



Stormwater runoff from rain and wet weather events can result in flooding, contaminated waterways, and soil erosion. In one Omaha, Nebraska neighborhood soil erosion from stormwater runoff removed soil from a church property and deposited it on a downstream property. Work to address this problem began when a property owner voiced concerns about stormwater runoff on his property, and he contacted a local engineering firm to look into the issue. The firm worked with the City of Omaha to evaluate the conditions and the residents' concerns. The community, the firm, and the city have partnered with the University of Nebraska-Lincoln to evaluate the entire watershed and identify tools to manage the issue.

ABOVE: A citizen-led green infrastructure workshop in the Saddle Hills neighborhood constructed 12 rain barrels.

University of Nebraska - Lincoln Develops New Tools to Reduce Runoff

In July 2012, the *University of Nebraska - Lincoln* (UNL) was awarded a \$59,876 grant from the U.S. Environmental Protection Agency (EPA) through the *Urban Waters Small Grant program*. The grant work will address challenges in Omaha, Nebraska caused by stormwater runoff through community engagement and the development of new technologies.

UNL has partnered with three Omaha neighborhoods – Saddle Hills, TV Towers, and Benson – to develop educational programs and mobile applications that inform local residents about stormwater issues and green infrastructure solutions. Highlighted tools include rain barrel and rain garden design and construction. These stormwater reduction tools, also known as green infrastructure (GI), increase rain water absorption and redirect stormwater to reduce flooding and pollution.

Project Highlights

The UNL project is:

- Analyzing current water quality and local stormwater flooding conditions.
- Providing education to residents to encourage behaviors that benefit the watershed.
- Developing three educational mobile applications to reduce the impacts of stormwater runoff.
- Measuring the impacts of community education and outreach through feedback surveys.

Local Partnership Supports Urban Waters Work

This project includes partners from and connects to the City of Omaha *Stormwater Program*, the Clean Solutions for Omaha (CSO) Program at the City of Omaha, the Nebraska Forest Service, and the University of Nebraska stormwater team.

The EPA Urban Waters small grant supports work to analyze data from two water quality monitoring stations with water flow meters and automatic samplers installed by the City of Omaha. Data from the monitoring stations will serve as a baseline to evaluate the effectiveness of future GI installed. The city has also calculated the total number of surfaces that contribute to stormwater runoff to estimate the total amount of water flowing through the watershed. Efforts are underway to build upon this grant to select the best sites to capture runoff before entering the storm sewer, and engage property owners in building GI.

Active Community Involvement Strengthens Educational Outreach

UNL and the City of Omaha have built strong alliances with three neighborhood associations and local church congregations to address stormwater issues. Together, these partners are working to increase community engagement through educational events, such as workshops on rain barrel construction. The alliances also work to increase information gathering, including the completion of resident surveys on stormwater issues. UNL and the city frequently engage with stakeholders, including city partners, community leaders, and residents. Community engagement has included attending public meetings, direct communications with neighborhood association leaders, resident mailing campaigns, and Facebook and email announcements.

The UNL Urban Waters project has also supported the involvement of college students in addressing the stormwater challenges in Omaha. More than 50 UNL undergraduate and graduate students have helped with project discussions at a public meeting, and developed educational materials for residents on GI initiatives. Future educational outreach plans include hands-on workshops for GI construction, and tours of local stormwater management projects.



Mobile Application Provides GI Education on the Go

EPA Urban Waters funding for the UNL project has supported the development of three new mobile application tools that

promote community participation to reduce stormwater runoff. The mobile applications records locations of GI in the city and provide information on how community members can construct their own GI.

The "*U.S. Green Infrastructure Reporter*" is a mobile application that collects information about the location and number of GI projects across the country. The application lists various types of GI in its national map, including green parking lots, green roofs, planter boxes, and rain gardens. The *U.S. Green Infrastructure Reporter* will link to social media, includes GI measurements and pictures of specific GI, and has links to additional information about efforts to reduce stormwater runoff.

The UNL research team has also developed two other GI mobile applications, "My Rain Barrel" and "My Rain Garden," to collect information and promote public awareness related to GI activities in Omaha. In spring 2013, the Community and Regional Planning Program at UNL created the "Volunteered Geographic Information (VGI) Lab" platform to promote the grassroots participation through these easy to use mobile-accessible tools. With current technology trends, the mobile applications will serve as a modern communications tool and allow best practices to be shared while protecting the local watershed.

Measuring Progress

To determine the success of the project, UNL will measure:

- Annual water quality improvements noted through data samples.
- The number of community hands-on workshops, tours, and educational programs related to GI.
- The number of users communicating information via the project's mobile applications.
- The number of green infrastructure educational materials developed.
- Increased citizen knowledge through feedback surveys.

LEFT: The "*U.S. Green Infrastructure Reporter*" mobile application maps a wide variety of sites across the United States, and provides information on multiple types of GI sites, industries and activities for users.