

Sustainable Planning, Protecting Social, Economic, and Environmental Interests of Coastal Communities

O'Hara, D.E.

SUST 310 Methods/Tools in Sustainability

Department of Political Science, Coastal Carolina University, Conway, SC

Introduction

Urban development has created a water management problem. As many of the natural features in urban areas are 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) (1). Wetlands can store 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) (2). Wetlands provide a multitude of benefits, including biodiversity, nutrient cycling, pollutant filtration, recreational activities, and economic services (Yarrow 2009, Turner 1991) (2&3). Most importantly wetlands can serve as a buffer during hurricanes that can help mitigate coastal flooding and storm surges.



Figure 1: King Tide in Murrels Inlet, SC causes flooding on local roads.

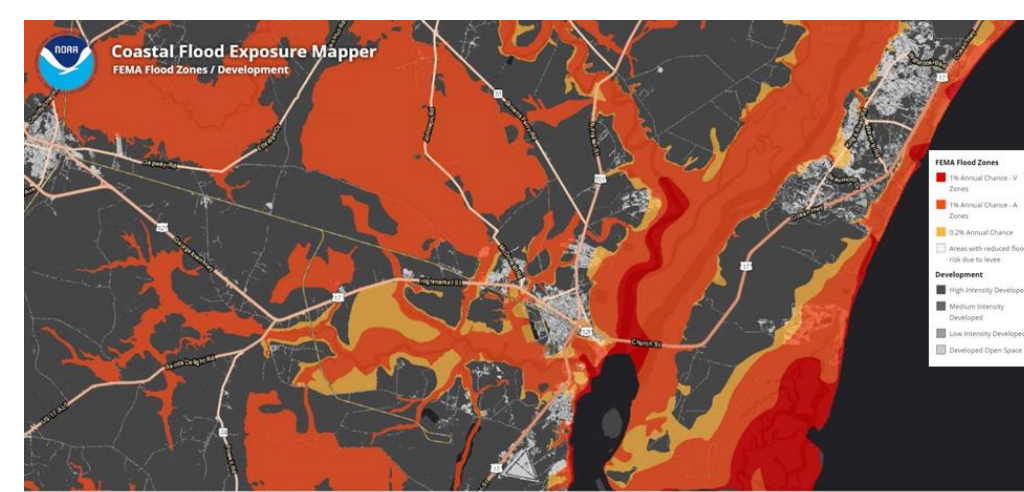


Figure 2: Flood risk in urban developments within Georgetown County

Purpose of UN SDGs

The Sustainable developments goals were created by the United Nations to protect and preserve the overall well-being of the relationship between humans and the environment. There are 17 goals, this project falls under Goal 14 (4), “to conserve and sustainably use the oceans, sea, and marine resources for sustainable development”, while using components of other goals and indicators to prove the relevance of implementation of wetland setbacks and buffers.

The Power of Wetlands

Hurricane Damage Reduction

- Wetland Environments can significantly reduce property damage attributed to natural disasters such as flooding and hurricanes.
- A Study conducted on South Carolina Coastal wetlands in 2008 valued the protection of wetlands at 4,600 USD per Hectare per year (Costanza et al 2008) (5).
- In 2020 a similar study was conducted and found the value was a range between 2,400 to 12,000 USD per Hectare per year (Sun and Carson 2020) (6)

Carbon Sequestration

- Wetlands Environments have the unique ability to be able to a major carbon sink (Drexler et al. 2013) (7).
- Studies have found that wetland environments play an important role in the uptake and removal of carbon from the atmosphere (Mitsch et al 2012) (8).

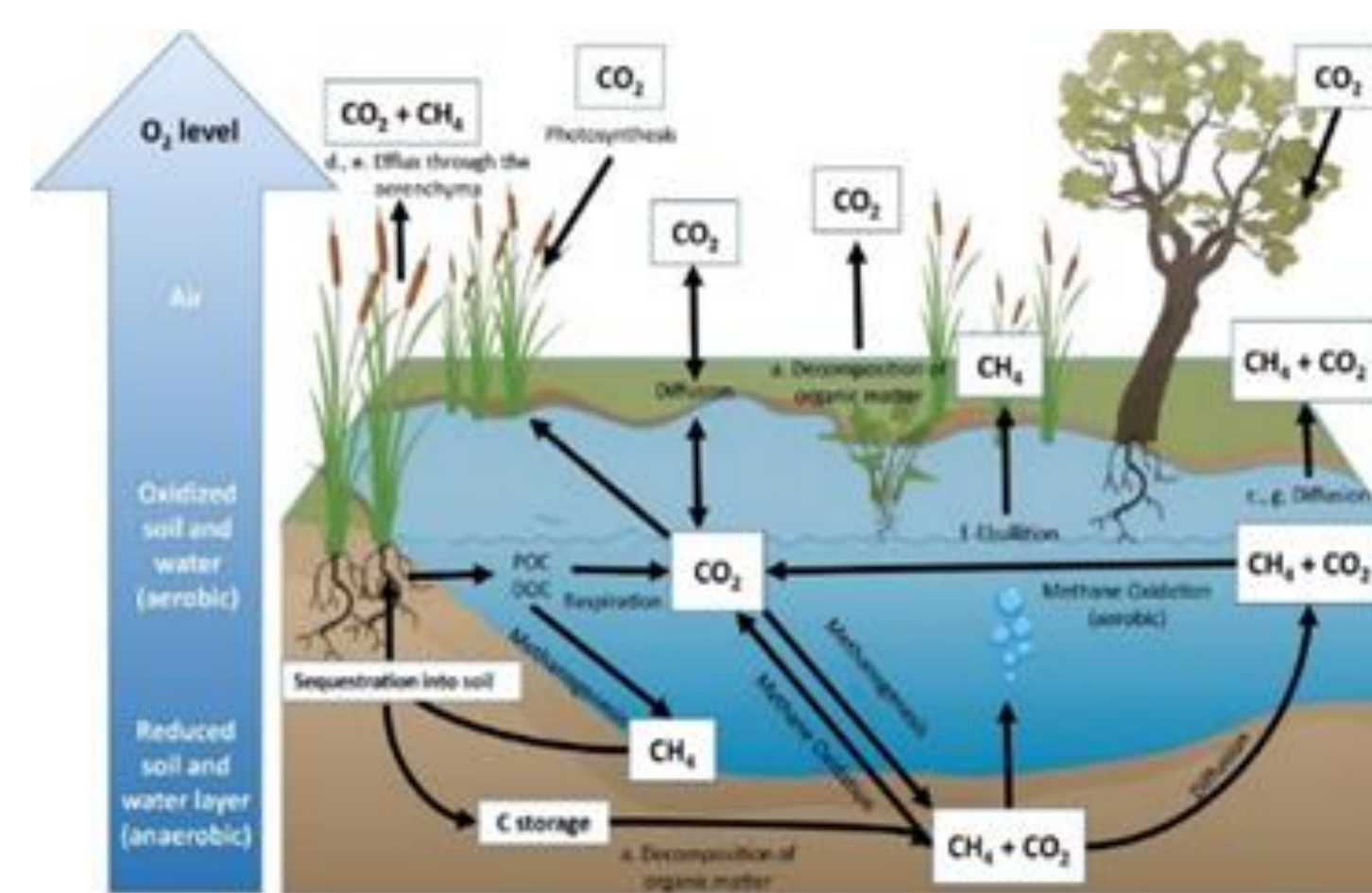


Figure 3. Carbon cycle within a freshwater marsh environment.

Aquifer and ground-water recharge

- Wetland environments play key roles in water quality control and water supply, these areas have essential storage and filtration mechanisms (Yarrow 2009) (2).
- The ability to retain and filter large amounts of excess flood water make these environments efficient at water filtration.

Water Quality

- When the environment is overloaded with essential nutrients, such as nitrogen and phosphorus, from wastewater runoff the system can experience eutrophication. (Hulth et al 2005 Conley et al 2008) (9&10).
- Naturally, a healthy margin of native plant species can help the uptake of these nutrients from runoff before reaching the water bodies. (Verhoeven et al 2006, Matheson et al 2003 and Silvan et al 2004) (11,12,&13).

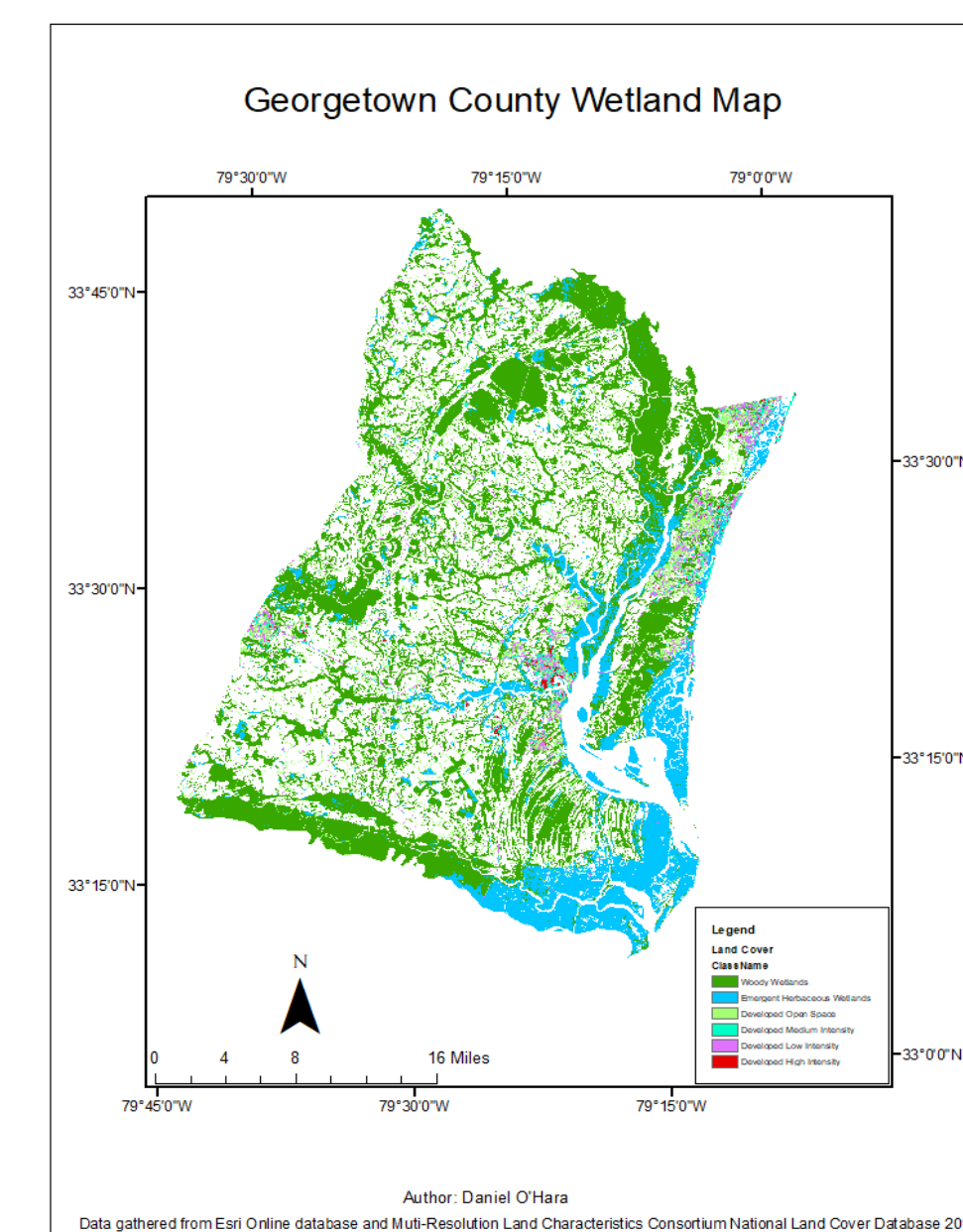


Figure 4. Land cover map of Georgetown county showing the type of wetland areas and their proximity to urban developments.

Discussion

When creating a 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.

Conclusion

The County has wetland environments that are crucial for the protection and improvement of necessary environmental services to protect human interests. Discussions with county residents, developers, stakeholders, and government officials in the area are the first steps to creating policy to properly serve the residents and interests of the County. 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.

Future Recommendations

Similar policies to Beaufort County should be adopted by Georgetown County, creating setback and buffer requirements based on the development and use of the land. Using various combinations of setback distances and buffer zones to optimize the services given to us naturally by wetlands. To not only ensure the protection of some of the County's most valuable resources but also in the interest of the economic and social well-being of the residents within Georgetown County.

References

Available on request.

Setbacks and Buffers

Setbacks are zoning policies that local governments can put in place to protect, important wildlife habitats and natural resources While buffer zones are comprised of various vegetation and soil types to help the uptake of nutrients in wastewater (Narumalani et al. 1997) (14). Buffer zones have proven to be extremely effective in the improvement of water quality of the surrounding water bodies (Verhoeven et al 2006, Matheson et al 2003 Silvan et al 2004 and Anbumozhi, Radhakrishnan, and Yamaji 2005) (11,12,13 &15).

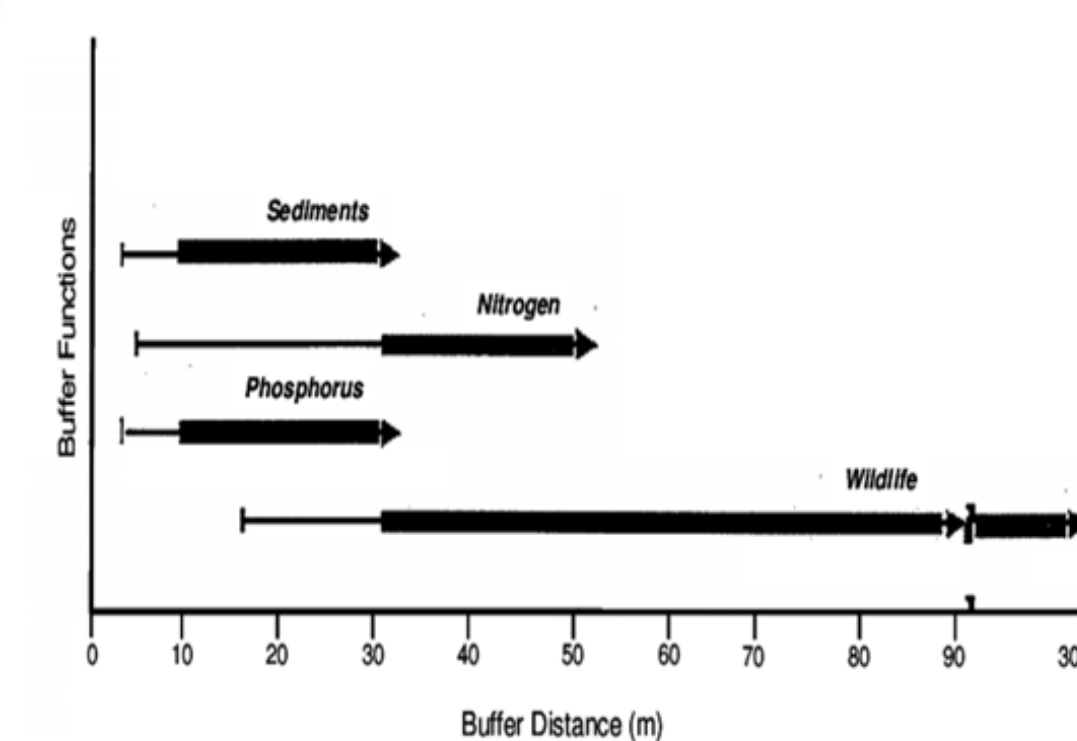


Figure 5. This figure shows the efficiency of the buffer distance on the target pollutant the buffer is protecting the water source from contamination. This figure was created by the Environmental Law Institute Buffer distance and the service effectiveness



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