



2015 BOSC Review

## FY16-19 Green Infrastructure Project Posters

### Summary of Posters

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#### 1. Green Infrastructure Models and Tools

The objective of this project is to modify and refine existing models and develop new tools to support decision making for the complete green infrastructure (GI) project lifecycle, including the planning and implementation of stormwater control in urban and agricultural settings, wastewater management, combined sewer overflow control, pollutant load reduction, and system resilience improvements. The research focus will be on sustainable GI designs and implementation at the watershed level, developing innovative systems and technologies for handling peak wet weather flows and simple, easily understandable tools for communities to use in GI planning and implementation.

#### 2. Information and Guidance through Community Partnerships

This project will provide technical assistance to support implementation of GI in U.S. communities and information on best practices for GI approaches that protect ground water supplies. Case studies that can be more broadly applied to other communities will be conducted. The project will provide program and regional offices with guidance on GI planning, implementation, and maintenance for stormwater management and capture/aquifer storage.

**NOTE:** An additional poster that summarizes GI studies that cross projects is also provided: *Summary of Green Infrastructure Place-Based Research*



# Green Infrastructure Models and Tools

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## Problem Summary and Decision Context

Communities rely on green infrastructure and green infrastructure models to solve multi-billion dollar system designs.

**Problem:** Green infrastructure models need to be validated and improved to meet system requirements.

**Objective:** Modify and refine existing models and develop new tools to support decision making for the complete GI project lifecycle, including the planning and implementation of

- stormwater control in urban and agricultural settings,
- wastewater management,
- combined sewer overflow control,
- pollutant load reduction, and
- system resilience improvements.

## Utility to Agency

### Research Focus:

- Sustainable GI designs and implementation at the watershed level
- Developing innovative systems and technologies for handling peak wet weather flows
- Developing simple, easily understandable tools for communities to use in GI planning and implementation.

## Tasks and Projected Outputs

**Task 5.01A:** GI models (including gap analysis, development and evaluation components)

**Task 5.01B:** GI decision support tools (including gap analysis, development and evaluation components)

**Task 5.01C:** Coding, Outreach, and Training

**Task 5.01D:** Sustainable Water Infrastructure Modeling Research Center (NCER) (see 4.3 Modeling Center Poster)

**Task 5.01E:** Life Cycle Costs of Alternative Water Infrastructures (NCER)

### Output Examples:

- Performance information, guidance and planning tools for Program Offices and community partners to facilitate increased adoption of GI.
- Demonstrate modeling tool approaches [for Program Offices and community partners] to assess GI effectiveness for managing both runoff volume and water quality at multiple watershed scales.



## Future Directions

- Optimize existing models, such as the Storm Water Management Model (SWMM), Hydrological Simulation Program--Fortran (HSPF), and Visualizing Ecosystems for Land Management Assessment (VELMA), and for GI applications.
- Integrate existing models to build a “supermodel” for GI planning and implementation.
- Integrate existing models and other information into green infrastructure decision support tools, such as Watershed Management Optimization Support Tool (WMOST) and (Green Infrastructure Tools and Resources) GITAR, and others.
- Develop web-based GI toolbox housing GI-related models and tools (collaboration with Modeling Research Center).

## Partner Engagement Opportunities

### Partners and potential collaborators:

- EPA Program Offices and Regions
- National Oceanic Atmospheric Administration
- United States Geological Survey
- United States Department of Agriculture
- United States Army Corp of Engineers

Multiple coordination efforts with **SSWR 5.02**, as well as **3.01D**, **3.03D**, **3.04A**, **4.01C** & **SHC 1.6**





**Problem Summary and Decision Context**

**Problem:** Many U.S. communities face challenges from combined sewer overflows. Some communities dealing with drought conditions need to augment source water supplies. Storm and waste water management strategies require more information on the role of natural wetlands in treatment processes.

**Objective:**

- Provide technical assistance to support implementation of GI in U.S. communities.
- Provide information on best practices for GI approaches that protect ground water supplies.
- Conduct case studies that can be more broadly applied to other communities.

**Utility to Agency**

- This project will continue to make a visible difference in underserved communities through GI implementation.
- Provide program and regional offices with guidance on GI planning, implementation, and maintenance for storm water management and capture/aquifer storage.

**Tasks and Projected Outputs**

**Task 5.02A:** Integrating GI into communities

**Task 5.02B:** Groundwater quality/quantity

**Task 5.02C:** Wetlands in wastewater management

**Task 5.02D:** Performance and effectiveness of GI storm water management approaches in the urban context: A Philadelphia case study (STAR)

**Task 5.02E:** Sustainable Chesapeake Research Center (STAR)

**Output Examples:**

- Guidance and examples demonstrating the effectiveness, costs, benefits, and risks/constraints on the use of GI to treat storm and waste water, and recharge aquifers at multiple scales.
- Guidance on the effects of GI on ground water.
- Guidance for monitoring the impact of wastewater/storm water management practices on coastal wetlands and inland wetlands.



**Future Directions**

- This project currently conducts field-based GI research in Camden, NJ, Cincinnati, OH, Detroit, MI, Kansas City, MO, and Omaha, NE. Researchers will identify new case-based studies in collaboration with program and regional offices focusing on underserved U.S. communities.
- Increase research on water capture and storage to aid in increasing overall water supplies in drier regions.
- Increase integration with the GI Models and Tools project in applying GI models to existing and future GI place-based studies.

**Partner Engagement Opportunities**

**Partners and potential collaborators:**

- EPA Program Offices and Regions
- Federal agencies (e.g. USGS, DOI, NOAA, USDA, HUD, USACE)
- State, local, and tribal governments
- Utilities
- Economic and business development organizations (e.g. Chambers of Commerce, trade associations, water technology clusters)





# Summary of Green Infrastructure Place-Based Research

**Yakima, WA**  
Collaboration with the City of Yakima on the evaluation of levee setback and indirect effluent discharge to restored floodplain ground water quality and hydrology.

**Omaha, NE**  
Analyzing soils and preparing monitoring equipment to provide guidance on how the city can incorporate GI into their control plan to reduce CSOs.

**Kansas City, MO**  
Five-year study quantifying the sewershed response due to the installation of GI practices for CSO control.

**Dallas, TX**  
Collaborating with partners to demonstrate development and installation of GI for parking lots to allow comparison of GI with and without the addition of trees.

**Louisville, KY**  
Monitoring any changes in performance of porous pavers and tree boxes installed for CSO control as the GI ages. Results will be shared with communities so that they can make informed choices.

**Detroit, MI and Cleveland, OH**  
GI pilot – Vacant lots for CSO control and improvement of neighborhoods.

**Camden, NJ**  
New collaboration is monitoring cisterns and bioinfiltration/biofiltration practices – mostly rain gardens and planters.

**Clarksburg, MD**  
BMP effectiveness of the County's efforts at using GI combined with gray infrastructure to protect aquatic resources.

**Cincinnati, OH**  
Collaboration with the Greater Cincinnati MSD (and others) to monitor and adjust several GI early success projects that are designed to control CSOs.

**Birmingham, AL**  
New collaboration will adapt EPA's National Stormwater Calculator to include green and grey infrastructure costs for the Birmingham, with a primary focus on land targeted by developers.

- Region 2
- Region 3
- Region 4
- Region 5
- Region 6
- Region 7
- Region 10

