

## **Quantifying Flood Storage in Urban Floodplain Wetlands**

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Flooding poses a significant risk to agricultural lands, forests, residential areas, infrastructure, and dams across North Carolina. While interest in flood storage capacity enhancement projects is growing, there is limited data on the floodwater storage potential of natural floodplain wetlands in the state. This study addresses that gap by analyzing five naturally flooded wetlands along Walnut Creek in Raleigh, NC—an urban watershed where flood mitigation is especially critical. We collected two years of in-situ water level data, digital elevation models (DEMs), and land-based bathymetric surveys to quantify flood storage volume, inundation extent, and flood attenuation during overbank events. Each wetland exhibited distinct hydrologic responses, influenced by factors such as wetland size, depth, proximity to the creek, and position within the watershed. Notably, we observed unique floodwater retention signatures, with surface water levels returning to pre-storm conditions over timescales ranging from several hours to several days. These findings will inform estimates of cumulative flood storage capacity along Walnut Creek and support broader statewide initiatives, including the development of decision-support tools and planning frameworks aimed at enhancing flood resilience across North Carolina's river basins.