

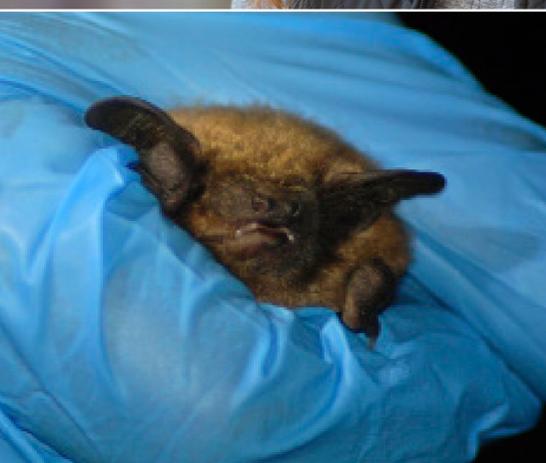


**Undergraduate Program**

Ecological Technology Design  
Ecosystem Health  
Soil and Watershed Science  
Natural Resources Management

**Graduate Program**

Soil and Watershed Sciences  
Ecological Technology Design  
Wetland Science  
Ecosystem Health & Natural Resource Management



## Bats and the City

*Bats in North America provide a valuable ecosystem service of limiting insect populations, which wreak havoc on agricultural crops and spread disease. Unfortunately, bats in the eastern and midwestern portion of the United States and Canada are threatened by disease. White Nose Syndrome (WNS), caused by the fungus *Pseudogymnoascus destructans*, decimated populations in New York starting in 2006 and has radiated across the United States and Canada. An Associate Wildlife Biologist and Lecturer, Shannon Pederson is studying urbanization's impacts on bats in the White-Nose Syndrome Positive states of Virginia, Maryland, and Delaware.*

### How Does Urbanization Affect Bats?

This cold-loving fungus, which thrives strictly in consistently cold and humid environments, such as winter bat hibernacula, is transmitted by direct contact with spores from infected bats or substrate. The fungus physically irritates the bats during hibernation, resulting in abnormal behavioral changes, premature usage of stored energy, dehydration, and finally death. WNS' devastating effects have been well documented at cold and humid winter bat hibernacula throughout most of its range. Interestingly, the role of urbanization, which would create warmer climates due to the heat island effect, in WNS positive areas has not been investigated. The nature of urban areas consists of impervious surfaces, man-made structures, planted trees, artificial light, and additional water sources. Pederson hypothesize that with the appropriate combination of landscape features, highly and moderately urban areas within a WNS positive region could serve as habitat not only for artificial roosting bats but also for other tree and cave roosting bats.

### Determining Which Variables Are Important

To test this overarching hypothesis, Pederson and her research team deploy bat acoustic detectors and insect traps every week from spring through fall for two years, among a gradient of urbanization levels, within two geographic regions of the Mid-Atlantic where WNS has persisted for several years. They collect habitat variables in the field and remotely for each site. Pederson will then attempt to identify any species' composition and activity level changes during varying conditions at different levels of urbanization from Washington, D.C. to the coast of Maryland and Delaware.

### Research Questions

- Do bats utilize highly urban areas?
- Do moderately urban areas serve as reservoirs surrounded by highly urban areas?
- Will certain bat species exhibit differences in activity and composition in highly urban areas?
- Can we predict which, if any, landscape features or combination of features are important to WNS sensitive species and remnant species along an urban-rural gradient?

Pederson's study will be the first to look at bat activity, diversity, and associated landscape features along the urban-rural gradient in a WNS positive region.