Assessing Change in North Carolina's Outer Coastal Plain Wetlands

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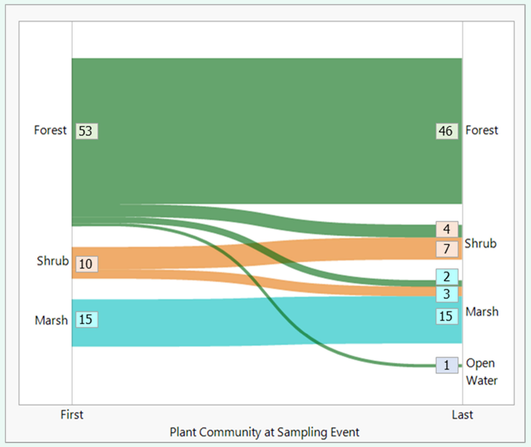
Objective

To assess on-the-ground changes in freshwater and brackish wetlands across the Outer Coastal Plain of North Carolina, NCDEQ staff returned to wetlands with historical vegetation survey data. The goal was to describe rate of change and identify early warning indicators of conversion of freshwater to salinity impacted wetlands.

Approach

- Resurveyed plant community composition in 78 wetland sites (Carolina Veg. Survey, NWCA, Duke Univ., NCSU, Nutrien Phosphate, and USFWS historical sites).
- Sites historically freshwater or transitional salinity wetlands, within ~2 miles of open brackish or salt water.
- Median interval between sampling = 12 years (range 5 - 34 years).
- Followed original veg. sampling protocol; measured soil (1m depth) and water chemistry from shallow groundwater and/or surface water wherever present.

10 Sites Changed Community Type



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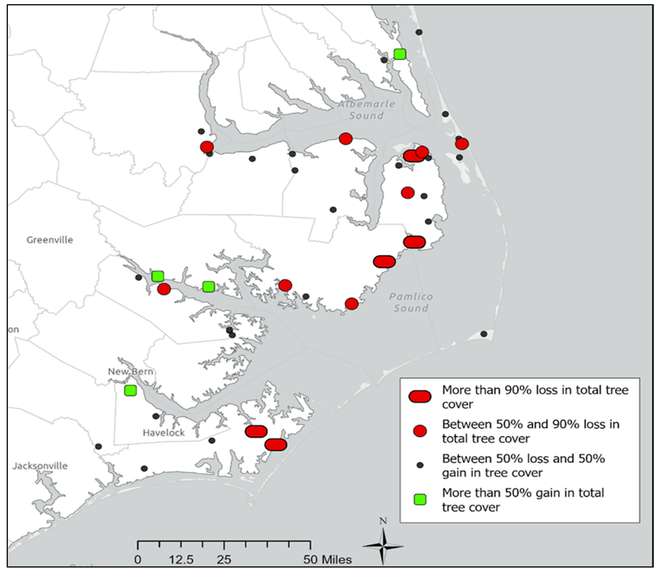
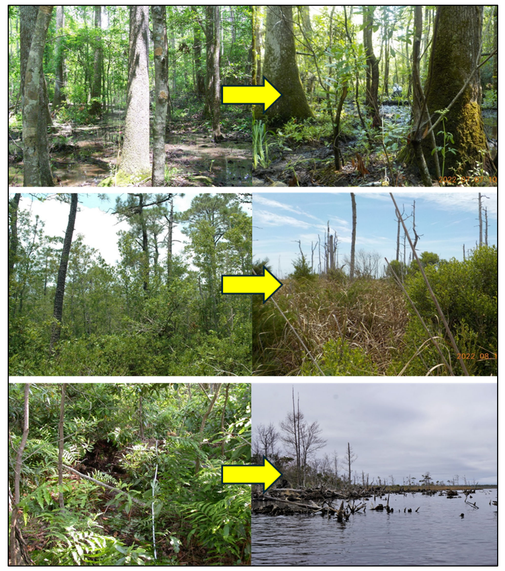
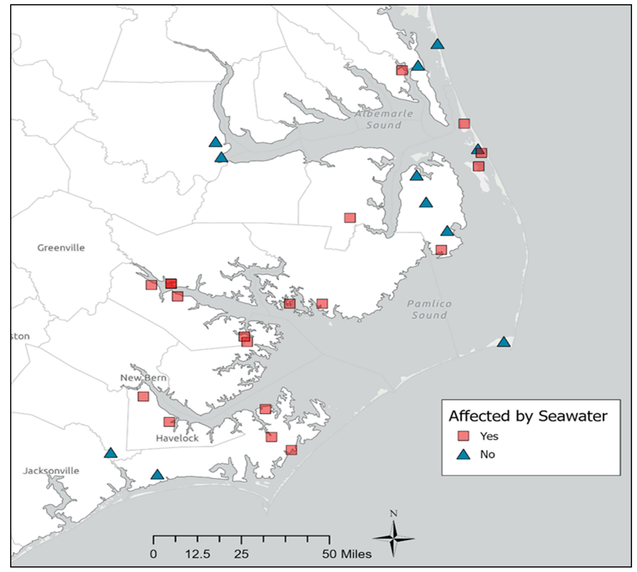
Wetland Change Varied by Plant Community Type & Geographic Location



Many sites lost cover by tree species.

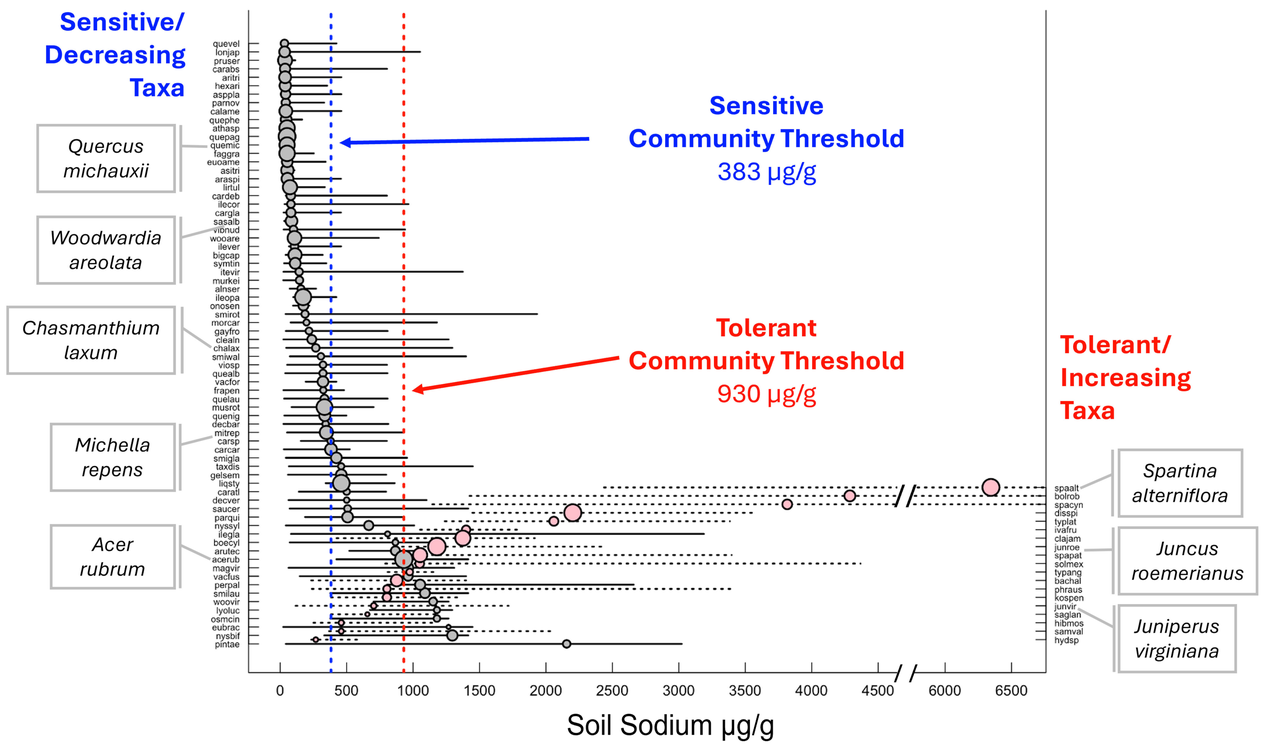


Some sites remained stable; others changed drastically.



Most sites were affected by seawater (based on groundwater Cl concentration).

Occurrence Data Used to Estimate Sodium Tolerance Thresholds



Outcomes

- Plant communities in Coastal Plain freshwater wetlands can potentially tolerate chronic exposure to 0.3 - 0.5 ppt water salinity, but chronic exposure above 0.5 ppt could precipitate changes in understory communities.
- Nearly two-thirds of the 32 sites with water chemistry data were deemed affected by seawater.
- Transitional salinity wetlands showed a lack of woody species recruitment.
- Freshwater forested wetlands changed less than transitional salinity wetlands, but all increased in nonnative species occurrences.
- Indicators of seawater intrusion (e.g., groundwater chloride, soil sodium, increasing brackish tolerant species) could be used to detect sites minimally or unimpacted by seawater, presenting opportunities to conserve, protect and restore existing coastal forested wetlands.