UNDERSTANDING THE HYDROLOGIC CONNECTIVITY BETWEEN UPLAND FORESTS AND WETLANDS

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Wetlands are key landscape elements that store and connect surface and subsurface water, and provide ecological, hydrological, and biogeochemical functions. Wetlands play a significant role in landscape ecohydrologic functions by supplying water storage, buffering water-table dynamics, providing critical habitat, activating carbon and nutrient cycling, and regulating microclimate. These emergent functions are deeply coupled to the surrounding land cover that exerts control on hydrologic variation in space and time. Here we explore the ecohydrologic impacts of upland forest on adjacent wetland and landscape hydrologic function focusing specifically on the dynamics of connectivity in terms of water and energy exchange. Based on the synthesis of field measurements—including hydroclimatic variation, upland evapotranspiration rates, integral hydrologic responses in wetland stage time series, and landscape topographic gradients—we identified patterns of connectivity across over 75 geographically isolated wetlands from 5 wetlandscapes. Using a daily water budget approach and net flow under disconnected conditions, we found that reduced vegetation density in the upland forest increases wetlandscape water yield. We conclude that a trio of factors controls wetland hydrology: topography, hydroclimate variation, and adjacent forest structure. This synthesis broadens our understanding of the hydrologic connectivity between forested uplands and wetlands, which provides important guidance for forest and wetland management.

PRESENTER BIO: Dr. Lee is a postdoctoral researcher in Ecohydrology, with a focus on wetland studies. She studies the connectivity between ecohydrologic processes in wetlands by synthesizing model and data to broaden our understanding of the ecohydrological significance and the role of wetlands to improve the preservation and restoration of wetlandscapes.