Recycling Urban Stormwater with Trees

As urban development increases impervious surfaces, managing stormwater becomes a growing challenge, especially with the added pressures of climate change. Urban forests have long been recognized for their ability to help mitigate stormwater runoff, but few studies explore the combination of natural and engineered solutions for this issue. Innovative solutions to urban stormwater runoff are urgently needed, especially considering nature-based approaches with engineering techniques. This presentation will introduce a new urban stormwater management strategy involving a gravel bed+tree system. This system recycles stormwater on-site, while also offering benefits like parking space, tree canopy, shade, and cooling.

The presentation will focus on a demonstration project that has been installed on Tennessee State University's main campus recently. This demonstration project aims to assess the effects of the gravel bed+tree system on stormwater runoff and tree growth. To evaluate the system's performance, the research includes monitoring rainfall, estimating runoff using standard models, and measuring outflow with HOBO water level loggers. Additionally, tree growth, including measurements of diameter, height, and canopy size, will be compared between trees in the gravel beds and control trees. The findings will provide valuable insights for urban planners, urban foresters, engineers, policymakers, researchers, and community members working to improve stormwater management in cities.

Keywords: Stormwater, Measurements, Climate Change, Tree Canopy, Hydrology and Green Infrastructure