

The Vermont Green Infrastructure Initiative Strategic Plan: 2011-2013



Introduction

Stormwater runoff is a significant contributor to water quality impairments, especially in developing and urban areas. Stormwater runoff affects water quality and quantity, habitat and biological resources, public health, and the aesthetic appearance of waterways. During the spring of 2011, communities throughout Vermont experienced firsthand the damaging effects of stormwater runoff. Flooding throughout the Lake Champlain Basin and beyond damaged infrastructure, destroyed roads, closed businesses, and necessitated millions of dollars in repairs. Stormwater runoff originates from a number of sources including residential areas, commercial and industrial sites, roads, highways and bridges.

When a land area is changed from a natural ecosystem to a constructed development, the introduction of rooftops, streets and parking lots significantly alters the hydrology of the system. When water can no longer infiltrate, recharge groundwater, or be utilized by plants, it is converted directly into surface runoff. Assessments of streams and rivers across the state have demonstrated how the force of stormwater runoff erodes stream banks, washes out roads, and introduces large amounts of sediment and pollutants to receiving waters. While only 5% of Vermont is considered developed land, that development is estimated to contribute about 46% of the phosphorus into Lake Champlain, due mostly to impervious surfaces and associated stormwater runoff.

Green Stormwater Infrastructure (GSI) is an emerging set of practices that address the stormwater issues associated with land development. GSI strives to manage stormwater and pollutants by restoring and maintaining the natural hydrology in a watershed. The advantages of using GSI in place of traditional stormwater management controls are many and varied. The conventional way of collecting and conveying stormwater in developed areas consists of inlets and underground pipes commonly referred to as storm sewers. This "gray infrastructure" is man-made and immovable. Utilizing GSI for stormwater management eliminates or reduces runoff and pollutant loading as close to the source as possible by linking together small-scale practices. GSI includes rain gardens, porous pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting.

In addition to water quality and surface water benefits, GSI hosts a variety of other environmental, economic and social benefits, especially in urban and suburban areas. These benefits include wetland and riparian habitat protection, improved air quality, increased land values, increased carbon sequestration, improved community value and aesthetics, and long term cost savings from reduced water infrastructure maintenance.

The spring 2011 floods were brought on by extreme weather events which are predicted to increase in frequency. The State of Vermont has been proactive in recognizing the need for a new approach to stormwater management in addition to its' current water quality initiatives. Moving Vermont towards development and retrofit practices that incorporate GSI will help lead the State to a more sustainable future. In response to that need, the State is developing a Green Infrastructure Initiative. To make GSI common practice throughout the State, the initiative has pulled together a group of experts from across Vermont to establish a framework for action by developing a programmatic strategic plan.

The Vermont Green Infrastructure Initiative's 2011 Strategic Plan has one overarching goal: to restore and maintain the pre-development hydrology of the State's watersheds through the use of green structure practices. To achieve this goal, four key audiences are targeted: stormwater professionals (i.e. design engineers, landscape architects), municipal governments, existing property owners, and State agencies. For each target audience, the Strategic Plan identifies the current challenges to widespread adoption of GSI and describes a set of objectives and tactics to address those challenges.

In considering the needs of design professionals, it became clear that the primary barrier was the lack of clarity in how GSI could be successfully employed to meet site needs and regulatory requirement and, in particular, compliance with the Vermont Stormwater Management Manual. Work on this issue has already begun with two training opportunities offered during the summer of 2011.

In the case of municipalities, non-MS4 communities are often not aware of the impacts of stormwater runoff, or the options available to address them. As a result, many have existing ordinances that may actually exacerbate runoff problems. Efforts to reach this audience will include support for review of existing zoning and land-use policies, assistance with development review to include the use GSI, and non-regulatory incentives for GSI adoption.

In most cases, individual property owners are unaware that a problem even exists, let alone how their properties are contributing. To address this target audience, we will work to identify gaps in messaging and education, work with partners to resolve those gaps and provide access to technical information and incentives to employ GSI.

None of these objectives can be met without the cooperation and active participation of State Agencies. Dedicated resources should be provided as part of the Green Infrastructure Initiative in order to address the issues facing each target audience, and ensure the implementation of this Strategic Plan. Additionally, the State has a unique opportunity in their own development projects to demonstrate GSI on new and existing properties. This Strategic Plan provides clear mechanisms for both of these Agency related issues to be resolved.

The Vermont Green Infrastructure Initiative is an Agency of Natural Resources undertaking with support from the Department of Environmental Conservation, the Ecosystem Restoration Program and the Department of Forests, Parks and Recreation. The plan was guided under the direction of the Green Infrastructure Roundtable, a group of experts in stormwater management from both the public and private sectors. The Roundtable was established in 2010 and much of their time has been invested in the development of the Strategic Plan. Roundtable members include:

Milly Archer, Vermont League of Cities & Towns
Karen Bates, Vermont Watershed Planning Section
Jenna Calvi, Vermont Stormwater Program
Craig Digiammarino, Agency of Transportation
Tom DiPietro, City of South Burlington

Danielle Fitzko, Vermont Dept. of Forests, Parks & Recreation
Stephanie Hurley, University of Vermont – Rubenstein School of Environment & Natural Resources

Justin Kenney, Winooski Natural Resources Conservation District
Laura Killian, University of Vermont, NEMO Program / SeaGrant
Megan Moir, City of Burlington
Julie Moore, Stone Environmental
Linda Setchell, Friends of the Winooski River
Ann Smith, Friends of the Winooski River
Adam Zahniser, Herbert, Rowland & Grubic, Inc.

Program History & Achievements 2009-2011

In 2009 the Water Quality Division's Basin Planning Program established a Green Infrastructure Coordinator position to help encourage and expand the use of GSI practices throughout Vermont. During that time, the effort was funded through the American Reinvestment & Recovery Act (ARRA). In addition to helping establish a Green Infrastructure Coordinator position for the State, those ARRA funds were also granted out to Regional Planning Commissions, as well as the Vermont League of Cities and Towns. Products from those grants include, but are not limited to, an analysis of barriers to implementing GSI in Vermont, as well as a Model Low-Impact Development Ordinance / By-law for use by municipalities throughout the State.

Funds from this source were exhausted at the end of 2010 and the position was transferred to the Stormwater Section. Recognizing the value and need for this work, funding for an additional year was provided by the Ecosystem Restoration Program and the Department of Forests, Parks and Recreation.

In the two years since its inception, the Green Infrastructure Initiative has made a number of notable accomplishments, as described below.

Vermont Low-Impact Development Guide for Residential & Small Sites

During the first six months of the Green Infrastructure Initiative, a technical guide for individuals seeking to install GSI on small and residential sites was developed and distributed. The guide contains a wide variety of practices, and is designed to educate individual homeowners on the different GSI practices that they might employ on their property. The guide also contains additional resources for those seeking more information, as well as a glossary of terms for those who are unfamiliar with stormwater basics.

Vermont Green Infrastructure Website

A comprehensive website for individuals seeking information on GSI and Low-Impact Development techniques was launched in 2010. The site features information on individual best management practices, links to various publications related to the subject, and an additional resources page to groups doing similar work.

In the future, the site will house virtual demonstrations of GSI installations around the State, and serve as a resource for property owners seeking technical assistance in their own projects. Additionally, the site will also provide a database of engineers and construction professionals who have implemented GSI projects to provide a connection to professional expertise.

Workshops & Professional Development

On June 15, 2011, a workshop focused on the use of green infrastructure practices in compliance with the Vermont Stormwater Management Manual was offered. Participants received an overview of GSI and how those practices can be used for jurisdictional projects. The one-day event had more than forty people in attendance, with a lengthy waiting list. Because of the huge amount of interest in this training opportunity, a second workshop is being planned for the Fall of 2011.

A second workshop is being planned for August of 2011, and will be focused on the site design aspects of GSI. The training will be administered by a regional expert at SUNY Albany, and will provide more technical guidance on the installation of GSI on larger sites.

The Vermont Agency of Natural Resources Green Infrastructure Strategic Plan 2011-2013



Green Stormwater Infrastructure:
Systems and practices that restore and maintain natural hydrologic processes in order to reduce the volume and water quality impacts of the built environment while providing multiple societal benefits.

Overarching Goal:
Restore and maintain the pre-development hydrology of the State's watersheds through the use of GSI.

Objectives

Design professionals (Engineers, Landscape Architects, Architects, Design/Build Contractors) statewide are trained in, promoting and utilizing GSI practices.

Municipalities recognize the impacts from stormwater runoff and work to mitigate the effects.

Property owners voluntarily advocate for and implement GSI practices on their property(s).

State Agencies secure and commit funding to develop policies and programs to support GSI.

OBJECTIVE 1.	
Design professionals statewide are trained in, promoting, and utilizing GSI practices.	
TACTIC A.	
Increase training opportunities for professionals.	
1A1	Offer yearly training in utilizing GSI practices via the stormwater manual. Seek professional credits i.e. Engineers, LA's, CPESC.
1A2	Offer quarterly web-trainings on GSI practices.
1A3	Offer yearly in-depth training on the technical aspects of GSI practices.
1A4	Investigate GSI training/certification program for design professionals that includes incentives i.e. expedited permitting.
1A5	Establish training partnerships with design professional associations.
1A6	Offer training with CEUs to wastewater design professionals in GSI practices.
1A7	Identify and promote higher educational programs that support GSI work.

OBJECTIVE 1.	
Design professionals statewide are trained in, promoting, and utilizing GSI practices.	
TACTIC B.	
Improve communication between design professionals working with stormwater.	
1B1	Investigate and promote existing networks of design professionals - i.e. NPS Information Listserv.
1B2	Develop a Vermont specific networking tool for design professionals.
1B3	Develop a database of design professionals utilizing GSI practices.
1B4	Investigate adding GSI project designation in existing stormwater permit database.

OBJECTIVE 1.	
Design professionals statewide are trained in, promoting, and utilizing GSI practices.	
TACTIC C.	
Provide tools & resources for design professionals to incorporate GSI on projects.	
1C1	Work with the media to promote a GSI messages, practices and projects.
1C2	Compile and share data demonstrating benefits associated with GSI practices with an emphasis on cost savings.
1C3	Develop and disseminate supporting documentation & tools on how to use GSI practices to meet the current stormwater regulations i.e. calculation worksheets, workshop proceedings.

OBJECTIVE 2.	
Municipalities understand the impacts of stormwater runoff and work to mitigate the effects.	
TACTIC A.	
Municipalities regulate land use with an understanding of the impacts on water quality and natural hydrologic systems.	
2A1	Identify and assess the barriers to GSI in current municipal regulations.
2A2	Develop set of tools and training opportunities for local planning review boards to assess the hydrologic impacts of development activities.
2A3	Develop and disseminate library of financial and technical resources to support local GSI planning efforts.
2A4	Work with ANR's Ecosystem Restoration Program (ERP) to include preference in grant applications for municipalities who are addressing the impacts of stormwater locally.
2A5	Identify mechanism to support demonstration projects on municipal properties.

OBJECTIVE 2.	
Municipalities understand the impacts of stormwater runoff and work to mitigate the effects.	
TACTIC B.	
Municipalities provide regulatory support for stormwater management.	
2B1	Strategize which towns need GSI regulations most and partner with Non-point Education for Municipal Officials Program (NEMO) and Vermont League of Cities and Towns (VLCT) to reach out to them with existing VLCT by-law materials.
2B2	Provide access to model GSI regulations.
2B3	Offer yearly technical training to municipal planning commissions / development review boards on how to evaluate new development projects for GSI components.

OBJECTIVE 2.	
Municipalities understand the impacts of stormwater runoff and work to mitigate the effects.	
TACTIC C.	
Municipalities provide non-regulatory incentives to reduce stormwater runoff.	
2C1	Develop financial resources guide for local GSI implementation.
2C2	Investigate offering expedited stormwater permitting to towns with GSI bylaws.
2C3	Develop outreach material on incentives options.

OBJECTIVE 3.	
Property owners voluntarily advocate for and implement GSI practices.	
TACTIC A.	
Developed property owners are aware of, understand, and feel empowered to address the environmental issues associated with stormwater runoff and the options available to address them.	
3A1	Inventory and assess existing messaging / outreach campaigns for stormwater in Vermont.
3A2	Identify gaps & assess the effectiveness of existing stormwater messaging / outreach campaigns.
3A3	Work with Green Infrastructure Roundtable to develop a targeted, statewide messaging / outreach campaign to fill gaps in existing messaging.
3A4	Work with partners to spread key GSI messages to target audiences.

OBJECTIVE 3.	
Property owners voluntarily advocate for and implement GSI practices.	
TACTIC B.	
Developed property owners have access to accurate technical and education information for implementing GSI practices.	
3B1	Develop an interactive website on GSI practices with details on installation.
3B2	Provide access to technical training on GSI practices.
3B3	Offer mechanism to match GSI experienced professionals to interested property owners.
3B4	Review existing technical & educational resources to identify gaps.
3B5	Develop technical and educational resources to fill in identified gaps.

OBJECTIVE 3.	
Property owners voluntarily advocate for and implement GSI practices.	
TACTIC C.	
Offer incentives for developed property owners to implement GSI practices.	
3C1	Seek grant funding and partnerships to offer financial aid to private landowners to install GSI practices on their properties.
3C2	Investigate recognition/certification program for GSI (i.e. Blue Certification).
3C3	Capture & share success stories.

OBJECTIVE 4.	
State agencies secure and commit funding to develop policies and programs to support GSI.	
TACTIC A.	
The Vermont Stormwater Program encourages the use of GSI practices.	
4A1	Identify GSI gaps in the current stormwater manual and promote updates/amendments.
4A2	Support regional stormwater coordination and project implementation.
4A3	Identify opportunities for a dedicated funding stream to support regional coordination and implementation efforts.
4A4	Encourage the VT Stormwater Program to require the use of GSI practices before conventional treatment practices in permitting.

OBJECTIVE 4.	
State agencies secure and commit funding to develop policies and programs to support GSI.	
TACTIC B.	
The State supports a recognizable GI Initiative.	
4B1	Vermont supports GI Initiative with staffing.
4B2	Provide a clear identity, mission and purpose for the GI Initiative.
4B3	Establish an advisory board to the GI Initiative.
4B4	Identify existing programs / initiatives that the GI Initiative can be integrated into.
4B5	Develop relationships / partnerships to sustain the GI Initiative.

OBJECTIVE 4.	
State agencies secure and commit funding to develop policies and programs to support GSI.	
TACTIC C.	
State agencies serve as a role model for GSI implementation.	
4C1	Identify state agency liaisons to champion efforts internally.
4C2	Draft an Executive Order or legislative language requiring all State development projects use GSI practices.
4C3	Support development of technical guidance for implementation of GSI practices on state projects.