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## The Importance of Wetlands and Creating Policy to Protect Wetlands in Georgetown County Goal 14

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# The Importance of Wetlands and Creating Policy to Protect Wetlands in Georgetown County Goal 14

Daniel E. O'Hara

## Introduction

During the colonial and pre-civil war era coastal communities used floodwaters to help cultivate agriculture. South Carolina became successful in rice cultivation in the coastal region of the state using the ebbing tides to irrigate the large fields (Coclanis, 2016). In recent years flooding has increasingly become a major problem for urbanized coastal communities. Sea-level rise has increased the frequency of flooding in coastal areas resulting in property damage, destruction, or blockage of infrastructure<sup>1</sup> and harmful effects on humans (Braford, 2021).

Urban development has created a water management problem, many of the natural features in urban areas have been replaced with impervious surfaces. Naturally, wetlands are an environmental feature to help absorb water and support life that can live in saturated soils (Clean Water Act – Section 404). Wetlands are capable of storing floodwater lessening the potential damage of floodwaters in areas. Wetlands are also necessary for recharging groundwater, filtering water from the surface through soils into aquifers below (Yarrow, 2009).

Wetlands provide a multitude of benefits, including biodiversity, nutrient cycling, pollutant filtration, recreational activities, and economic services (Turner & Yarrow, 2009). Most importantly, wetlands can serve as a buffer during hurricanes that can help mitigate coastal flooding and storm surges. The coastal wetlands' potential for protection against hurricanes can be as effective as man-made levees (Costanza et al., 2008). Urban development can decrease the surface areas of wetlands destroying the natural benefits provided. In a study conducted by Dahl (2008), he found that the lower 48 states are losing 80,000 acres per year. Planning in local governments is the front-line defense and protection of these areas. Through the creation of zoning ordinances and policies,



Figure 1: King Tide resulting in flooding of roads in Murrells Inlet, South Carolina. The photo was taken by David Gee on 01/04/2022

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<sup>1</sup> Figure 1: "SC King Tide Recap: December 2021 - January 2022." MyCoast, Department of Health and Environmental Control, 10 Jan. 2022, <https://mycoast.org/reports/blogpost/sc-king-tide-recap-december-2021-2>.

local governments can protect and preserve certain areas. This project looks to gather policy and scientific information from local, regional, federal, and international levels and United Nations Sustainable Development Goal 14: “Conserve and sustainably use oceans, seas, and marine resources” in Georgetown County. To encourage wetland protection and preservation to improve policies and practices in Georgetown County and create more sustainable and healthier

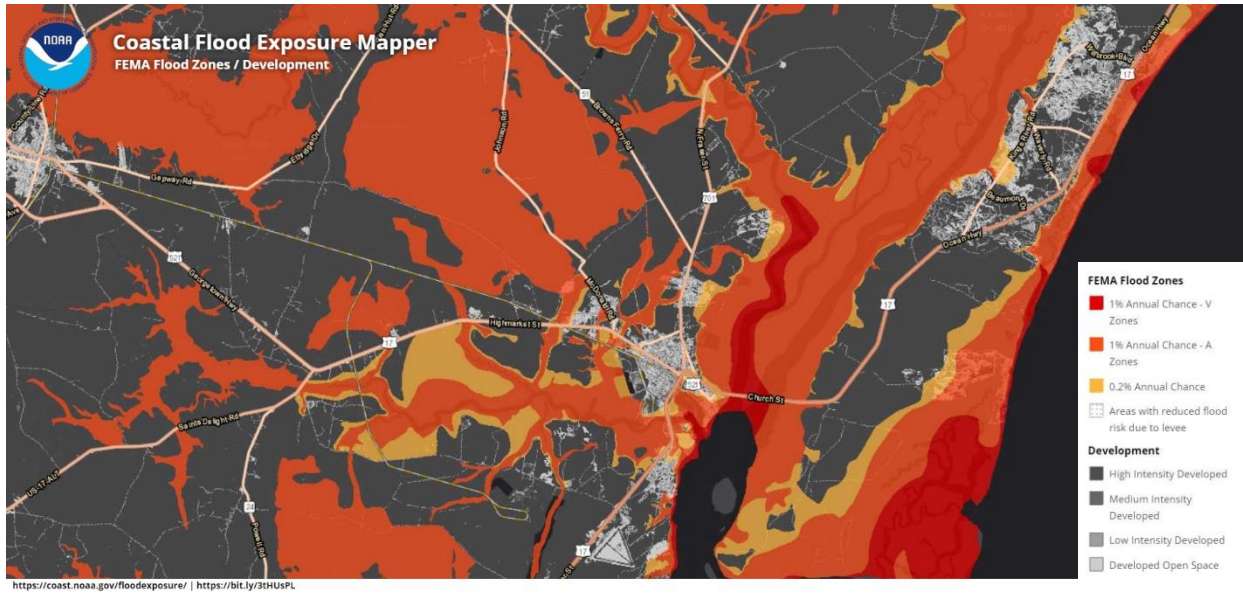


Figure 2: The above figures show areas in the county with flood hazards overlaid above the urban sites. The darker the flood hazard areas the higher amount potential flood zones. The lighter areas have lower chances of flooding while the darker have a much larger potential of being flooded environments.<sup>2</sup>

## Literature Review

### South Carolina Wetlands

It is estimated that since the 1700s the state of South Carolina has lost approximately 27% of its wetlands (Environmental Law Institute, 2007). Wetlands in South Carolina account for 23% of the total land area, with 90% freshwater and 10% saltwater or intertidal areas (Dahl, 1990). Within Georgetown County, approximately 11% of the total area is covered by coastal marshes and wetlands (Purcell et al., 2020).

<sup>2</sup> Figure 2: Coastal Flood Exposure Mapper, NOAA, 18 Oct. 2021, <https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html>

## Types of Wetlands

These areas are some of the most ecologically diverse and South Carolina wetlands are comprised of five different wetland systems: Palustrine, Lacustrine, Riverine, Estuarine, and Marine (Yarrow, 2009).

Palustrine are higher vegetated areas of wetlands comprising trees, shrubs, and various aquatic plant species with an area of fewer than 20 acres and a depth of fewer than 6.6 feet intermediately submerged or submerged. These areas are comprised of marshes and swamps<sup>3</sup>. Lacustrine systems are areas that are larger than 20 acres immediately

submerged or submerged in water. These areas are generally associated with lakes and ponds<sup>3</sup>, while also having a depth of greater than 6.6 feet. Vegetation in this system is predominantly aquatic-based plants. Riverine systems have the same vegetation as Lacustrine systems. The major defining characteristic is that there is a defined channel within the wetland; these systems represent streams and rivers<sup>3</sup>. Estuarine and Marine systems are both tidally influenced wetlands with a variance of physical properties and chemicals from mixing with ocean waters. Estuarine systems are defined as wetlands with salinity higher than 0.5 ppt (parts per thousand) and varying effects from mixing with saltier waters and low wave energy. Estuarine systems represent brackish environments where freshwater sources meet seawater. Marine systems<sup>2</sup> are

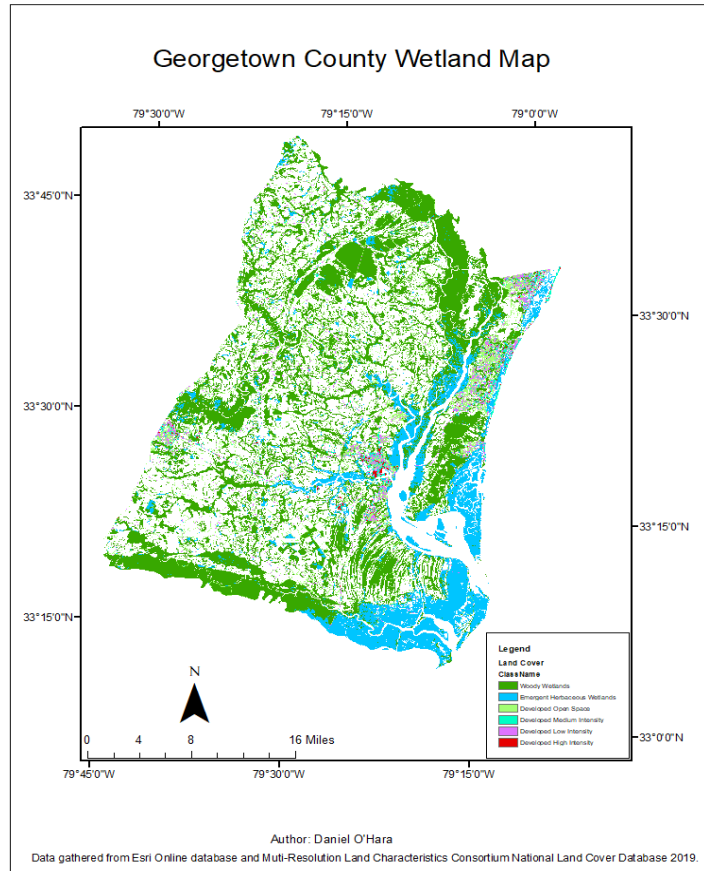


Figure 3: This figure shows a landcover map of Georgetown County. Wetlands and Urban development are the land covers observed in this map. The majority of wetlands in Georgetown County are woody wetlands displayed as dark green. Emergent herbaceous wetlands are smaller in number and displayed as sky blue. The development intensity was included to display areas of urban development and their proximity to wetland areas. Other landcover types were blocked out to allow an optimal view of the wetland area in the county. See Bibliography (19, 33,35, 68, 69).

<sup>3</sup> Fretwell, Williams, and Redman 1989 and Yarrow 2009

defined as wetlands with salinities higher than 30ppt and interact with open ocean currents and waters. These systems are associated with the ocean and saltwater intertidal zones.

### **Attributes of Wetlands**

South Carolina wetlands can provide a multitude of services for humans and the environment: natural disaster mitigation and protection, air quality improvement and greenhouse gas sequestration abilities, water filtration, and aquifer restoration. Services provided by wetland environments make them crucial for the protection of coastal communities.

Wetlands can provide economic benefits for coastal communities through economic mitigation from natural disasters and ecotourism. A study conducted looking at the monetary value of Coastal wetlands conducted by Costanza et al.<sup>4</sup> (2008) this study analyzes the impacts of hurricanes and how wetlands can mitigate the cost of the damage caused by them. The study quantified the protection value of wetlands in various states. South Carolina was included in this study. South Carolina's wetlands were calculated to have a value of around 4600 USD ha<sup>-1</sup> yr<sup>-1</sup> (Costanza et al., 2008)<sup>5</sup>. Another study conducted in 2020 saw that the value of wetland protection ranges from 2,400 to 12,00 USD ha<sup>-1</sup> yr<sup>-1</sup>(Sun and Carson 2020). Coastal wetlands can also provide economic revenue for the state and local communities. Coastal tourism contributed approximately \$9 billion to the overall economy in 2019 (Purcell et al., 2020).

A study conducted by Drexler et al. (2013), found that natural tidal, freshwater wetlands in the lower Winyah Bay watershed had high rates of carbon sequestration (Drexler et al., 2013). But it is important to note that wetlands also can release methane which has more adverse effects on the environment than carbon dioxide (Drexler et al., 2013 Mitsch et al., 2012).<sup>6</sup>Mitsch et al. (2012) observed that while wetlands can release amounts of harmful methane, they should not be

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<sup>4</sup> Costanza, Robert, Octavio Pérez-Maqueo, M. Luisa Martinez, Paul Sutton, Sharolyn J. Anderson, and Kenneth Mulder. "The value of coastal wetlands for hurricane protection." *Ambio* (2008): 241-248.

<sup>5</sup> Hectare or ha is 2.471 acres or 10,000 m<sup>2</sup>

<sup>6</sup> Figure 5: Limpert, Katy E., Paul E. Carnell, Stacey M. Trevathan-Tackett, and Peter I. Macreadie. "Reducing emissions from degraded floodplain wetlands." *Frontiers in Environmental Science* (2020): 8.

considered radiative sources instead they are extremely important carbon sinks. Healthy wetlands can contribute to the efforts of lowering carbon emissions ultimately helping the global climate crisis. Wetlands also can sequester large amounts of methane within deep sediments (Trifunovic et al., 2020). These sediments if disturbed could release harmful amounts of methane into the atmosphere which is 25 times more dangerous to the environment than carbon dioxide (Trifunovic et al., 2020).

Wetland environments are crucial systems for the mitigation of floodwaters, restoration of aquifers, and pollutant filtration (Yarrow, 2009). Wetlands serve as a storage

area for access to water during flooding events. This provides a sponge-like buffer for flood water as the system holds on to the waters and releases it at a slow rate (Yarrow, 2009). While the water is sequestered in the soils in wetland systems, microorganisms act as filters for access to nutrients such as nitrogen and phosphorus. Plants are also able to influence levels of nitrogen in wetlands releasing absorbed nitrogen into the atmosphere (Yarrow, 2009). Manmade wetlands have proved to be extremely efficient at the fixation of nitrogen using specific plants to help optimize its uptake. Since wetland environments can hold on to water and filter it, this makes them key in the restoration of underlying aquifers. Aquifer recharge is extremely important in rural areas and in agriculture as well water is dependent on subsurface water (Yarrow, 2009). These environments are extremely important in today’s climate as groundwater is increasingly important for humans.

### Alteration of Wetlands

Naturally, wetlands can be created or altered by various natural processes, high-energy storm events, and rising and falling sea levels. Hurricanes, typhoons, and cyclones can change the elevation, vegetation, and chemical composition of upland and coastal wetlands (Hauser, et. al., 2006). The surface saturation of wetlands from increased precipitation can drown vegetation, it can also create a supersaturated setting that allows the roots of plants to be easily disrupted by winds (Wang, et. al., 2006). Vegetation can also be harmed, and the restoration of wetlands can

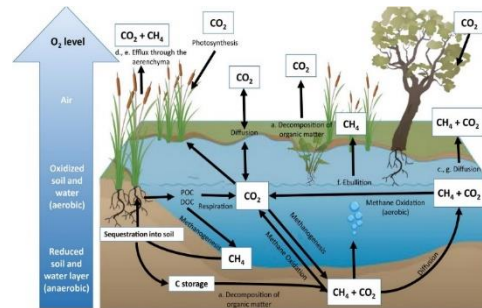


Figure 4: Diagram above shows the Carbon Cycle of an inland wetland environment. Methane and Carbon Dioxide are both naturally stored and released in the cycle. There are various ways carbon can be released into the environment as seen in the graphic above.

be altered by low levels of salinity (Middleton, 2016). High amounts of rainfall can increase the freshwater influx into these environments making it difficult for various types of vegetation to regrow, ultimately altering the restoration of wetlands (Middleton, 2016).

### Anthropogenic change

Humans can alter wetlands by changing surrounding environments through changing hydrological processes, water quality, and vegetation (EPA, 2001). These activities can decrease the natural benefits that wetlands provide and also decrease the potential protection that wetlands can provide to communities. Major influencers of change and alteration of wetland environments are agricultural practices and urban developments. Agricultural sites especially large farms, create large amounts of biomass and nutrient supply that are in excess in comparison to normal conditions (Hunt, Matheny, and Stone, 2003).

<sup>7</sup>Water bodies can produce harmful algal blooms that can result in losses of biological life in the environment. This is called eutrophication and it happens when the environment is overloaded with essential nutrients, such as nitrogen and phosphorus, from agricultural sites, golf courses, and wastewater runoff (Conley et al., 2008). Properly maintained wetlands specifically riparian buffer zones can assist in the process of nitrogen removal (Verhoeven et al., 2006). Matheson et al. (2003) and Silvan et al. (2004) both looked at the wetland environment and riparian buffer vegetation's ability to lower nitrogen and other nutrient levels. These studies showed that the proper maintenance and use of certain plant species are effective in preventing the contamination of marine areas.

Urban development and agriculture practices can create eutrophication, but there are other practices like irrigation ditches and dykes that can create an alteration in flow and sedimentation (EPA, 2001). Human development with the addition of impervious services can

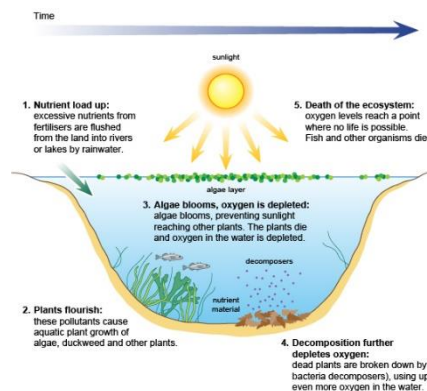


Figure 5: Eutrophication cycle in freshwater systems. The addition of essential nutrients such as nitrogen and phosphorus from water runoff can create hypoxic conditions resulting in large losses of biomass. Common fertilizers are rich in nitrogen and phosphorus and golf course and agricultural sites can be the largest contributors of nutrient runoff

<sup>7</sup> Figure 6: "Pond Cleanup." Spring Point Homeowners Association, 2014, <http://www.springpt.org/Business/PondCleanup.shtml>.

increase flooding and water pollutants in wetland environments (EPA, 2001). Trace metals were found in several areas in Georgetown County in a study conducted by Sanger, Holland, and Scott 1999. The study looked at wetland environments across the coastal area of South Carolina, two sample sites within the county, one in Murrell's Inlet and another in the North Inlet. The study discovered that elevated levels of trace metals were linked to current or past developments in the watershed or on the water body (Sanger, Holland, and Scott, 1999). Murrell's Inlet had higher values of trace metals found within its area than the North Inlet area. The North Inlet had higher levels of arsenic and a slightly higher value of mercury in the area, but this region also had the lowest values recorded among the two in every category (Sanger, Holland, and Scott 1999). These contaminants can be extremely lethal to humans and animals alike (Kuivenhoven and Mason, 2021). Murrells Inlet is also a regularly active recreational area and relies heavily on this industry. While some modifications to the surrounding environment can have negative effects on wetlands, there are ways to promote sustainability in wetland environments and their surrounding ecosystems. Humans can modify and create more wetland habitats through various practices and projects.

South Carolina has been awarded 5 million USD for the conservation and protection of wetlands<sup>8</sup>. Part of this money will be going to protect the Santee River in Georgetown County to protect wildlife habitat. The Department of Natural Resources will use the money to protect over 1,964 acres and over a hundred different important species<sup>9</sup>.

Another project ongoing in the county is Morgan Park, currently a project funded by the Boyd Foundation to create one acre of the living shoreline of the coast of East Bay Park and Morgan Park<sup>10</sup>. A living shoreline is a green infrastructure that uses native vegetation and hard



Figure 6: The image above is a picture of the Wetland Restoration Project at the Samworth WMA in Georgetown, County, South Carolina. The State was awarded 1 million dollars to restore and protect natural resources in the project. Hannah Strong.

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<sup>8</sup> Lucas, David. "\$5 Million in Grants Awarded to SCDNR, Conservation Bank to Protect Coastal Wetlands." SCDNR News, South Carolina Department of Natural Resources, Mar. 2021, <https://www.dnr.sc.gov/news/2021/mar/mar10-grants.php>.

<sup>9</sup> Figure 7: "SCDNR Receives \$1M Grant to Restore Wetlands in Georgetown County." Post and Courier, The Post and Courier, 26 Jan. 2021

<sup>10</sup> "Building a Shoreline." The Nature Conservancy, 11 May 2021, <https://www.nature.org/en-us/about-us/where-we-work/united-states/south-carolina/stories-in-south-carolina/boyd-living-shoreline/>.



substrates to act as a man-made bulkhead<sup>11</sup>. These structures have proven to be more effective than traditional man-made structures (Smith et al., 2018). Smith et al. (2018) looked at a living shoreline in North Carolina. The results suggested that living shorelines could reduce long-term saltmarsh loss while also decreasing damage to salt marshes by increasing the natural resistance against high energy storm events (Smith et al., 2018).

Other techniques of wetland preservation and protection are the creation of buffer zones. These buffer zones are comprised of various vegetation and soil types to help the uptake of nutrients in wastewater (Narumalani et al., 1997). Buffer zones have proven to be extremely effective in the improvement of water quality of the surrounding water bodies (Verhoeven et al., 2006).

## Protection of Wetlands

### The Ramsar Wetland

Convention<sup>12</sup> is a combination of 172 countries across the world, The United States entered the convention on December 18<sup>th</sup>, 1986, and currently has 41 Ramsar Sites. The purpose of this convention is to promote knowledge about wetlands, conservation, and mitigation of global climate change. When managing sites, the Ramsar Convention suggests the creation of buffer zones around the core wetland to protect and preserve the area from disturbances from other land uses.<sup>13</sup>

The guidelines promote the use of buffers dependent based on the size and area of the wetland and then its proximity to urban sites and other land uses<sup>14</sup> through the management of “Ramsar Sites” which are designated regions that must meet a certain set of standards and qualifications to be considered: Criteria based on plant species if there are rare or unique species in the area or the biodiversity that the area supports, endangered species and animals, migratory

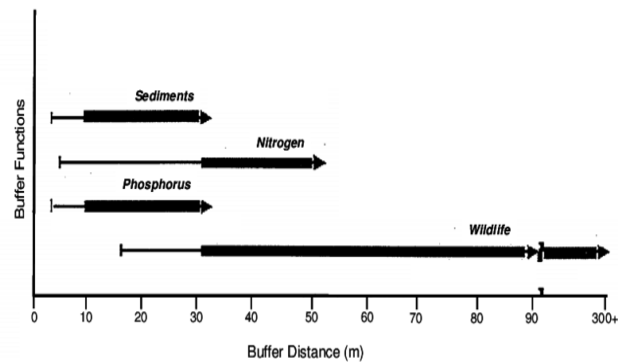


Figure 7: This figure shows the efficiency of the buffer distance based on the function of the buffer.

<sup>11</sup> US Department of Commerce, National Oceanic and Atmospheric Administration. “What Is a Living Shoreline?” NOAA's National Ocean Service, 14 Mar. 2019, <https://oceanservice.noaa.gov/facts/living-shoreline.html>.

<sup>12</sup> “About the Convention on Wetlands.” Ramsar, THE RAMSAR CONVENTION SECRETARIAT, 2014, <https://www.ramsar.org/about-the-convention-on-wetlands-0>.

<sup>13</sup> Ramsar Convention Secretariat. (2010). Handbook 4 Ramsar - IUCN. Ramsar handbooks for the wise use of wetlands 4th.

<sup>14</sup> Figure 8: McElfish, J. M., Kihslinger, R. L., & Nichols, S. S. (2008). Planner's Guide to Wetland Buffers for Local Governments. Environmental Law Institute.

birds, fish species and other taxa. If the environment meets all of these criteria, then it can be considered a Ramsar Site.

In South Carolina, local governments have control over the ordinances and zoning regulations that are required within the Counties' jurisdiction. Within local planning, it is required to list some of the required criteria to determine a Ramsar site in the Natural Resource element of the comprehensive plan.

Georgetown County currently has 15 feet of setback for marsh and tidal environments which is the minimum

recommended amount and also does not have any form of Riparian Buffer zone. In a survey sent out to the citizens of Georgetown County asking about future land use, when asked about the strictness of zoning regulations regarding the conservation of natural resources 74% of respondents said that they were not strict enough.

The State of South Carolina has no restrictions or rules except for those mentioned in the Clean Water Act. Local governments within the state are responsible for creating and regulating any additional ordinances not specified by South Carolina State Law. Various counties and municipalities have variations of wetland buffers and setbacks. Beaufort County, a South Carolina coastal county, has very strong and easy-to-use wetland ordinances. They have their ordinances based on types of developments and zoning districts in the County. For instance, the distance of the buffer/setback would be higher for farming and agriculture than in a single-family development. Beaufort County also has prohibited development within wetland systems except for boardwalks, piers, pipes, and docks. They also have filling mitigation regulations to prevent developers from filling in these environments. These ordinances come from recommended practices by the South Carolina Department of Health and Environmental Control.

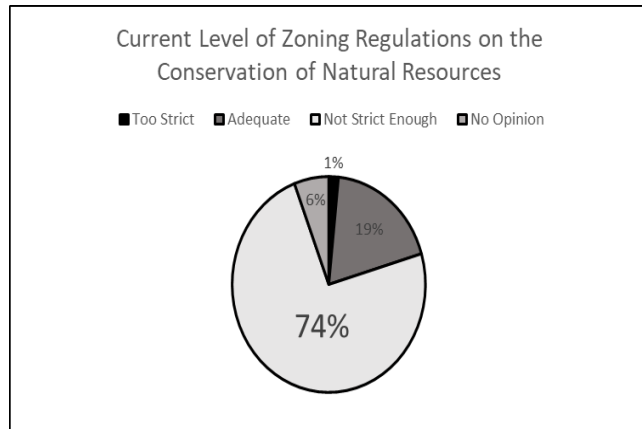


Figure 8: Data displayed in the figure above was gathered from the 2021 Land Use Survey sent out by the Planning Department of Georgetown County. This data represents roughly 10% of the County.

## Analysis

### Discussion

When creating a buffer zone or setback it is important to look at what you are trying to prevent from entering the water and surrounding ecosystem and habitat. In the Georgetown County waterways, it is important to maintain excellent water quality, maintain the natural habitat, protect local endangered animals, mitigate economic loss from natural disasters, promote sustainable development, and help mitigate global climate change.

The economic safety and protection of the natural habitat that wetland buffers provide fall under goal 8, target 8.9, “*devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products*” (United Nations, 2016). Coastal wetlands can also provide economic benefits for the state. Coastal tourism contributed approximately \$9 billion to the overall economy in 2019 (Purcell et al., 2020). Increasing the natural area of these important ecosystems could also help increase the economy and create and improve jobs within the area.

The research in this document helps support the implantation and execution of a new ordinance to not only protect natural resources but also protect socio-economic interests, while also by the United Nations Sustainable Development Goals. The monetary value of wetland protection from storms (Carson et. al., 2020) calculated that the wetlands here in South Carolina can prevent millions in property damage if properly maintained. This falls under goal 11, target 11.5, “*significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to the global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable*” (United Nations, 2016). Wetland buffers and setbacks in the county would help create a healthy wetland system in areas that are prone to flooding. This could be measured by the number of losses due to natural disasters in the county before stricter buffers and setbacks were implemented versus after. This can be monitored by the comprehensive plan of the county to measure the economic losses.

Wetlands can also help protect the air quality of the County. Drexler et al. (2013) found that the Winyah Bay watershed has the capability of high carbon sequestration rates. The

protection of these environments is highly important in the combat against global climate change (Mitsch et al., 2012). Trifunovic et al., (2020) found that wetlands also can store larger amounts of methane within sediments. Prohibiting the development and disturbance of sediments in these regions is imperative to decreasing the number of harmful greenhouse gasses in the atmosphere. This falls under goal 13, target 13.1, “*Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries*” (United Nations, 2016). Lowering the overall world carbon budget is essential to stopping adverse effects from climate change like heightened hurricane seasons and sea-level rise which directly are affecting the county.

The ability wetlands have to be able to influence the water quality of a region is extremely important to human life (Yarrow, 2009). Sanger, Holland, and Scott (1999) found high amounts of trace metals in key areas of the County that are dependent on its water features for tourism, recreation, and economic stability. Riparian zones and setbacks have shown useful in the uptake of excess nutrients from anthropogenic sites and the overall improvement of water quality. (Verhoeven et al., 2006, Matheson et al., 2003, Silvan et al., 2004, Anbumozhi, Radhakrishnan, and Yamaji 2005). The creation of these setbacks and buffers in water quality protection directly aligns with goal 14, target 14.1, “*prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution*” The data and science from the studies mentioned in this document are direct indicators that the appropriate buffers and implantation are capable of protecting water quality from harmful pollutants.

Following the Ramsar convention and extending the distance between human development and natural wildlife is crucial for maintaining critical areas for threatened or endangered species. Wetland buffers and setbacks within the county can also contribute to goal 15, target 15.1, “*ensure the conservation, restoration, and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains, and drylands, in line with obligations under international agreements*” (United Nations, 2016). By the policies and procedures of the Ramsar convention, the county can ensure sustainable use of wetland environments to help benefit humans and the environment.

## **Conclusion**

The County has wetland systems that are crucial for environmental services and the protection and improvement of current policy are entirely necessary to protect human interests. If successful, Georgetown County will be protecting, preserving, and conserving some of the most valuable natural features the County has to offer. These systems are large carbon sinks and preventing the disturbance of these sediments will help retain large amounts of greenhouse gases. The healthier the environment the higher economical support it will provide in the mitigation of losses due to natural disasters. Humans are heavily reliant on the restoration of natural water sources that wetlands provide. Keeping harmful pollutants out of them is essential for protecting terrestrial life and also marine life.

In a growing coastal community, such as Georgetown County, various challenges stand in the way of the support and creation of new protection ordinances. Georgetown County has increasingly become a vacation and retirement location for people from all over the country. Developers trying to meet the demands of those coming here would be limited in what they could do in the coastal region of the county if there were stronger restrictions. Although, without the implementation of these buffers and setbacks, losses from flooding and hurricanes will create serious health and safety concerns for the residents of the county. These ordinances do not just promote environmental well-being but will increase the protection of the socio-economic interests of county residents. Most importantly these ordinances will promote sustainable development by the United Nations for Georgetown County.

## **Future Recommendations**

The objective of this paper is to support the implantation of stronger and sustainable wetland protection ordinances in Georgetown County. These ordinances and distances should be based on the following factors: the type of wetland, the type of development, and the amount of disturbance within the environment. The prevention of development within the wetland environments is paramount to lowering the net loss of wetlands. It is suggested by the findings in this paper that the current 15 feet buffer on tidal wetlands is not sustainable for maintaining healthy tidal environments within the county.

The American Planning Association strongly recommends the addition of a wetland protection policy to be introduced during the development review discussions. Currently, the County is reviewing the Land Use Element for the Comprehensive plan. The suggestion of the APA is to include public interest meetings and discussions with county residents, developers, stakeholders, and government officials in the area about land use. The County is in the perfect position to create and reform the current zoning regulations. At the meeting, participants should be prompted on several variations of wetland ordinances allowing the participants to vote on which one they would like to see implemented. Whether the new ordinance is one of the choices or if it is a combination of them with the help of public input the policy will have a much higher chance of being approved by the council. It is the objective of this paper to provide evidence and support for the creation of stronger ordinances. This ordinance review process has a long duration and will require political input and agreement. The planning staff has already begun the steps to generate ideas and feedback from community members on natural resource protection. The staff of the planning department is dedicated to improving and increasing the natural beauty, and resilience of the county.

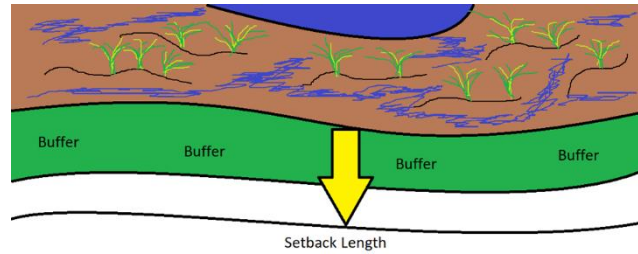
Use of guidelines set by the South Carolina Department of Health and Environmental Control Office of Ocean & Coastal Resource Management. The OCRM critical line is widely adopted by many local governments and is the delineation of the coastal wetland environment (Halfacre-Hitchcock et al., 2005). The use of this distinction will allow for adequate distancing and protection of the wetland environments in the county. While it is used for the coastal wetland delineation it could be used in perpetuity to determine the starting point for all wetland setbacks and buffers. Beaufort county includes statements in their ordinances and regulations to prohibit the development within these environments. This study has found multiple studies to support this practice and prohibit the activity. To create a more sustainable Georgetown County they should move to try and adopt similar policies to Beaufort and Charleston County. These ordinances use easily regulated standards to allow staff to enforce them. Most importantly they are ordinances in practice in two Coastal counties similar to Georgetown.

## Wetland SBP (Setback-Buffer-Protection) Ordinance

1. Purpose and Intent. Setbacks shall be placed landward from the OCRM critical line of wetland environments. In addition, this zone shall include a vegetative buffer.

This ordinance is in place to:

- a. Reduce potential marine pollutants such as sediments, nutrients, and other potentially harmful or toxic substances from entering wetland environments.
  - b. Prevent disturbance of wetland sediments or environment to protect, important wildlife habitats and carbon sinks.
  - c. Increase the resilience of wetland environments to assist in the mitigation of floodwater and lower economical loss due to natural disasters
  - d. To overall increase the natural beauty of the County.
2. Residents should adhere to the following regulations for development type, and a vegetative buffer shall be maintained along the bank of wetland environments.
    - a. Residential development
      - i. Single-Family: 20-foot setback with a 5-foot buffer
      - ii. Multi-family: 35-foot setback with a 10-foot buffer
    - b. Commercial/Industrial: 50-foot setback with a 20-foot buffer
    - c. Impervious surface (roads, driveways, and parking): 50-foot setback with a 10-foot buffer
    - d. Agriculture: 100-foot setback with a 30-foot buffer



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