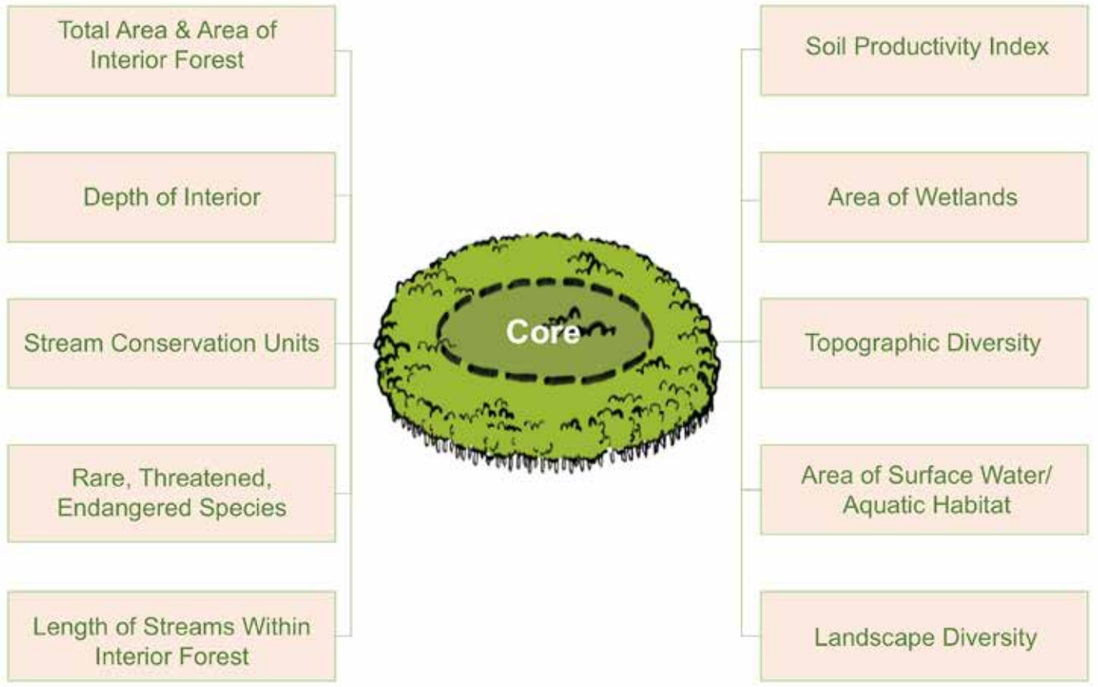
For more on how habitat cores are created, see the Methods and Maps section (page 7) and the Technical Appendix of the full report.

Ranking cores for the values they provide allows land-use planners, agency officials, and site managers to prioritize those specific habitat cores that best meet management goals and objectives, while providing the highest value for species.



Habitat cores consist of an area of intact interior wildlife habitat of 100 acres or more and an edge area that serves as a buffer absorbing impacts from outside the core.

Habitat cores are ranked based on these ecological metrics.

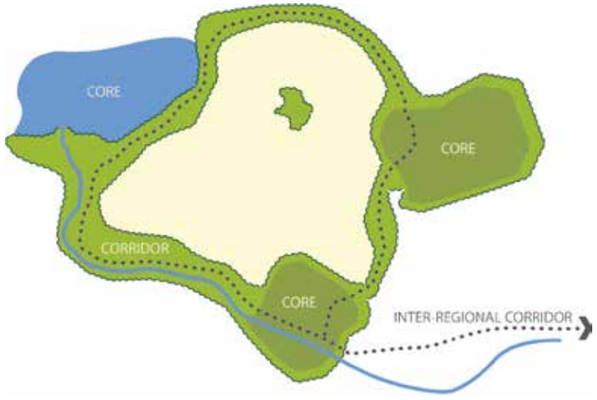


GIC modeled and mapped ranked habitat cores across both the region and state, based on ecological metrics, *see chart above*.

Corridors

Wildlife moves between habitat cores along corridors that support biodiversity by allowing species to move across the landscape and repopulate areas following such disturbances as hurricanes or fires. Restoration or preservation of corridors may also present opportunities to incorporate trails for human recreation. In addition to regional corridors, GIC modeled corridors that are of statewide importance. A graphic representation of this connectivity is displayed on the maps as state and local corridor lines. As the region continues to grow, every effort should be made to continue to maintain these corridors for a more connected and resilient landscape.

For more on corridor modeling see the Introduction section (pages 10 and 11) and the Technical Appendix of the full report.



Green Infrastructure planning is about connecting the landscape. Corridors provide connections between core habitats. A well-connected landscape is more resilient.

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Assets

Natural Assets are the environmental elements that provide healthy surroundings, recreational opportunities, and clean water and food for both people and wildlife. These natural assets include forests, waterways, wetlands, bays, agricultural soils, and other natural resources. *Cultural Assets* are the landscape elements or uses that people value, such as parks, boat landings, trails, historic or archaeological sites, or scenic vistas and roads that add to the beauty of the area. Natural assets support cultural assets by providing scenic backdrops to historic sites, buffering them from storms and providing settings in which to enjoy them, such as the trails through historic sites that engage visitors in history while they enjoy the natural surroundings. GIC mapped these assets using existing state and national datasets, as well as data from stakeholders. The asset maps include water, agriculture, recreation, and cultural assets. Locating these assets is the first step in protecting them and allows decision-makers and planners to make more informed decisions about growth and conservation.

Risks

Mapping important habitats, agricultural soils, and cultural sites is only a first step towards planning to conserve important assets into the future. Mapping risks, in order to understand which assets are most vulnerable is the next step. GIC analyzed the following risks across the state: sea level rise, storm surge, impaired waters, development, and solar development. These risk maps can be used to determine most critical regional risks and priority areas for conservation. Sea level rise maps can be used to determine areas to protect for marsh migration. Storm surge maps and impaired waters maps can be used to determine areas to target for riparian plantings. Development and solar development maps can guide conservation efforts, as well as planning policy. Tools to mitigate risk can also include planning for marsh migration, establishing solar ordinances, or drawing urban growth boundaries to avoid high-value habitat cores.

Waccamaw Risks

23 of 1,006 (3%) habitat cores with **impaired streams**

218 of 1,006 (22%) habitat cores at risk of **development**

60 of 1,006 (6%) habitat cores at risk of **solar development**

915 of 1,006 (91%) habitat cores at risk of **sea level rise**

172 of 1,006 (17%) habitat cores at risk of **storm surge**

970 of 1,006 (96%) habitat cores at **cumulative risk**

Brookgreen Gardens was once a working rice plantation and today is both an ecological and cultural asset.

Regional Observations

The Waccamaw region's highest quality habitat cores are found along river corridors: the Santee River, Black River, Great Pee Dee River, Little Pee Dee River, and Waccamaw River. The larger wildlife corridors in the region also follow these rivers. Connectivity can be ensured by maintaining buffers and seeking protection along them. Additional high-quality cores are found along Black-Mingo Creek, around Winyah Bay, and in the Tilly Swamp area. The prime agricultural soils in the region are found in Horry and Williamsburg counties. The region supports cultural assets, such as historic lighthouses and plantations, with a higher concentration in the coastal counties of Horry and Georgetown. Additionally, recreation opportunities, such as swimming in a state park, paddling a blueway trail, or biking along the East Coast Greenway, abound in Horry and Georgetown counties. The number of assets highlighted in the maps is the result of participation by stakeholders, so the counties that participated in the process are likely to see more assets represented on the maps.

Protected land makes up 13% of the total area in the Waccamaw COG, below the statewide rate of 14%. The Governor has adopted the 30 by 30 goal to preserve 30% of the state's lands by 2030. To achieve this goal, the region will need to more than double its protected lands and should continue to work with the Pee Dee Land Trust, Waccamaw Land Trust, and other organizations to protect high-value habitat cores and corridors in the region. Currently, 21% of regional habitat cores are protected and the habitat cores and corridors map shows the most important lands that still need protection. Public park land in the region is only 1% of the total area, below the 5% statewide rate, and one of the lowest percentages across the state. South Carolina Parks Recreation and Tourism and local governments should prioritize more high-quality public park space in the region and habitat cores should be a key consideration for locating future parkland.

Marshes and floodplains are extensive in the region and sea level rise and storm surge are risks likely to impact habitats and human use of the land in all three counties over the next 40 years. Another risk for the region is urban development, especially suburban sprawl-patterned growth. Development risks are greatest in Horry and Georgetown counties, and around Myrtle Beach, Conway, Georgetown, and Andrews. Additionally, habitat cores and prime agricultural soils across the region are at risk of development for utility-scale solar farms. Data driven planning used to guide smart growth, new ordinances, and land protection will be critical to maintain habitat connectivity, food production capability, and resiliency in the face of the many risks facing this region.

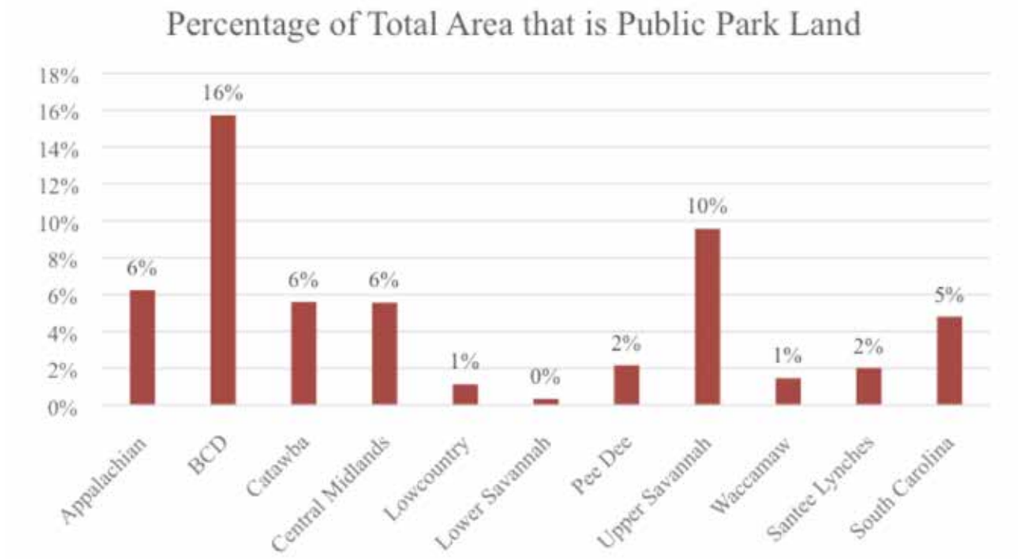
Regional Stakeholders

Participants in the Waccamaw stakeholder workshops include representatives from:

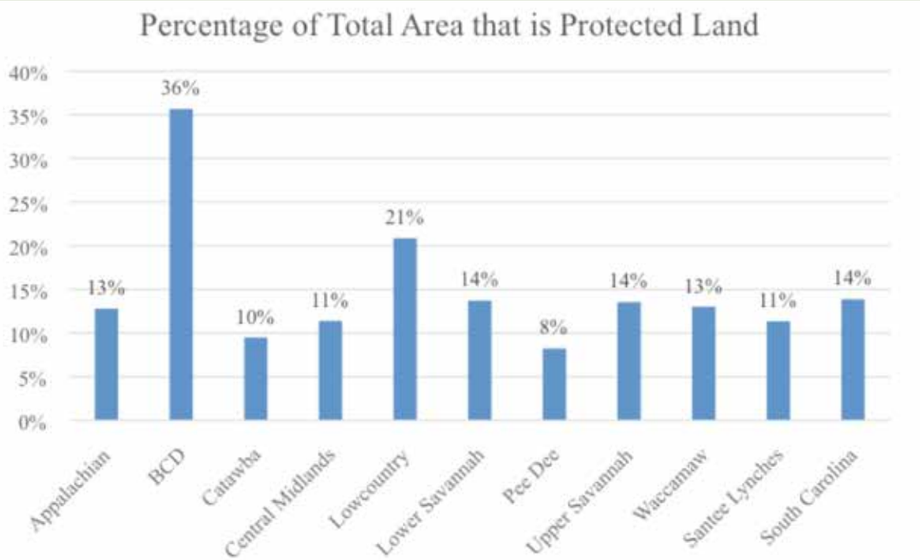
- Waccamaw Council of Governments
- Georgetown County
- City of Myrtle Beach
- City of Georgetown
- City of Conway
- City of Loris
- Town of Andrews
- Pee Dee Land Trust
- Coastal Carolina Association of Realtors
- Waccamaw National Wildlife Refuge
- Waccamaw Indian Tribe
- Waccamaw Riverkeeper
- Black-Sampit Riverkeeper
- Open Space Institute
- South Atlantic and Southeast Conservation Blueprint
- SC Forestry Commission

Development risks are greatest around Myrtle Beach.

Waccamaw COG



The percentage of public parkland in the Waccamaw region is only 1%, one of the lowest rates in the state and well below the 5% statewide rate.



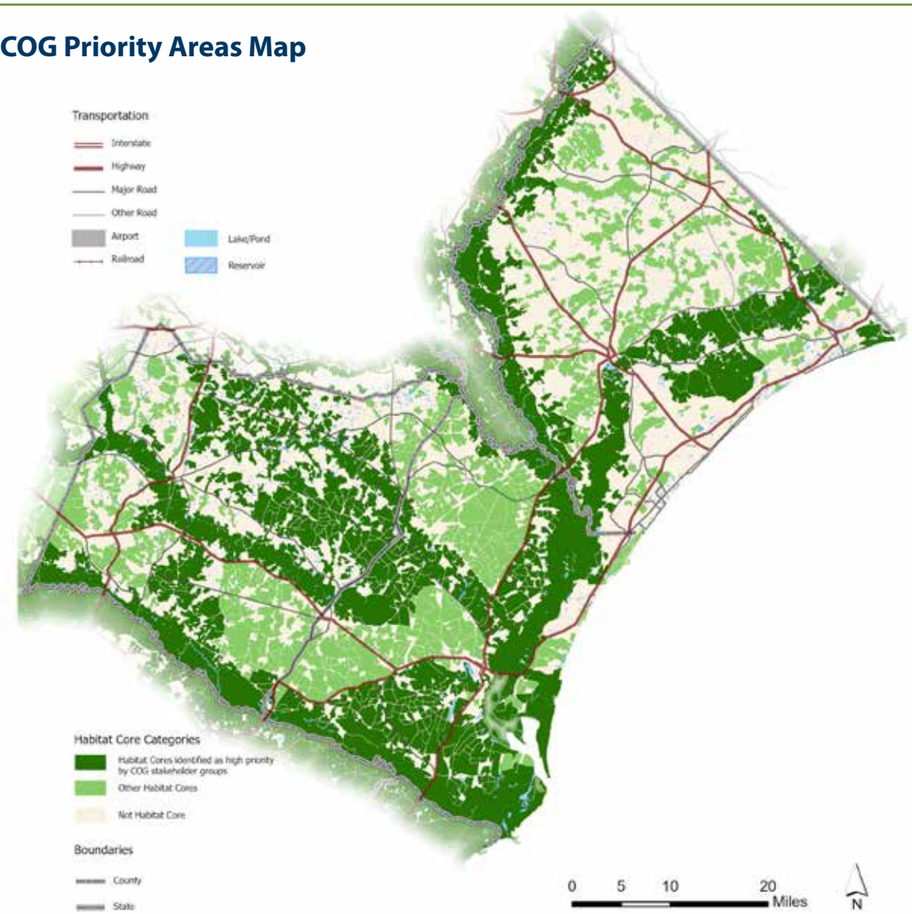
The percentage of protected land in the Waccamaw region is 13% below the 14% statewide rate.

Waccamaw Priority Areas

Waccamaw stakeholders identified several areas in the region that are priorities for protection and restoration.

- Protect and restore the Black River, Lower Lynches River, and Lower Waccamaw River Corridors.
- The Lower Pee Dee Basin suffers from high fecal coliform levels because wildlife is forced into narrow stream corridors and small habitats. Requiring wider buffers and conserving more land in this corridor will protect and restore water quality.
- Protect the Tilly Swamp Area, Black-Mingo Creek Area, Santee-Black River Connector, and Waties Island.
- Collaborate across the state and with NC on water quality protection for the Upper Waccamaw and Little Pee Dee/Lumber River Corridors.
- Restore the Buck Creek corridor.
- Protect and restore the Lower Santee River Corridor as a connection between Francis Marion National Forest and Santee Coastal Reserve and Tom Yawkey Wildlife Center.

Waccamaw COG Priority Areas Map



This map illustrates the habitat cores corresponding to the COG identified priority areas for protection and restoration.

Waccamaw COG

Waccamaw Strategies

Project maps to inform these strategies can be found at the end of this chapter as well as on the project HUB site https://scgiplan-gicinc.hub.arcgis.com/ . Users can access all the data online and download data for any county.

Strategy 1: Adopt a Green Space Sales Tax.

Horry, Williamsburg, and Georgetown Counties should consider placing the Green Space Sales Tax on their ballots to raise funds to conserve more land in the region. Counties can use the funds collaboratively to protect land across county boundaries.

Strategy 2: Create and strengthen solar ordinances.

Create solar ordinances in Horry, Williamsburg, and Georgetown Counties. The South Carolina Energy Office has resources for creating or updating solar ordinances and model solar ordinances.

Strategy 3: Establish Urban Growth Boundaries for municipalities in the region.

Establish urban growth boundaries for all municipalities in the region and utilize the habitat cores and corridors data to protect regional green infrastructure.

Strategy 4: Utilize data and maps from Green Infrastructure Plan to secure trail grants.

The COG, counties, and municipalities should use the maps and data from this plan to secure grants for trail and greenway master planning, with a focus on habitat connectivity.

Strategy 5: Horry County should use the cores and corridors data to inform its parks and open space plan.

Horry County is working on a Parks and Open Space Plan that highlights the importance of protecting green infrastructure. The plan outlines needs and locations for new recreation facilities as well as areas to focus conservation efforts. The county should overlay the habitat cores data with proposed park locations and conservation areas to determine if high quality habitat will be protected by the plan.

Moss draped oak trees are found in the Waccamaw region.

Strategy 6: The Black River Initiative will plan for green infrastructure for wildlife and recreation.

The Black River Initiative is a collaborative effort to establish a recreational water trail along 70 miles of the Black River in Williamsburg and Georgetown Counties. The effort will protect habitat, water quality, wildlife connectivity, and flood retention capacity while supporting the surrounding rural economy and providing equitable access to the river. Building on 25,000 acres of privately protected lands in the region, the Black River Initiative will include 12 properties open to the public including a new state park. https://arcg.is/0XnDD4

Strategy 7: The City of Conway will use its tree canopy assessment data to plan for green infrastructure.

The City of Conway received a technical support grant from the SCFC to create an urban tree canopy assessment and planning assistance from GIC. The city will use these data to prioritize new tree plantings and conserve forest land.

Next Steps

The data created for this plan are a foundation upon which to build a detailed local Green Infrastructure Plan. Any municipality or county wishing to pursue a more detailed local plan should contact GIC.

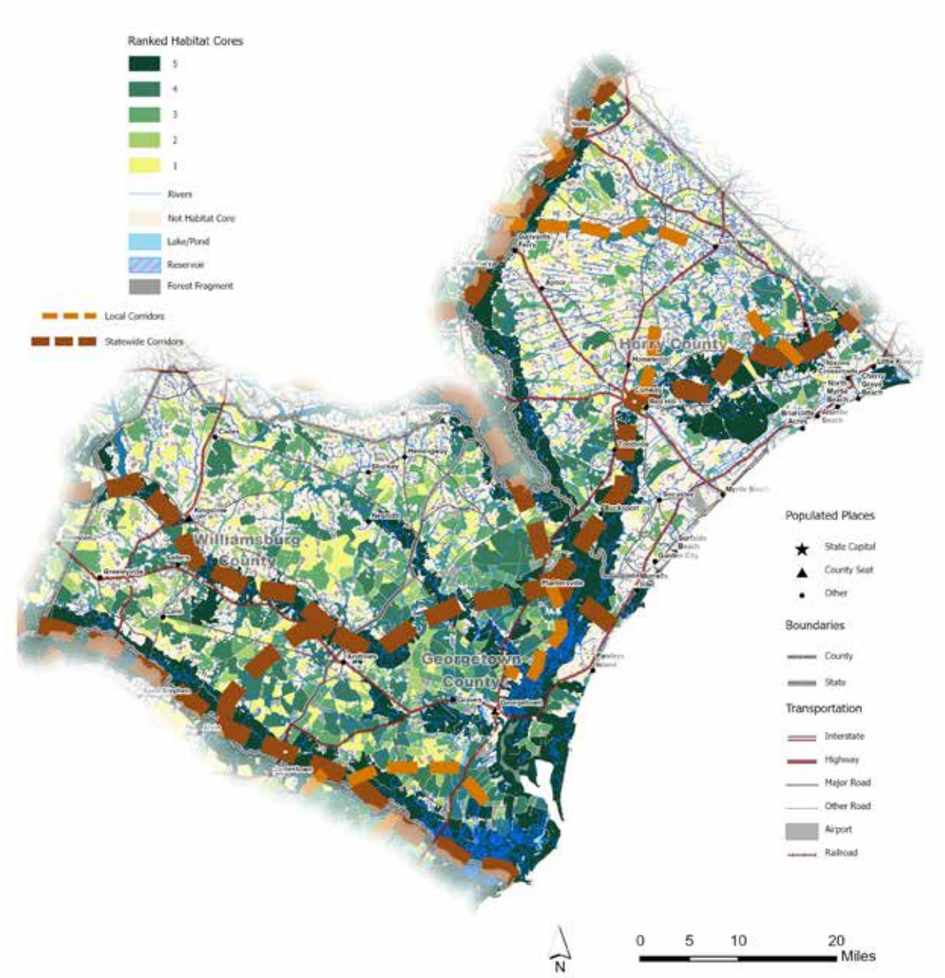
The purpose of this project was to identify and prioritize those green infrastructure assets that most urgently require protection or restoration in the state. The strategies and maps of habitat cores, corridors, assets, risks, and priorities provide a roadmap and shared vision for conservation and restoration efforts of state agencies, counties, cities, and landowners. Moving forward, agencies, planners, and citizens can view and download these priorities, maps, and data through the HUB site GIC has created in partnership with Esri. Additionally, the GIS datasets have been disseminated to all the agencies, municipalities, and organizations involved in this project to use in land use decisions and conservation planning. https://scgiplan-gicinc.hub.arcgis.com/

Dunes along Myrtle Beach

Maps

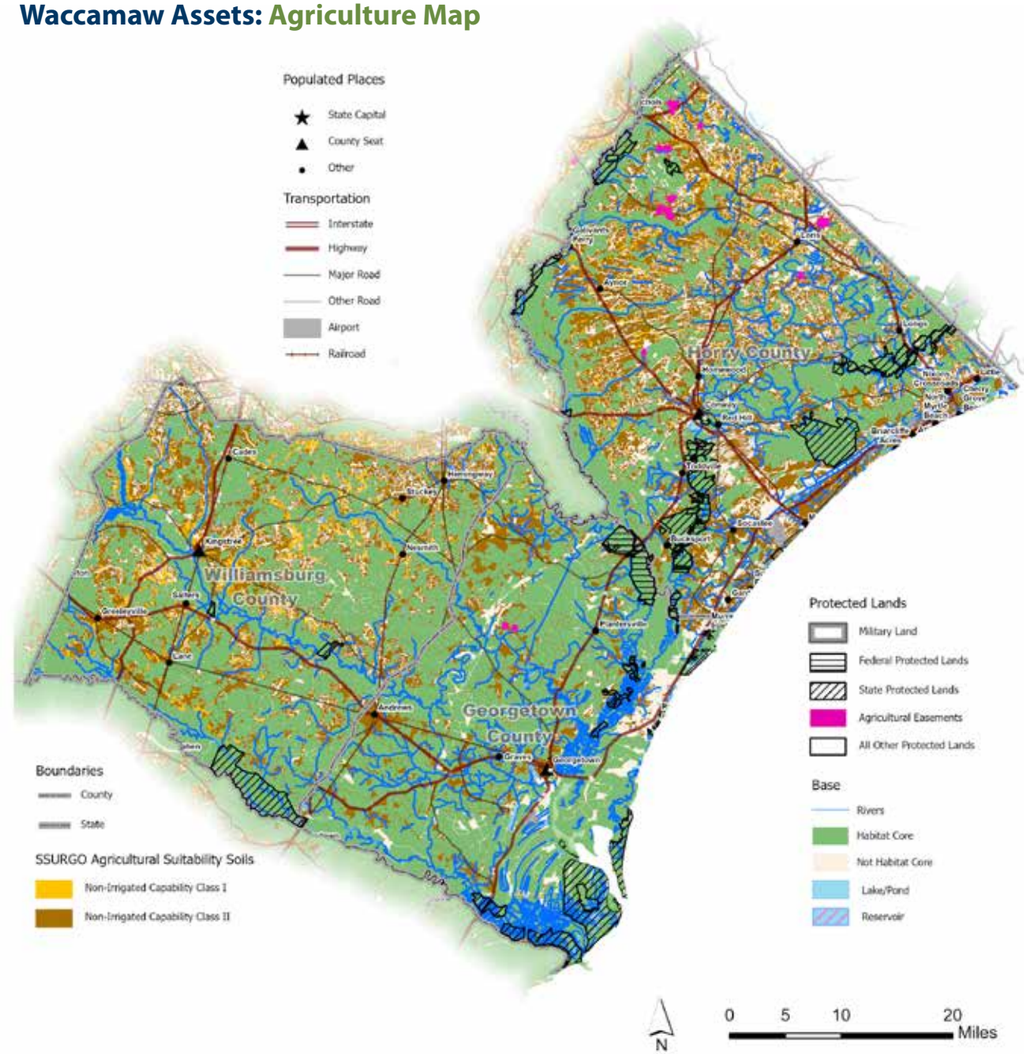
View all these maps on line and download habitat core data at:
https://scgiplan-gicinc.hub.arcgis.com/

Waccamaw Strategic Planning Map: Ranked Habitat Cores and Corridors



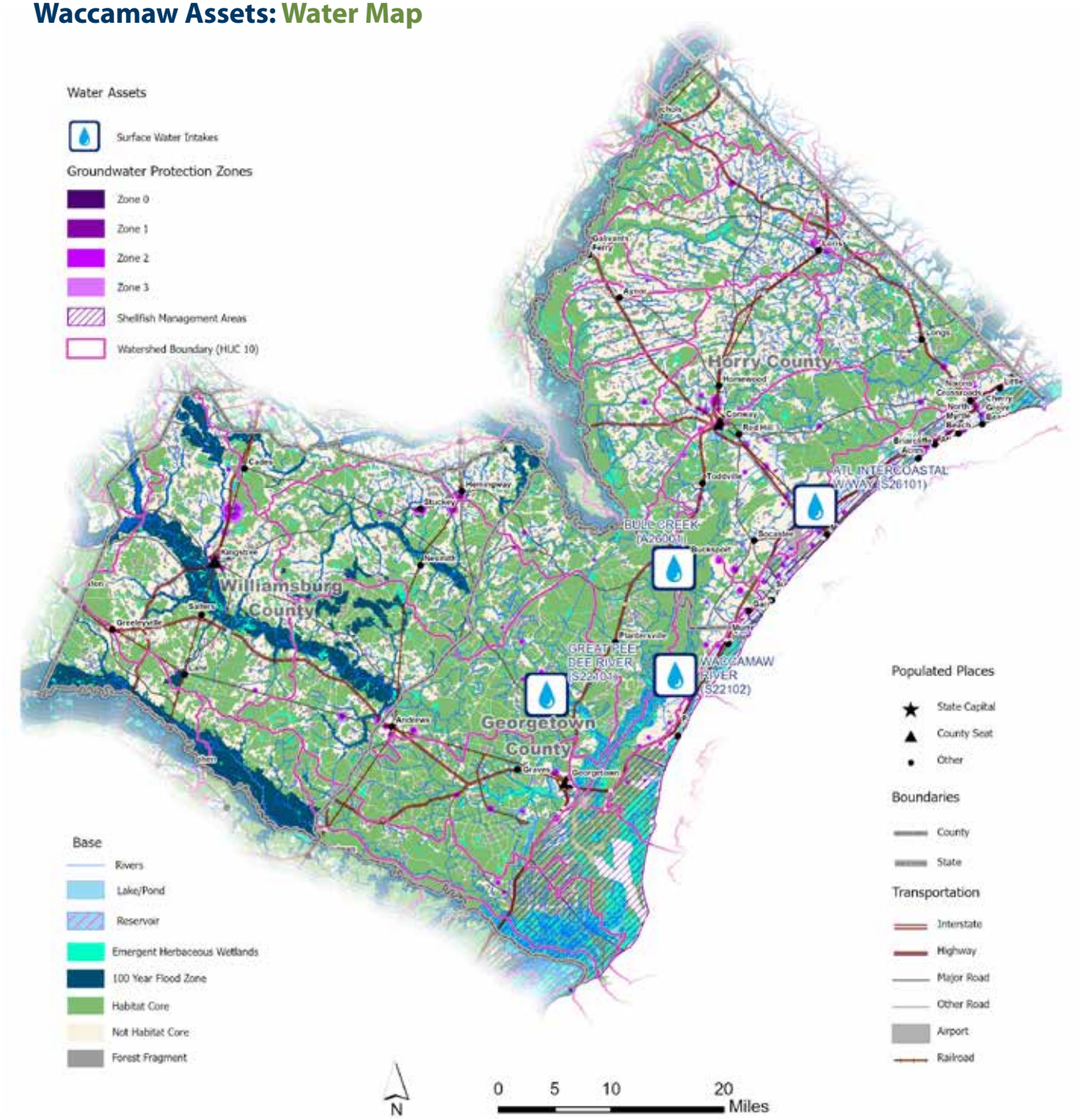
Habitat cores are intact natural landscapes large enough to support interior forest or marsh dwelling species. This map depicts the region's habitat cores and shows them connected by corridors to form a network. The more connected the landscape, the more resilient it is and the more pathways there are for people, pollinators, and plants. The habitat cores are ranked based on ecological metrics, with dark green representing the highest quality habitat cores and yellow representing the lowest quality habitat cores. A ranking of 5 is the best and 1 is the lowest. Additionally, statewide and regional wildlife corridors are represented on this map by brown dashed lines.

Waccamaw Assets: Agriculture Map



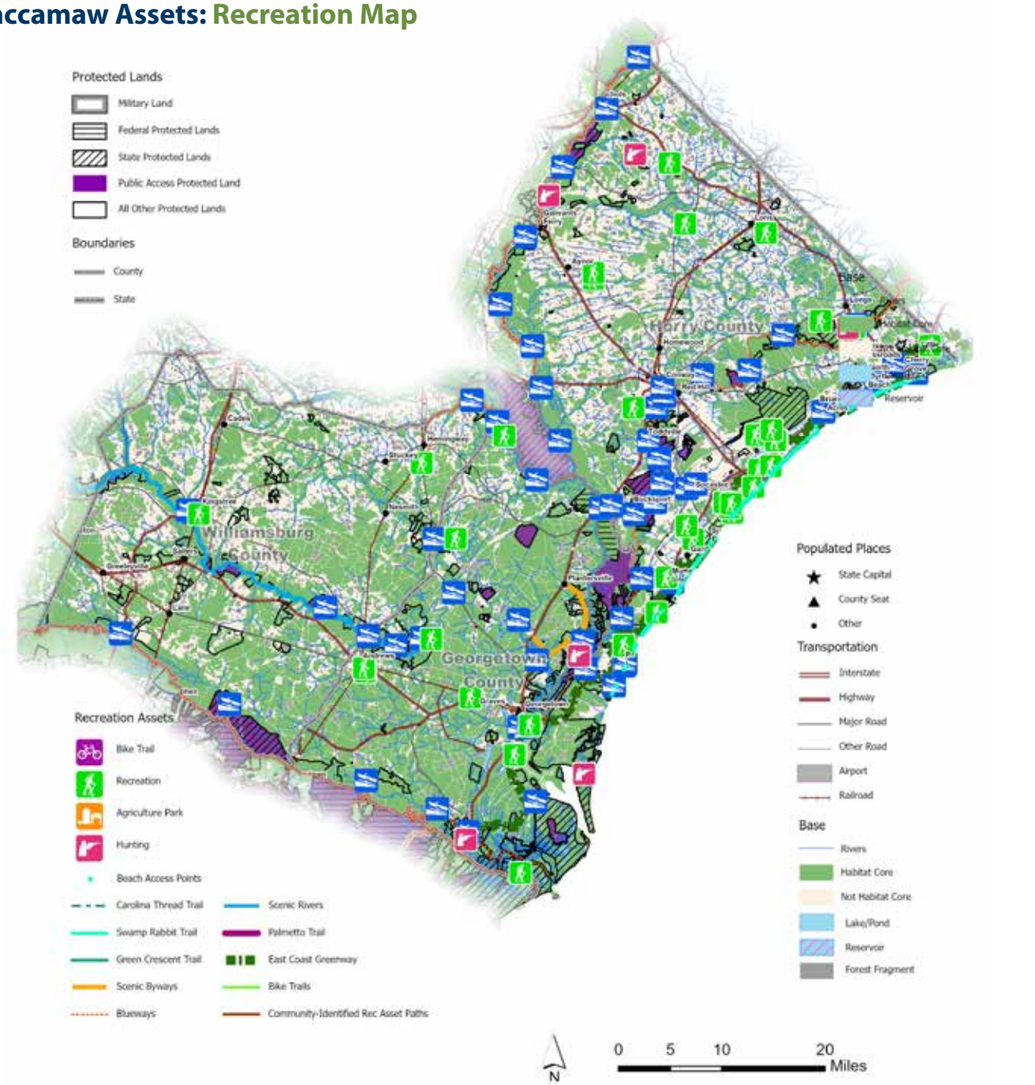
This map identifies the highest quality agriculture soils (classes 1 and 2) on open land, as well as agricultural easements in the region.

Waccamaw Assets: Water Map



This map depicts drinking water reservoirs, surface water intakes, groundwater protection zones, and the 100-year floodplain in the Waccamaw region. The many forests and wetlands in the region help cleanse runoff to protect surface water quality and provide groundwater recharge.

Waccamaw Assets: Recreation Map



This map depicts boat ramps, blueways, scenic rivers, scenic highways, greenways, Wildlife Management Areas, and federal, state, and local parks over 10 acres in the Waccamaw region. Many recreational activities depend on a healthy landscape for their enjoyment, such as hiking, birding, boating, fishing, hunting, and other nature-based sports. A healthy landscape provides both access and scenic settings for enjoying the outdoors. Large intact habitats provide refuge, shelter, and food for the many species that residents and tourists appreciate when enjoying the outdoors.

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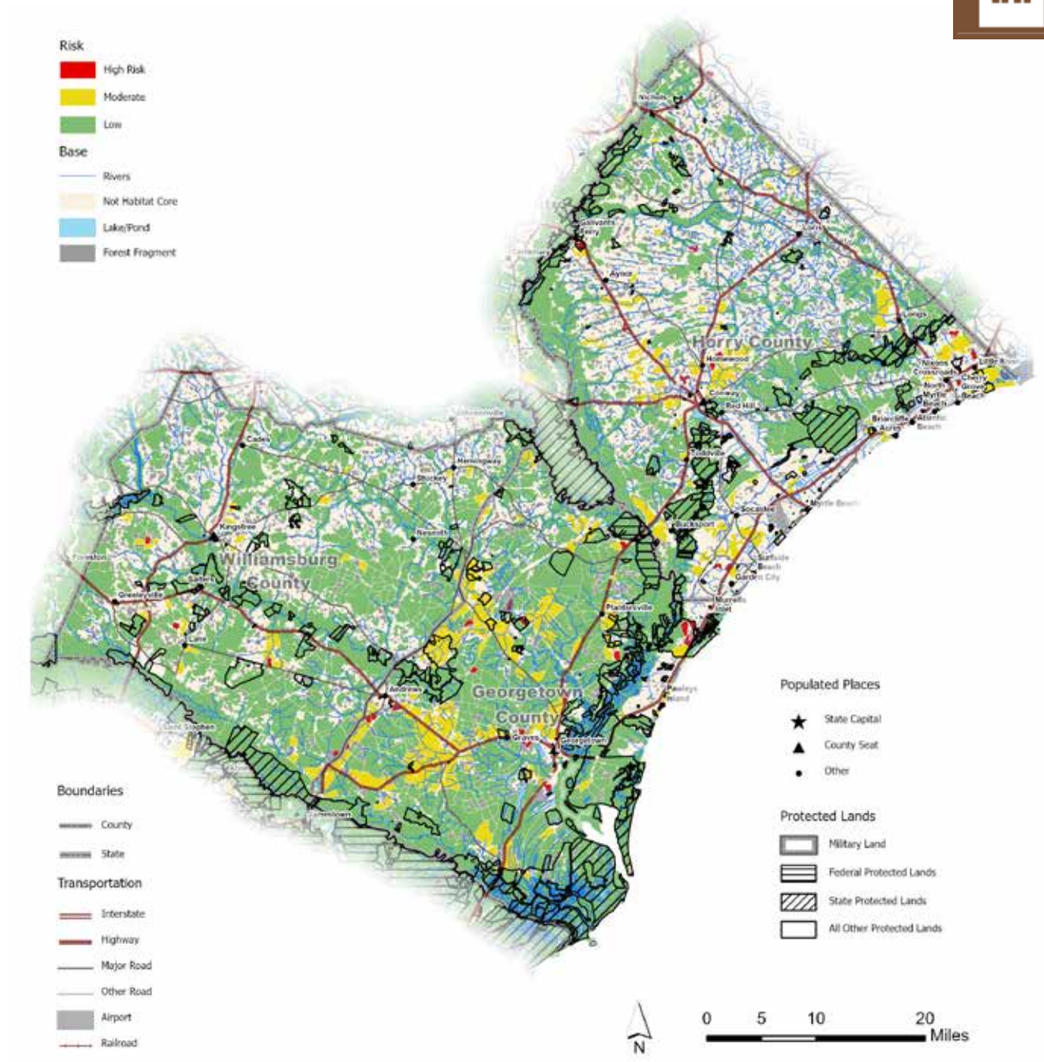
Waccamaw Assets: Culture Map

This map displays historic sites, Native Peoples sites, cultural overlay districts, scenic highways, scenic rivers, and waterfalls in the Waccamaw region. Natural landscapes provide the context, backdrops, and buffers for these sites and contribute to their settings and beauty.

Waccamaw Risks: Development Risk Map



This map depicts the level of development risk based on the SLEUTH Urban Growth Model projected to the year 2060, with protected lands excluded.

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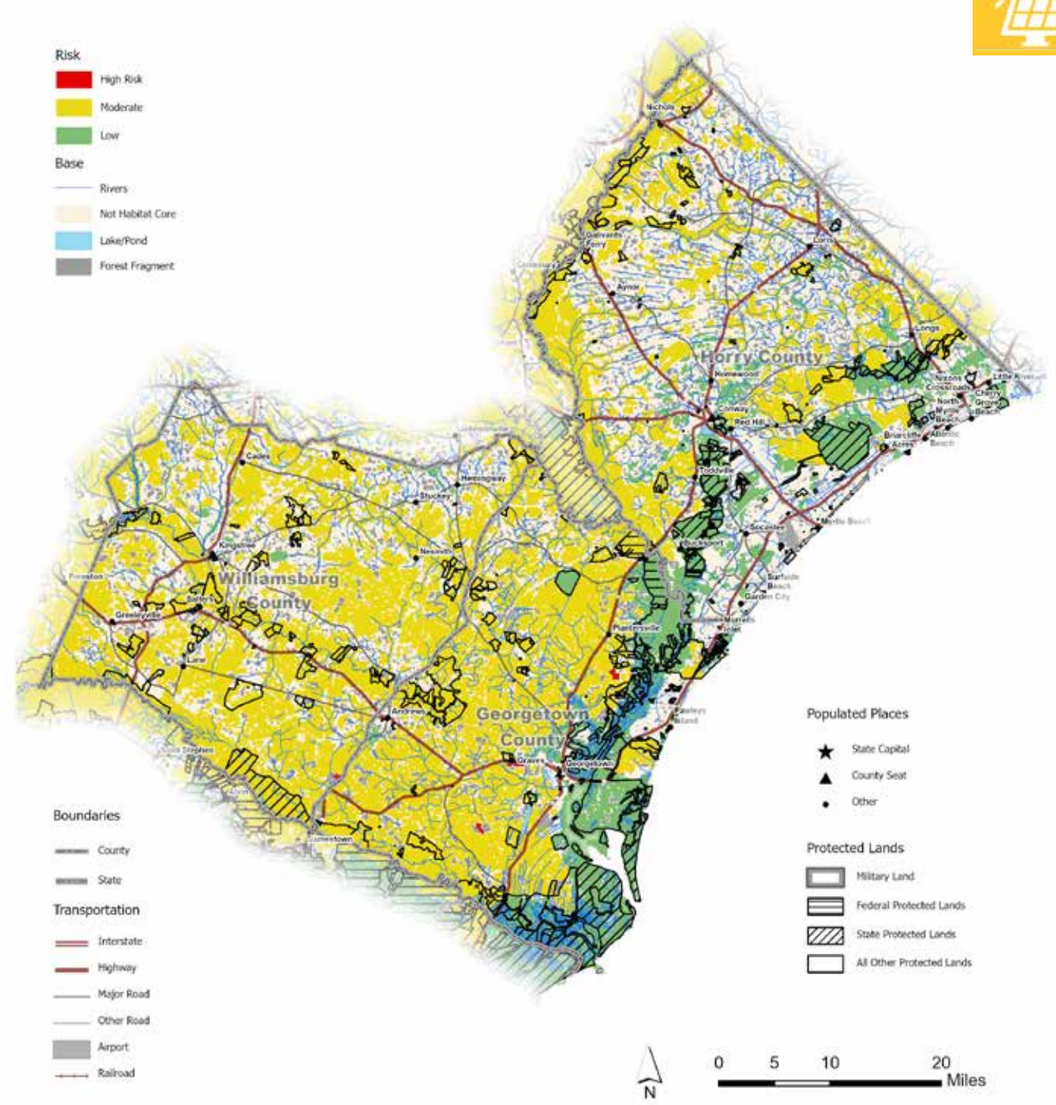
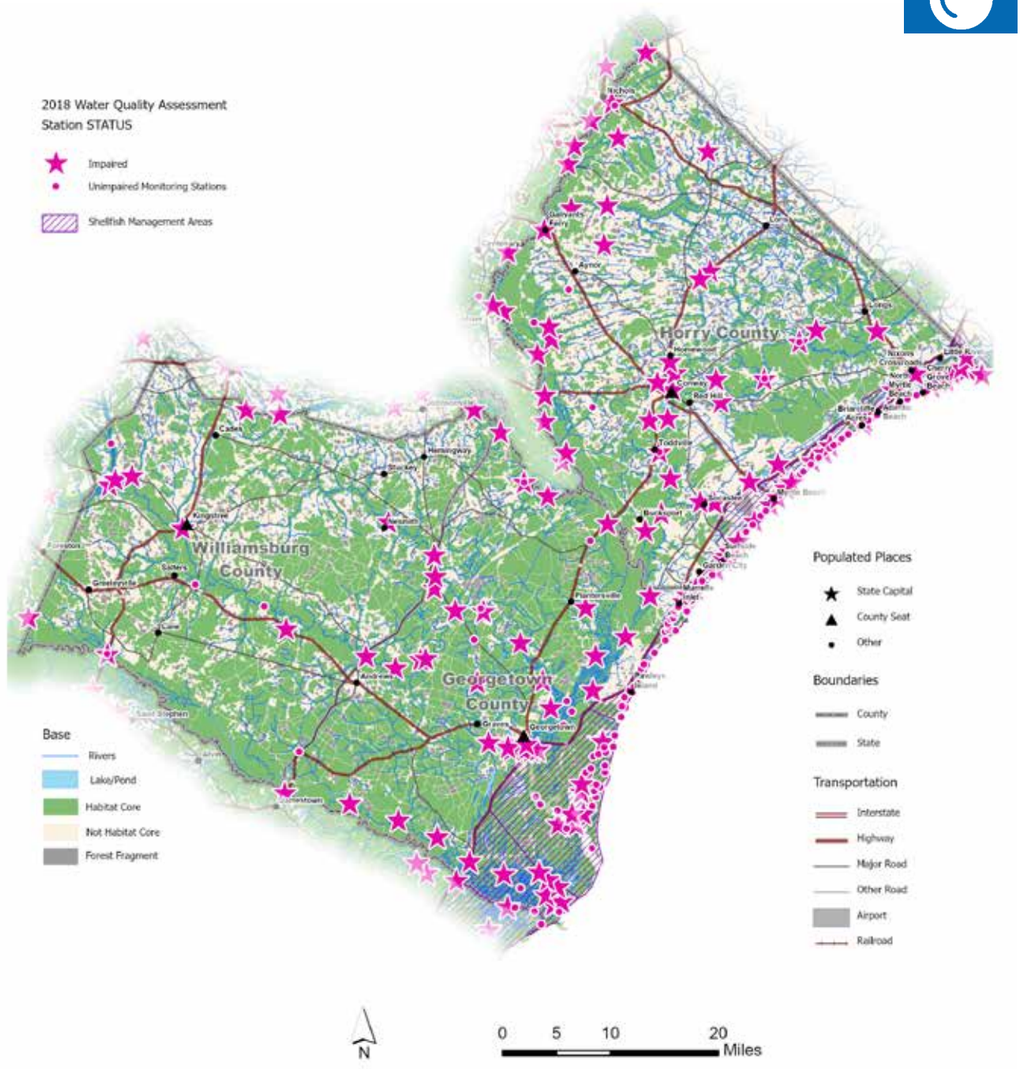
Waccamaw Risks: Solar Development Risk Map



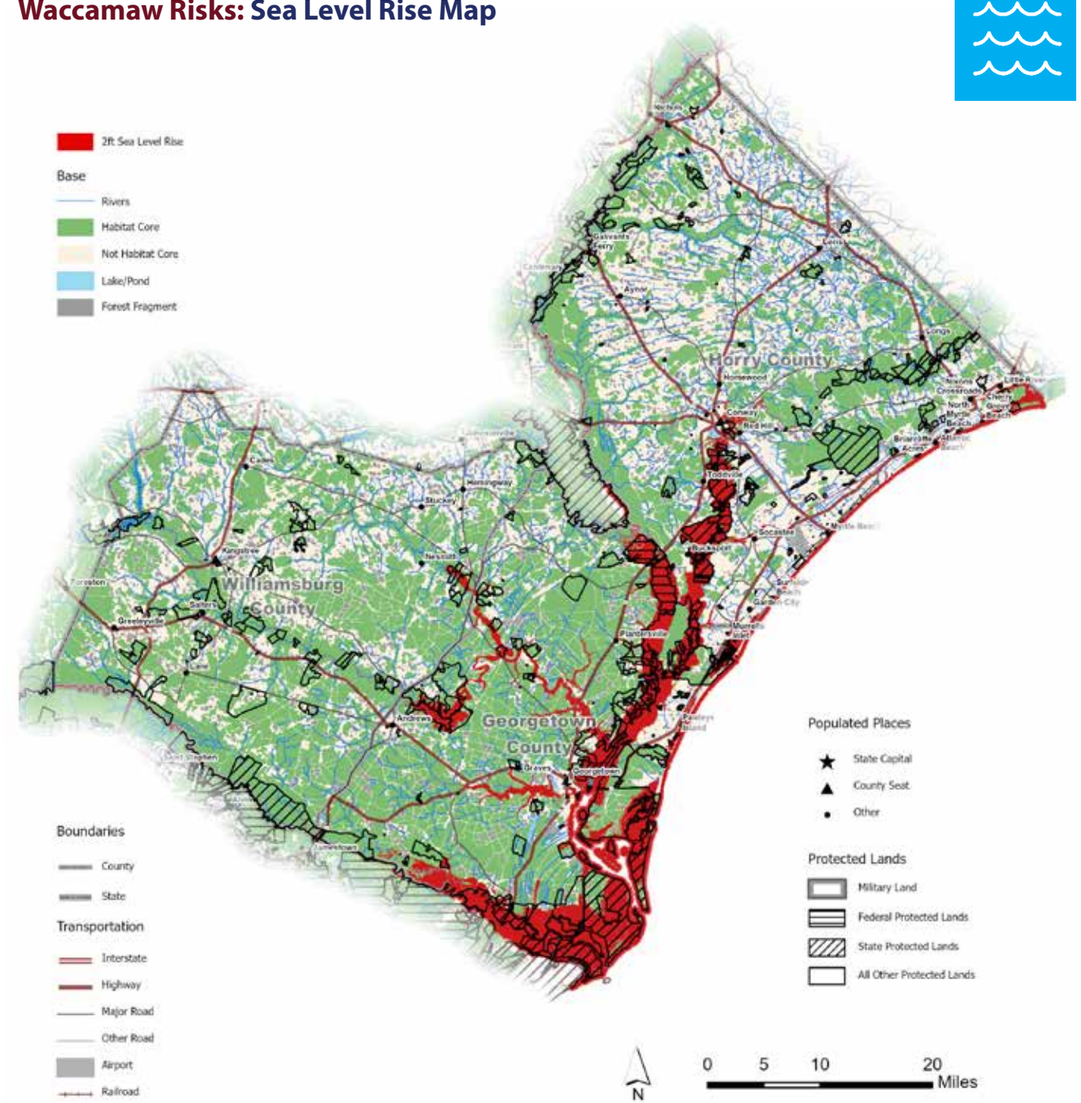
This map depicts the level of solar development risk based on Argonne Lab's Solar Site Suitability Analysis, with wetlands and protected lands excluded.

Waccamaw Risks: Water Quality Impairments Map



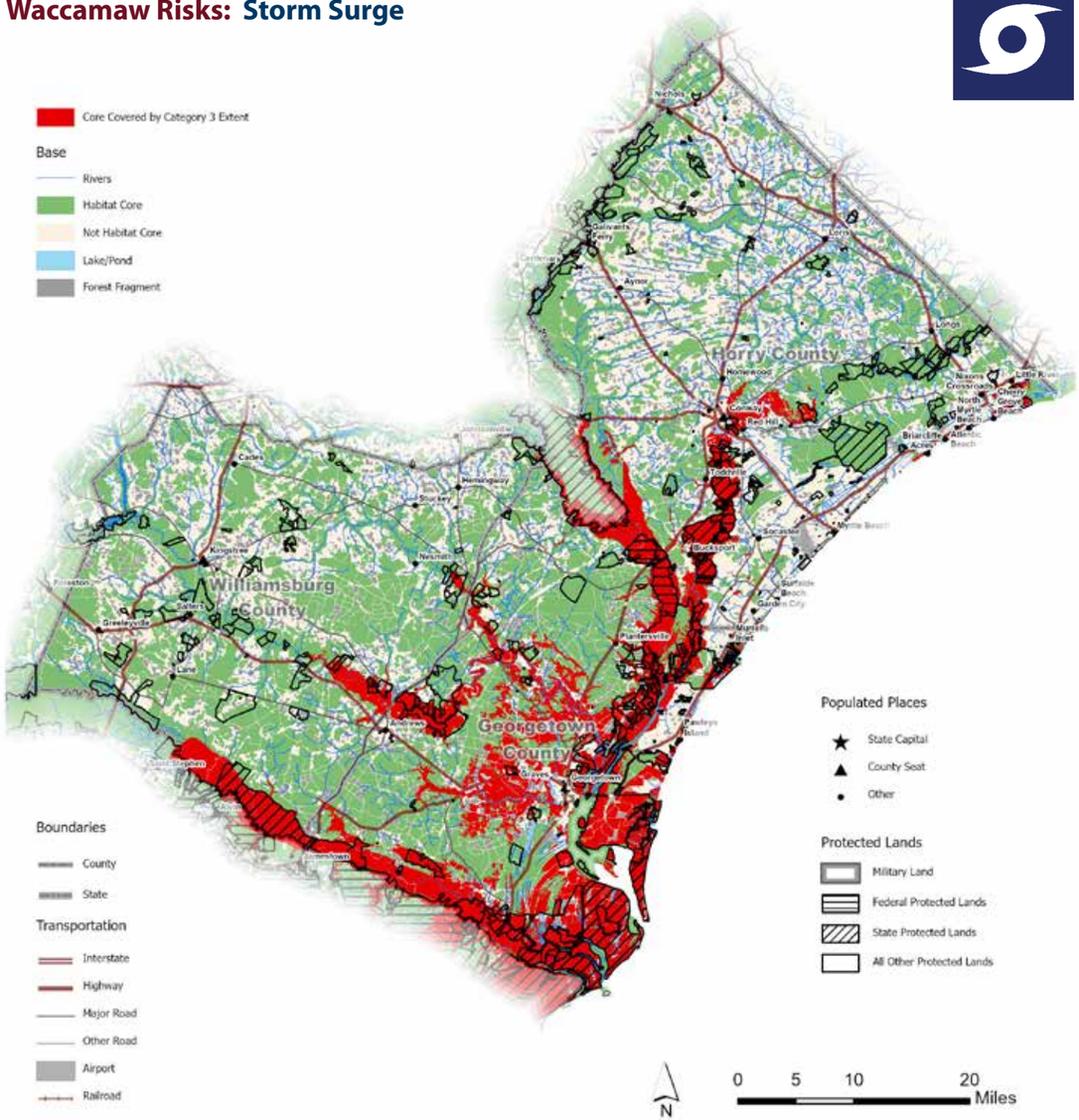
This map depicts water quality assessment sites and specific impairments across the region, and includes SC DHEC Water Quality Assessment data.

Waccamaw Risks: Sea Level Rise Map



This map shows in red the core areas that will be inundated by 2 ft sea level rise based on the intermediate-high curve for the year 2060 in NOAA's 2017 sea level rise data.

Waccamaw Risks: Storm Surge



This map shows in red the core areas that will be inundated by a Category 3 storm based on NOAA's SLOSH model for storm surge.

Notes

*Native people of the Waccamaw region as shown on Native Land Map:
Disclaimer from https://native-land.ca/
This map does not represent or intend to represent official or legal boundaries of any Indigenous Nations. To learn about definitive boundaries, contact the nations in question.

**Additional Native people of the Waccamaw:
https://www.ccpl.org/charleston-time-machine/first-people-south-carolina-Waccamaw
Waddell, Gene. 1980. Indians of the South Carolina Waccamaw, 1562-1751. Columbia, SC: Southern Studies Program, University of South Carolina.

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