Green Infrastructure Implementation PLANNING FOR A SUSTAINABLE FUTURE



CORE QUESTION: What are the long-term, sustainable strategies that will enable Michigan's communities to begin the wide-spread implementation of green infrastructure and reap economic, social, and environmental benefits?

OVERVIEW

Traditionally, Michigan communities have managed stormwater through "gray infrastructure" such as storm drains, sewer pipes, basins, and in the case of combined sewer areas, wastewater treatment plants. These carry large capital costs for installation, and the centralized nature of gray infrastructure means failures can discharge hundreds or thousands of gallons of untreated stormwater into nearby water bodies.

Green infrastructure is an approach to stormwater management that protects natural drainage patterns and mimics the natural hydrologic cycle. Green infrastructure solutions can be implemented on differing scales. On the local scale, green infrastructure practices include rain gardens, permeable pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting systems. At the watershed scale, green infrastructure includes preserving and restoring natural landscapes such as forests, wetlands, and riparian buffers.

Green infrastructure projects can also help communities improve safety and quality of life, conserve vital ecosystem functions, and mitigate the effects of heavy rainfall and flooding. In fact, various groups, including the U.S. Environmental Protection Agency and the Water Environmental Federation, have suggested that green infrastructure projects convey environmental, social, and economic benefits, a trio of factors known as the "triple bottom line." Across Michigan, many communities are interested in using green infrastructure to manage stormwater, particularly as climate change drives more frequent, intense storms. However, there are many barriers to the large-scale adoption of green infrastructure projects. Individuals, organizations, and communities face challenges, including multiple levels of regulations and a lack of funding, quantifiable incentives, and technical knowledge.

PROJECT DESCRIPTION

The project team will identify and attempt to address challenges that block the large-scale implementation of green infrastructure projects.

The project team will:

- Highlight successful green infrastructure projects through case studies and testimonials.
- Compare the costs and benefits of green infrastructure efforts across the state.
- Compile sources of creative funding opportunities to help communities launch large-scale projects.
- Identify common regulatory barriers and offer strategies for overcoming them.
- Host focus groups and presentations for local government officials and professional associations that are or could become involved with green infrastructure projects.
- Assess legal issues related to responsibility and ownership of public and private green infrastructure installations.



Rain gardens are an example of green infrastructure practices (left). Rain barrels help slow down, store, and filter rainwater before it reaches the storm drain (right).

WHAT IS INTEGRATED ASSESSMENT?

Rather than collecting new data or running experiments, an integrated assessment research team summarizes what is known and offers an assessment of how the science could be interpreted and used. The team focuses on a complex environmental issue and then conducts a comprehensive analysis of natural and social scientific data and information.

The IA process is different from traditional research because researchers work closely with stakeholders to examine an issue from many perspectives, identify challenges, and evaluate feasible solutions. The aim is to create results that are current, trusted, accessible, and useful.

Along the way, the team will engage stakeholders at all levels of government, as well as representatives from nonprofits and community organizations. Discussions with these decision-makers and implementers will help the team develop strategies for easing the transition toward green infrastructure in Michigan.

EXPECTED OUTCOMES

At the end of the project, the team will develop a tool kit and information packet that can help decision-makers determine how green infrastructure projects might fit into their own communities. The tool kit will include case studies, economic analyses, and options for potential funding mechanisms.

GET INVOLVED

Stakeholder engagement is a key component of any integrated assessment project. The project team will strive to draw insights from and share knowledge with people involved in local planning and decision-making efforts. The team will facilitate stakeholder engagement through focus groups and day-long workshops in targeted communities. Stakeholders also will be able to participate in an online survey about the perceived barriers facing green infrastructure adoption.

CONTACT

PRINCIPAL INVESTIGATOR

Donald D. Carpenter, PhD, PE, LEED AP Professor of Civil Engineering Lawrence Technological University carpenter@ltu.edu (248) 204-2549

CO-INVESTIGATORS

Sanjiv Sinha, Ph.D., P.E. Vice President & Corporate Leader-Water Resources Environmental Consulting & Technology, Inc. ssinha@ectinc.com (734) 272-0859

Avik Basu, Ph.D.

Lecturer and Research Area Specialist University of Michigan abasu@umich.edu (734) 262-5800







Michigan Sea Grant helps to foster economic growth and protect Michigan's coastal, Great Lakes resources through education, research and outreach. A collaborative effort of the University of Michigan and Michigan State University, Michigan Sea Grant is part of the NOAA-National Sea Grant network of 33 university-based programs.