

Connected Land Conservation Plan of the East Cooper Region of South Carolina

Produced by the East Cooper Land Trust in collaboration with the College of Charleston and SC Sea Grant Consortium with support from the SC Forestry Commission and USDA Forest Service

Acknowledgements

Project Team

East Cooper Land Trust
College of Charleston
South Carolina Sea Grant Consortium



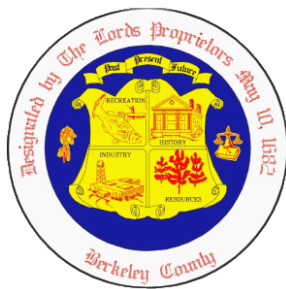
With support and sponsorship from

USDA Forest Service
South Carolina Forestry Commission
Green Infrastructure Center Inc.



Additional data share from

Berkeley County
The Nature Conservancy
Charleston County Parks & Recreation Commission
South Carolina Department of Natural Resources



Collaboration and data share from

Town of Awendaw
Charleston County
City of Charleston
City of Isle of Palms
Town of McClellanville
Town of Mount Pleasant
Town of Sullivan's Island
Berkeley-Charleston-Dorchester Council of Governments





A Message from East Cooper Land Trust

OUR MISSION

East Cooper Land Trust is a community-supported organization devoted to conserving natural spaces, thus the quality of life for current and future generations.

OUR VISION

East Cooper Land Trust will be leading the most important and ambitious conservation effort for the East Cooper area. We will:

- Identify and conserve natural spaces of environmental, cultural, or historical value.
- Enrich our urban community with natural spaces and preserve the rural character of surrounding coastal communities.
- Collaborate with other organizations to provide natural lands such as parks, gardens and trails for people to enjoy.
- Provide education about the benefits of open space and conservation for all ages.



HOW WE WORK:

Land conservation is one of the most effective ways to preserve the beauty and character of our community. Natural areas, productive farms, clean water and our remarkable natural and cultural resources can be preserved through our voluntary and cooperative approach to conservation. Our strategy is informed by our Connected Land Conservation Plan throughout the East Cooper area.

CONSERVATION EASEMENTS

Conservation Easements are a way for private landowners to ensure that their vision for their land, lifelong stewardship and family heritage live on for generations to come. Conservation easements permanently promote best management practices, while restricting or limiting activities that may diminish the natural value of the land, such as clear-cutting, subdivision and intensive development.

LAND OWNERSHIP

In special instances, East Cooper Land Trust may choose to purchase land, usually through a bargain sale. Owning and managing land requires additional resources and organizational capacity, and therefore must meet a higher conservation threshold. Land may also be donated to East Cooper Land Trust (now or as a future gift through a will or bequest).

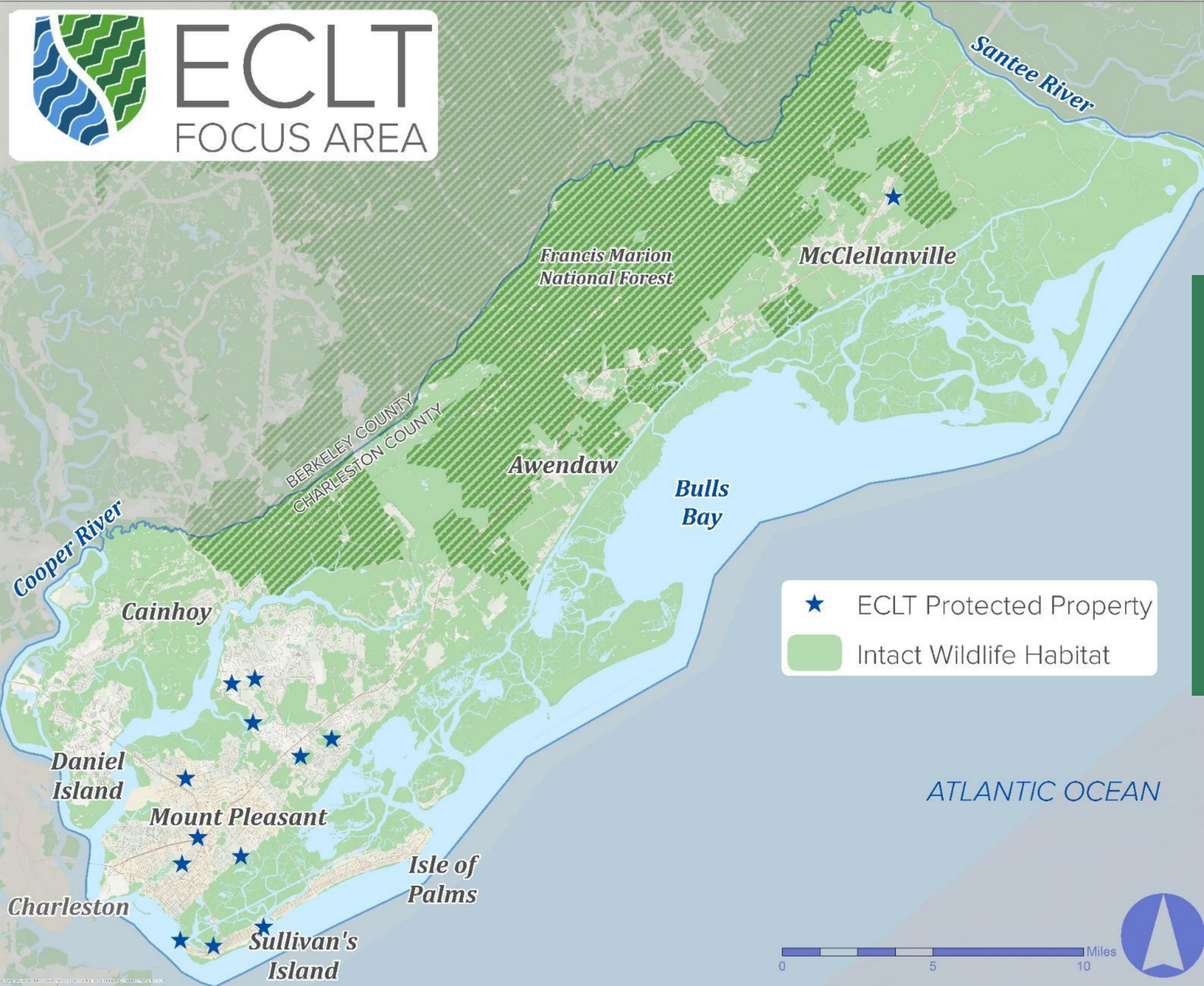
TRAIL & PUBLIC ACCESS EASEMENTS

These legal agreements between a landowner and East Cooper Land Trust secure public access to private land through a trail corridor. A trail easement is an altruistic gift from a landowner to the community – sharing one's enjoyment of beautiful natural land. Ideally a network of easements will exist to create the East Cooper Trail.





ECLT
FOCUS AREA



Municipalities within the East Cooper Region:

- Town of Mount Pleasant
- City of Charleston (*Daniel Island & Cainhoy*)
- Town of Sullivan's Island
- City of Isle of Palms
- Town of Awendaw
- Town of McClellanville

The East Cooper Region falls within both Charleston and Berkeley counties.

Currently, East Cooper Land Trust protects 17 properties, 14 of which fall within the East Cooper Region.

Map 1: East Cooper Land Trust's protected properties within its geographic area.

Introduction

East Cooper Land Trust has been working with local planning departments to create a Connected Land Conservation Plan. Natural asset mapping and prioritization are being used to document the remaining intact wildlife habitat of the region and develop solutions to protect the areas that are most important to healthy wildlife and human communities. The creation of a natural asset plan will also provide new opportunities for the organization to educate and inform the public and developers about the need to protect the region’s natural resources.

This project has been funded through an Urban and Community Forestry (U&CF) Financial Assistance Grant administered through the South Carolina Forestry Commission and funded by the USDA Forest Service. It partners East Cooper Land Trust with the College of Charleston, the South Carolina Sea Grant Consortium, the South Carolina Forestry Commission, as well as Charleston County and all of the local municipalities. Berkeley County was South Carolina’s pilot study for this project, and mapping initiative can now be extended through the East Cooper half of Charleston County. This gives the organization the mapping tools it needs to proactively prioritize and protect the most valuable lands in East Cooper.

On March 21, 2016, East Cooper Land Trust hosted the 2nd annual meeting of the Mayors Council on Land Conservation in East Cooper. This included participation from the Mayors and planning staff from 6 municipalities and Charleston County. This alliance resulted in a signed Memorandum of Agreement in which each municipality agrees to consider open space planning and natural corridors in their comprehensive planning process as well as cooperate with each other and the local land trusts. The Mayors Council will continue to meet annually.

The purpose of the Mayors Council is to encourage informed decisions in our municipalities and to keep land conservation a priority. The tools utilized during the duration of this project are important in supporting these causes.



The Mayors Council on Land Conservation in East Cooper MEMORANDUM OF AGREEMENT

THIS Memorandum of Agreement (“Memorandum”) is made and entered into this Twenty-first day of March, 2016 (the “Effective Date”) by and between the Mayor of Awendaw, Mayor of Charleston, Mayor of Isle of Palms, Mayor of McClellanville, Mayor of Mount Pleasant, Mayor of Sullivan’s Island, and Chairman of Charleston County Council. The Mayors and Charleston County Council Chair are collectively referred to herein as the Parties.

RECITALS

WHEREAS the parties share a joint interest in ensuring the economic vitality and improving the quality of life for all residents in their cities and towns; and

WHEREAS the parties recognize that natural areas in and around their municipalities add to the quality of life for all residents in their cities and towns; and

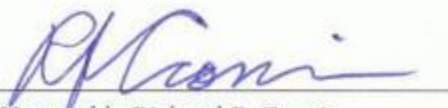



WHEREAS the parties strongly commit to the practice of permanently protecting natural resources; and

NOW, THEREFORE IT IS HEREBY AGREED THAT:

1. The parties agree to make conservation issues a high consideration in both development and land management within their respective jurisdictions.
2. The parties will work to ensure the preservation and development of open space areas and nature corridors as part of their comprehensive planning process.
3. The parties agree to support the efforts of each other and land trusts in conserving natural areas and open space across the East Cooper region.

The Mayors Council on Land Conservation in East Cooper recognizes that these activities are of vital importance to the future of the region. As such, the provisions of this memorandum become effective upon the signatures below.

IN WITNESS WHEREOF the undersigned being duly authorized by their respective Governments, have signed this Memorandum of Agreement on the Twenty-first day of March, 2016.

 The Honorable Richard F. Cronin Mayor, City of Isle of Palms	 The Honorable Patrick O’Neil Mayor, Town of Sullivan’s Island
 The Honorable Miriam C. Green Mayor, Town of Awendaw	 The Honorable Linda Page Mayor, Town of Mount Pleasant
 The Honorable Rutledge B. Leland, III Mayor, Town of McClellanville	 Chairman J. Elliot Summey Charleston County Council
 The Honorable John Tecklenburg Mayor, City of Charleston	

Introduction

Natural Assets form a region's "green infrastructure" and consist of the connected natural systems, wildlife habitat, and ecological processes that contribute to the region's clean water and air, enhance residents' quality of life, and support the region's economy. A connected series of natural assets provide critical functions, such as water filtration, clean air, wildlife habitat and migration corridors, and access to recreational opportunities. Human health, however, can be considered the "ultimate ecosystem service." There is growing evidence that contact with diverse natural habitats and many different species has important positive impacts for human health.¹

The Green Infrastructure Center recommends a six-step process for creating a natural asset conservation plan:

1. Set your goals
2. Review data
3. Map your ecological and cultural assets
4. Risk assessment
5. Rank your assets and determine opportunities
6. Implement opportunities

The purpose of this plan is to provide a logical method in determining where land conservation is appropriate, as well as for the routing of greenways through the region. Greenways, or multi-use recreation trails, will provide a way to connect people to existing recreational open spaces and provide immense economic and health benefits to the local communities. The East Cooper Trail is a greenway in the planning phase which has had its route influenced by knowledge gained through this project.

"We are at a key juncture in history where biodiversity loss is occurring daily and accelerating in the face of population growth, climate change, and rampant development. Simultaneously, we are just beginning to appreciate the wealth of human health benefits that stem from experiencing nature and biodiversity" - Sandifer et al., 2015

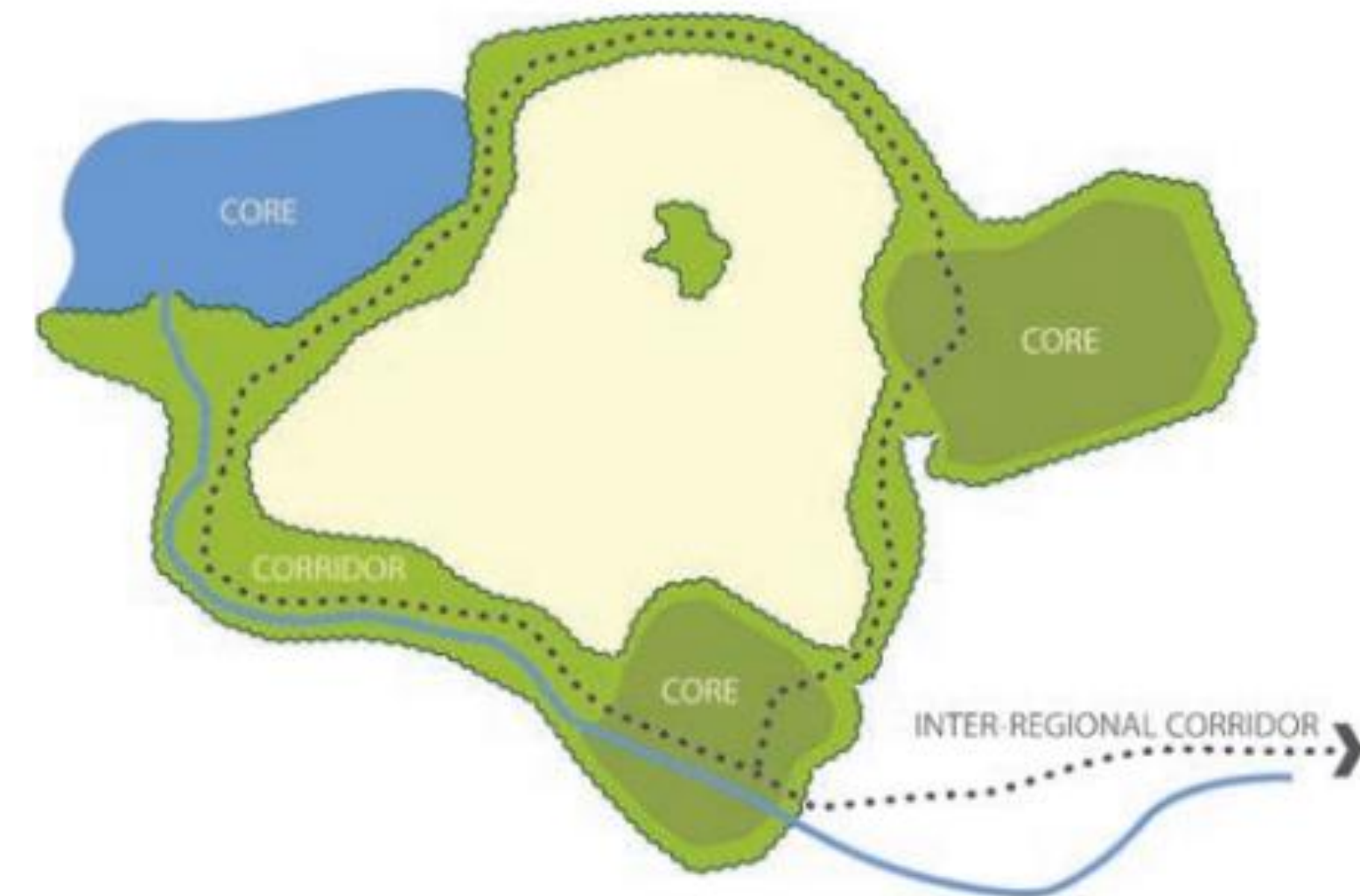
This natural asset planning initiative has given East Cooper Land Trust new tools for identifying and prioritizing parcels that can be targeted for conservation projects. The habitat core data layer allows for easy identification of areas that would appear to benefit from permanent protection. A core is an area of relatively undeveloped and intact habitat that is large enough to support healthy species and a beautiful landscape.

When zoomed into a landscape scale with a parcel overlay in the Geographic Information System (GIS), specific parcels can be compared and analyzed based on their proximity to natural, recreational, and historical assets to create a preliminary strategy for an area. Additionally, wildlife corridors can be discovered as important connections between habitat cores.

This project aligns with Esri's [National Green Infrastructure Initiative](#). This approach to habitat conservation is beginning to gain [national attention](#).

The following report was created for the technical purpose of describing the project's progress as of December 2016 and the methodology that will shape East Cooper Land Trust's prioritization process for future conservation projects.

¹ Sandifer et al. (2015) "Exploring connections among nature, biodiversity, ecosystem services, and human health and well-being: Opportunities to enhance health and biodiversity conservation." *Ecosystem Services* 12. 1–152



Introduction

Project Goals

The specific purposes of the Connected Land Conservation Plan of the East Cooper Region are to map existing natural assets; create an inventory of the region’s recreational, historic, and cultural assets; provide GIS assistance to the region’s municipalities so that informed decisions can be made regarding their natural assets; and begin a conservation project prioritization process.

Goal:

To be a resource and a force in the region for the identification and the protection of sensitive and connected tracts of land.

Strategy:

Identify habitat cores using the methodology developed by the Green Infrastructure Center and approved by the SC Forestry Commission. Work with other conservation groups that actively maintain conservation areas in the region such to connect land that is already protected or should be protected using various conservation tools. This will ensure that the core quality is maintained through some of the most sensitive habitat cores. Communicate with these other groups to continue data sharing initiatives within the conservation community as well as with municipal planning departments. Create and maintain an ArcGIS Online web application for the easy sharing and display of data.

Goal:

To continue to define the route of the East Cooper Trail, an off-road pedestrian and bicycle trail that connects the Cooper River to the Santee River and gives residents and visitors non-motorized transportation and recreation options.

Strategy:

Use GIS data collected and created during the duration of this project to connect the trail route through habitat cores, park sites, and recreational points of interest where possible. Locate opportunities to connect habitat cores or fragments using green landscape corridor routes identified by the National Land Cover Database. Once several potential routes are identified, begin maintaining a database of landowner contacts through parcel data collection where the route intersects.

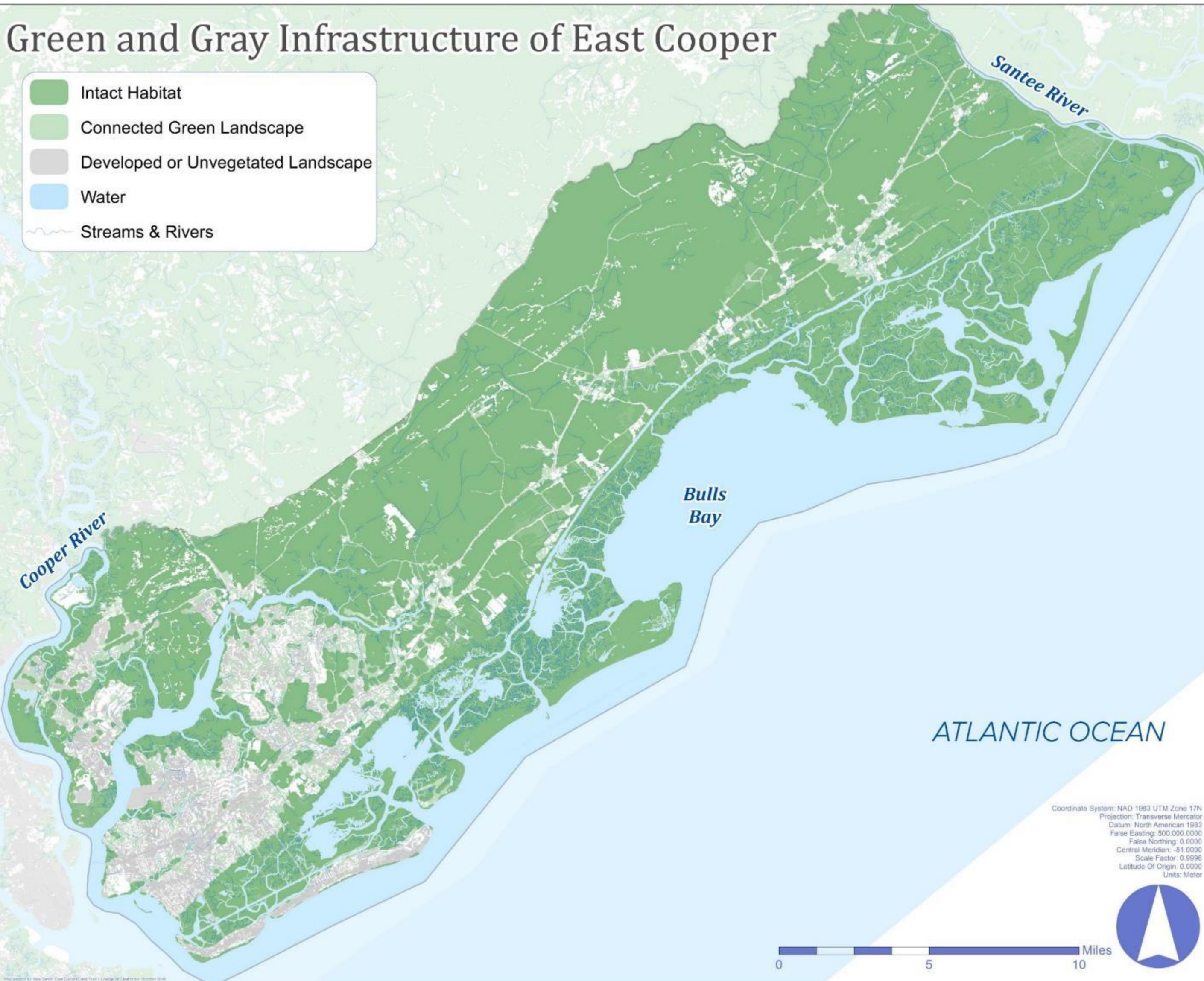
Goal:

To create a prioritized inventory of potential conservation projects within the East Cooper region.

Strategy:

Analyze vacant parcels within the region for their proximity to high quality natural assets, recreational opportunities, and areas of historical or cultural significance. Maintain a spreadsheet with parcel data and landowner contact information.





Identifying the Habitat Cores

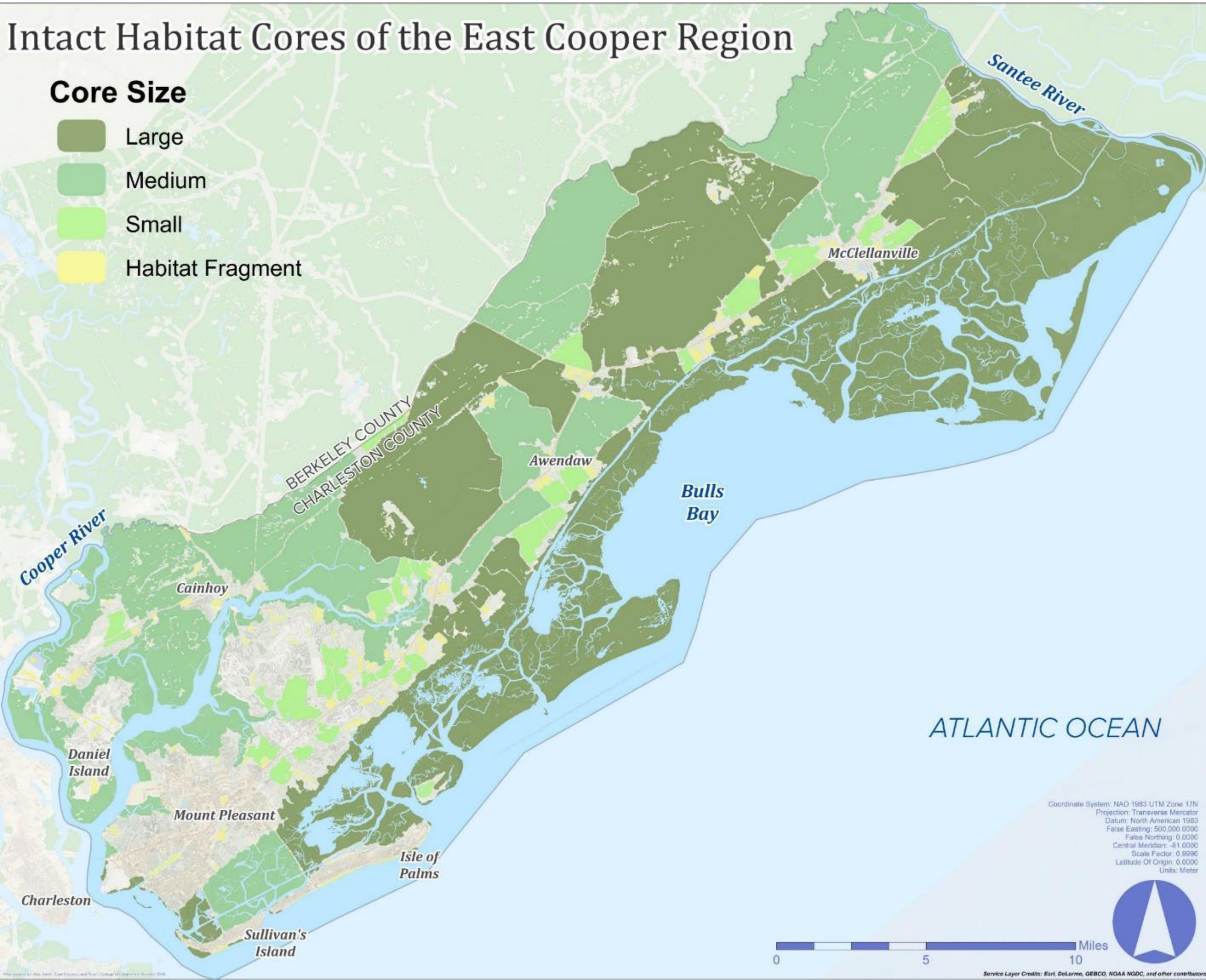
The Green Infrastructure Center has created a natural asset modeling tool which has been utilized to identify the location and shape of habitat cores, then rank them based on their ecological integrity using the best available data. These two major steps are essential for creating a natural asset model of the study area.

In the first step of identifying the cores, data layers were obtained that identify the land cover, infrastructure, and development across the landscape. These specific datasets include: the National Land Cover Database (NLCD) which covers the entire state of South Carolina, as well as local roads, rail lines, and building locations which are necessary to assess fragmentation of the habitat cores. This data was received from various sources including Charleston County, Berkeley County, and Georgetown County as well as state and federal sources. Map 2 displays all of the intact natural landscape after fragmentation from roads and buildings has been taken into account. The landscape is assessed at a 30 meter (30x30m), or about a 100 foot (100x100ft) resolution. This means that only cores larger than 100 by 100 feet are visible during the analysis.

Here, digitized intact habitat cores are overlaid upon connected green landscape that includes tree canopy which is identified using the National Land Cover Database. Land that is classified as “Mixed Forest, Evergreen Forest, Deciduous Forest, Woody Wetlands, or Emergent Herbaceous Wetlands” make up this layer. Agricultural fields are not considered eligible to be a core. This layer proves useful in determining the connectivity between habitat cores. These two layers together determine the “green infrastructure” of the region. The project’s team has determined that the use of the term “natural assets” in place of “green infrastructure” is preferable when communicating with the municipalities and citizens of the region.

Land that is classified as “Developed High Intensity, Medium Intensity, Low Intensity, or Barren Land” as well as all of the impervious roads and buildings within the region determine the developed or unvegetated landscape and “gray infrastructure” of the region.

Map 2: Green infrastructure, including habitat cores, tree canopy, and wetlands, and gray infrastructure, including developed land, roads, and buildings, of the East Cooper region of South Carolina.



Identifying the Habitat Cores

The habitat cores within the region can be analyzed based on their size. Any part of the habitat land (from Step 1) that is within 100 meters of a fragmenting feature is removed. Once this ‘edge habitat’ is taken out, individual cores of interior habitat are identified by calculating their area in acres. Habitat patches of less than 10 acres are also deleted. Habitat patches with areas ranging from 10 to 100 acres are then classified as ‘habitat fragments’ and remain in the analysis, while habitat patches of greater than 100 acres are classified as cores.

Map 3 displays the habitat cores classified by their objective size. Patches of habitat smaller than 100 acres (after fragmentation is considered) are considered “Habitat Fragments,” between 100 and 1,000 acres are considered “Small Cores,” between 1,000 and 10,000 acres are considered “Medium Cores,” and larger than 10,000 acres are considered “Large Cores.”

Map 3: Intact habitat cores classified by size within the East Cooper region of South Carolina.

Ranking the Habitat Cores

In the second step of ranking the cores, additional data layers were then used to compute statistics about the cores, which can be summarized in a composite “score” used for ranking. This score determination, which is referred to by the Green Infrastructure Institute as the Core Quality Index (CQI), represents the ecological quality of the core using quantifiable metrics. These ten metrics include: area, thickness, topographic diversity, species richness, percent wetland cover, soil diversity, compactness ratio, stream density, and RTE (rare, threatened, and endangered) species abundance and diversity, and are displayed in Figure 1. Each of these metrics is weighted by its importance in determining ecological integrity.

All of the data layers required to calculate this score are publicly available (with the exception of the RTE data). Specific datasets include: the National Wetlands Inventory (NWI), the Soil Survey Geographic Database (SSURGO 2.2), the National Hydrography Dataset (NHD), the SC Species Richness raster dataset, the SC RTE Species Inventory, a digital elevation model (DEM) for the area of interest, and Coastal Land Use (NOAA C-CAP). All of this data was clipped to the 20 kilometer buffer. Statistics were calculated for a series of attribute fields within each habitat core and weighted by their importance.

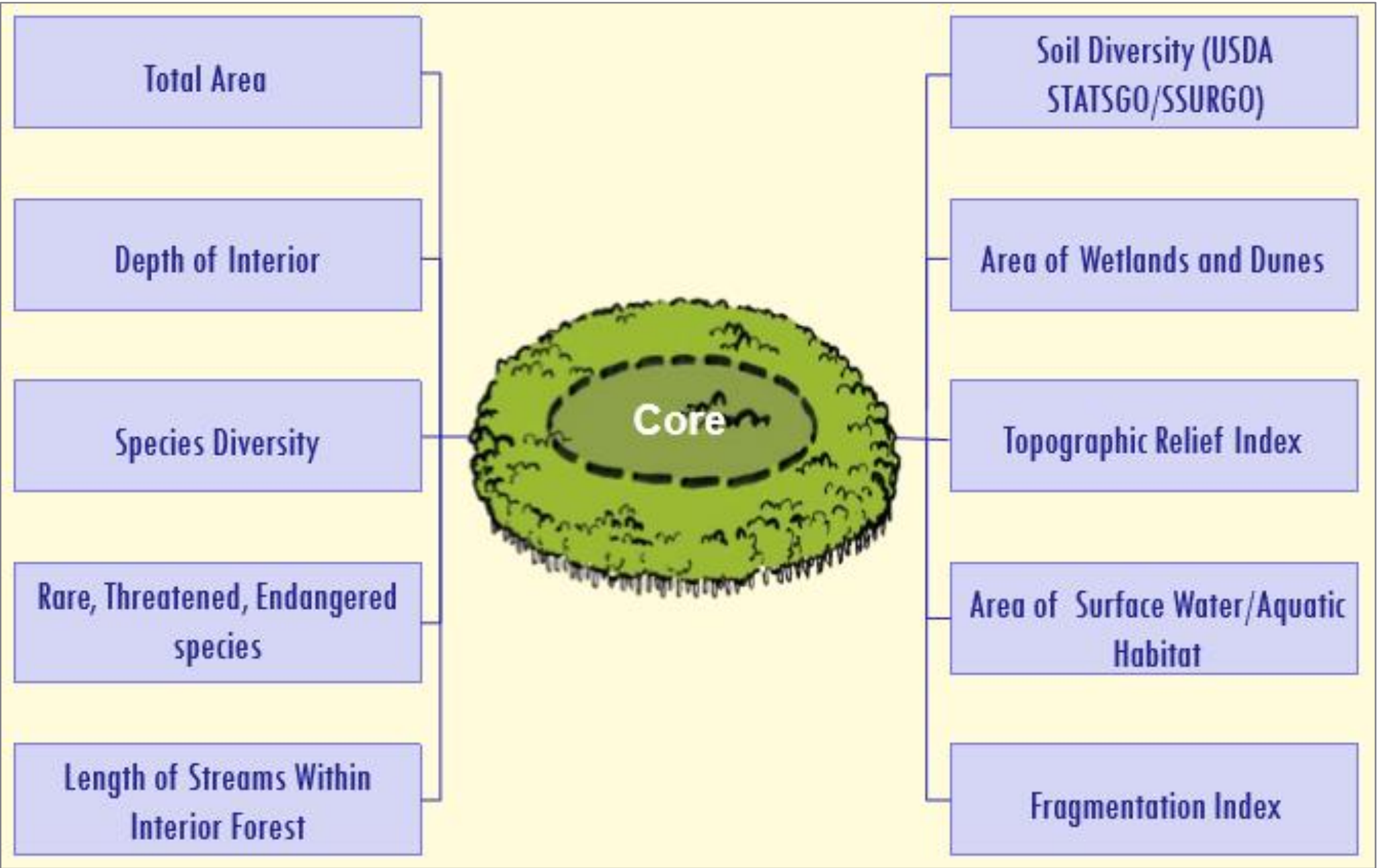


Figure 1: The metrics that are used to rank habitat cores under the Core Quality Index.

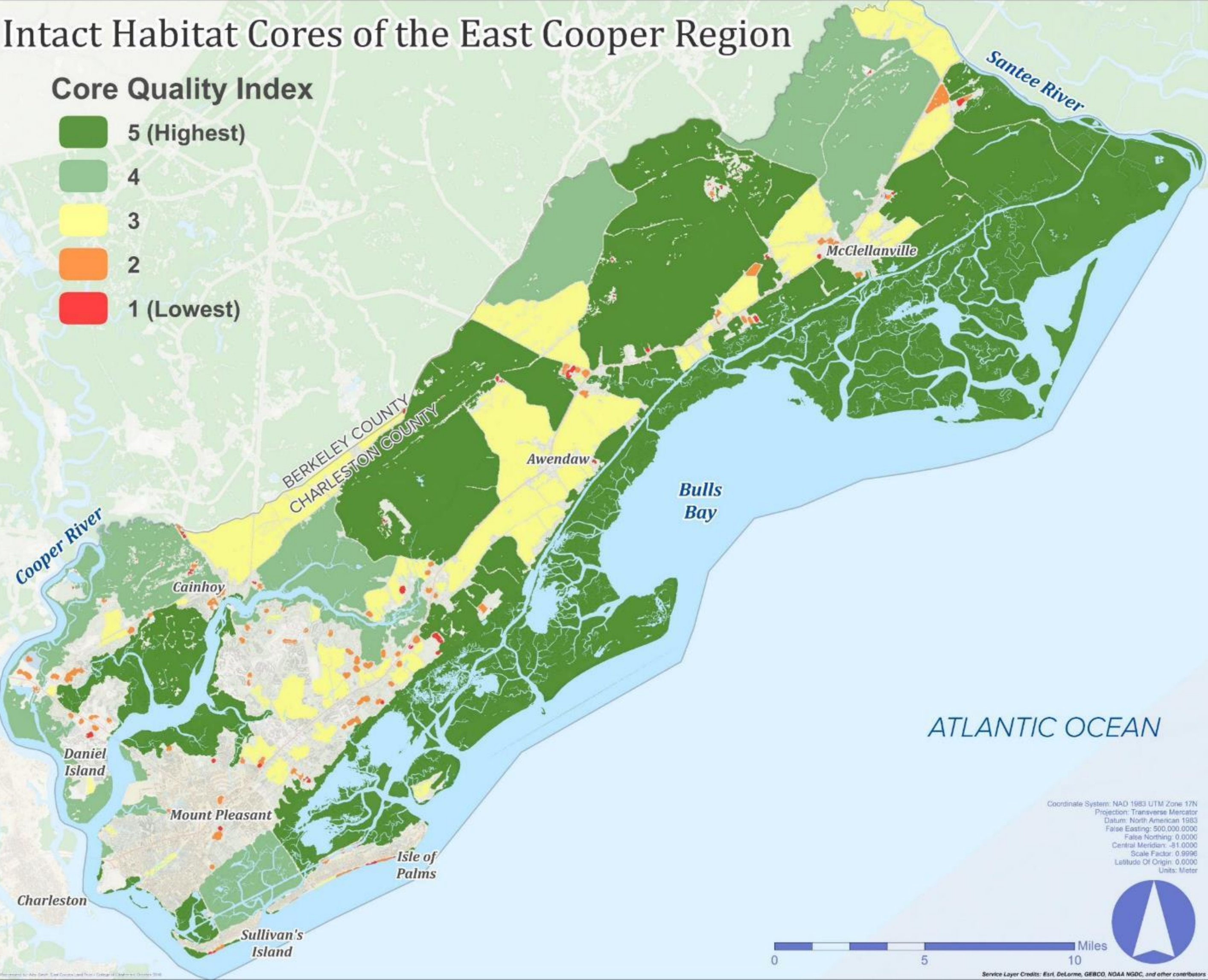
Ranking the Habitat Cores

Map 4 displays the base map of the habitat cores ranked from one to five using the CQI. All of the cores of the region are ranked against one another, as the scores are relative and divided into quintiles. A score of one indicates that the core’s score is lower than the 20th percentile when compared to the other cores of the region. A score of five indicates that the core’s score is higher than the 80th percentile. This base map displays the largest, highest ranked cores within the Francis Marion National Forest and Cape Romain National Wildlife Refuge. It also reveals where cores are most at risk, such as the areas around Mount Pleasant and Daniel Island.

LIST OF METRICS USED TO RANK HABITAT CORES		
ATTRIBUTE	WEIGHT	DESCRIPTION/RATIONALE
Area	0.40	The raw surface area of a core is the single most important variable for supporting ecosystem functions.
Thickness	0.10	Core thickness measures the radius of the largest circle that can be drawn within each core, without going outside the core. Interior habitat is important for many species, and this metric is also a measure of fragmentation.
Topographic Diversity	0.05	There are higher diversity of communities where there is vertical stratification of land.
Species Richness	0.10	Predicted (modeled) number of species present, on average. Weight is less than actual observations (RTE Element Occurrences).
Percent Wetland Cover	0.05	Wetlands are some of the most productive ecosystems, and provide a number of benefits including wildlife and fish habitat, water filtration and erosion and flood control.
Soil Diversity	0.03	Contributes to a potential diversity of plant communities.
Compactness Ratio	0.02	The compactness ratio is the ratio between the area of the core and the area of a circle with the same perimeter as the core. This is one measure of 'roundness'; a circular core functions better than an elongated core because the depth to its interior is more consistent and it has less edge compared to interior (all other things being equal).
Stream Density	0.10	Streams within interior forests are more likely to contain pristine aquatic conditions than unforested streams, in addition to providing valuable habitat, a source of water, and improving water quality. The greater the density of surface waters the more aquatic habitat is likely, which relates to greater potential for more diverse species of flora and fauna.
RTE Species Abundance	0.05	The raw number of observations. Weighted less than the number of unique species observed (since there may be many observations of a single species). Only observations since 1980 are included. Older observations may no longer be accurate.
RTE Species Diversity	0.10	The number of unique species observed in the core. Only observations since 1980 are included. For example, if there are 10 observations of rare, threatened, and endangered species inside a core, but nine of them are of the same species, the Species Diversity score would be 2.

Table 1: Descriptions of the metrics that are used to rank habitat cores under the Core Quality Index, weighted by their importance in assigning ecological integrity.

Intact Habitat Cores of the East Cooper Region



Map 4: Intact habitat cores are ranked using the Core Quality Index so that the highest-quality habitats can be identified.

Watersheds & Wetlands of East Cooper

East Cooper Region, SC
Hydrologic Unit Code (HUC) 12
Labeled Subwatersheds

Watershed Division
Streams & Rivers
Wetlands
Intact Habitat

Outlet Wambaw Creek
South Santee River
Headwaters Wambaw Creek
Bulls Bay
Cape Romain
Awendaw Creek
French Quarter Creek
Upper Cooper River
Guerin Creek
Lower Wando River
Lower Cooper River
Breach Inlet
Copahee Sound
Atlantic Ocean

Coordinate System: NAD 1983 UTM Zone 17
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 500,000.000
False Northing: 0.000
Central Meridian: -81.000
Scale Factor: 0.9996
Latitude Of Origin: 0.000
Units: Meters

0 5 10 Miles

East Cooper Watersheds

A watershed is defined as a geographic area of land, water, and biota within the confines of a drainage divide. Watershed boundaries define the aerial extent of surface water drainage to a point. The boundary between watersheds is defined as the topographic dividing line from which water flows in two different directions.

The East Cooper region lies within the Cooper River, Santee River, and Bulls Bay HUC 8 watersheds. Divided into HUC 12 classification, the region contains land within twelve different sub-watersheds.

Being located within the floodplains and low terraces between the Santee and Cooper rivers, the resiliency of the coastal communities in the East Cooper region is important as they face risks from flooding, coastal storms, and sea level rise, as well as stressors associated with growing populations and development.

It can be important for East Cooper Land Trust to be able to identify which watershed a particular conservation project falls in. This aides in the organization's technical competency; the ability to identify how a conservation project will affect the water resources of the region is important and beneficial to future grant applications for technical assistance or funding. East Cooper Land Trust hopes to be a resource in aiding the local municipalities in their environmental knowledge and mapping needs.

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Map 5: Hydrologic Unit Code 12 watershed boundaries labeled and overlaid upon the natural assets of the East Cooper region of South Carolina.

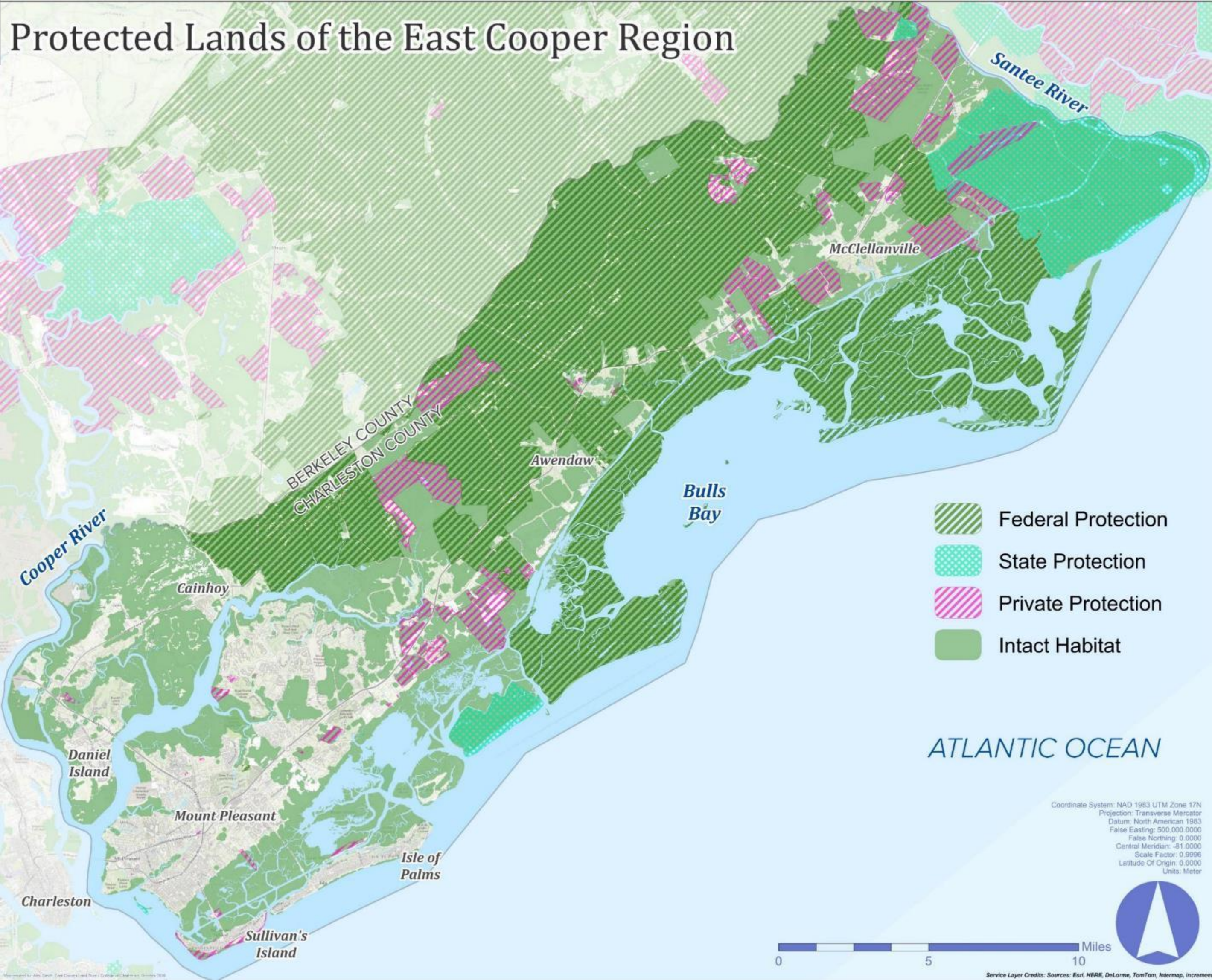
What is Protected?

There are approximately 216,372 acres of land within defined Charleston or Berkeley County parcel boundaries in the East Cooper region, and approximately 112,760 of these acres are currently protected through federal, state, or private means. This acreage comes from The Nature Conservancy South Carolina database of protected lands, updated in March 2016. This shows that approximately 52% of the defined parcel area of the East Cooper region is protected. Much of this is accounted for in the federally-owned Francis Marion National Forest and Cape Romain National Wildlife Refuge.

The East Cooper communities benefit greatly from this federally protected land, as it holds some of the highest ranked habitat in the region. This protection does limit the geographic growth and annexation of some of the local municipalities, as their borders cannot expand into these protected areas. However, they provide a wealth of recreational, cultural, and natural assets to benefit the quality of life of these municipalities' residents. There is a delicate relationship between development and these protected areas that must be maintained for the benefits to be fully realized.

East Cooper Region Protected Land	
	Acres
Federal Protected Land	73,919.15
State Protected Land	20,595.08
Private Protected Land	18,244.64
Total Protected Land	112,758.87

Table 2: Total acreage of protected lands within the East Cooper region. All acreages listed include only those within defined parcel boundaries.



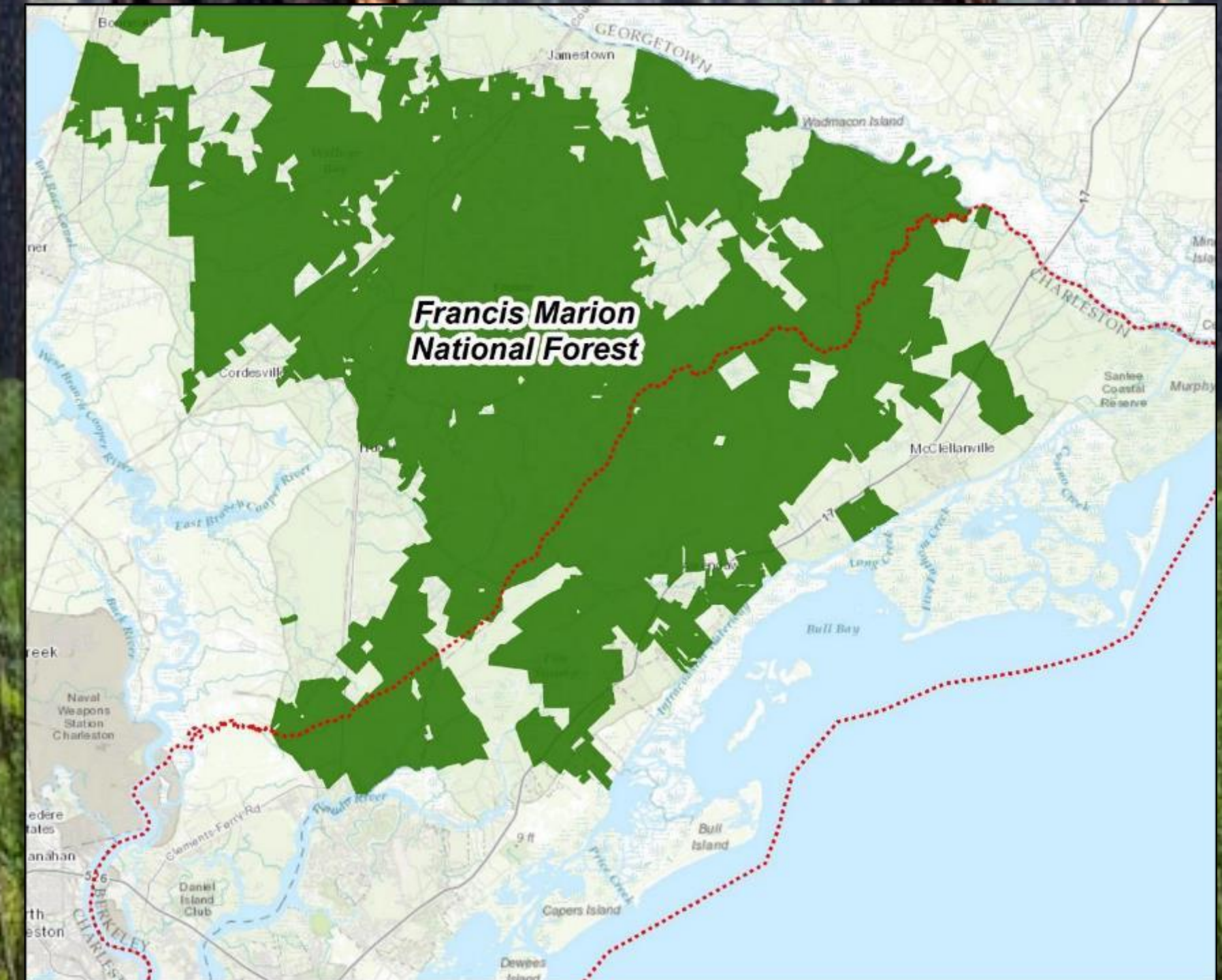
Map 6: Federal, state, and privately protected status land boundaries overlaid upon the natural assets of the East Cooper region of South Carolina.

Francis Marion National Forest



The Francis Marion National Forest contains the largest area of protected land in the region, with 72,268 acres within the region's defined parcel boundaries. The entire Forest spans almost 259,000 acres, which spread across Berkeley and Charleston Counties, edging the Santee River as it runs from Lake Moultrie in Berkeley County to the coast. In addition to providing recreation opportunities such as hiking, cycling and camping, the USDA Forest Service manages the Francis Marion for timber and wood production. With its significant size and location in the upper reaches of the Santee and Cooper watersheds, the Francis Marion plays a strategic role in protecting local and regional water resources – including groundwater, the waters of the Santee and Cooper Rivers, and downstream coastal habitats and resources like the Cape Romain National Wildlife Refuge that are critical to the region's biodiversity, economy, and culture.¹

¹*Our Region Our Plan: Envisioning the Future of Berkeley, Charleston, and Dorchester Counties.* (December 2012). Berkeley-Charleston-Dorchester Council of Governments.



Cape Romain National Wildlife Refuge



The Cape Romain National Wildlife Refuge is the second largest federally protected area within the region. The entire refuge stretches 22 miles along the coast and spans 66,287 acres, most of which are composed of salt marshes, barrier islands, and open water which are not defined by parcel boundaries. The largest and most ecologically significant of the barrier islands is Bulls Island, known for its important bird habitat. The habitats of the island support the majority of the 277 bird species found in the refuge, which include migrating waterfowl, shorebirds, and local resident species. The island also contains ancient shell heaps or “middens” deposited by Native Americans and the foundation of a fort used in the Revolutionary and Civil Wars. The refuge also holds two 1800’s historic lighthouses that still serve as daytime landmarks for boaters. Cape Romain is rich in cultural and recreational assets and hosts a variety of activities including hunting, fishing, wildlife observation, photography, hiking, shelling, boating, interpretation and environmental education.¹

¹Our Region Our Plan: Envisioning the Future of Berkeley, Charleston, and Dorchester Counties. (December 2012). Berkeley-Charleston-Dorchester Council of Governments.

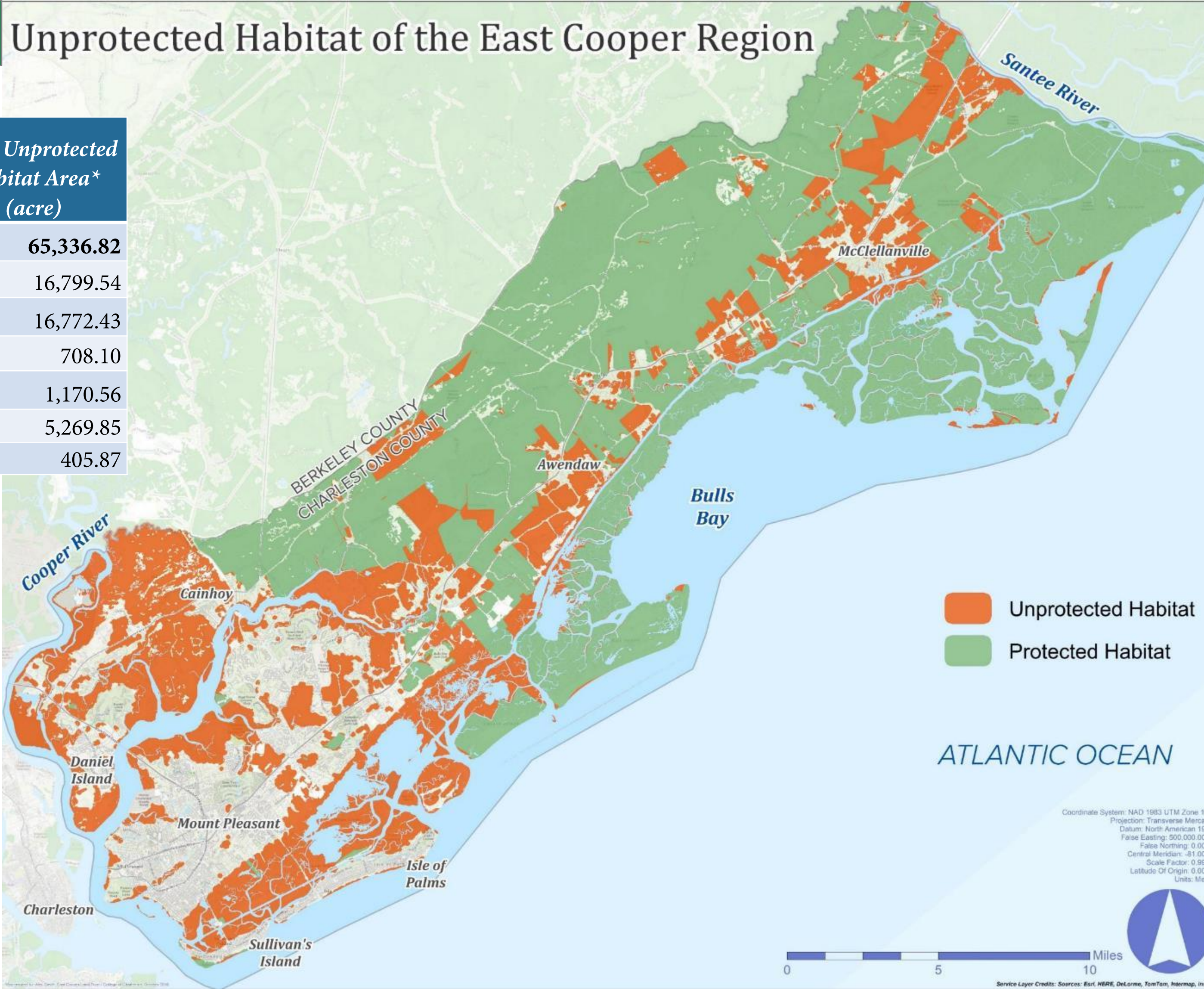
What is Unprotected?

	Total Area* (acre)	Total Habitat* Area (acre)	Total Unprotected Habitat Area* (acre)
East Cooper Region	216,370.81	170,268.23	65,336.82
Mount Pleasant (Planning Area)	47,537.65	17,684.61	16,799.54
Daniel Island & Cainhoy	27,389.54	19,942.06	16,772.43
Sullivan's Island	1,473.67	843.69	708.10
Isle of Palms	2,897.49	1,170.56	1,170.56
Awendaw	10,245.53	7,660.75	5,269.85
McClellanville	1,205.10	405.87	405.87

Table 3: Total acreage of habitat cores within the East Cooper region.

*All acreages listed include only those within defined parcel boundaries.

There are approximately 170,268 acres of intact habitat cores within these county or municipal parcel boundaries in the East Cooper region. Of these acres, 65,336 are not permanently protected through federal, state, or private means. This unprotected acreage includes some government-owned park and recreational land, however, these areas still face the risk of changes in zoning and development pressure. This project has revealed that more than half of the land within the region is permanently protected. This percentage is significantly lower if the land within the Francis Marion National Forest is not included.



Map 7: Intact habitat cores of the East Cooper region of South Carolina classified as protected or unprotected by federal, state, and private conservation mechanisms.

Vacant Land

According to a study completed by East Cooper Land Trust staff in 2014,¹ the East Cooper region included an estimate of over 4,500 parcels which were identified as vacant. These vacant sites present opportunities for conservation projects that may contain valuable natural assets that of ecological, recreational, or general public value.

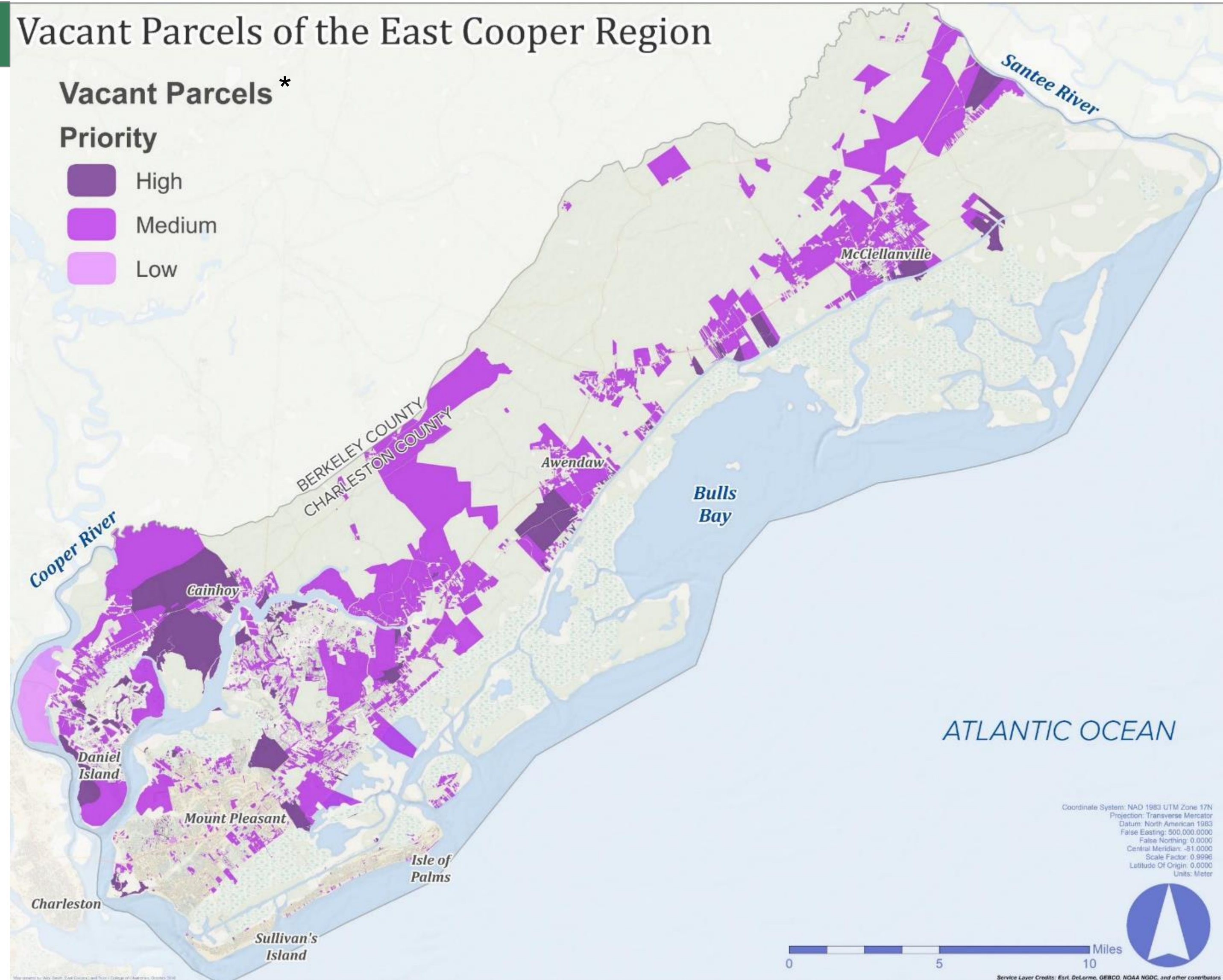
During the course of this 2014 study, vacant parcels of the East Cooper region were manually ranked and assigned a priority level. The vacant parcels smaller than 0.5 acres were omitted from this inventory. Parcels that had the highest overall conservation value were classified as high priority. Priority was assigned a ranking of 0-3 for the following specific criteria: protection of water quality, soil permeability, maintenance of biological diversity and wildlife habitat, buffer from undesirable uses, recreational opportunity, protection of natural resources, scenic views, historic resources, education, risk of sea level rise, and fire hazard.

Although this previous study was a static look at the region and there needs to be an updated vacant parcel evaluation, it provides a quick insight into which parcels may be available for conservation projects. The addition of the habitat core analysis has created a methodology and visualization process that transcends parcel and jurisdictional boundaries. The Green Infrastructure Center's GIS tools also allow for the vacant parcel inventory to be refined even further. Additionally, the vacant parcel inventory will be updated during the new and dynamic analysis that is now taking place.

¹ Gosnell, Ashley. "A GIS Analysis and Conservation Assessment of Vacant Land Parcels in the East Cooper Area of South Carolina." (December 2014). East Cooper Land Trust, College of Charleston.

* This inventory of vacant parcels was completed in December 2014 and may be updated to reflect development projects which have occurred since this date.

Vacant Parcels of the East Cooper Region



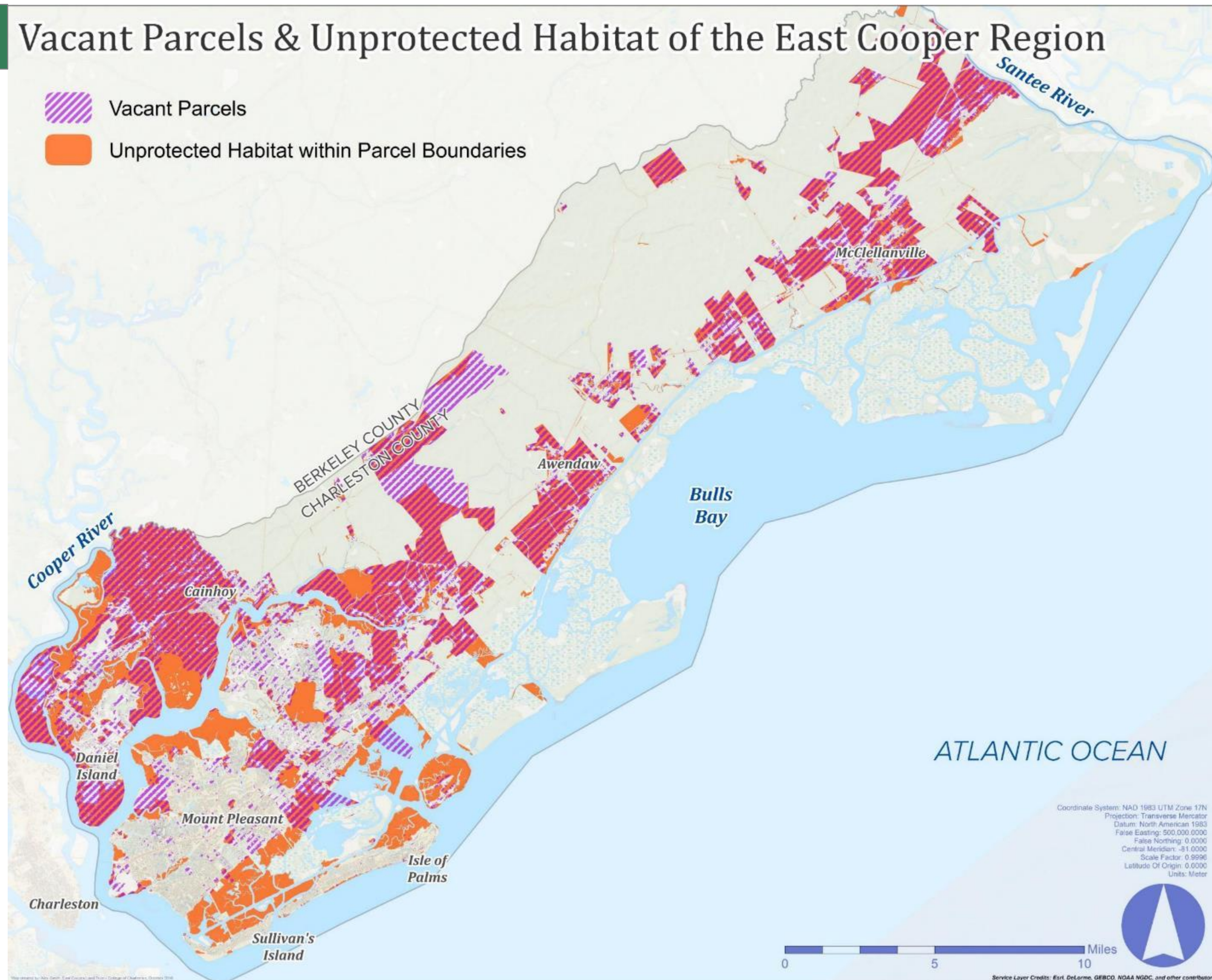
Map 8: Vacant parcels classified by conservation priority within the East Cooper region of South Carolina.

Vacant Land

When overlaid upon the unprotected habitat cores within the region, there is considerable overlap in the location of the 2014 vacant parcels and areas that may need to be protected. This emphasizes that vacant parcel locations provide a reliable indicator where a conservation project may be appropriate. However, not all of these vacant parcels are ideal for conservation projects and may not contain intact habitat. Additional analysis is needed.

East Cooper Land Trust is not a government organization that has the ability to purchase large tracts of land or directly impact development decisions through zoning or eminent domain. Since the organization does not have the resources or influence to protect entire habitat cores, the prioritization of conservation areas needs to be focus on individual parcels.

The following few pages of this report describe how East Cooper Land Trust can build upon a prioritization methodology which is already in place by incorporating the new data that comes with the habitat core model.



Map 9: Vacant parcels overlaid upon unprotected habitat cores that fall within parcel boundaries within the East Cooper region of South Carolina.

Parcel Prioritization for Conservation

The specific parcels that were identified were based first on the identification of parcels that are listed as ‘vacant’ in the Charleston or Berkeley County GIS database, and then based on whether they are located within a habitat core or may serve as an important connection between habitat cores. The Core Quality Index ratings of the associated habitat cores which are adjacent and intersecting these parcels played a factor in determining the appropriateness of pursuing a conservation project. Additionally, these parcels were then analyzed based on their proximity to recreational and cultural assets as well as water resources. These recreational and cultural assets were the point, polygon, and line features identified in the GIS regional inventory that has been created during this project and displayed on the theme-overlay maps, which are discussed later in this report. The parcels’ proximity to the proposed route of the East Cooper Trail or a kayak launch point which could be utilized by the public are examples of the prioritization in reference to their proximity to important recreational resources. Vacant parcels located in riparian corridors along rivers, major streams, and wetland systems were prioritized for their ability to serve as a buffer to water quality.

East Cooper Land Trust now has a methodology for creating, maintaining, and updating a prioritized list that contains spatial, ecological, and legal attributes of specific parcels that have been identified and organized based on their geographic area. Owner contact information has been identified on certain parcels when this information is available, and the organization will continue its efforts of researching these parcels and obtaining the appropriate contact information. Parcels may be removed from the inventory when a landowner expresses no interest in conservation options or if the parcel becomes completely developed. Local knowledge provided through meetings as well as ground truth knowledge will also help to shape this inventory, either by adding or removing parcels.

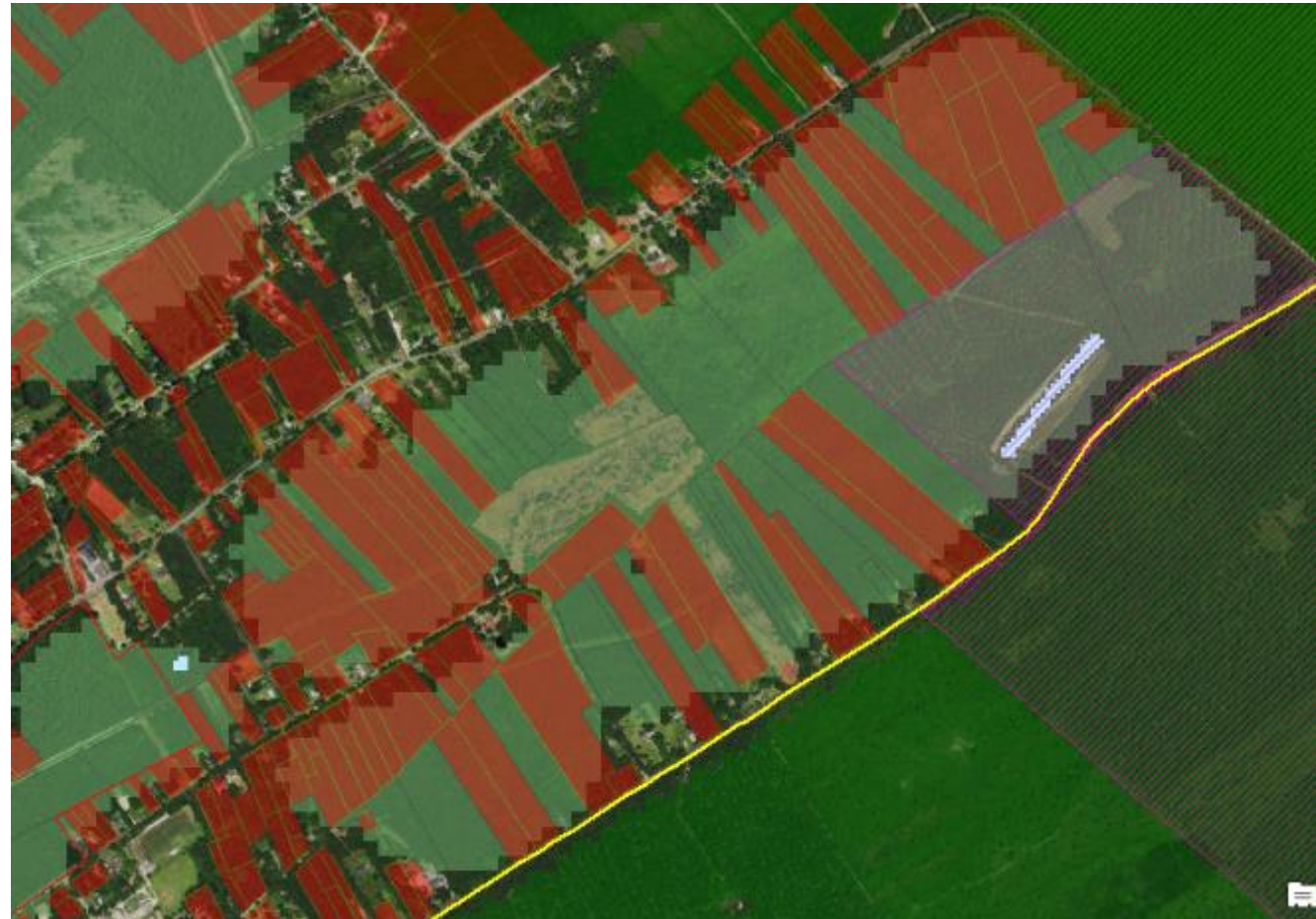


Map 10: Parcels prioritized using East Cooper Land Trust’s natural asset planning methodology overlaid upon the natural assets of the southern section of the East Cooper region of South Carolina.

Mt Pleasant High Priority Parcels											
Parcel ID	DEEDED ACREAGE	Calculated Acres	OWNER1	OWNER2	CLASS CODE	Address					
5141000114	2.32	2.33	JSP SCANLONVILLE LLC		624 - CEMETERIES	0 4TH	ST	MOUNT PLEASANT	SC	29464	
5170000001	162.86	167.15	PATRIOTS POINT DEVELOPMENT	AUTHORITY	711 - MUSEUM-CULT	0 PATRIOTS POINT	RD	MOUNT PLEASANT	SC	29464	
5170000103	0.0023	0.00	PATRIOT'S POINT DEVELOPMENT	AUTHORITY	990 - UNDEVELOPABLE	0 PATRIOTS POINT	RD	MOUNT PLEASANT	SC	29464	
5171500104	1.29	1.39	DOSCHER ELIZABETH DEANNE		905 - VAC-RES-LOT	0 BEACH	ST	MOUNT PLEASANT	SC	29464	
5300000001	242.1	398.48	LAWRENCE PHILIP J	ETAL	905 - VAC-RES-LOT	0 N HIGHWAY 17		MOUNT PLEASANT	SC	29464	
5300000005	199.83	200.07	CONCH CREEK CORPORATION		905 - VAC-RES-LOT	0 HIGHWAY 703		MOUNT PLEASANT	SC	29464	
5300000008	198.24	188.27	CONCH CREEK CORPORATION		905 - VAC-RES-LOT	0 HIGHWAY 703		MOUNT PLEASANT	SC	29464	
5350000042	5.12	5.28	TWELVE OAKS PROPERTIES LLC		800 - AGRICULTURAL	0 DUPRE	LN	MT PLEASANT	SC	29464	
5350000055	1	3.86	GADSDEN JOSH JR		905 - VAC-RES-LOT	0 MATHIS FERRY	RD	MOUNT PLEASANT	SC	29464	
5350000056	1	3.86	ANDERSON BENJAMIN LIFE ESTATE	ANDERSON BENJAMIN JR	905 - VAC-RES-LOT	0 MATHIS FERRY	RD	MOUNT PLEASANT	SC	29464	
5370000050	19.84	22.55	RD AND COMPANY LLC	MR JONES	900 - RES-DEV-ACRS	0 BELLE HALL PKWY		MOUNT PLEASANT	SC	29464	
5370000097	2.32	1.93	BELLE HALL HOMEOWNER'S ASSOCIATION INC	ASSOCIATION INC	990 - UNDEVELOPABLE	0 COBBLESTONE	WAY	MOUNT PLEASANT	SC	29464	
5370000108	0.72	0.72	MIDDLETON CATHERINE P	MIDDLETON LEWIS B	905 - VAC-RES-LOT	364 TIDAL TERRACE	CT	MOUNT PLEASANT	SC	29464	
5370000174	3.72	3.78	GRASSY CREEK	CMG	742 - HOA-PROP	270 RIVER OAK	DR	MOUNT PLEASANT	SC	29464	
5370000283	0.21	2.38	CUZZELL CHARLES L IV	CUZZELL HALEY M	905 - VAC-RES-LOT	314 RIVER OAK	DR	MOUNT PLEASANT	SC	29464	
5370000284	0.36	2.38	MASSEY CYNTHIA LAHEE		905 - VAC-RES-LOT	314 RIVER OAK	DR	MOUNT PLEASANT	SC	29464	
5370000285	0.22	2.38	BRANDT CHRISTOPHER J	BRANDT BRITTANY W	905 - VAC-RES-LOT	314 RIVER OAK	DR	MOUNT PLEASANT	SC	29464	

Site-Scale Conservation Plans

At the site-scale, it becomes easy to identify potential connections between fragmented habitat cores through the analysis of vacant parcels. Though some parcels are inevitably slated for development either for residential or commercial uses, there are opportunities to reach out to landowners at opportune times to discuss mutually-beneficial conservation options.



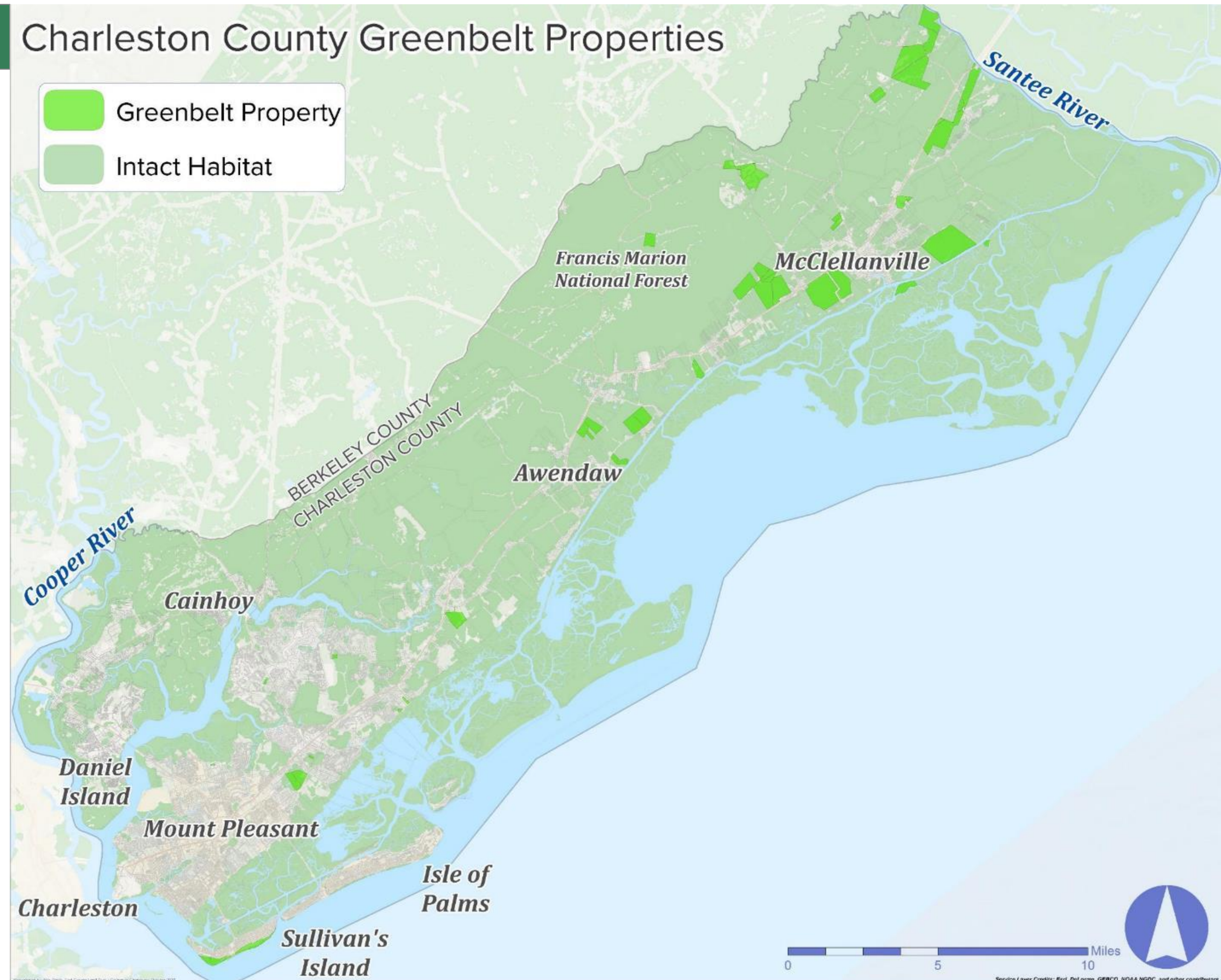
The analysis of vacant parcels can be used to identify risks posed by development. The image above displays an area of McClellanville with vacant parcels in red. The green overlay represents a habitat core that is partially protected by a conservation easement on its eastern side (pink overlay). The shape of the red parcels present potential ways in which an area can be developed and a habitat core can be fragmented. However, this also presents opportunities for a land trust to work with the landowners to ensure that the natural landscape remains connected.



The images above display an area within the Cainhoy Peninsula with a selected group of parcels that were identified as a potential opportunity to connect two smaller habitat fragments. Preserving these parcels in their natural state, sometimes using restoration efforts, can create a larger habitat core, capable of housing a higher level of biodiversity. Through a little research, it was determined that the parcel on the southern end of this group holds a habitat fragment owned by a local Cainhoy conservation group. This is a very localized group, and their property was not registered in The Nature Conservancy's South Carolina database of protected lands. The parcel directly to its north is on the market for purchase. A smaller land trust such as East Cooper Land Trust has the opportunity to reach out to this local conservation group to develop a site-scale conservation plan for this local area to connect nearby habitat fragments with the Francis Marion National Forest, which borders the area to the east.

Greenbelt Program

Charleston County Greenbelt Properties



Map 11: Parcels acquired by various groups using funding from the Charleston County Greenbelt Program within the East Cooper region of South Carolina.

On November 8th, 2016 Charleston County voted to extend its Greenbelt Program into the future and re-fund the Greenbelt Bank to \$210 million.

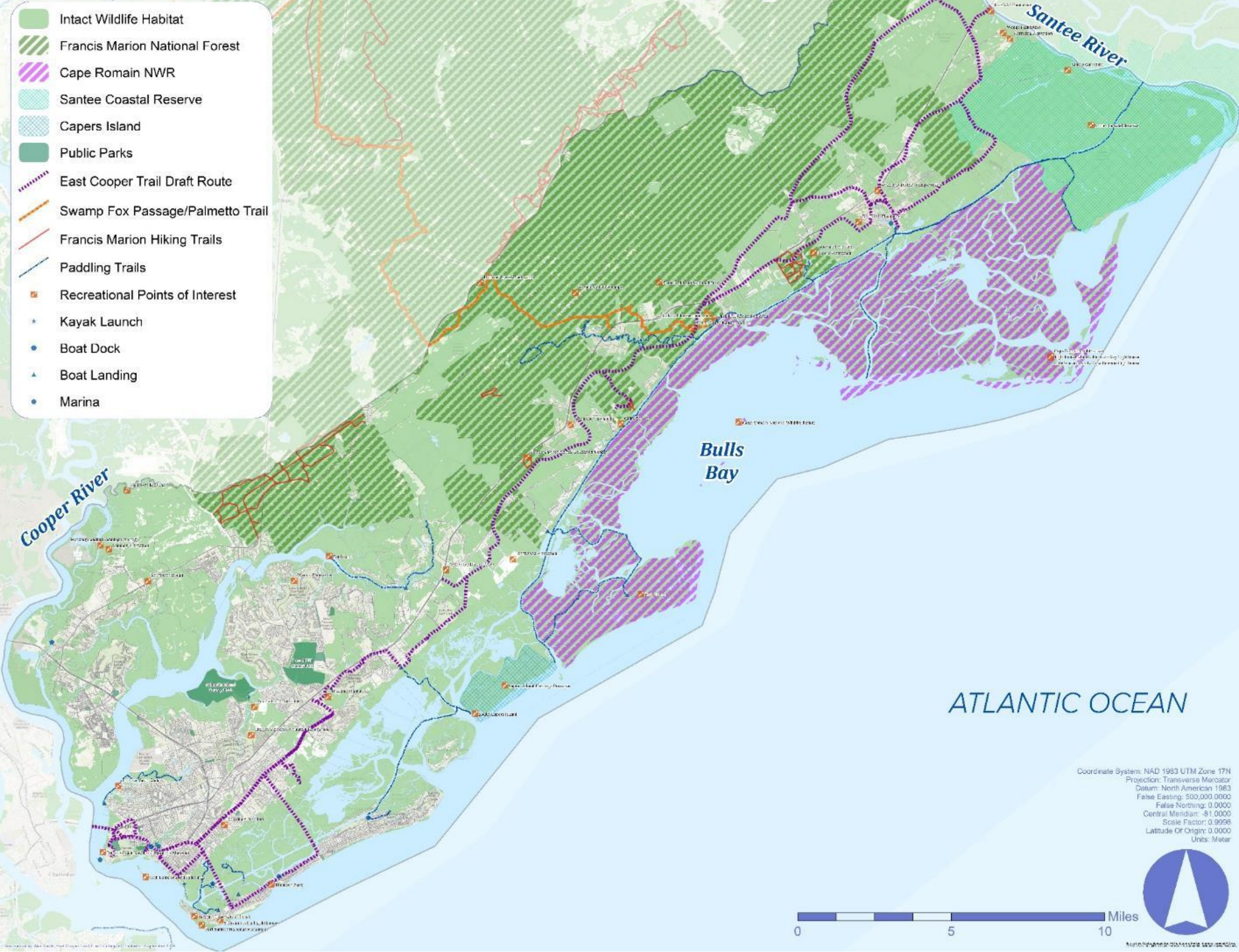
The Greenbelt Program was originally established in 2004 using funding from the county Transportation Sales Tax, making \$66.5 million available for protecting green space in within the county. Since then, the program has protected over 20,000 acres of rural and urban land within the county.¹ Within the East Cooper region, the program has protected 46 parcels totaling over 6,450 acres.

East Cooper Land Trust qualifies as an eligible recipient of these funds and has been a partner of Charleston County on both rural and urban projects. The organization currently holds conservation easements on three Greenbelt properties: Thornhill Farm, the CAGE Organization Property, and Magnolia Park & Urban Horticulture Center in West Ashley. With availability of the new round of funding, East Cooper Land Trust plans to locate and protect additional Greenbelt sites.

This funding source should continue to be pursued by East Cooper Land Trust when conservation opportunities arise. The GIS mapping tools used in this project can be used to locate parcels that qualify for Greenbelt funding and display a logical approach to selection during the application process. Acquisition of prioritized parcels may require this funding or a combination of multiple funding sources.

¹ Charleston County Greenbelt Program. (2016).
<<http://charlestoncountygreenbelt.org/status.php>>

Recreational and Natural Assets of East Cooper



Map 12: Recreational assets overlaid upon the natural assets of the East Cooper region of South Carolina.

Recreational Assets

The recreational assets of a community are important features that can contribute to resident physical and mental health, and a region's economic and tourism activity. They can sometimes shape the culture in ways that put emphasis on exercise and nature, and open up the doors for funding sources which can be used for open space preservation. The recreational assets of the East Cooper region have never before been displayed over the natural assets in ways that show how trails and recreational destinations connect, or be used to connect, important habitat cores.

These maps were created by overlaying the Francis Marion National Forest's hiking and paddling trail systems obtained from their geospatial data portal on their website,¹ the Palmetto/Swamp Fox Trail alignment, paddling trail alignments and kayak launch, boat landing, boat dock, and marina locations provided by the BCDCOG Blueways and Greenways for South Carolina Project (ArcGIS Online); the East Cooper Trail alignment created by East Cooper Land Trust with contributions from Charleston County Parks and Recreation Commission, South Carolina points of interest locations from the College of Charleston database; and federal and state-protected areas from The Nature Conservancy's March 2016 database of protected lands.

¹“Geospatial Data – Francis Marion National Forest.” (2016). United States Forest Service. <<https://www.fs.usda.gov/main/scnfs/landmanagement/gis>>

The Need for Greenways

East Cooper Land Trust has been playing an active role in planning our region's trails and greenways for the future. Staff serve on the SC East Coast Greenway Steering Committee and the BCDCOG's Walk + Bike Steering Committee. In addition, we are working with all six municipalities and Charleston County to encourage and support their efforts for safe multi-use trails. These efforts assure that adequate trail routing and connections make it into local and regional plans. This has been a collaborative effort between the East Coast Greenway Alliance, Charleston Moves, the Charleston County Parks and Recreation Commission's People 2 Parks Study and all of our local municipalities.

The desire and need to invest in off-road options for recreation and transportation was displayed in a recent public input study¹ where respondents placed greenways and trails as the number one type of initiative that would make their community a safer and friendlier place to walk. Additionally, when told that they have \$100 to spend on regional transportation improvements, residents allocated the greatest percentage (30%) towards trails and greenways. Trails and greenways are important ecologically because, if protected from fragmentation, they can serve as important connections between habitat cores.

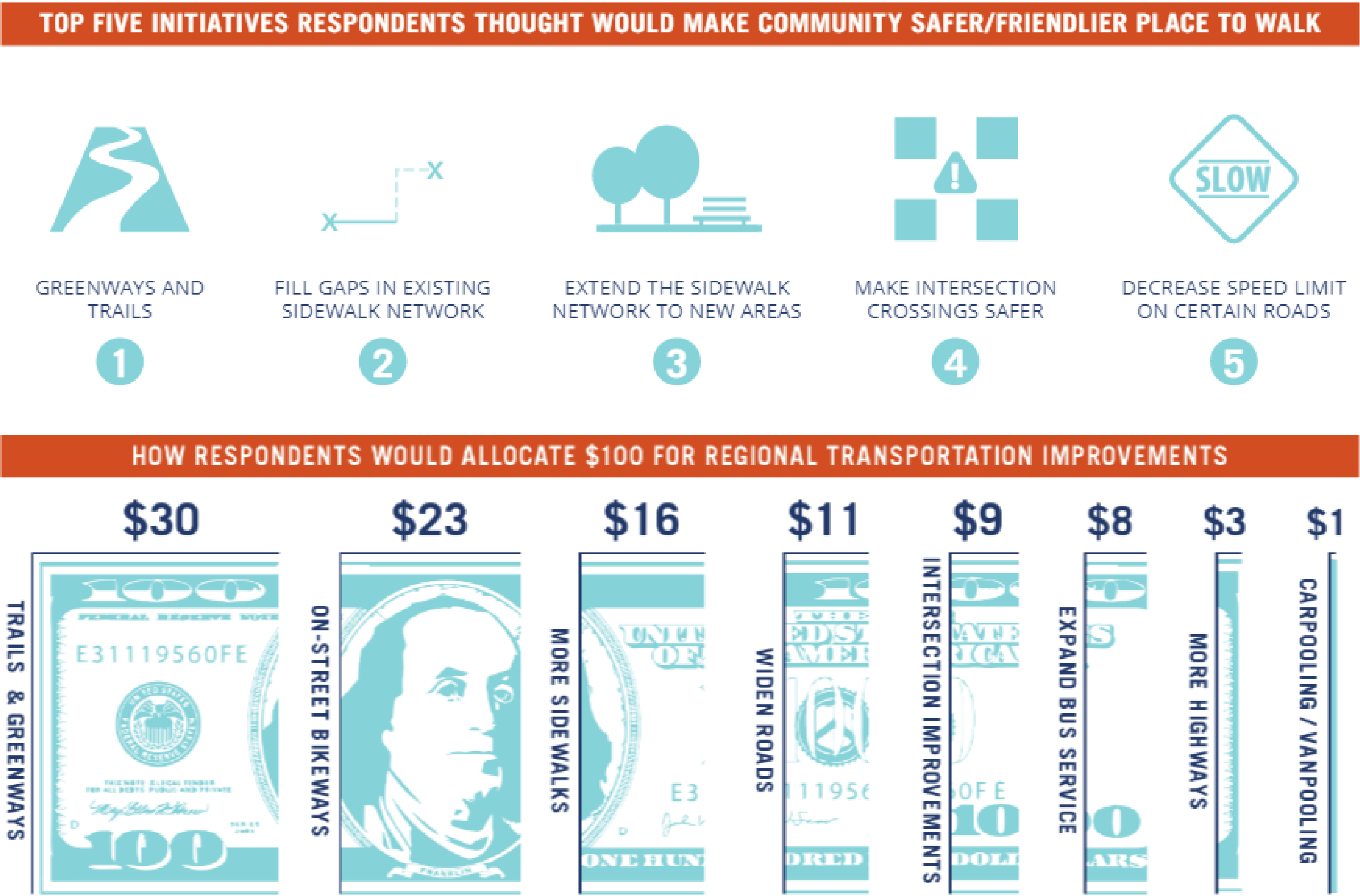
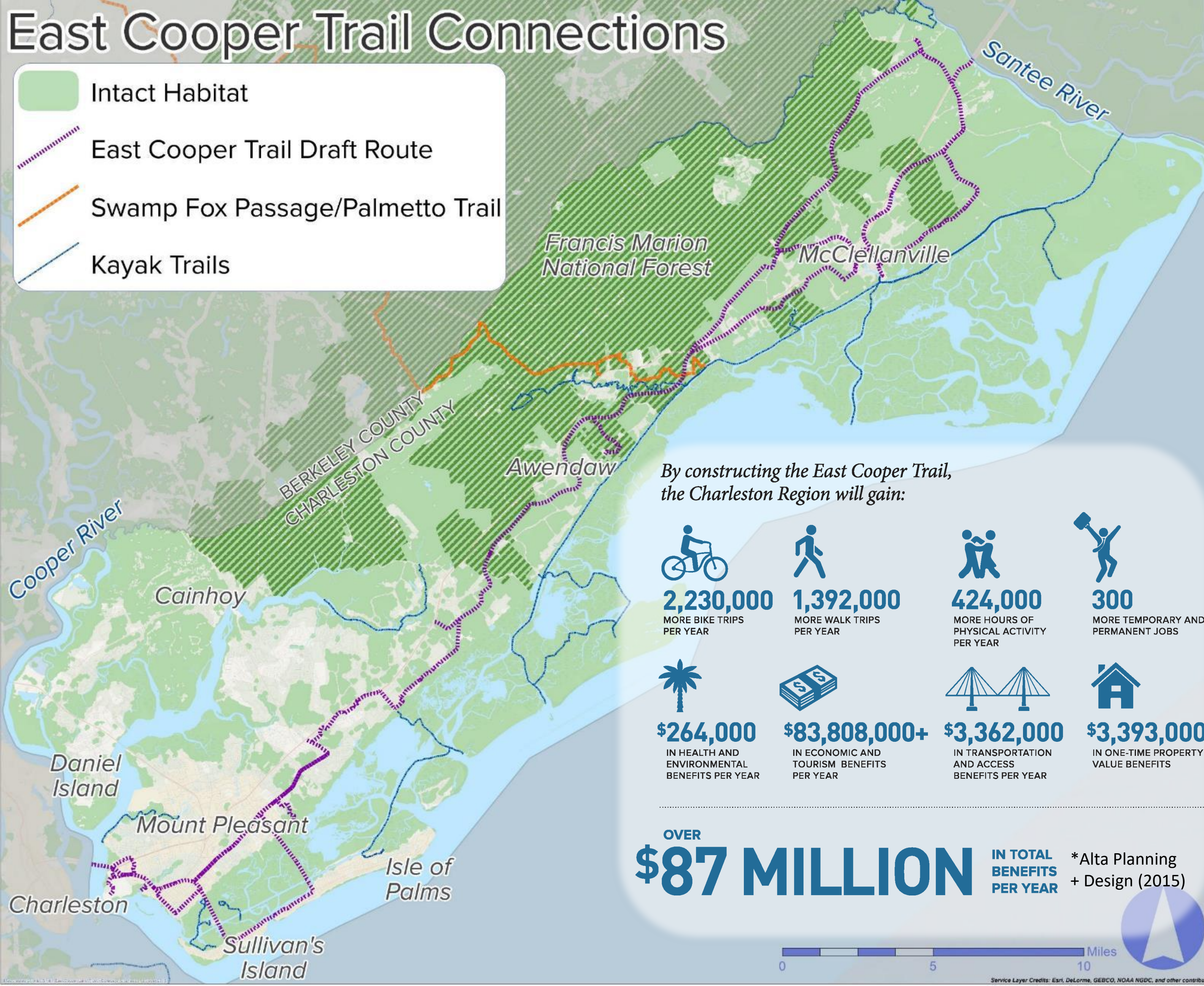
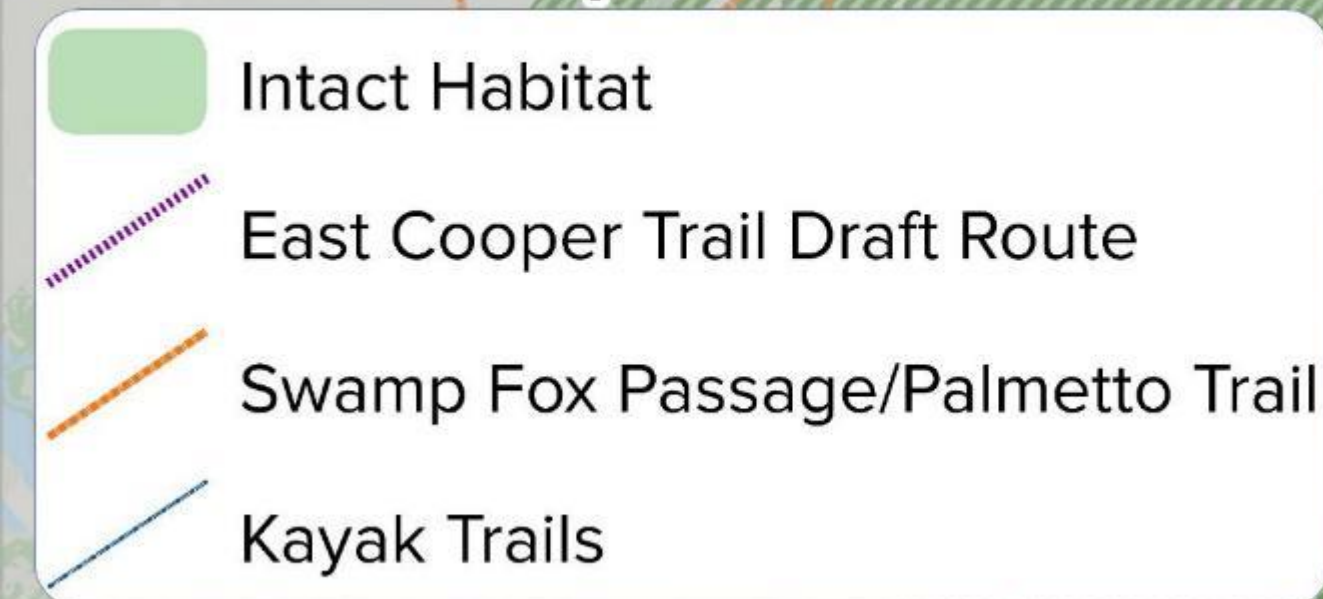


Figure 2: Respondent data to survey questions concerning transportation spending in the Berkeley, Charleston, Dorchester, SC tri-county region.

¹ "Presentation to Walk + Bike BCD Steering Committee." (September 29, 2016). Berkeley-Charleston-Dorchester Council of Governments. <<http://walkbikebcd.weebly.com/documents.html>>

East Cooper Trail Connections



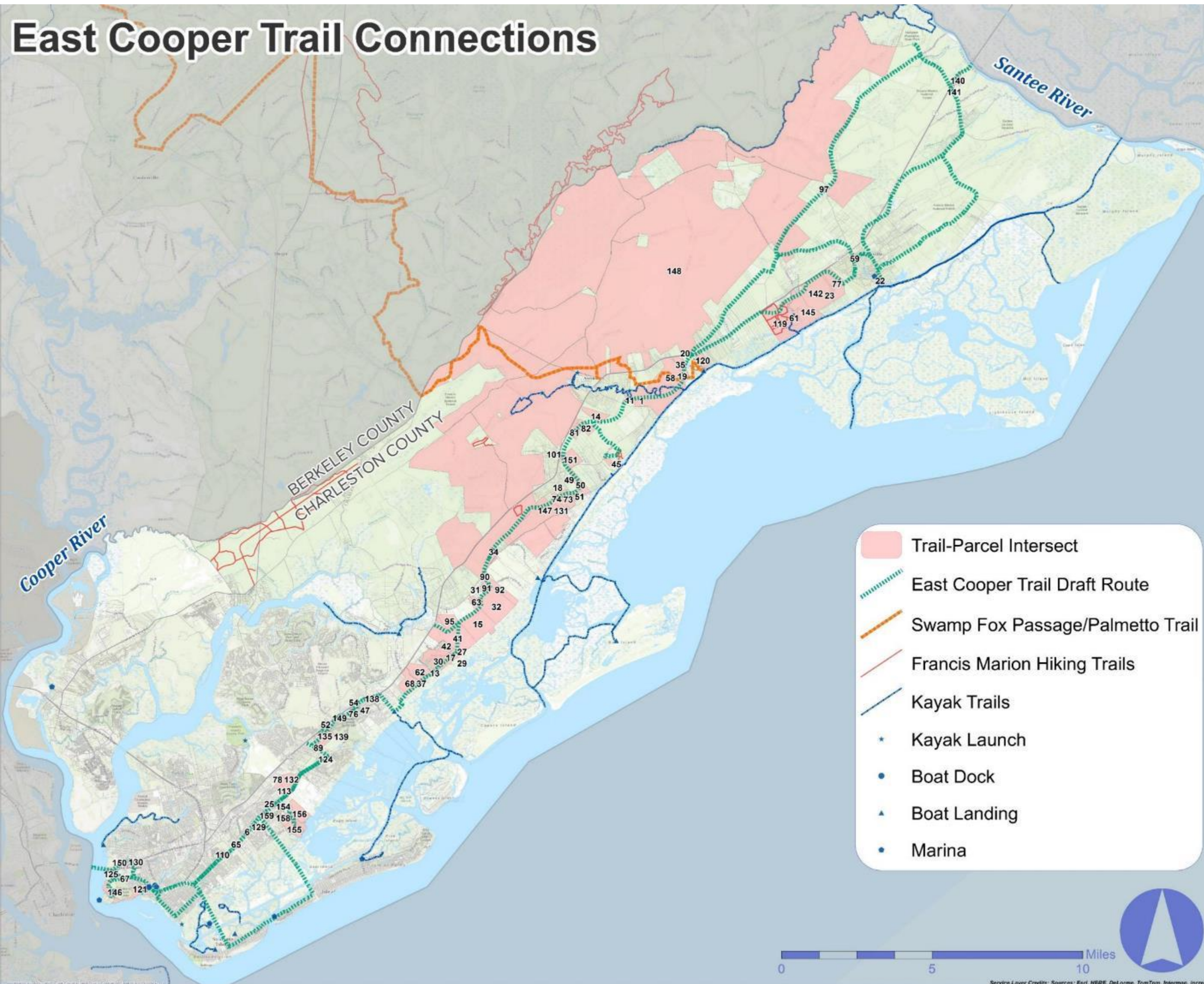
East Cooper Trail

One of East Cooper Land Trust's goals is to help protect or establish connections between existing trail networks and recreational hubs. This includes working to build relationships with landowners on publicly-accessible easements working with municipal and other partners to encourage connectivity throughout East Cooper. It is through these public and private collaborations that the organization will be successful in maximizing the region's potential for a better quality of life with an assurance of access to the outdoors.

Additionally, the GIS mapping tools provided by the Green Infrastructure Center have improved East Cooper Land Trust's ability to locate corridors of off-road green landscape which can be used in the route of the East Cooper Trail. Identifying connections between sections of forest and other habitat allows the organization to determine where a conservation easement would be useful to set aside land that can be used for greenway or wildlife corridor and protect this connection from fragmentation caused by development. Once protected, these corridors can serve as both natural and recreational assets for the benefit of the local communities.

Map 13: Trails within the East Cooper region and how they connect to a proposed routing of the East Cooper Trail.

East Cooper Trail Connections



East Cooper Trail

Using county parcel data, parcels that are intersected by the draft route of the East Cooper Trail have been located and inventoried. Landowner information has been securely stored and contact information has begun to be collected for each parcel. Map 14 displays these parcels and a reference numbers that have been assigned to each. This inventory will make it quick and easy to contact landowners when certain sections of the trail are being planned.

When zoomed in, this map provides a reference number for each parcel that intersects the trail route so the landowner contact information can be identified quickly from the landowner inventory. The northern section of the route provides opportunity for collaboration with the Forest Service, as some segments of the trail are best routed through the Francis Marion National Forest.

There are segments of the trail that will need to stay on-road, as there are not off-road options available. The routing process is identifying the options of least traffic in these areas to maximize user safety.



Map 14: Parcels that intersect the draft route of the East Cooper Trail the East Cooper region of South Carolina.

Mt. Pleasant Natural and Recreational Assets



The Town of Mount Pleasant

The U.S. Census Bureau cited Mt. Pleasant as one of the fastest growing municipalities in the country in 2013.¹ This rapid growth welcomes new residents and development, and also increases the need for open space.

In 2006, Charleston County adopted a Comprehensive Greenbelt Plan that established a goal of 30% open space.² Currently just over 10% of land area in the Town of Mount Pleasant is designed parkland or natural open space, totaling 3,837 acres. To be in line with the county's 30% goal, Mt. Pleasant would need 11,080 acres of open space. The 10% Open Space was further categorized into:

253 acres Public Active Recreation: 23 sites containing built recreational facilities with public access for active use by Mt. Pleasant residents.

2,107 acres Public Passive Parkland: 14 sites with public access and contain predominantly natural open space, but are not permanently protected. Small neighborhood parks within gated communities are not included.

1,479 acres Permanently Protected: 17 sites that are forever protected under conservation easement held by land trusts and other conservation entities. Eight of the sites allow public access.

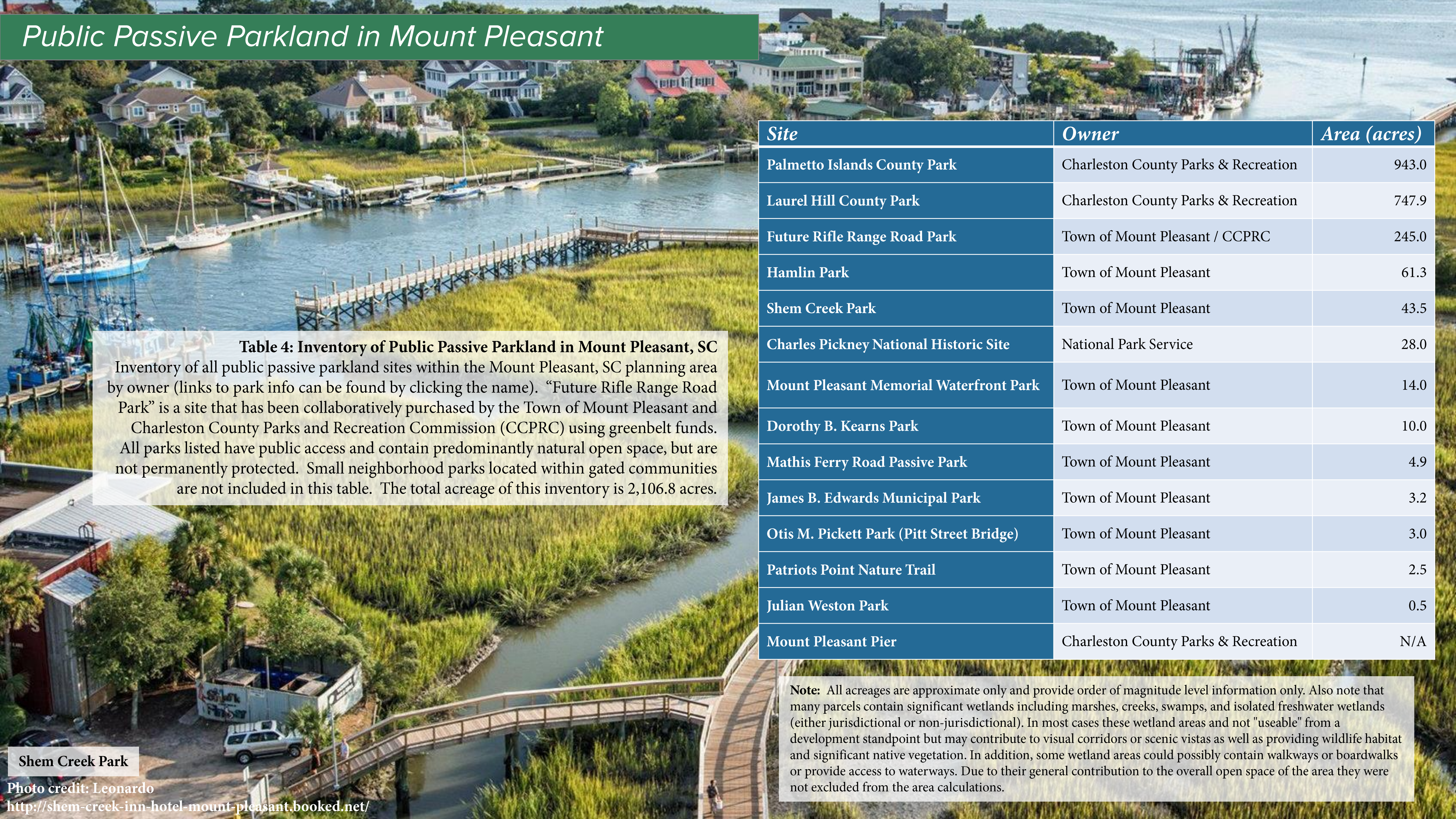
The following inventory contains all of the public parkland categorized by the entity that owns the land. The Mount Pleasant planning area displayed in Map 15 (outlined in red) contains many land parcels that are not currently incorporated in the Town. While not all of the sites listed in the inventory are within incorporated Mount Pleasant, the residents of the Town still benefit from the presence of these recreation and conservation sites. Open space with public access that is owned by private entities and not under conservation easement is not included in this list, as it is currently not protected from rezoning or development.

¹ Cohen, T. "Population Trends in Incorporated Places: 2000-2013." (2015). U.S. Census Bureau.

<<http://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1142.pdf>>

² "Comprehensive Greenbelt Plan." (2006). Charleston County Greenbelt Program. <<http://charlestoncountygreenbelt.org/cgp.php>>

Map 15: Recreational assets overlaid upon the natural assets of the Mount Pleasant, SC area.



Public Passive Parkland in Mount Pleasant

Table 4: Inventory of Public Passive Parkland in Mount Pleasant, SC
Inventory of all public passive parkland sites within the Mount Pleasant, SC planning area by owner (links to park info can be found by clicking the name). “Future Rifle Range Road Park” is a site that has been collaboratively purchased by the Town of Mount Pleasant and Charleston County Parks and Recreation Commission (CCPRC) using greenbelt funds. All parks listed have public access and contain predominantly natural open space, but are not permanently protected. Small neighborhood parks located within gated communities are not included in this table. The total acreage of this inventory is 2,106.8 acres.

Site	Owner	Area (acres)
Palmetto Islands County Park	Charleston County Parks & Recreation	943.0
Laurel Hill County Park	Charleston County Parks & Recreation	747.9
Future Rifle Range Road Park	Town of Mount Pleasant / CCPRC	245.0
Hamlin Park	Town of Mount Pleasant	61.3
Shem Creek Park	Town of Mount Pleasant	43.5
Charles Pickney National Historic Site	National Park Service	28.0
Mount Pleasant Memorial Waterfront Park	Town of Mount Pleasant	14.0
Dorothy B. Kearns Park	Town of Mount Pleasant	10.0
Mathis Ferry Road Passive Park	Town of Mount Pleasant	4.9
James B. Edwards Municipal Park	Town of Mount Pleasant	3.2
Otis M. Pickett Park (Pitt Street Bridge)	Town of Mount Pleasant	3.0
Patriots Point Nature Trail	Town of Mount Pleasant	2.5
Julian Weston Park	Town of Mount Pleasant	0.5
Mount Pleasant Pier	Charleston County Parks & Recreation	N/A

Note: All acreages are approximate only and provide order of magnitude level information only. Also note that many parcels contain significant wetlands including marshes, creeks, swamps, and isolated freshwater wetlands (either jurisdictional or non-jurisdictional). In most cases these wetland areas and not "useable" from a development standpoint but may contribute to visual corridors or scenic vistas as well as providing wildlife habitat and significant native vegetation. In addition, some wetland areas could possibly contain walkways or boardwalks or provide access to waterways. Due to their general contribution to the overall open space of the area they were not excluded from the area calculations.

Shem Creek Park

Photo credit: Leonardo
<http://shem-creek-inn-hotel-mount-pleasant.booked.net/>



Active Recreational Facilities in Mount Pleasant

Site	Owner	Area (acres)
Carolina Park Sports Fields	Town of Mount Pleasant	77.0
Park West Recreation Complex	Town of Mount Pleasant	59.0
R.L. Jones Center	Town of Mount Pleasant	23.0
Patriots Point / Cheryll Woods-Flowers Soccer Complex	Town of Mount Pleasant	15.0
Mugsy Kerr Tennis Complex	Town of Mount Pleasant	15.0
Sloan Park / Joe Gawrych Baseball Complex	Town of Mount Pleasant	11.0
Wando High School	Charleston County Schools	7.5
Duffy Complex	Town of Mount Pleasant	5.0
Alhambra Hall & Park	Town of Mount Pleasant	4.0
Town Hall Gym/Track	Town of Mount Pleasant	4.0
Laing Middle School	Charleston County Schools	3.0
Moultrie Middle School	Charleston County Schools	3.0
Cario Middle School	Charleston County Schools	3.0
Speight's/Reid Street Fields	Town of Mount Pleasant	2.3
Wando South (Old Wando)	Town of Mount Pleasant	2.1
James B. Edwards Elementary School	Charleston County Schools	2.0
Whitesides Elementary School	Charleston County Schools	2.0
Remley's Point Community Center	Town of Mount Pleasant	1.9
Green Hill Park Community Center	Town of Mount Pleasant	1.1
T. Stokes-Marshall Senior Services Center	Town of Mount Pleasant	1.0
Miriam Brown Community Center	Town of Mount Pleasant	0.8
G. M. Darby Building	Town of Mount Pleasant	0.5

Table 5: Inventory of Active Recreational Facilities in Mount Pleasant, SC
Inventory of all public active recreational facilities within the Mount Pleasant, SC planning area by owner. All facilities listed have public access for active use by Mount Pleasant residents. The total acreage of this inventory is 247.7 acres.

Alhambra Hall & Park

Conserved Open Space in Mount Pleasant

Table 6: Inventory of Conserved Open Space Sites in Mount Pleasant, SC
Inventory of all permanently protected open space sites within the Mount Pleasant, SC current urban growth boundary by entity who is responsible for the permanently protected status. These sites are not publicly-owned and not characterized by the municipality as “parkland,” however, they contribute to the overall open space within the municipality. The total acreage of this inventory is 1,479.1 acres.

<i>Permanently Protected Site</i>	<i>Protected By</i>	<i>Area (acres)</i>	<i>Public Access?</i>
Wando Farms	Ducks Unlimited	558.4	No
Sewee Preserve	Ducks Unlimited	381.0	No
Wingswood	Lowcountry Open Land Trust	153.0	No
Oakland Plantation	East Cooper Land Trust	132.6	No
Parkers Island	Lowcountry Land Trust	99.0	No
Marsh View Trail	East Cooper Land Trust	57.0	Yes
Gold Bug Island	Lowcountry Land Trust	30.0	No
Fort Palmetto	SC Battleground Preservation Trust	26.0	Yes
Rivertowne Wetland	East Cooper Land Trust	21.0	Yes
CAGE Property	East Cooper Land Trust	6.0	Yes
Shem Creek Headwaters	East Cooper Land Trust	3.4	Yes
Bayview Acres	Lowcountry Land Trust	3.0	No
Candy's Cove at Shemwood II	East Cooper Land Trust	2.0	Yes
Rivertowne Island	East Cooper Land Trust	2.0	No
Moultrie Park	East Cooper Land Trust	1.8	Yes
Phillips Community	East Cooper Land Trust	1.8	Yes
Buzzard Island	SC Department of Natural Resources	1.1	No

Note: All acreages are approximate only and provide order of magnitude level information only. Also note that many parcels contain significant wetlands including marshes, creeks, swamps, and isolated freshwater wetlands (either jurisdictional or non-jurisdictional). In most cases these wetland areas and not "useable" from a development standpoint but may contribute to visual corridors or scenic vistas as well as providing wildlife habitat and significant native vegetation. In addition, some wetland areas could possibly contain walkways or boardwalks or provide access to waterways. Due to their general contribution to the overall open space of the area they were not excluded from the area calculations.

Marsh View Trail

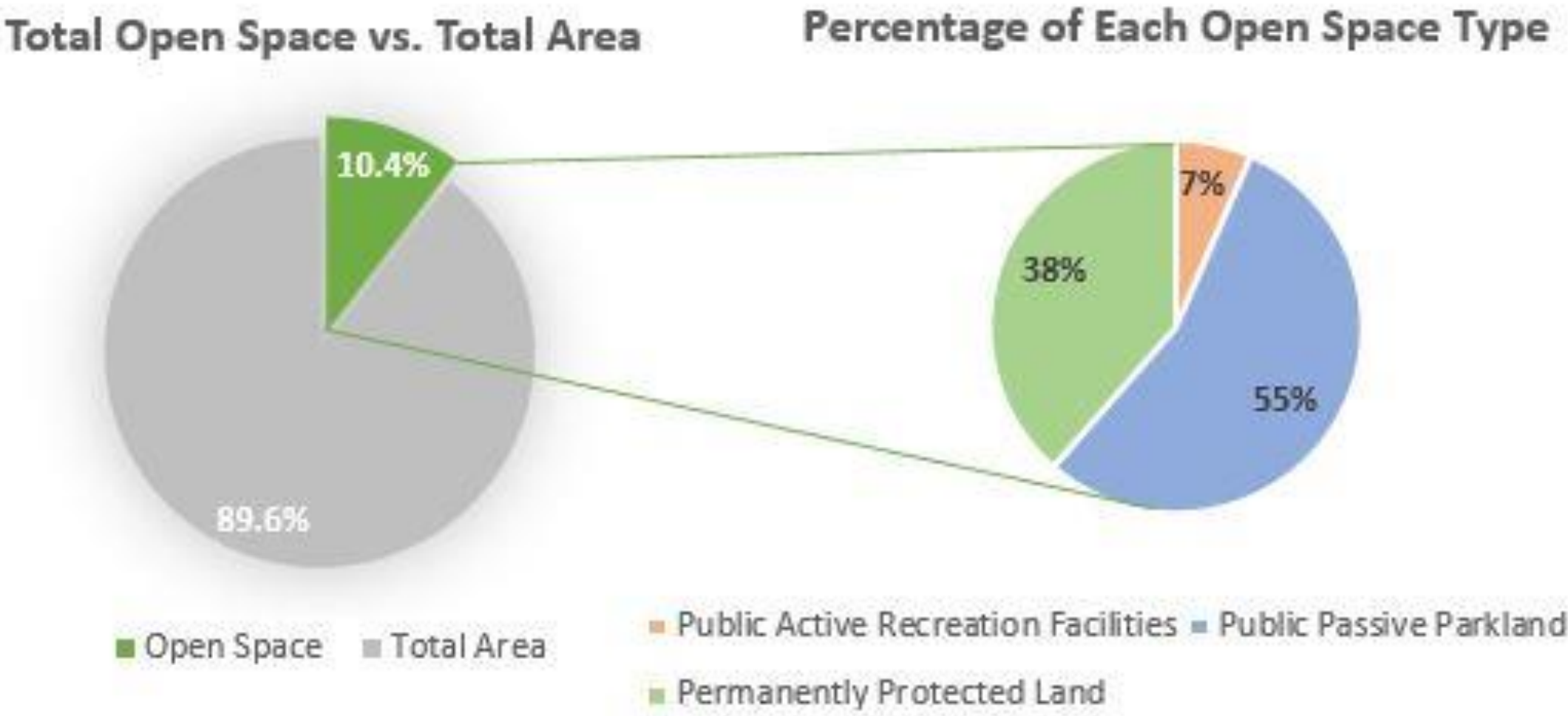
Sites by Land Owner or Conservation Easement Holder and as Percentage of Mount Pleasant

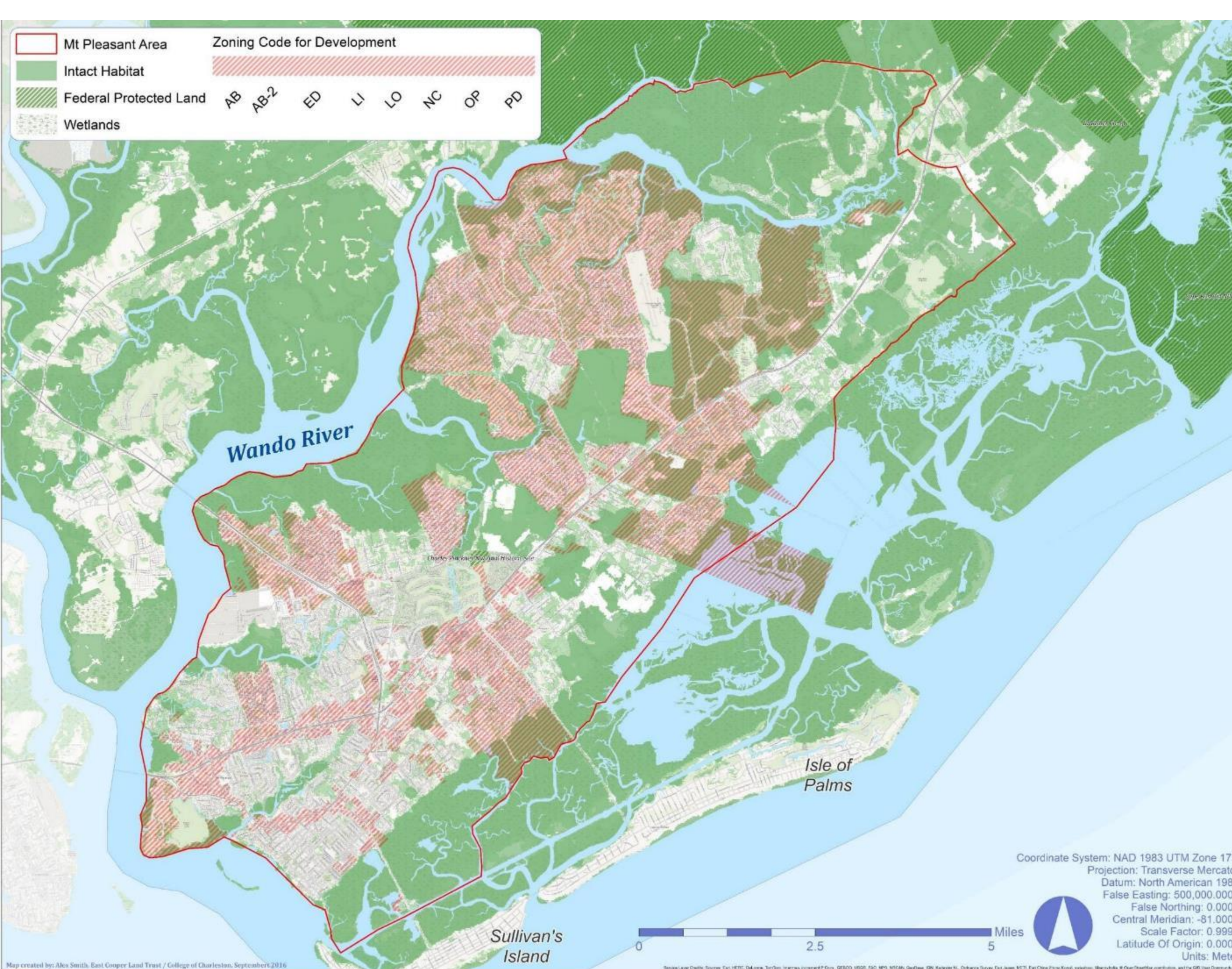
	Population 2015 Estimate^	Land Area (acres)	Active Recreation Facilities (acres)	Public Passive Parkland (acres)	Permanently Protected Land (acres)	Total Park & Protected Acres
Mount Pleasant, SC	81,317	36,932.0	243.2	2,106.8	1,479.1	3,836.2
Charleston County Parks & Recreation Commission (CCPRC)*				1,813.4		1,813.4
Ducks Unlimited					939.4	939.4
Town of Mount Pleasant*			222.7	265.4		488.1
Lowcountry Open Land Trust					285.0	285.0
East Cooper Land Trust					227.6	227.6
National Park Service				28		28.0
Charleston County Schools			20.5			27.6
SC Battleground Preservation Trust					26.0	26.0
SC Department of Natural Resources					1.1	1.1
Percentage of Total Mount Pleasant Area		100%	0.66%	5.71%	4.01%	10.39%

Table 7: Sites by Land Owner or Conservation Easement Holder and as Percentage of Mount Pleasant, SC Area
Statistics from within the Mount Pleasant, SC planning area boundary. Only publicly-owned land set aside for active and passive recreation as well as land that is permanently protected through means such as conservation easement is displayed. The entity that owns the land or is responsible for the permanently protected status is displayed in descending order of total acres. The Future Rifle Range Road Park acreage is split equally between CCPRC and Town of Mount Pleasant to represent co-ownership. “Percentage of Total Mount Pleasant Area” displays the percentage of open space out of the total area within the Mount Pleasant, SC planning area boundary. “Percentage Designed/Percent Natural Open Space” distinguishes the total area of open space as either designed parkland or natural habitat.

^ 2015 Census Population Estimate statistic from: <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>
* “Future Rifle Range Road Park” from Table 4 is co-owned evenly by Town of Mount Pleasant and CCPRC. The Total Park & Protected acres shown here on Table 7 contains half of the total acres (122.5) of this park in each entity’s total.

Figure 3: Pie graphs displaying the percentage of open space within the total acreage of the Mount Pleasant planning area, as well as the percentage of public active recreation facilities vs. public passive parkland vs. permanently protected land within the 10.4% of total area.





Risks from Zoning

Performing an analysis of what areas are zoned for development and their proximity to habitat cores aides in the ability to assess the risk that the connected natural landscape faces. This is especially true in Mount Pleasant, the most fragmented landscape of the East Cooper region. Fortunately, the largest tracts of habitat cores have been set aside for county and municipal recreational parks. This does not ensure that the cores will not be fragmented, however, and East Cooper Land Trust should still focus efforts on finding ways to ensure more permanent options for the conservation of these tracts of land.

The smaller pockets of fragmented cores face the greatest risk in Mount Pleasant. The site-scale approach to keeping wildlife corridors intact where possible to connect smaller habitat fragments and cores is the best conservation strategy in this swiftly-developing area.

East Cooper Land Trust will continue to work with Town staff and developers to ensure that the habitat cores within Mount Pleasant are protected in logical patterns so that the natural landscape remains as connected as possible.

Map 16: Parcels zoned for development by the Town of Mount Pleasant, SC overlaid upon its natural assets of the area.

Town of Sullivan's Island

The Town of Sullivan's Island currently contains a robust Natural Resources chapter within its Comprehensive Plan that summarizes the threats associated with sea level rise and beach erosion as well as the need for marsh and accreted land conservation. The Town has taken significant steps to conserve its natural and historical assets. Some examples include the adoption of a tree ordinance, designation of recreation and conservation zones, and beach, vegetation, and sea turtle protection.¹ The “Needs and Goals” listed within the Natural and Cultural Resources chapters clearly show that the Town shares many of the goals as the natural asset planning process. The Town itself has initiated multiple easements for ecological and cultural preservation purposes.

East Cooper Land Trust will continue to work with the Town to identify the need for conservation projects. The organization currently holds conservation easements on three parcels within the town boundaries: Station 9, Station 19, and the Marshall Boulevard Beachfront property. The Station 9 and 19 properties are owned by the Town and hold a unique historical significance to the island. The Marshall Boulevard Beachfront easement was established in 2016 as a means to proactively address shoreline retreat in an area with especially high property values. Additionally, Lowcountry Land Trust holds a deed restriction easement on nearly 80 acres of the island's accreted beach, which preserves important vegetation and bird habitat that functions as a natural buffer between the dynamic beach size (due to erosion and accretion) and high-value homes. The Town has also zoned all of the wetlands within its boundary as “Conservation” because it views this land as naturally-functioning open space. The protected accreted beach and the wetlands serve as the main connected sections of habitat cores within the Town. East Cooper Land Trust commends the Town on these efforts it has already taken to protect its natural resources and fragile dunes.



¹ “2008 Comprehensive Plan.” (2013-2014 Update). Town of Sullivan's Island. <<http://www.sullivanisland-sc.com/>>

Map 17: Privately protected land boundaries overlaid upon the natural assets of the Sullivan's Island, SC.

Town of Sullivan's Island

Sullivan's Island contains a great number of historical and recreational assets. Along with the conserved land, the island holds multiple historic and open space sites. The natural, historic, and recreational assets of Sullivan's Island make it a truly unique area for ecological and historical conservation.

The Station 9 easement is a parcel of historical significance that was once the landing area for the Pitt Street Bridge that connected Mount Pleasant to Sullivan's Island and now contains a short nature trail. The Station 19 easement holds a publically-accessible boat landing and kayak launch. A recreational paddling trail connects this property with the surrounding marsh habitat and Intracoastal Waterway.

Fort Moultrie is a series of fortifications that dates back to 1776. The fort contained active military structures during and between the years of the Revolutionary War, Civil War, as well as World War I and II. The fort is currently maintained by the National Park Service as a historical site after its decommission and transfer to the agency in 1960.¹ The Town also maintains its own property of historical relevance, Thomson Park. This is the site of a Revolutionary War battle and is located on the northern Breach Inlet of the island.²

¹ "Fort Moultrie." National Park Service.

<www.nps.gov/fosu/learn/historyculture/fort_moultrie.htm>

² "Thompson Park." Doug MacIntyre. <<http://thomsonpark.wordpress.com>>



Map 18: Recreational and historical assets overlaid upon the natural assets of the Sullivan's Island, SC.

Town of Sullivan's Island

“...all properties on Sullivan's Island are part of a dynamic and ever-changing barrier island environment, vulnerable to erosion and catastrophic flooding events. Whereas all Island properties in close proximity to marshes, beaches and waterways are predisposed to erosion, loss of critical dune vegetation and structural damage during large storm events, the Town recognizes a need to develop innovative methods to incentivize the protection of open space, preserve view corridors, and reduce the intensity of residential land uses.”

- Sullivan's Island Planning Commission from the July 8, 2015 Public Hearing, in reference to conservation easement uses and structures within the Town borders

The Town's Comprehensive Plan maintains a “Soils” section within its Natural Resources section with a description of the soil classification, but lacks a visual component. Map 19 displays the national Soil Service Geographic Database (SSURGO) soil series within the municipal boundary, illustrating the distribution of soil types. This visual gives an overview of how the soil series are distributed within the Town, and which soils remain natural and which are considered “Made land” in the national database.

East Cooper Land Trust recommends continuing to maintain the zoned conservation status on all of the wetlands and small islands between Sullivan's Island and Mount Pleasant, and encourages the establishment of legal permanent conservation tools in this wetland area (as zoning ebbs and flows) with the assistance of private landowners. Both the land that remains on natural soil types (such as the Cg, Co, CvC series) and within the Intact Wildlife Habitat area (represented in green on the maps) is recommended to be protected from additional development on the island to reduce the future impacts of flooding.

Additionally, the permanent protection of the recreational and historical sites within the Town that are not already protected, such as Thomson Park, is a goal that is recommended to be included on a Comprehensive Plan update.



Map 19: Labeled SSURGO soil series overlaid upon the natural assets of the Sullivan's Island, SC.



City of Isle of Palms

The City of Isle of Palms, a barrier island community similar to Sullivan’s Island, also maintains a robust Natural Resources chapter of its Comprehensive Plan. The key issues identified in this chapter include: improvement and maintenance of water quality; protection of beach, dunes, and marsh lands; and protection of wildlife and vegetation.¹ These natural assets are vital to the future of the community, and the City shares the goal of protecting them. Another similarity to Sullivan’s Island is that Isle of Palms is also mostly-developed with habitat core area only found along the beach dunes and wetlands. Isle of Palms, however, does not have the benefit of beach accretion and the subsequent protection of this land, as does Sullivan’s Island, and instead is more subject to erosion

The beaches of Isle of Palms provide the primary recreational attraction within the City, but there is also some green space and public water access within the City. Charleston County Parks and Recreation maintains the Isle of Palms County Park that provides recreational benefit to the community’s residents, and the Isle of Palms Marina allows public access to the Intracoastal Waterway for boaters and kayakers. The Wild Dunes Resort on the northern end of the island maintains multiple golf courses that maintain some green space in the short term, however the resort’s private status does not provide general public benefit.

Although there are currently no permanent conservation areas on the island, the City desires to investigate the potential for establishing small parks on City-owned, undeveloped green spaces. Through various meetings during this duration of this project, East Cooper Land Trust and the City have identified some potential park sites for future conservation. Additionally, there may be some options for private conservation on surrounding wetland parcels that become available through ongoing communication with landowners. East Cooper Land Trust intends to continue to partner with the City and provide GIS support for upcoming Comprehensive Plan updates.

Map 20: Recreational assets overlaid upon the natural assets of Isle of Palms, SC.

¹ “Amended Comprehensive Plan.” (2015). City of Isle of Palms.
<<http://www.iop.net/>>

Daniel Island & Cainhoy Peninsula

Daniel Island and the Cainhoy Peninsula lie within Berkeley County and are incorporated areas of the City of Charleston. These areas can benefit the most from natural asset planning within the East Cooper region, as they are mostly undeveloped and have significant acreage of habitat cores. Additionally, these are the areas most at-risk. Much of the undeveloped sections of these areas are already planned for development. However, it is important that the natural assets within this area are taken into consideration by City of Charleston planners.

Daniel Island is defined by the Cooper River to the west, the Wando River to the east, and wetland system that shape the development patterns. The area currently contains mixed residential and business development, a private golf course, and various small neighborhood parks. The City of Charleston has created an inventory of planned future public park sites as well of shared-use trail systems which connect neighborhoods. While the City is not considering permanent conservation on these particular sites at this time, it has an interest to work with East Cooper Land Trust on the identification of new park sites and conservation options. Through various meetings during the duration of this project, several sites potential have been identified for public-access conservation options, including the habitat surrounding an over 80 acre retention pond.

The Cainhoy Peninsula contains the historic Cainhoy Plantation land, and is bordered by the Francis Marion National Forest to the north and Daniel Island’s developed business center to the south. Only one main public route allows access to and from the area, Clements Ferry Road, due to the peninsula’s narrow geography. While Daniel Island has mostly been developed into residential and business districts, the Cainhoy Peninsula is currently almost entirely undeveloped. However, a conceptual residential development plan for the area exists. This plan anticipates the development and fragmentation of two medium-sized habitat cores with high rankings on the Core Quality Index. The plan does account for high biodiversity of the area, and lists key considerations when planning for biodiversity: connectivity of habitat; consideration of the impacts; and biodiversity and culture go hand-in-hand.¹ East Cooper Land Trust does not take a position on this development project, but seeks to inform developers and city planners through the sharing of natural asset GIS data layers.

¹ “Cainhoy Plantation Plan Presentation – 10/15/2013.” City of Charleston.
<<http://www.charleston-sc.gov/DocumentCenter/View/3284>>

Map 21: Recreational assets and federal and privately protected land boundaries overlaid upon the natural assets of Daniel Island and the Cainhoy Peninsula, SC.

Daniel Island & Cainhoy Peninsula Recreational and Natural Assets



Town of Awendaw

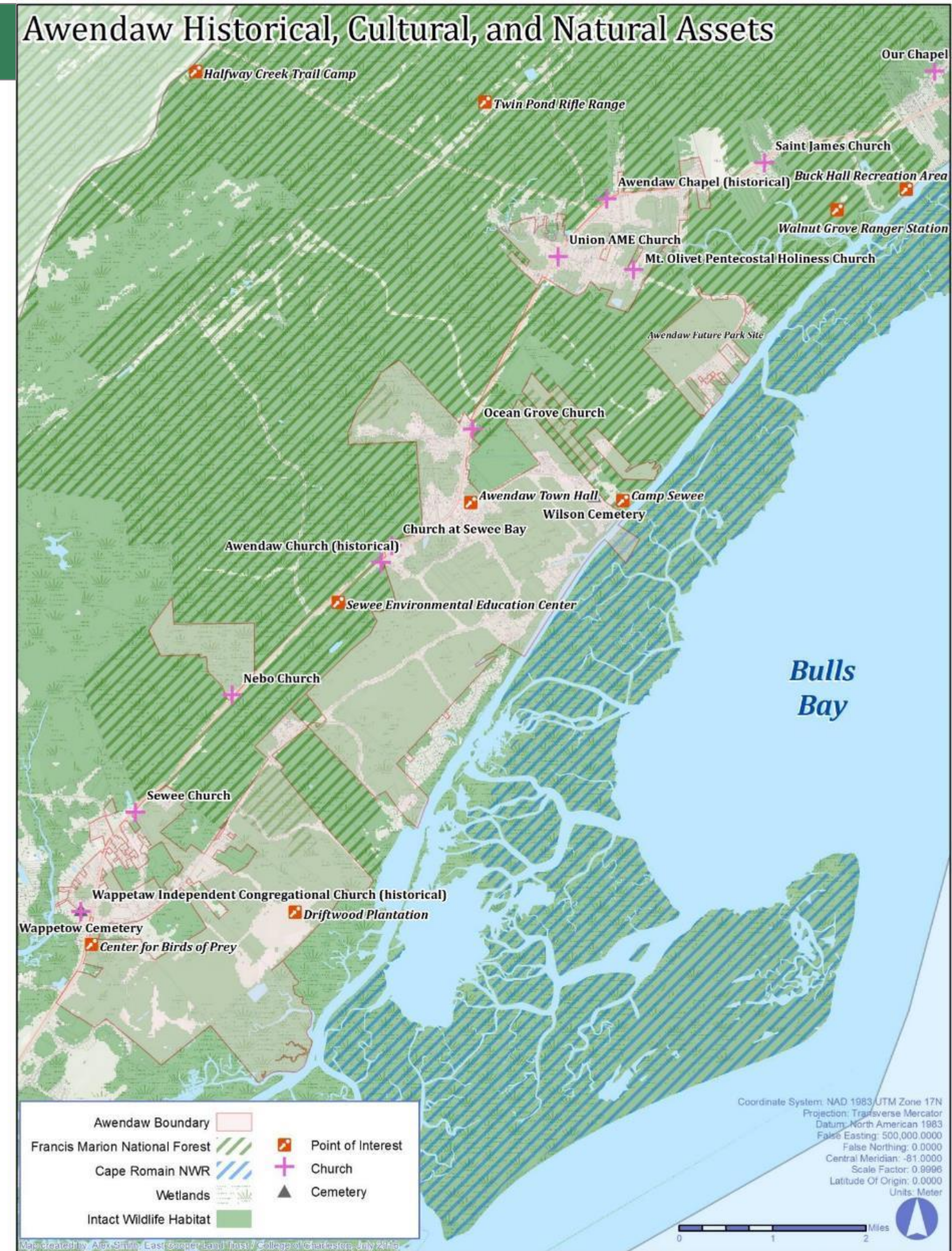
The Town of Awendaw is buffered by the protected lands of the Francis Marion National Forest to the west and north, Cape Romaine National Wildlife Refuge to the east, and is also surrounded by privately-owned conservation easements. Conservation groups that operate in the region such as The Nature Conservancy, Ducks Unlimited, and Lowcountry Land Trust have been working to protect lands that fall within the gaps of the federally-owned lands of the Francis Marion. The rural character of the landscape is preserved through permanent conservation, which also limits the areas in which the Town can expand to accommodate the region's population growth.

East Cooper Land Trust understands and respects the Town's need to expand for economic and spatial reasons, and has been partnering with Town staff to determine the best areas for development or conservation. Much of the land within the Town boundaries remains undeveloped, and small and medium-sized habitat cores remain intact. While much of this land is zoned for development, the Town plans to use the habitat core data layers created from this project to inform development locations so that the areas with the highest ecological integrity can be preserved wherever possible.

Awendaw is centrally located along the Gullah Geechee Cultural Heritage Corridor and the area has a rich cultural history that dates back to the 1696 settlement of "Wappetaw."¹ The Town has assisted East Cooper Land Trust in creating an inventory of local historic churches and cemeteries of cultural significance so that new maps can be made for an upcoming Comprehensive Plan revision. There are opportunities to establish cultural easements on some of these sites so that their history is maintained well into the future, which will continue to be explored as East Cooper Land Trust grows in resources.



Map 22: Historical and cultural assets and federal protected land boundaries overlaid upon the natural assets of Awendaw, SC



¹“History.” Town of Awendaw. <www.awendawsc.org/about-Awendaw/history/>

Town of Awendaw

The unique setting of Awendaw presents abundant outdoor experiences of recreational opportunities for its residents and visitors. The most notable of these is the Swamp Fox/Awendaw Passage of the Palmetto Trail, which is an important segment of the planned 500-mile trail system across the state of South Carolina with its eastern terminus at the Buck Hall Recreation Area and the Intracoastal Waterway area just north of the Town. A trail system as expansive as the Palmetto Trail brings national attention to the recreational potential of the East Cooper region. Outdoor enthusiasts who complete the farthest eastern sections of the trail are exposed to the hospitality and recreational assets of Awendaw and the neighboring municipalities, bringing tourism and economic stimulation.

Recreational assets provided by the Francis Marion National Forest, maintained by the US Forest Service, and Cape Romain National Wildlife Refuge, maintained by the US Fish and Wildlife Service, provide an additional multitude of recreational opportunities through their local hiking and paddling trail systems. The Sewee Visitor and Environmental Education Center is jointly operated by both federal agencies and offers an exhibit hall, classrooms, pollinator gardens, fishing ponds, and walking trails. Additionally, the Center for Birds of Prey is a non-profit avian conservation and education center directly off of Highway 17 within the Town which brings additional nature-based tourism to the area.

The Town has been providing input and planning its own section of the East Coast Greenway, a trail system that runs north-south and, when complete, will connect the state of Maine to Florida through a 3,000 mile stretch of non-motorized connections. Awendaw's section of the East Coast Greenway will be almost entirely off-road and link users to other recreational assets such as the Palmetto Trail, an historic Native American Seewee Shell Mound (Shell Middens Park), and a future planned park site, which will be a partnership between the Town and Charleston County Parks and Recreation Commission.

Staff from East Cooper Land Trust serve on the East Coast Greenway Steering Committee alongside staff from the Town of Awendaw to ensure that this section of the greenway utilizes the best possible route. The Awendaw section of the East Coast Greenway will share a route with the East Cooper Trail through this section of the region. The shared vision of the East Cooper region as Charleston's "Outdoor District" will keep East Cooper Land Trust and the Town of Awendaw working together in partnership to ensure the region remains connected through natural and recreational corridors.

Map 23: Recreational assets and federal protected land boundaries overlaid upon the natural assets of Awendaw, SC



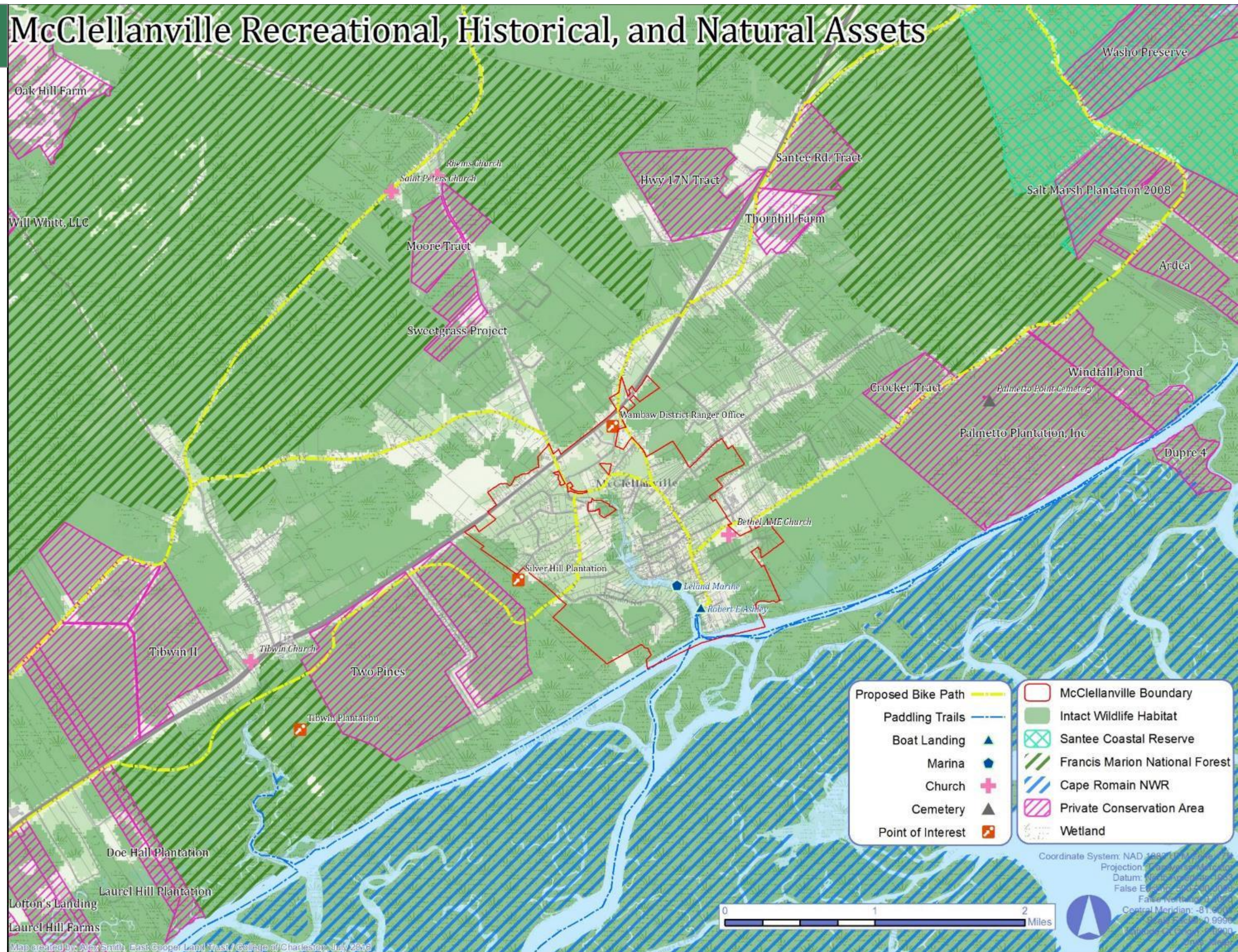
Town of McClellanville

The Town of McClellanville is a municipality which seeks to preserve the rural character of its community. The town boundary is surrounded by tracts of land under various forms of private, state, and federal protection. Much of the surrounding privately-protected land was acquired through the use of Charleston County Greenbelt funding. These protected areas serve as a buffer from the reaches of development which may spread northward from the Town of Awendaw.

In 2014, East Cooper Land Trust purchased Thornhill Farm, a 94-acre working farm just north of the Town, with funding from the SC Conservation Bank and the Charleston County Greenbelt Program. While East Cooper Land Trust does not hold any conservation easements within incorporated McClellanville, there are a great deal of opportunities in the surrounding rural landscape to utilize Greenbelt funding for conservation projects that connect parcels that are already protected through federal, state, or private mechanisms. There are also many opportunities for collaborations and partnerships with the other conservation groups that work in this rural area. The Nature Conservancy, Ducks Unlimited, Lowcountry Land Trust, and the Sweetgrass Society all manage conservation properties in the area.

Regarding prioritization for future projects, East Cooper Land Trust will put a focus on the protection of the riparian habitat edging the Santee River to the north. Staff from the organization serve on the Santee Basin Task Force, a conservation group working to protect the integrity of the Santee River Basin and Watershed. Discussions with this group and the use of GIS tools have given a list of clear target properties in the area north of McClellanville and south of the Santee River. East Cooper Land Trust has begun some communication with landowners of nearby plantations that have expressed interest in working with the group on future conservation options.

McClellanville Recreational, Historical, and Natural Assets



Map 24: Recreational and historical assets and federal, state, and privately protected land boundaries overlaid upon the natural assets of McClellanville, SC.

Flooding/Storm Surge Potential and Green Infrastructure

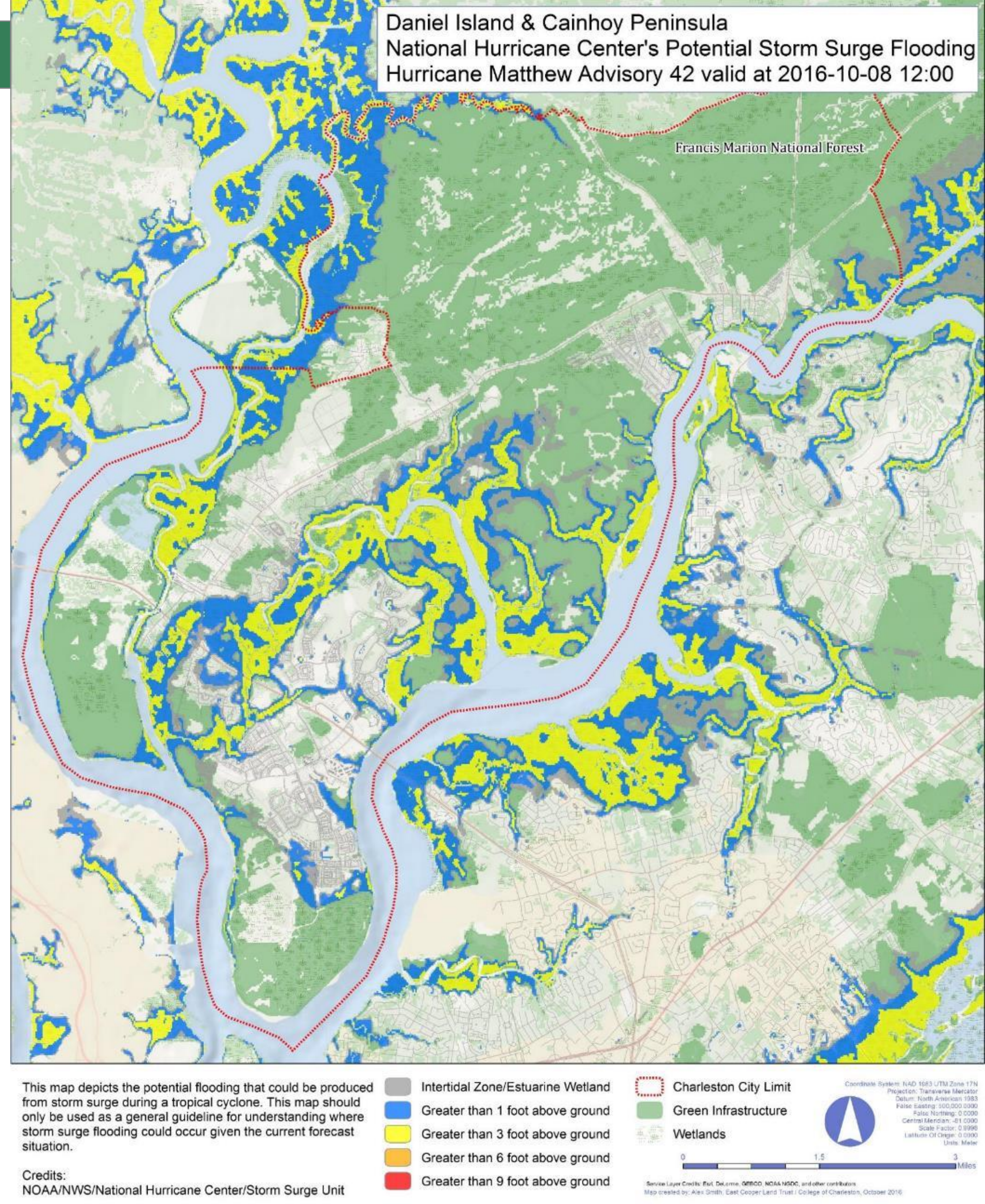
The natural asset data layers provide the versatility of the ability to be used with a variety of data layers from other sources. Municipal planners who have access to natural asset and green infrastructure data can overlay other layers that are important to them and view their data in a new way. Digitized green infrastructure layers have not been utilized by planners within the East Cooper region in the past, and it is the hope of East Cooper Land Trust that by providing this data to them, planners begin to amend some of their practices to consider the benefits of natural assets and green infrastructure.

As emphasized in the publications of the Green Infrastructure Center, green infrastructure provides a multitude of benefits in terms of flood mitigation. Map 25 displays a data layer prepared by NOAA, the National Weather Service, and the National Hurricane Center overlaid upon the green infrastructure layer in Daniel Island, Cainhoy, and Mount Pleasant. This layer shows publically available potential storm surge flooding from the October 2016 Hurricane Matthew event. This particular event had a great impact on the entire South Carolina Lowcountry and caused an evacuation of the East Cooper region. Here, the predicted storm surge of where water levels will rise and to what degree during a certain hour of the day during the hurricane are displayed. The green infrastructure that is also displayed on this map, if left as intact habitat and wetlands, provides ecosystem services that minimize risks and alleviate the future costs of damage and the building of drainage systems.¹

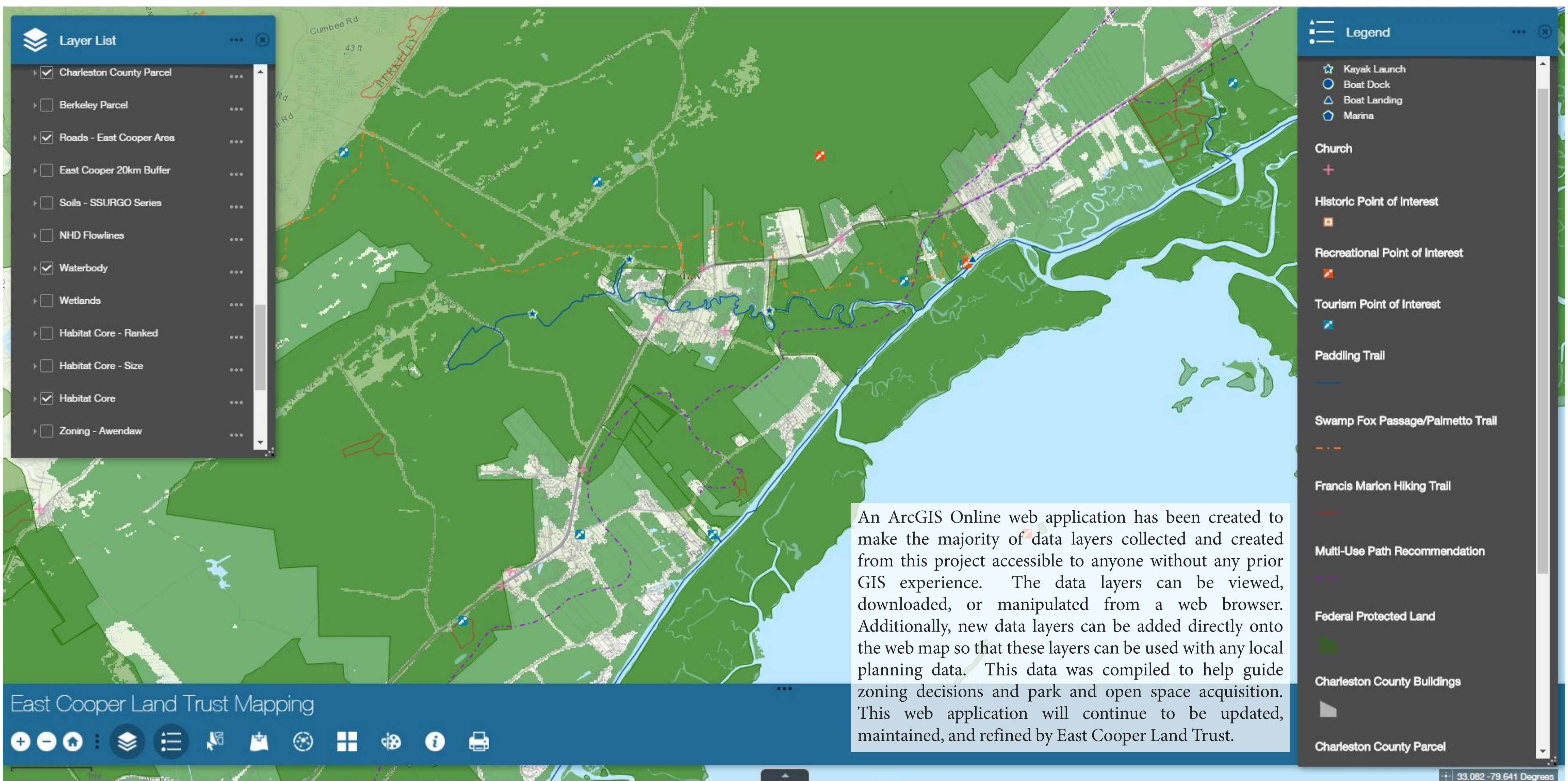
What is important to note here is that planners from each municipality can use the data layers created and collected during this project in ways that work for them; in ways that will make their jobs easier. The data needs to be viewed and shared easily. ArcGIS Online has a web application builder that has made this data share process understandable and easy to use.

¹Firehock, Karen. *Evaluating and Conserving Green Infrastructure Across the Landscape: A Practitioner’s Guide*. (2015) The Green Infrastructure Center.

Map 25: Potential storm surge flooding data from Advisory 42 of Hurricane Matthew overlaid upon the green infrastructure of Daniel Island and the Cainhoy Peninsula, SC.



Web Application



Conclusions

Uses

The greatest value that comes with the natural assets maps and web application data layers created during project is a new approach that can be used by the organization to quickly identify areas of high ecological value and take immediate action if particular parcels are at risk. For example, using the data produced from this project, East Cooper Land Trust has identified 5 large parcels (each totaling >400 acres of wetland and highland) that are important migratory bird habitat and have made steps with the landowners to either purchase the land as a fee simple arrangement or put it under conservation easement. This logical approach for prioritizing conservation areas, recommended by the SC Forestry Commission and USDA Forest Service, has been displayed to support a current North American Wetland Conservation Act (NAWCA) grant application.

It is anticipated that these tools may also be used as evidence when working with municipalities and landowners to explain why a particular parcel or group of parcels needs protection now before it is too late. Showing how fragmentation breaks apart habitat reinforces the need to protect corridors through greenways and linear conservation easements. These are just simple examples of how the tools can be pulled out and utilized quickly, but the project scope is intended to create a long-term informative perspective.

The [web application](#) created during this project makes the sharing of data layers easy and provides support for planning staff that do not have access to GIS software. East Cooper Land Trust intends to continue to provide GIS support to the partnering municipalities and help influence important conservation decisions.

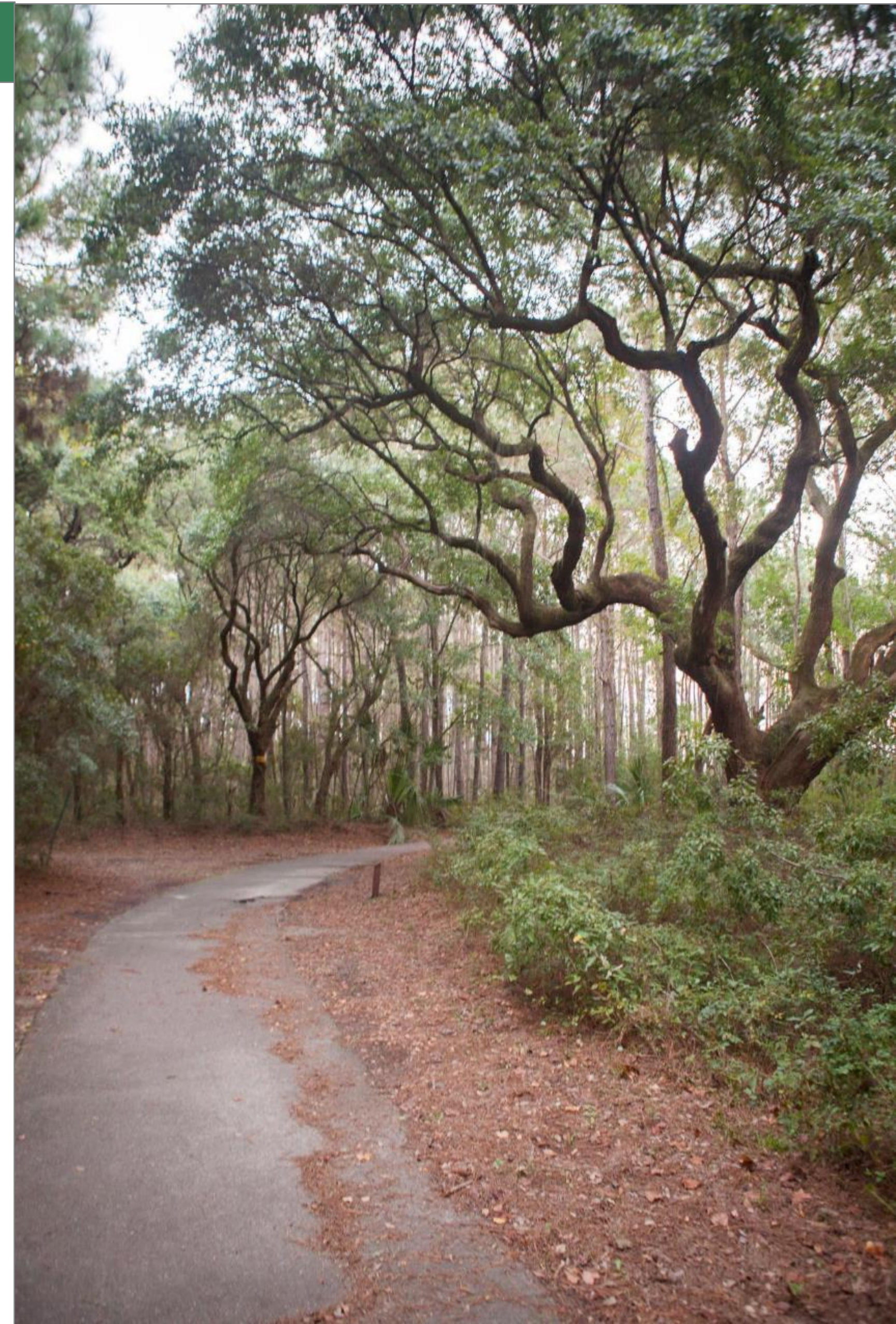
Challenges

Identifying an area with a high conservation value using informed standards and practices, but then determining that the area is already planned for development presents a struggle for a small non-profit organization. It can be a challenge to convince developers of the importance of the natural green infrastructure when they have already put development plans in place. That is why it is important for East Cooper Land Trust to utilize the knowledge gained from completing this project to be proactive in determining what needs to be protected, instead of reactive. This seems like the obvious approach, but the organization has lacked the tools to be proactive in the past, and has mostly relied on landowners to come to them first.

Engaging the municipalities to ensure that the location and connectivity of habitat cores are fully taken into consideration when zoning decisions are made will always be a challenge for a non-political organization. Municipal staff are faced on a daily basis with competing political wills of the people they serve, and the conservation community is just one of many voices. The organization will continue to work with this staff to ensure that the data is understood and valuable to the municipalities and Charleston County.

Implementation

Although East Cooper Land Trust does not have the ability to implement planning decisions, it can inform. The implementation step of its natural asset planning process includes proactively seeking to establish conservation projects on the prioritized inventory of parcels that has been created during the duration of the project. This inventory will continue to be expanded and refined as the organization's work continues.



Credits

The Connected Land Conservation Plan of the East Cooper Region project team consists of:

- Alex Smith, *East Cooper Land Trust – Land Protection/GIS Specialist*
- Catherine Main, *East Cooper Land Trust – Executive Director*
- Dr. Norman Levine, *College of Charleston – Santee Cooper GIS Lab Director*
- April Turner, *SC Sea Grant Consortium – Coastal Communities Specialist*
- Bill Eubanks, *East Cooper Land Trust – Board Member/Land Protection Committee Chair*
- Steve Livingston, *Former City of Charleston Parks Director*
- Dr. Kevin Keenan, *College of Charleston – Director of Urban & Regional Planning Certificate Program*

Thanks to the following local government staff for their direct input and collaboration (by agency):

- | | |
|---|---|
| ▪ Cathy Ruff – <i>Charleston County Greenbelt Program</i> | ▪ Mayor Richard Cronin – <i>City of Isle of Palms</i> |
| ▪ Joel Evans – <i>Charleston County</i> | ▪ Douglas Kerr – <i>City of Isle of Palms</i> |
| ▪ Mayor John Tecklenburg – <i>City of Charleston</i> | ▪ Mayor Miriam Green – <i>Town of Awendaw</i> |
| ▪ Christopher Morgan – <i>City of Charleston</i> | ▪ Bill Wallace – <i>Town of Awendaw</i> |
| ▪ Philip Overcash – <i>City of Charleston</i> | ▪ Jody Muldrow – <i>Town of Awendaw</i> |
| ▪ Mayor Linda Page – <i>Town of Mount Pleasant</i> | ▪ Kathryn Basha – <i>BCDCOG, Town of McClellanville</i> |
| ▪ Kevin Mitchell – <i>Town of Mount Pleasant</i> | ▪ Vonie Gilreath – <i>BCDCOG</i> |
| ▪ Katherine Hendricks – <i>Town of Mount Pleasant</i> | |
| ▪ Susan Bettelli – <i>Town of Mount Pleasant</i> | |
| ▪ Mayor Patrick O’Neil – <i>Town of Sullivan’s Island</i> | |
| ▪ Joe Henderson – <i>Town of Sullivan’s Island</i> | |



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For more information on the East Cooper Land Trust, visit: www.eastcooperland.org

