2021 Coastal Habitat Protection Plan

Improving Water Quality by Addressing Inflow and Infiltration

DEPARTMENT OF ENVIRONMENTAL QUALITY

CHPP Steering Committee | Anne Deaton| January 21, 2021

Inflow and Infiltration

What is it, What Causes It?

- Sewer pipe deterioration
- Construction materials (pipe type) and methods
- Insufficient maintenance
- Improper customer use (ex. grease down the drain)
- **Site conditions (shallow water table)**
- **Heavy or prolonged rainfall**

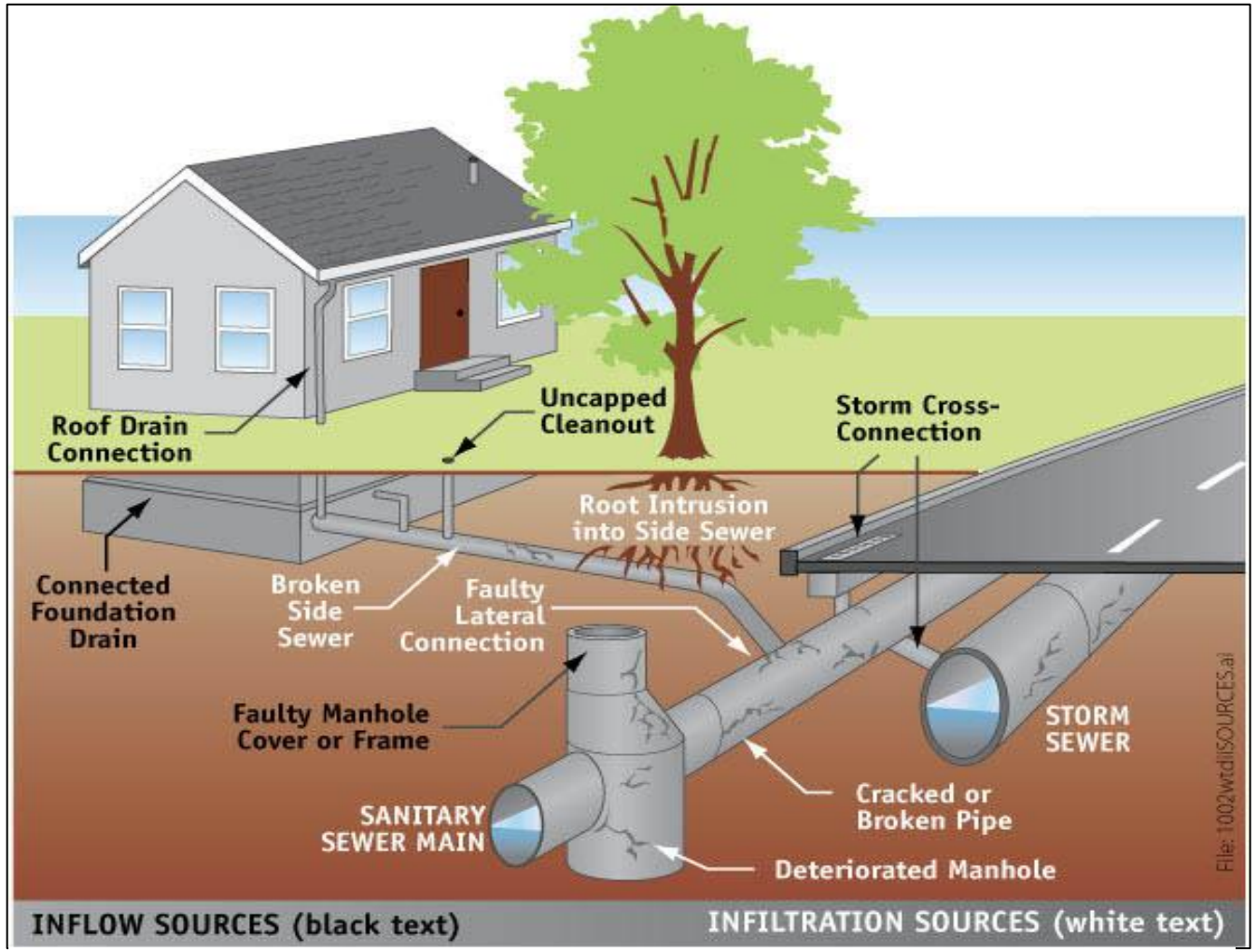

Photo credit: King County Dept. Natural Resource and Parks, Wastewater Treatment Division

Inflow and Infiltration

The Connection with Sewer Overflows

- Excess flows into the sewer lines may cause sanitary sewer overflows (SSOs)
- Sewer lines, pump stations, and WWTPs are designed for specific flows and peak flow volumes and rates.

Wallace Park, Burnt Mill Creek, Wilmington, 2018

Photo credit: L. Cahoon

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Water Quality Impacts of Sewer Overflows

- ↑ Bacteria and nutrients → algal blooms, low DO, fish kills, shellfish harvest closures, swimming advisories
- Toxins (oil, heavy metals, endocrine disrupting chemicals)
- Hewlett Creek SSO study – UNC-W
  - Fecal Coliform bacteria- 270,000 CFU/100 ml
  - Declined after 3 days in water column; > 1 month in sediment
  - Nutrients declined quickly – taken up by phytoplankton, marsh, algae

Photo credit: M. Mallin

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Prevalence

- 577 discharge and non-charge WWTP facilities in CHPP region
- Studies showed I & I is prevalent (Cahoon and Hanke 2017, 2019)
  - 92% of 93 municipal WWTPs had statistically significant increased flow with rain events
  - I & I significantly greater with repeated rain events
  - Infiltration contributes more than inflow

Photo Credit: NC Health News

Inflow and Infiltration

Coastal Conditions Intensify Issue

- 2,000 mi^2 of coast have < 3 ft elevation – highly vulnerable
- Gravity-fed lines and lift stations located in low areas near water
- High rainfall and more high rain events on coast
- High water table – leaky pipes sit in groundwater
- Salt water in pipes from groundwater

Climate change will compound these factors!

Photo credit: L. Cahoon

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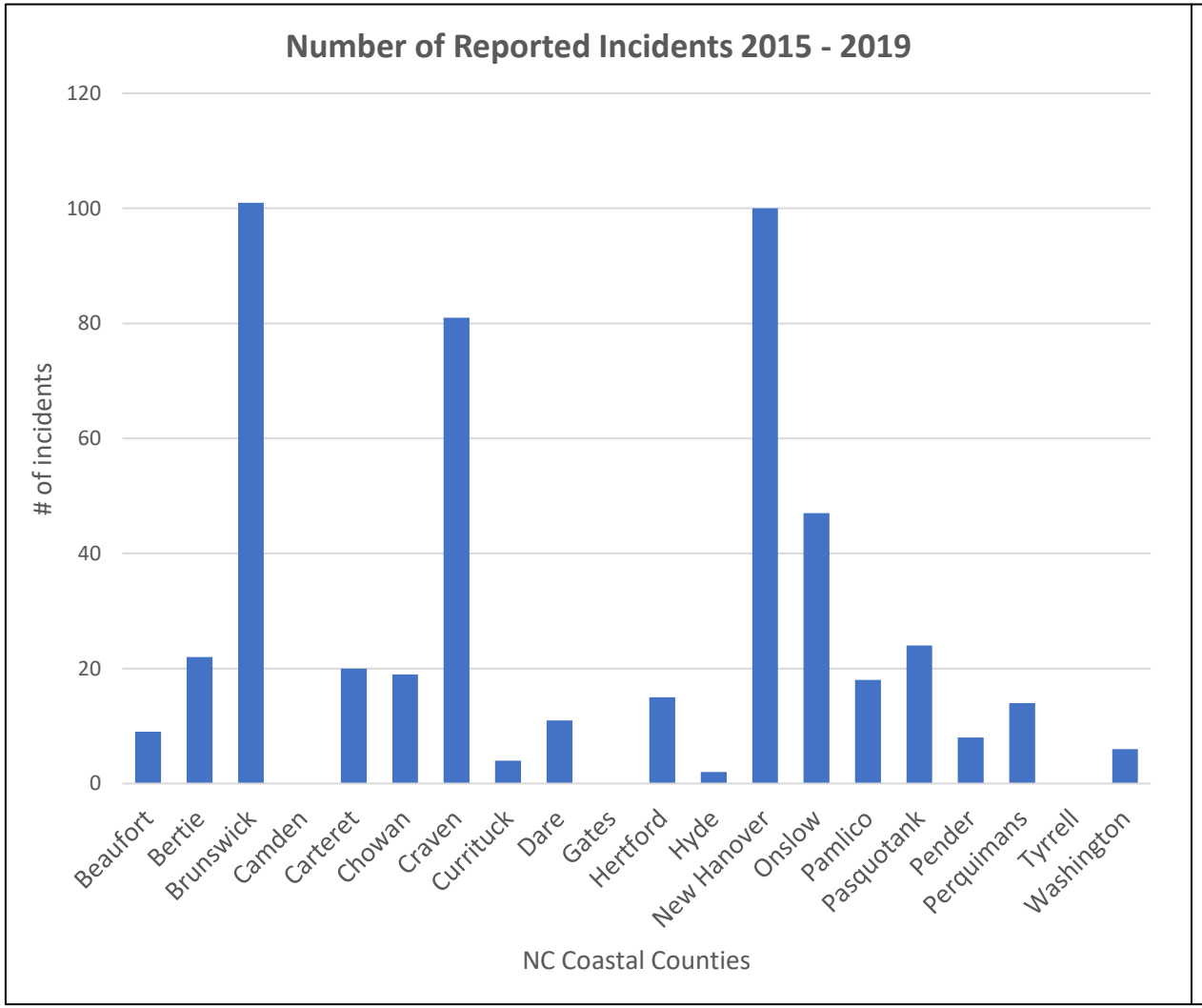
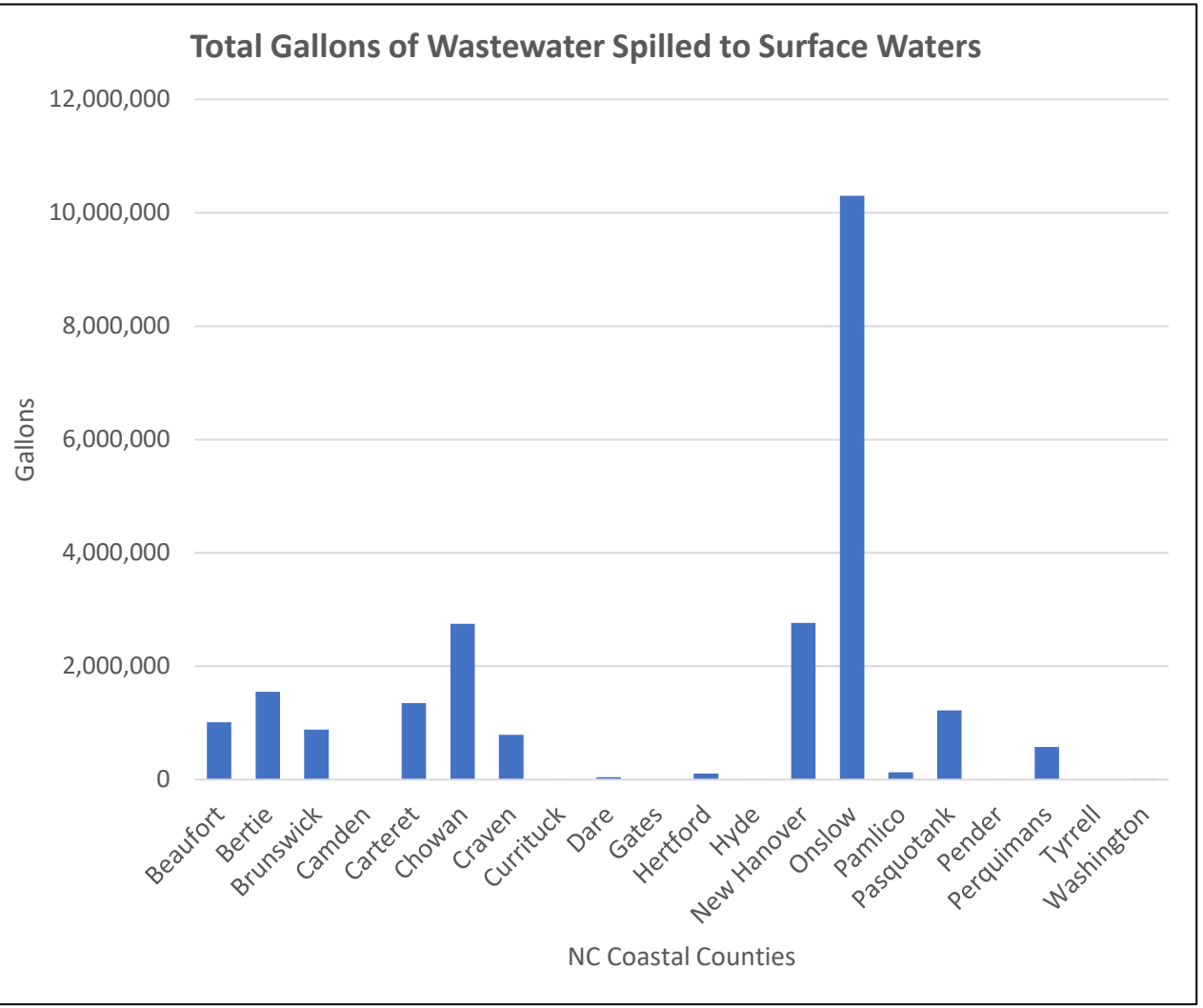
Sanitary Sewer Overflows, 2015-2019





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Economic Impact on Communities

- Wastewater infrastructure problems are financial burden on counties
- I & I increases volume to be treated, which increases operating expenses
- SSOs are permit violations - expensive fines
- Remedial cleanup - expensive
- Beach closures impact tourism and can lower property values

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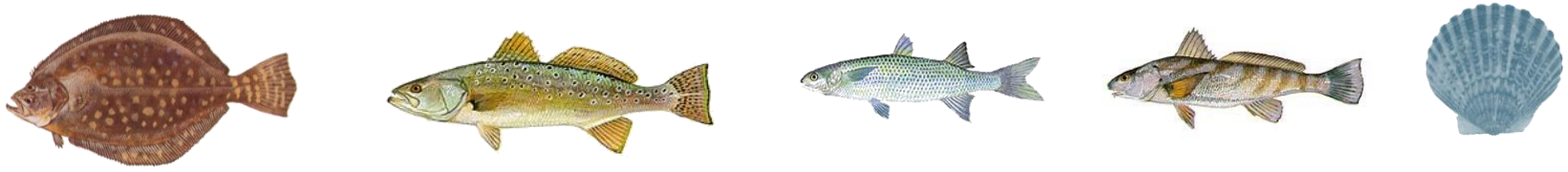
Recognized priority

- 2010 - Strategies for Estuarine Shorelines *(NC Sea Grant Report)*
- 2013 - State Water Infrastructure Authority formed *(GS 159G-70)*
- 2020 - NC Climate Risk Assessment and Resilience Plan *(EO 80)*
- DMF Fishery Management Plans:

"Reduce point source pollution from wastewater through improved inspections of WWTPs, improved maintenance of collection infrastructure, and establishment of additional incentives to local governments for WWTP upgrading"



Southern Flounder, Spotted Seatrout, Striped Mullet, Kingfishes, Bay Scallop

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GS 159G-70: State Water Infrastructure Authority (SWIA)

Photo Credit: NC Health News

- SWIA – responsible for awarding federal and state funding
- Develop a water infrastructure master plan
- Establish prioritization criteria
- Division of Water Infrastructure – support for SWIA

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NC Statewide Infrastructure Master Plan (2017)

- $7-11 billion – needed for wastewater infrastructure for next 20 yr
- Since 2014, awarded ~ 900 projects, $1.9 billion
- Insufficient amount of grants and loans
- Rural areas are most impacted - declining industries and population

Grant and Loan Programs:

-State Wastewater Reserve Grants

-Community Development Block Grants - Infrastructure

-USDA Rural Development Loans and Grants

-Clean Water State Revolving Funds

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State Water Infrastructure Authority (SWIA)

Division of Water Infrastructure

Asset Inventory and Assessment Grants –asset inventory, assess condition, prioritize most critical needs, develop Capital Improvement Plan

Merger/Regionalization Feasibility Grants – investigate partnerships, consolidating systems, or decentralizing

SL 2020-79

- Requires local governments to determine if they are “distressed” due to water infrastructure
- Provides Viable Utility Reserve Grant Fund - $9 million

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Recommended Actions

1. Request adequate and recurring state appropriated funds needed for the Viable Utility Reserve. (*SWIA 2019-2020 Annual Report*) (Funding)

2. Request the NC General Assembly modify legislation to allow SWIA flexibility in establishing grant conditions for programs under their authority, to ensure grant funds are used to help systems achieve long-term viability. *(SWIA 2019-2020 Annual Report)* (Legislative)

3. Within the funding programs under the purview of the SWIA, consider additional priority for projects with a direct benefit to sensitive estuarine waters, including SA waters, fish nursery areas, and impaired waters, particularly those adversely impacting estuarine fish and their habitat. (*SWIA 2019-2020 Annual Report – modified to be coastal specific*) (Policy)

Photo Credit: NC King Tides Project, Oriental, NC

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Recommended Actions

4. Develop additional incentives to encourage improved maintenance of the collection system (e.g. incentivize owners and operators of wastewater lines for both existing systems and potential new systems to adopt construction designs that minimize the potential for sewer spills over the long term). (*Schiavinato and Kalo 2014, DWR staff*) (Policy)

5. Evaluate modifications of DWR rules to require deemed permitted collection systems under select criteria (e.g. 100,000 or more GPD) to have a certified operator as an Operator in Responsible Charge (ORC). DWR shall provide an update on this evaluation effort to the EMC's Water Quality Committee in approximately one year. (*Schiavinato and Kalo 2014, DWR staff*) (Potential rule making)

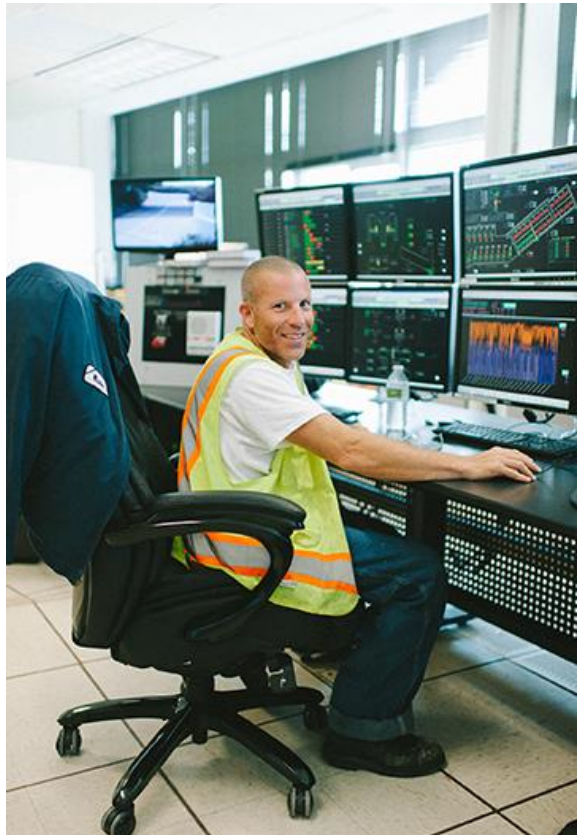

Photo credit: King County WTD, Dec. 22, 2020

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Recommended Actions

6. Investigate modification of DWR rules to require deemed permitted collection systems to be cleaned annually on a systematic basis (e.g. 3 to 5 years). The DWR shall provide an update on this evaluation effort to the EMC's Water Quality Committee in approximately one year. (*Schiavinato and Kalo 2014, DWR staff*) (Potential rule making)

Camera inspection -Clean Pipe

Photo credit: Pipe camera shots-ScottHomeInspection.com

Grease, fat, oil buildup

Photo credit: https://scotthomeinspection.com/wp-content/uploads/2019/06/ezgif.com-optimize-3.gif

Cracked Pipe

Photo credit: https://www.youtube.com/watch?v=9OnFayHzfHo

Smoke test- Leaky Pipe

Photo credit: pipespy.com

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Recommended Actions

7. Work with state and local governments in the coastal counties to develop policies or rules (within 15A NCAC 02T) regarding flood-proofing wastewater infrastructure; siting new and relocating existing infrastructure away from sensitive estuarine waters and floodplains; upgrading sewer infrastructure; and develop strategic priorities for public and natural infrastructure improvements. *(NC Climate Risk Assessment and Resilience Plan*) (Potential rule making)

8. Prioritize research on alternative wastewater collection system designs that may be better suited for coastal conditions (alternative sewer systems, composting toilets, etc). (*DWR, L. Cahoon, UNC-W*) (Research)

↑ resiliency of wastewater infrastructure =
↑ resiliency of coastal communities and estuary

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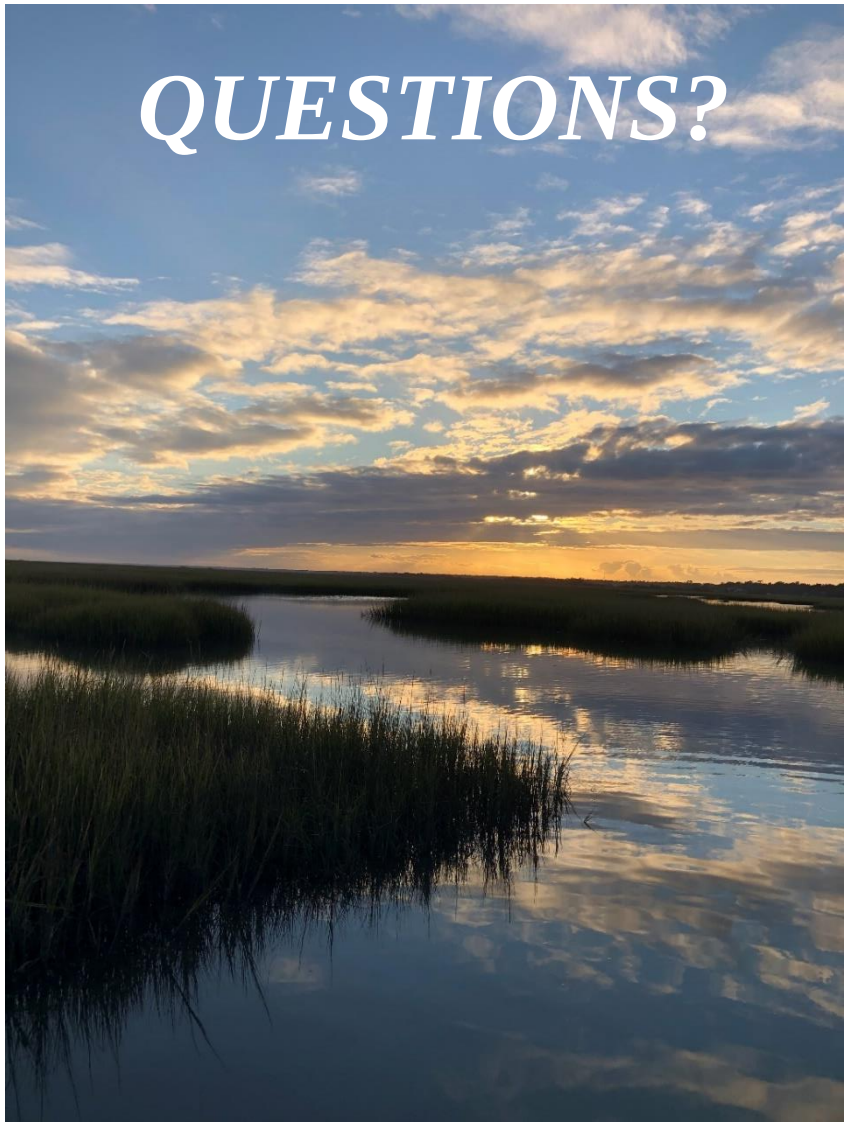

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