



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



Green Infrastructure and Ecosystem Services in Cities

Urban growth generates many environmental challenges on ecology, hydrology, and human health, including storm water runoff, water quality, flooding, urban heat island effects, increased air pollution, and habitat loss. These impacts occur against a broader backdrop of resource limitation, sustainability, and resilience challenges. The growth and health of cities thus requires a continuing investment in infrastructure and will ultimately require new holistic strategies technological, social, and political - to adapt growing cities to these environmental challenges. Dr. Mitch Pavao-Zuckerman has a green infrastructure research and outreach program that focuses on ecological processes, decision-making, design, and planning in cities.

What is possible?

Despite the promise of green infrastructure, we are just beginning to understand how it can provide ecosystem services. Through monitoring and modeling projects Dr. Pavao-Zuckerman is quantifying the storm water, urban microclimate, and bioretention benefits of street-scape water harvesting basins in southern Arizona. This research characterizes the ecosystem services of green infrastructure with different design characteristics and explores the function and efficiency of these green infrastructure installations. His research also explores how green infrastructure provides ecosystem services at lot, neighborhood, and city scales.

What is practical?

Knowing what ecosystem services are possible through green infrastructure implementation is just on step to addressing urban sustainability and resilience. We also need to understand how management, design, and policy result in the green infrastructure that we actually see in urban landscapes. Dr. Pavao-Zuckerman collaborates with managers, NGOs, city and county officials, and other stakeholders to better understand their decision making and the constraints and drivers of green infrastructure adoption.

Ecosystem services of Maryland's green infrastructure

The multifunctionality of green infrastructure makes it a solution that can be applied to different environmental problems across diverse cities. Dr. Pavao-Zuckerman is studying the ecosystem services of green infrastructure in Maryland as well. Interactions between cities and the Chesapeake Bay through storm water runoff has made green infrastructure a common practice in the region. His research will explore local drivers and effects of green infrastructure in this more temperate and mesic environment. While the general approaches to implementing rain gardens in Arizona and Maryland is similar from a technological perspective, the climate, ecological, social, and policy drivers are expected to be divergent between the two areas. Dr. Pavao-Zuckerman hypothesizes that this will result in the ecosystem services of green infrastructure in Maryland having different practicalities and possibilities than in Arizona, with different implications for urban sustainability and resilience.