

Wetlands are essential for providing various ecosystem services to humans. They play a crucial role in the global carbon cycle and are thus considered a valuable terrestrial carbon sink (Li et al., 2023). Hydrology is the most vital factor in driving wetland ecosystem services, as it affects multiple biophysical processes within wetlands. In the southeastern United States, flatwood ecosystems (a matrix of upland pine and mostly isolated wetlands) have the potential for upland restoration (i.e., thinning of plantation pine) to increase wetland hydration (Jones et al. 2018) and thus enhance carbon storage. 25 wetlands with water-level loggers were randomly selected across a contiguous pine flatwoods site in Bradford County, Florida, covering 27,000 acres. Soil samples were taken to a depth of 60 cm to quantify the link between hydrology and soil carbon dynamics. This presentation will focus on one question: 1) How do the location, size, and water table depth of wetlands influence wetland soil carbon across a wetland-landscape? Data collection and analysis are still ongoing, but preliminary results support the hypothesis that water table depth influences soil organic carbon stock and accumulation rates. The results can be applied to guide wetland management, conservation, and policy decisions that better account for potential future changes in carbon storage.