# UNDERSTANDING THE LINKAGES BETWEEN A TIDAL FRESHWATER FORESTED WETLAND AND AN ADJOINING BOTTOMLAND HARDWOOD FOREST

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The low-gradient coastal topography of the southeastern Atlantic Coastal Plain, coupled with large oceanic tidal amplitudes cause rivers that discharge to the coast to exhibit tidal influence of tides far inland. In those reaches, tidal-freshwater forested wetlands (TFFW) occupy floodplains which eventually transition to non-tidal, bottomland hardwood-forested ecosystems. Hydrodynamic studies have not adequately addressed the upland boundary of TFFWs, where the hydrologic regime shifts from tidal-to fluvial-dominated processes as a result of a deceasing tidal gradient. Understanding how the tide influences those upper reaches is fundamental to understanding how rising sea-level may influence wetland dynamics. In this study, we investigated the following questions: (i) how, and to what extent, does the tidal-freshwater stream influence the shallow groundwater in the riparian zone; and (ii) how does the vegetation community differ in riparian zones of tidal-freshwater streams as compared to adjacent non-tidal systems. To address these questions, we collected hydrology and vegetation information in a fourth order stream, Huger Creek and its non-tidal tributary, Turkey Creek (USGS gage ID 02172035), in the Santee Experimental Forest near Cordesville, South Carolina. These streams form the headwaters of the East Branch of the Cooper River, which flows into the Charleston Harbor estuary. Information was collected over an eighteen-month period from monitoring gages in Huger and Turkey Creeks, from water-table wells in the riparian wetlands, and from vegetation surveys in riparian zone plots. Our analysis indicates: (i) that the water-table gradient is "upstream" and the tidal pulse affects the shallow ground water table, and (ii) that the forest-community structure showed no significant relationship to tidal vs. non-tidal hydrodynamics in the riparian zones. These results emphasize the need to assess ecology and hydrology characteristics of tidal-freshwater forested wetland systems separately from non-tidal systems because of the tidal regulation of the water budget. Considering that rising sea level will affect large areas of the coast with low topographic gradients, existing TFFW systems should be inundated. As a result, upstream non-tidal zones will soon be affected by tides due to rising seas. Improved understanding of the linkages across the interface of tidal and non-tidal terrestrial ecosystems will provide valuable information to decision makers and is needed to anticipate long-term ecological resiliency during higher sea levels.

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