Abstract: Temperate forests have a strong carbon sink capacity, although the future of this ecosystem service is uncertain in the eastern United States in light of widespread changes affecting succession. This study quantified aboveground carbon accumulation and storage in a southeastern Pennsylvania forest fragment, while assessing whether carbon storage capacity will be supported in the future. Six 0.2 ha plots were censused in 2013 and 2018 for living tree and dead wood carbon storage, as well as tree species composition. Three plots were in a 100-year-old forest, while the remainder were in a 200-year-old forest. Living tree carbon storage increased significantly over time ($p < 0.05$), although dead wood carbon storage did not. Living tree carbon storage, basal area, and stem density were significantly higher in the younger forest ($p < 0.05$). The 200-year-old forest lacked small-diameter stems (<30 cm), relative to the younger forest, although both areas contained many large-diameter trees (>60 cm). Compositional data suggest decreased future canopy tree diversity, with the native *Fagus grandifolia* and nonnative *Acer platanoides*dominating forest understories. While there is high living tree carbon storage capacity, the dead wood pool will increase over time as many large trees die. Intervention to augment regeneration and maintain sink strength in the 200-year-old forest is needed. Action to limit the spread of *A. platanoides* and increase native regeneration throughout the forest will support forest resilience and long-term carbon storage capacity. Assessments of understory conditions are critical in supporting forests' carbon sink capacity into the future.L.

Jessica L. Schedlbauer, Ph.D.

Professor of Biology
West Chester University

Jessica Schedlbauer has a Master's degree in Ecology and Environmental Sciences from the University of Maine and a Ph.D. in Natural Resources from a joint doctoral program between the University of Idaho and the Centro Agrónomico Tropical de Investigación y Ensenzaña (CATIE) in Turrialba, Costa Rica. She had a post-doctoral appointment at Florida International University before beginning a faculty position at West Chester University of Pennsylvania. Jessica's principal research interest is in carbon storage and cycling, and she often works at the interface of terrestrial ecosystem ecology and plant ecophysiology. Her research, which has spanned a range of ecosystems, from the tropics to the Arctic, addresses research questions relevant to ecosystem management, as well as climate change. Jessica's current research is centered around the deciduous forest ecosystems of Pennsylvania.