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Roots of Resilience: Developing a GIS-Based Green Stormwater Infrastructure Database and Performance Framework for the CAP LTER Study Area

This project contributes to CAP V research questions within the Urban Climate and Air Quality, Environment, and Human Well-being interdisciplinary research themes. In the Central Arizona–Phoenix Long-Term Ecological Research (CAP LTER) study area, effective urban climate adaptation requires balancing the cooling benefits of urban forestry with limited water resources. Urban Ecological Infrastructure (UEI), particularly green stormwater infrastructure (GSI), can mitigate extreme heat, urban flooding, and ecosystem degradation. However, GSI projects are often implemented by diverse actors without a centralized inventory to document their locations or support consistent evaluation of long-term ecological and hydrologic performance. This study is developing a practitioner-informed GIS-based database of GSI projects by integrating long-term CAP LTER datasets with new field-based observations. The database will catalog GSI locations and design attributes, including basic quantitative information (e.g., location, square feet, volume, plant communities), and create a research and practitioner-informed framework for metrics such as hydrologic function and cooling-related performance indicators. In parallel, this work will establish a foundational framework for standardized assessment across GSI sites by extending CAP-compatible approaches to measure mean radiant temperature (MRT), incorporating satellite-based thermal imagery, and documenting stormwater infiltration characteristics in the field. Interviews are providing consultation with community partners and experts through CAP, including the [Sustainable Cities Network Green Infrastructure Workgroup](#), [the Urban Forestry Roundtable](#), the [Urban Nature Project](#), and the [Arizona Water Innovation Initiative](#), to identify additional GSI projects and areas of study. By combining geospatial documentation with field-based ecological assessments and practitioner-informed data, this project will produce a resource to support water-related urban resilience research and evidence-based climate adaptation decision-making in the Phoenix metropolitan area.

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