Stormwater….what is it, why is it a problem and what is the transportation connection

***

Current Regulatory Programs Addressing Stormwater

***

VTrans Response to Those Programs

***

Regulatory Outlook and What it Means for VTrans

Responding to "Vermont's Clean Water Initiative"

Craig DiGiammarino
Environmental Program Manager
Maintenance & Operations Bureau
VTrans Highway Division
802-922-4681 craig.digiammarino@Vermont.gov

Presented to House NRF&W on January 19, 2017

What is stormwater?

Stormwater runoff is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces (paved streets, parking lots, and building rooftops), and does not percolate into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing and providing drinking water.

http://water.epa.gov/polwaste/npdes/stormwater/index.cfm

Sources of Surface Water Pollution

When it rains, water that is not absorbed into the ground, intercepted by vegetation, or evaporated flows into surface waters such as rivers, canals and coastal waters. This flow is called runoff. As the runoff flows over the roads and land, it picks up pollutants.

Surface water can be polluted through groundwater.

Roads are a source of pollution. Oils, grease, construction dirt, trash & cigarette butts wash off roads when it rains.

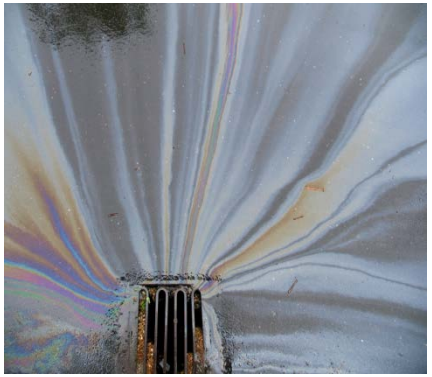
Excess fertilizers wash off lawns & gardens when it rains & flow into surface water.

Things put into stormdrains and on the street can end up in our rivers, canals, & coastal waters

The effects of stormwater

Too much water in river systems results in bank failure, sedimentation and excessive nutrients.

Sediment can cloud the water and make it difficult or impossible for aquatic plants to grown. Sediment also can destroy aquatic habitats.



Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick from eating diseased fish and shellfish or ingesting polluted water.

Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.

What is the Transportation connection?

Road-Related Stormwater Management

Impervious surfaces can quickly convey polluted runoff during wet weather events to nearby waterways.

Road surfaces can carry both land-adjacent and road-vehicle pollutants including heavy metals from tires, brakes, and engine wear, and hydrocarbons from lubricating fluids.

If these pollutants are not properly controlled they can impair waters causing them to no longer meet state Water Quality Standards.

Transportation authorities are responsible for maintaining stormwater systems along streets, roads, highways and other transportation facilities (Airports, Maintenance Yards, Park & Rides, Welcome Centers, Gravel Pits, etc) by managing the quality and quantity of stormwater discharging to our nation's waters via those systems.

Transportation stormwater management differs in some ways from traditional regulated entities (cities, towns, retail, commercial). Some of the differences include:

- **Linear transportation systems often stretch for many miles, and cross numerous waterways, watersheds, and jurisdictions.**
- **Transportation storm conveyance systems often discharge stormwater and associated pollutants that originate outside of the transportation right-of-way.**

Current Stormwater Regulations Perspective & Timeline

Stormwater regulations are still young, evolving and they keep on coming

In 2002 (15 yrs ago) this agency started moving in a new direction in response to new and anticipated stormwater regulations addressing varied stormwater concerns and involving varied land areas/sites. All permits impact VTrans. Some we need to build projects and others we comply with for existing developed lands.

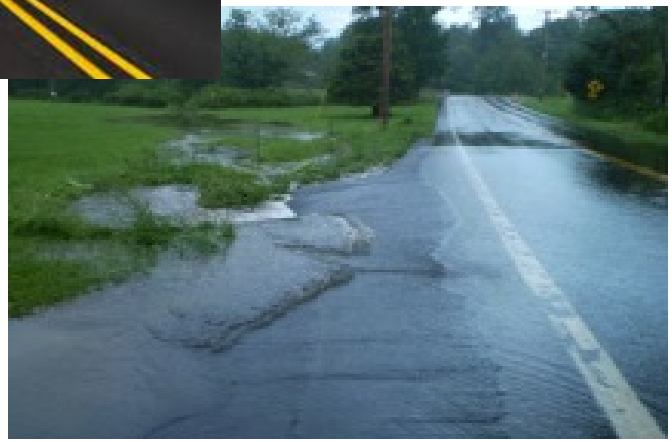
Most are from the EPA National Pollutant Discharge Elimination System (NPDES) Programs (Clean Water Act).

The Maintenance & Operations Bureau assumed oversight of all NPDES stormwater programs for VTrans in 2007.

Vermont Post-Construction Operational Stormwater Discharge Permit Program

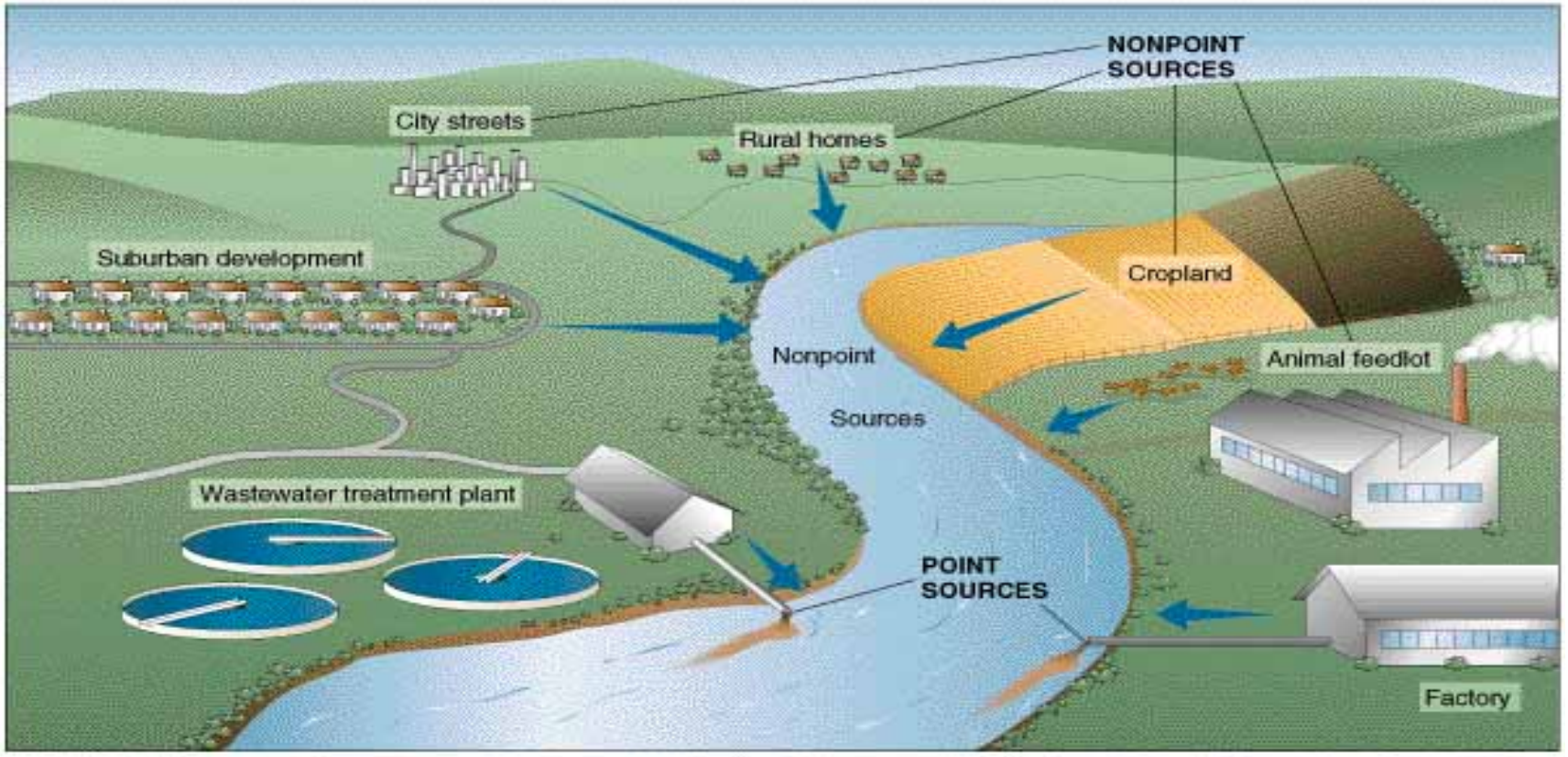
pre-2002

- A State program addressing “post construction” stormwater discharge management off new or redeveloped impervious surfaces statewide (roads, buildings, parking lots, etc)
- Permanently treating stormwater with collection, conveyance, treatment and discharge practices.
- Average for VTrans is 10 projects per year obtain this permit.
- Currently 75 projects constructed and being maintained (and growing).
- Another 24 under design development, permitting or construction.
- Statewide program only required on projects that trigger jurisdiction.
- Site-by-site approach not a watershed approach.
- Not linear friendly intended to regulate traditional development patterns.



Federal Clean Water Act

Regulates discharges of pollutants into waters of the US under the National Pollutant Discharge Elimination System (NPDES)
1972 amended 1987



NPDES Construction Stormwater Permit (CGP)

2004

- Statewide Program
- Goal is to prevent discharge of sediment to surface waters
- Project specific regulating temporary earth disturbance & construction
- Requires design & construction of temporary erosion prevention & sediment control practices
- On average 30 VTrans projects per year need this permit

NPDES Multi-Sector Industrial Stormwater Permit (MSGP)

2007

- Site specific by facility type
- Goal is to manage sites for industrial stormwater runoff and source control, materials storage, usage & disposal, vehicle washing and equipment maintenance
- Requires facility audits, training, new and retrofit treatment and surface water quality testing
- Requires development of a Stormwater Pollution Prevention Plan for each facility
- Transportation Sectors impacted include Airports, Gravel Pits, and Public Transit & Rail Facilities

NPDES Municipal Separate Storm Sewer System(MS4)

2003 with new provisions & expanded area in 2012

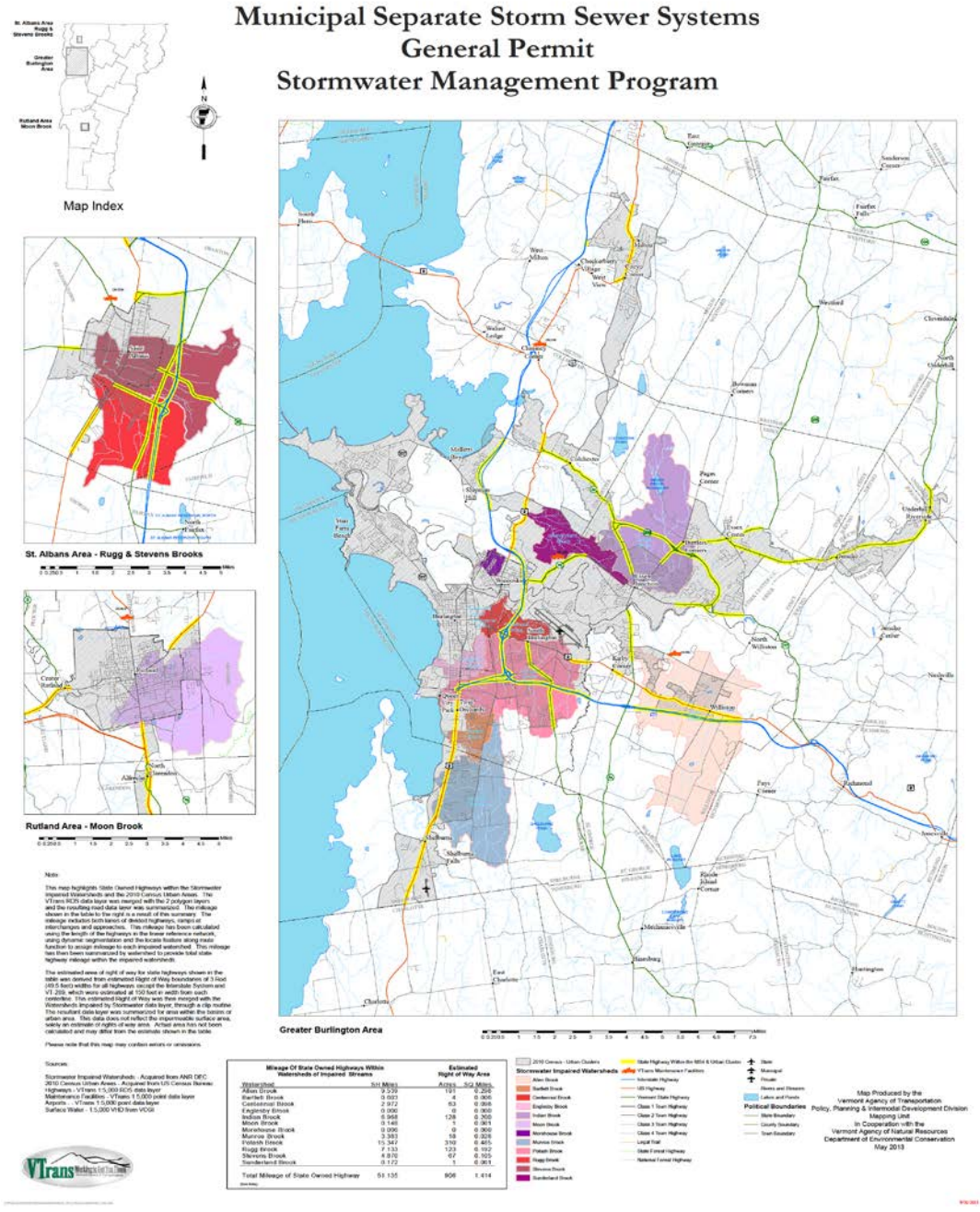
Watershed specific and not statewide (at the moment)

Goals:

- Public education & participation
- SDP /CGP compliance
- Asset mapping/management
- Illegal connection/non-stormwater discharge prohibition
- MSGP activities for transportation garages
- Water quality monitoring
- **TMDL compliance**
- Technical assistance
- Good housekeeping at Transportation Garages
- and more…

VTrans is subject to this permit in 15 watersheds includes transportation infrastructure in multiple communities (Burlington, Colchester, Essex Town, Essex Jct, Jericho, Milton, Shelburne, So. Burlington, Williston, Winooski, St. Albans City & Town, Rutland City & Town).

<u>We collaborate with all on compliance because watersheds cross multiple jurisdictions</u>.



MS4 Municipal Partnerships
Public Education, Outreach & Involvement

Smart WaterWays
Chittenden County's Stormwater Website

- ✓ MS4 Member Steering Committee
- ✓ Regional Stormwater Education Program
- ✓ Resources for Educators
- ✓ Public Surveys
- ✓ Media

http://smartwaterways.org/

- ✓ MS4 Member Steering Committee
- ✓ Public Involvement
- ✓ Volunteer Opportunities
- ✓ Stream Monitoring and Cleanup
- ✓ Events and Workshops

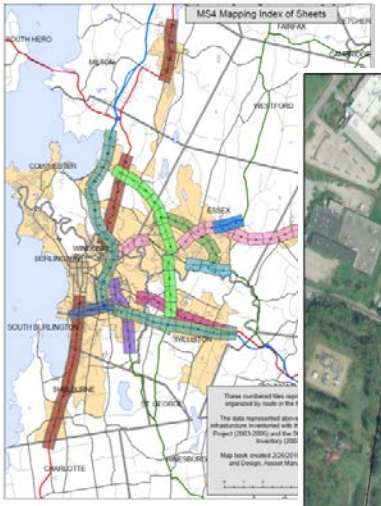
http://ccstreamteam.org/

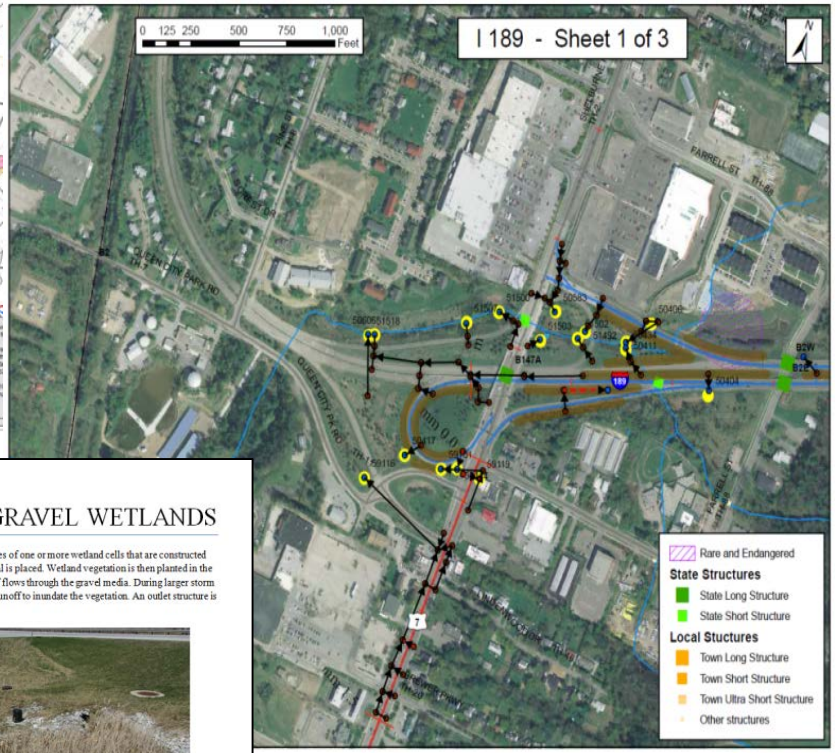
Lake Champlain Basin Program

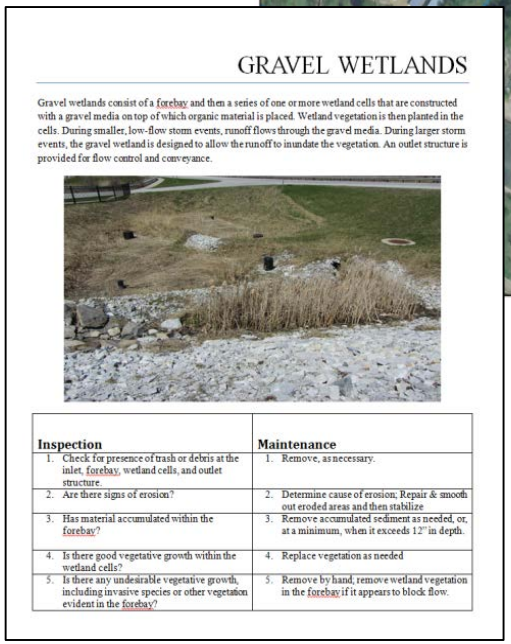
Chittenden County Regional Planning Commission

MS4 Asset Management, Operation & Maintenance

- Stormwater Treatment Practices are an asset (both constructed and naturally “Green” occurring)
- Operations Environmental Staff on Asset Management Team
- Mapping all SWTPs
- Mapping all SW Collection Systems
- Developing guidance documents to aid in design development and ongoing operation and maintenance of SWTPs….including costs associated with O&M
- Overall Transportation Infrastructure Management Plan considers SWTP
- Altering project scoping process to include the need for SWTPs under a permit or under Green Stormwater Infrastructure Principles even if permit is not required.







GRAVEL WETLANDS

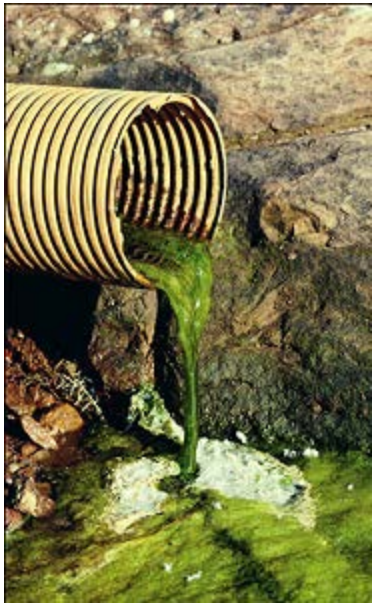
Gravel wetlands consist of a forebay and then a series of one or more wetland cells that are constructed with a gravel media on top of which organic material is placed. Wetland vegetation is then planted in the cells. During smaller, low-flow storm events, runoff flows through the gravel media. During larger storm events, the gravel wetland is designed to allow the runoff to inundate the vegetation. An outlet structure is provided for flow control and conveyance.

Inspection	Maintenance
1. Check for presence of trash or debris at the inlet, forebay, wetland cells, and outlet structure.	1. Remove, as necessary.
2. Are there signs of erosion?	2. Determine cause of erosion; Repair & smooth out eroded areas and then stabilize
3. Has material accumulated within the forebay?	3. Remove accumulated sediment as needed, or, at a minimum, when it exceeds 12" in depth.
4. Is there good vegetative growth within the wetland cells?	4. Replace vegetation as needed
5. Is there any undesirable vegetative growth, including invasive species or other vegetation evident in the forebay?	5. Remove by hand; remove wetland vegetation in the forebay if it appears to block flow.

MS4 “Run-on”, Illegal Connections & Illicit (non-stormwater) Discharges

VTrans regulates “run on” activities into the State ROW, within its authority under Title 19 Section 1111 and requires proposed dischargers to the ROW treat stormwater prior to discharging into the ROW.

Furthermore, VTrans prohibits the illegal connection or illicit (non-stormwater) discharge to its ROW statewide.



MS4 Construction & Post Construction Discharge Management

VTrans is strengthening its stormwater programs, building partnerships to improve water quality throughout the state, and making water quality protection fundamental to the agency's way of doing business.

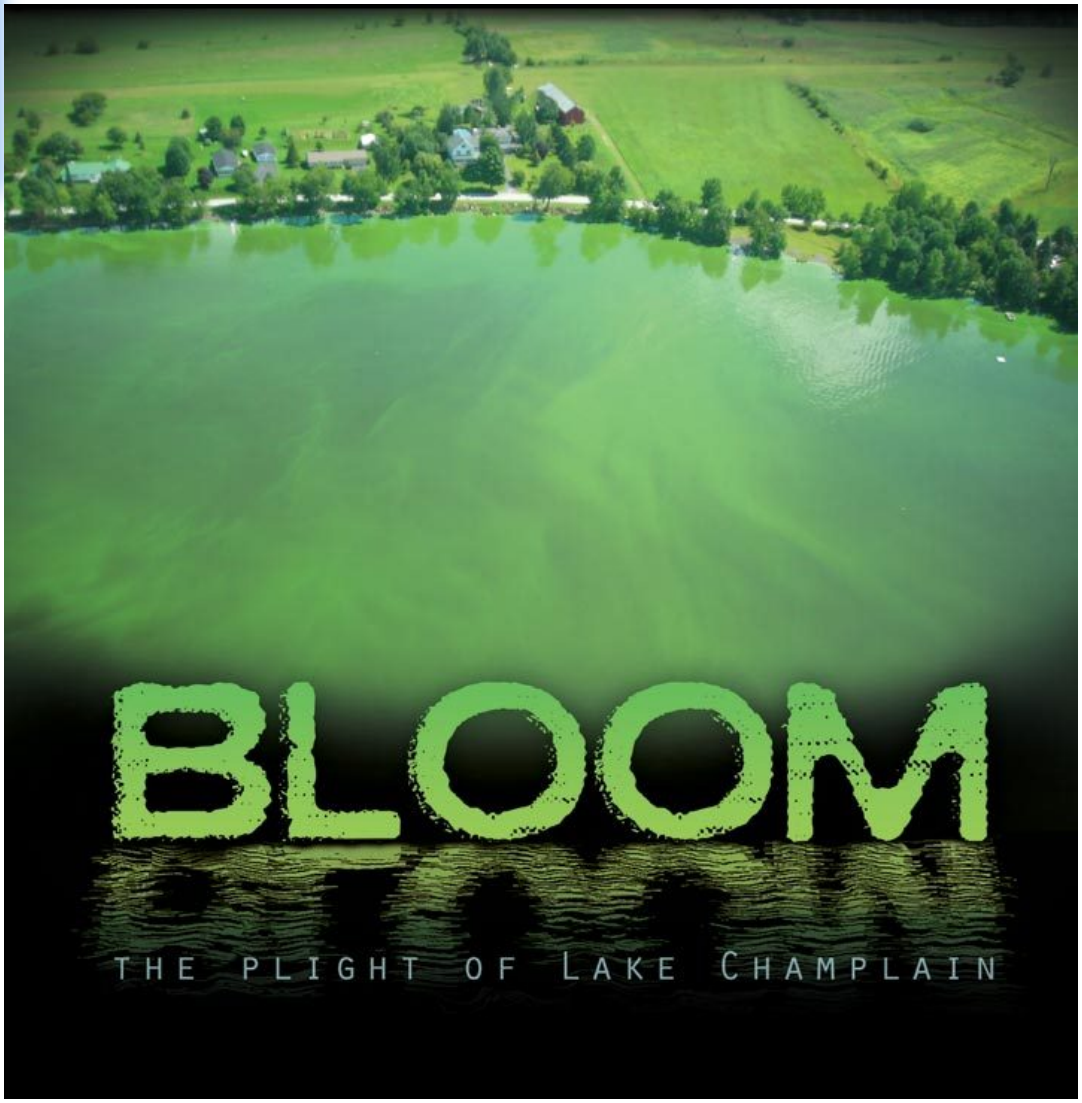
Construction Stormwater
Erosion Prevention & Sediment Control
Temporary during construction

Post Construction Stormwater Discharge Management off Impervious Surfaces
Permanently treating stormwater

NPDES Total Maximum Daily Load (TMDL)

2001/ongoing

- Watershed specific (implementation under MS4, TS4 or RDA)
- Requires collaborative planning/design/construction/maintenance of new & retrofit stormwater treatment.
- TMDLs are issued to address the pollutant of concern or stressors (e.g. phosphorus, nitrate, E. coli, etc…).
- Vermont's TMDLs use stormwater as a surrogate as it represents a combination of stressors.
- TMDLs vary for River/Streams, Ponds, Lakes….all have their own set of requirements, some overlap.
- **TMDL compliance efforts are still evolving for VTrans and Municipalities….MUCH MORE TO DO!!!**

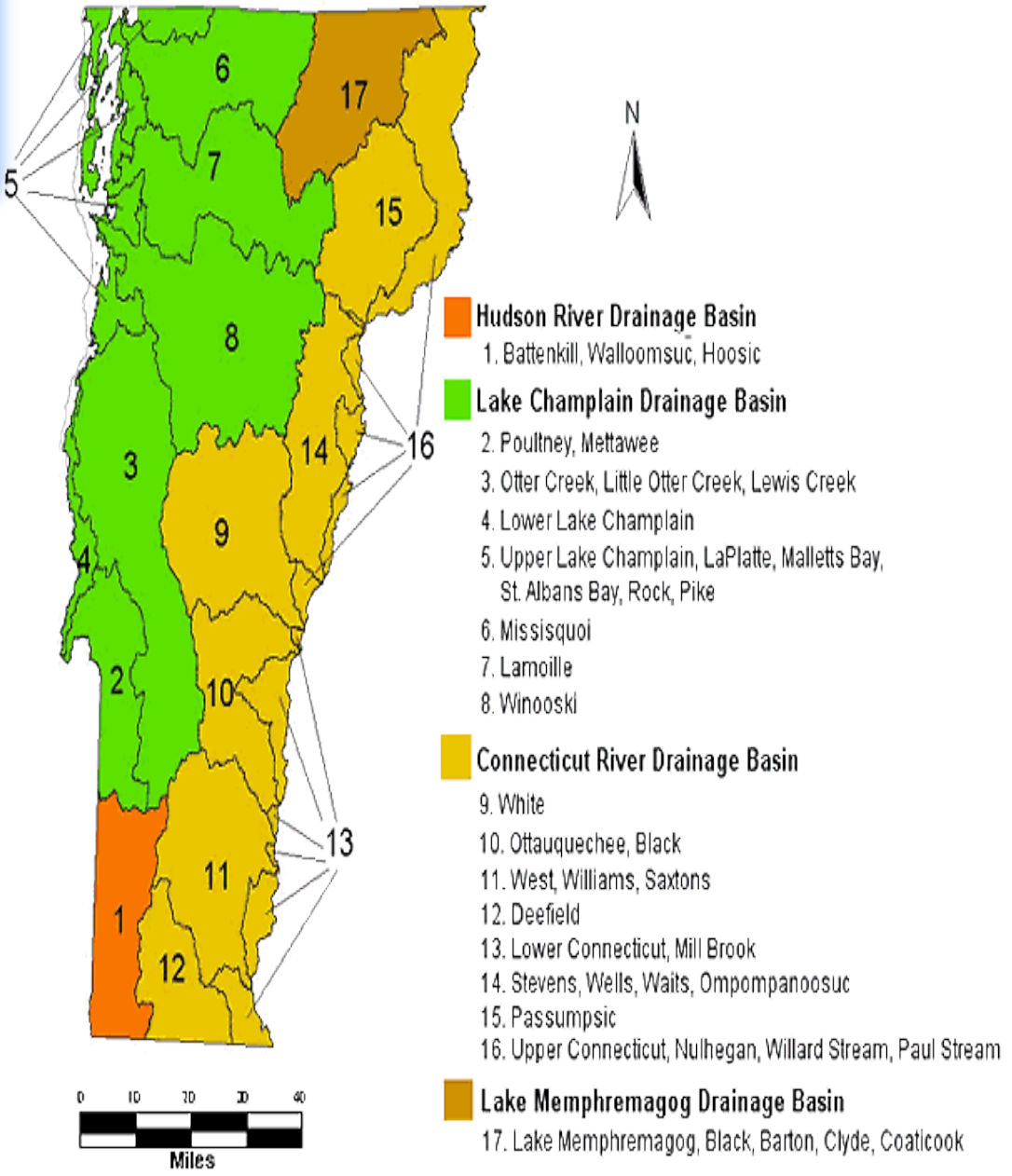


NPDES TMDLs Approaching Statewide Implications

2014 and beyond

94% of the State is addressing water quality impairments including:

- ❑ Lake Champlain (P)
- ❑ Long Island Sound (N)
- ❑ Lake Memphremagog (P)

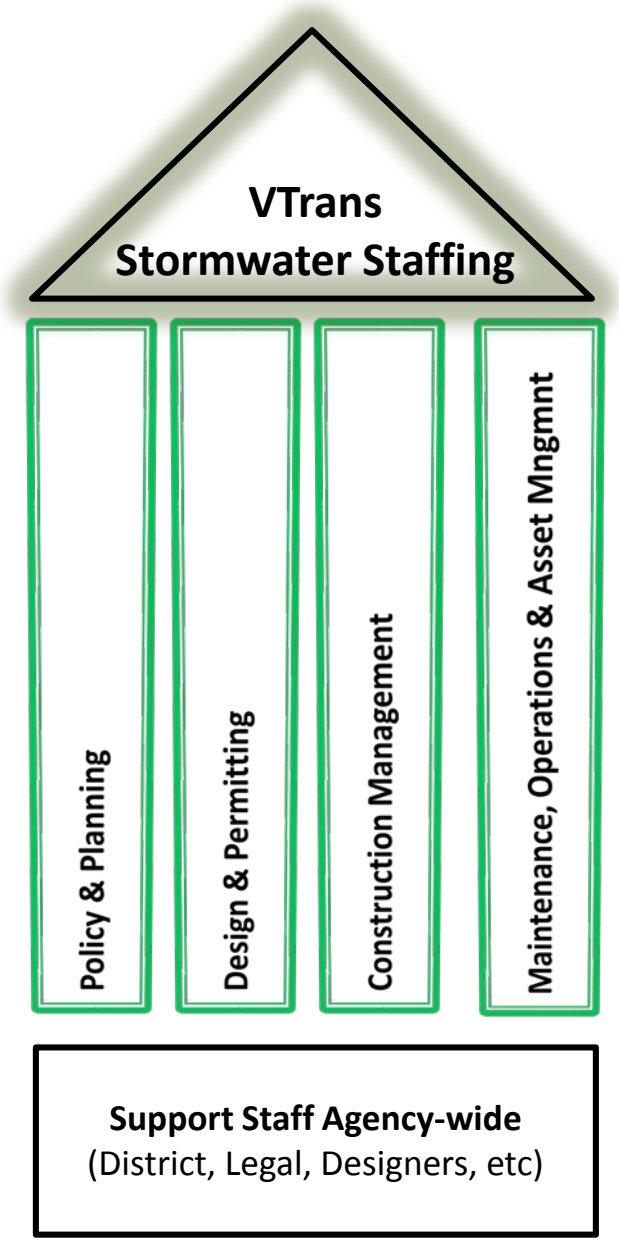


VTrans Response to Current Stormwater Programs

VTrans is strengthening its stormwater programs, building partnerships to improve water quality throughout the state, and making water quality protection fundamental to the agency's way of doing business

Over the past 15 years we have responded with:

- ✓ Integration of stormwater across the Agency and fostering a new way of thinking in the Agency
- ✓ New programs, initiatives and focus across the Agency:
  - ✓ Integration of stormwater concerns early in project delivery process (resource identification and scoping)
  - ✓ Greater focus on Asset Management (inventory, mapping, GIS) and Asset Maintenance (street sweeping, catch basin cleaning, repair, etc)
  - ✓ Flow Restoration Planning & Phosphorous Reduction Planning under TMDLs
  - ✓ Water Quality Enhancement Program
  - ✓ Building a Stormwater Retrofit Program
  - ✓ Green Stormwater Infrastructure Program
  - ✓ Enhanced education, outreach and awareness internally (all levels) and externally (Legislature, Municipalities, Public)
  - ✓ Improved internal coordination, new internal operating procedures, policy, best management practices and training targeting surface water quality
- ✓ Enhanced partnerships and collaboration with Municipalities, Watershed Groups and State and Federal Agencies looking to gain efficiencies, raise public awareness and address surface water quality issues
- ✓ Focused assistance to Municipalities (Better Back Roads, VT Local Roads, VTrans Training Center, funding through Town Grant Programs and Municipal Assistance Bureau
- ✓ New and reallocated positions
- ✓ Increased financial investments (planning, research, environmental mitigation/restoration and stormwater retrofits)



Integrating Stormwater Across the Agency

4 VTrans Environmental - Stormwater Pillars

Staffing across the Agency focused on stormwater includes **4 primary environmental units** that work on policy, procedure and rule making and also take projects and asset management from planning stage through design development, permitting, construction, implementation and into ongoing operation and maintenance:

1 Policy Planning and Intermodal Development
Environmental Policy Planner – legislation, policy, procedure

2 Project Delivery Bureau
Stormwater Management Engineer – scoping, design development, permitting

3 Project Delivery Bureau
Construction Environmental Engineers (two Engineers) – monitor construction for compliance

4 Maintenance and Operations Bureau
Environmental Program Manager and **Stormwater Technicians** (three water quality technicians) – policy, procedure, best management practices, research, scoping, design development, mainly post construction maintenance and compliance and compliance with other Federal NPDES Clean Water Act Programs (MS4, MSGP, TMDL)

Numerous positions throughout the Agency support the SW staff and/or are involved in stormwater design, permitting, ongoing compliance, operation, maintenance and asset management.

Project Plan Review

- ✓ Input into projects earlier
- ✓ Minimize ongoing O&M Costs
- ✓ Promote sheet flow and infiltration
- ✓ Encourage SW BMPs in impaired and stressed watersheds
- ✓ VTrans Projects, Local Transportation Projects, Section 1111 permit applications

Water Quality Enhancement Program

Work with maintenance districts, watershed groups and other state agencies to identify and correct:

- ✓ Areas of potential or active erosion
- ✓ Enhancements to existing infrastructure to benefit water quality

Stormwater Retrofits

Identify and Implement SW retrofits to:

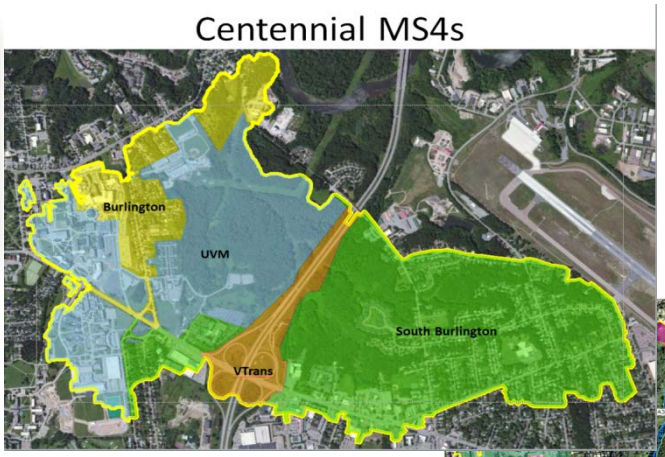
- ✓ Implement TMDLs (SW, Lake Champlain)
- ✓ Improve impaired and stressed streams
- ✓ Comply with the Flow Restoration & Phosphorous Reduction Planning, Design and Construction component of our MS4 Permit

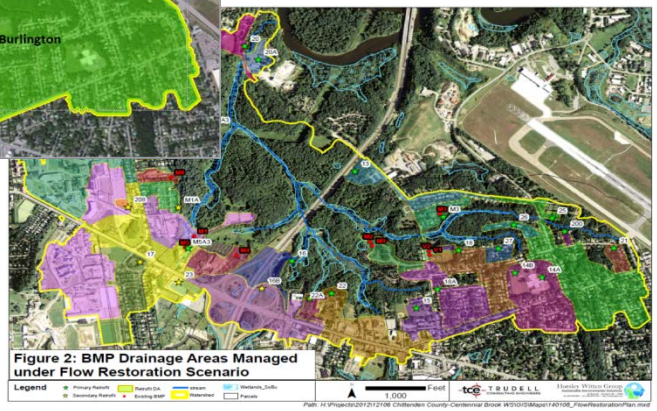
Flow Restoration Planning under TMDL

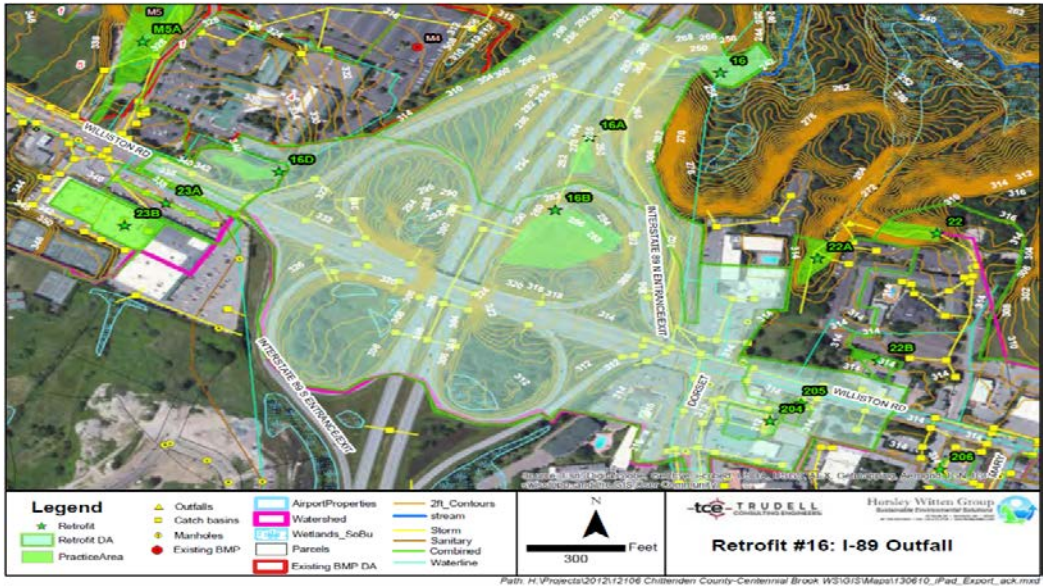
(example) **Centennial Brook**

- ✓ I-89 Corridor, So. Burlington
- ✓ Focus on 303(d) listed waterways impaired for stormwater
- ✓ Municipal Collaboration on development of FRP
- ✓ Allocate level of commitment under FRP based on impervious coverage in each stormwater impaired watershed
- ✓ Plan for and design SWTP/Retrofits
- ✓ Focus treatment on VTrans impervious surface and avoid right-of-way purchase
- ✓ Develop treatment options, sizing information, and retrofit candidate ranking

<u>Same will happen in response to the Lake Champlain TMDL and others over the coming years</u>



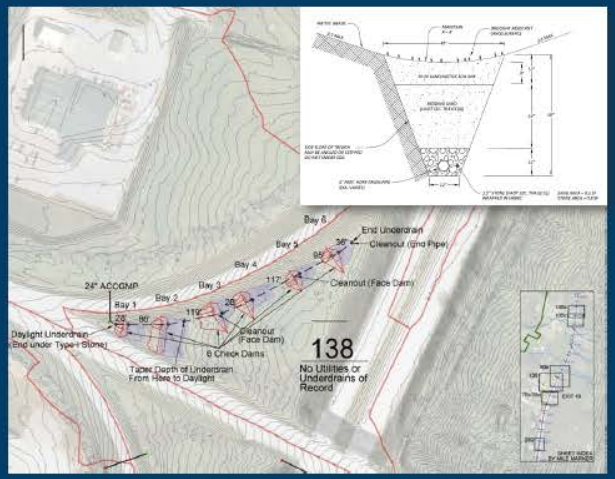




TMDL Flow Restoration Project - St. Albans

VTrans Stormwater Retrofits
I-89 Median Swales

The Vermont Agency of Transportation, VTrans, in collaboration with the Vermont Agency of Natural Resources, completed a project to design and implement stormwater retrofits for the linear transportation environment. A a series of innovative sand filter swales were designed in the median and exit ramp cloverleaves along Interstate I-89 in St. Albans and Williston, VT, all located within impaired watersheds. Median swales were designed to address the States' Stormwater and Phosphorus TMDL's, mitigating **stormwater runoff** and **phosphorus loading** from impervious surfaces.



During Construction

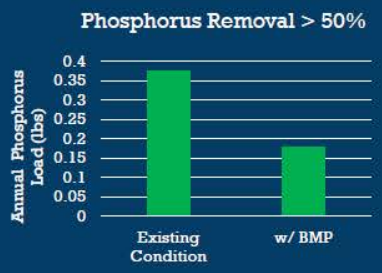
VTrans 138 I-89 Exit 19 S. Bound Off-Ramp

Post Construction

VTrans 75c I-89 Exit 19 N-Bound Off-Ramp

Best Management Practice Benefits:

- Easy Maintenance
- Meets VTRANS safety standards
- Easily reproduced design
- Credit toward Stormwater TMDL



*Results presented are estimated Particulate Phosphorus from 1 year simulation, using local rainfall data, modeled with WinSLAMM, a continuous simulation water quality model.

Project Implementation to Date:

Rugg Brook Sites :

- Three(3) Constructed in 2012
- 3.12 impervious acres managed
- Over 50% reduction in Phosphorus annual loading to Lake Champlain
- Total Cost: $118,690 ($38,000/ Impervious Acre)

Implementation Plan:

Impaired Watershed	Planned BMPs	Runoff Volume Storage (ac-ft)
Rugg Brook	3	0.19
Stevens Brook	5	0.54
Allen Brook	5	0.41

Project Design by:

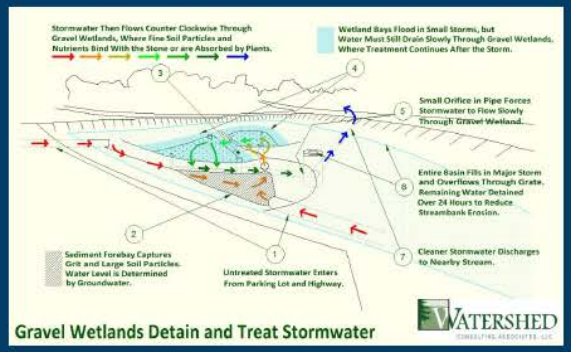
Watershed Consulting Associates, LLC

Lakeside Environmental Group

TMDL Flow Restoration Project - St. Albans

VTrans Stormwater Retrofits
St. Albans Park & Ride Gravel Wetland

The Vermont Department of Transportation (VTrans), in collaboration with the State of Vermont Ecosystem Restoration Program, funded a projet to design and permit a subsurface gravel wetland at the St. Albans Park and Ride, owned and operated by VTrans. The goal of the project was to mitigate stormwater runoff and water pollution, particularly phosphorus from the Park and Ride, to improve water quality and provide credit toward the State's TMDL for Stevens Brook. The site was designed according to the "Best Fit" ANR Engineering Feasibility Analysis Procedure.



Gravel Wetlands Detain and Treat Stormwater

Project Design by:

WATERSHED CONSULTING ASSOCIATES, LLC

LAKESIDE ENVIRONMENTAL GROUP

Before Construction

During Construction

Best Management Practice Benefits:

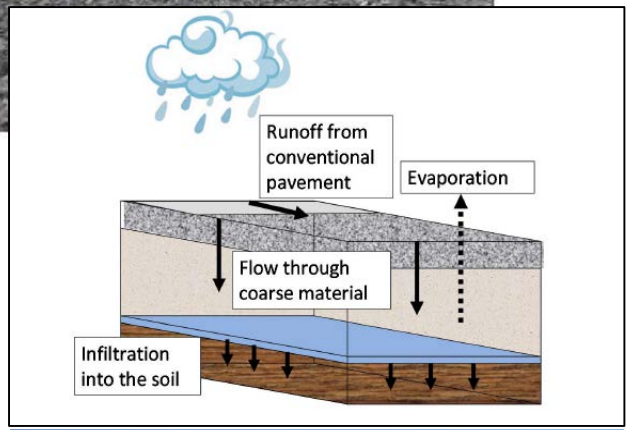
- Manages 1.8 impervious acres
- Mitigates 0.16 ac-ft stormwater runoff
- Aesthetic value
- Over 50% Total Phosphorus Removal reported for this type of design
- Reproducible design for other Vtrans facilities

BMP and TMDLs:

- Provides Credit toward Stevens Brook FRP as required by MS4 permit
- Will provide credit toward Lake Champlain Phosphorus TMDL

Post Construction

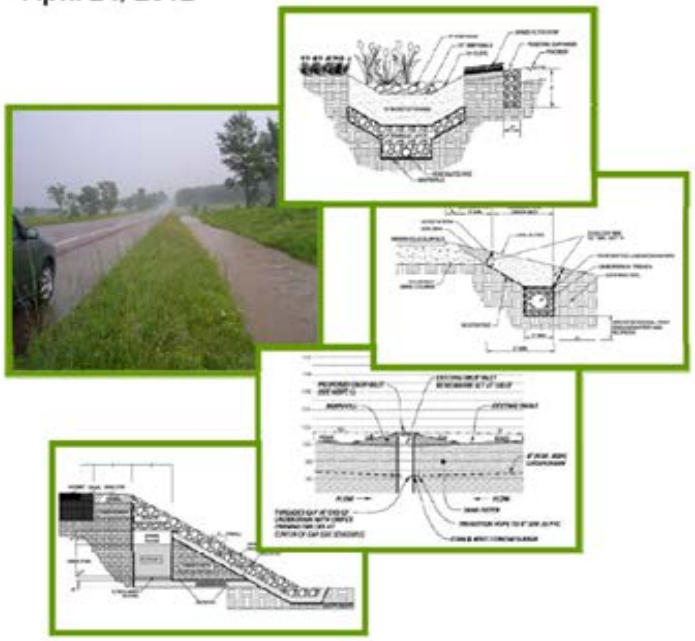
Research



VTrans Working to Get You There

Stormwater Practices Research Project Final Report

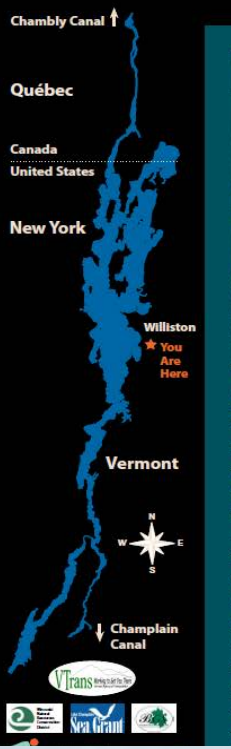
April 24, 2012



Prepared by:
Comprehensive Environmental Inc.

I-89 NB Welcome Center Demonstration Project - Williston

Pervious Concrete: Absorb the Storm



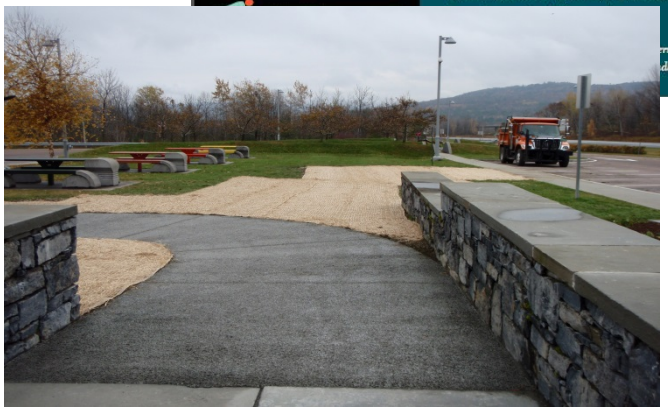
Stormwater Volume and Pollution

The health of our streams and lakes is impacted by excess stormwater volume and harmful pollutants generated by human activity such as automobile wastes, deicing salts, traction sand, fertilizers and pesticides deposited on roadways, driveways, sidewalks, parking lots and used in your yard. During rain events this accumulated pollution washes off developed lands, into storm drain systems, eventually flowing to our streams and lakes. As conversion of natural land to impervious surfaces increase, less rain water is absorbed by the soil and cleaned through the natural processes of plants and soils. Instead, this water flows too quickly to our waterways picking up toxic pollutants along the way. Excessive volumes of stormwater flowing to our streams and lakes during rain storms can erode stream channels and lakeshores, cause flooding and destruction of aquatic organism habitats needed for healthy populations of invertebrates and fish, and can quickly contribute to a long-term

Pervious Concrete

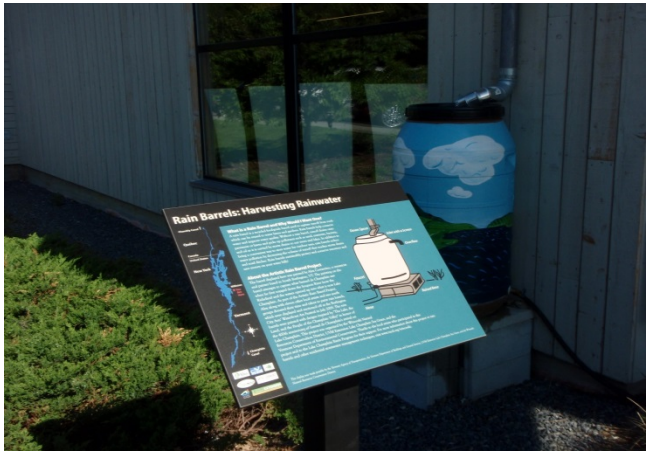
Pervious concrete is made with little or no sand, producing a strong and durable pavement with voids that allow rain water to pass through it. Pervious concrete pavements reduce or eliminate runoff and support pollution mitigation by capturing the first flush of rainfall allowing it to percolate into the ground where soil chemistry and biologic activity "treat" the polluted water naturally. By collecting rainfall and allowing it to infiltrate, groundwater and aquifer recharge is increased, peak water flow through and erosive damage to stream channels is reduced, and flooding is minimized. Pervious pavements reduce runoff that would otherwise burden our streams and lakes with warm, polluted water. This technology eliminates the need for detention ponds, swales, and expensive storm water systems allowing for more efficient land use. Pervious concrete plays a valuable role in green sustainable growth and is recognized by the U.S. Environmental Protection Agency.

rmont Agency of Transportation, the Vermont Department of Buildings and Ge
de UVM Extension Lake Champlain Sea Grant, the Lake Champlain Basin P



Green Stormwater Infrastructure

- ✓ Rely on natural systems to infiltrate and treat stormwater
- ✓ Reduce use of traditional "collect and convey" systems
- ✓ "Harvest Rain Water"
- ✓ "Absorb the Storm"
- ✓ ROW "surplus" or preservation for transportation benefit and surface water quality benefit
- ✓ Design Standards Review & Update
- ✓ Facilities Audits



VERMONT

Executive Summary

State of Vermont | ***Agency of Transportation*** | **Operations Division**

TO: Executive Staff
FROM: Craig DiGiammarino, Operations Environmental Program Manager (and VTrans GSI Team Liaison)
DATE: June 12, 2013
RE: EXECUTIVE SUMMARY of VTrans Green Stormwater Infrastructure Work Plan

Over the past few months I have been working with the Green Stormwater Infrastructure (GSI) Council, an internal GSI Team, and with relevant VTrans Program Directors, Managers and Staff in PDD, OPS, PPAID and Legal on the development of the attached ***VTrans Green Stormwater Infrastructure (GSI) Work Plan***. The GSI Work Plan is now being submitted for your review prior to my presentation at the June 17, 2013 Executive Staff Meeting. At that time I will seek your support and ultimately signature by Secretary Searles. Our Work Plan is due to ANR by June 24th for inclusion in a single joint report by the Council to the Governor by July 1, 2013.

This GSI Work Plan responds directly to the attached March 2012 Governor Executive Order which established an Interagency GSI Council charged with:

A. Identifying opportunities for integrating GSI systems and practices into existing state programs.
B. Developing technical guidance for implementation of GSI systems and practices.
C. Establishing a plan and timeframe for implementing GSI systems and practices (state properties).
D. Identifying state liaisons to support GSI implementation within their agencies.
E. Identifying and undertaking GSI research and monitoring studies.
F. Identifying sustainable funding sources to support regional planning, coordination, and implementation.

Members of the Interagency GSI Council include the Agencies of Natural Resources, Transportation, and Commerce and Community Development as well as the Department of Buildings and Services.

The basic premise behind GSI is to move away from traditional stormwater collection and conveyance practices (pipes and storm drains) and promote GSI as an alternative approach, which relies on natural systems to infiltrate and treat stormwater (grass swales, vegetated slopes, removing pavement, promoting sheet flow, and more). VTrans will need to address how and to what extent GSI will be implemented across Agency functions. Although GSI is an important practice to have in the tool box, developing strategic policy recommendations and specific actions addressing the issues, barriers, questions, and opportunities put forth in this GSI Work Plan, needs to be a balanced and fitting approach for the transportation sector.

Moving forward, this effort will focus on identifying initiatives that promote transportation co-benefit opportunities such as flood resilience, regulatory relief, mitigation, and cost savings, and recognize strategies worthy of research and more analyses. Additional resources or significant investment is not anticipated over the coming years to execute this GSI Work Plan.

The long-term vision for VTrans is to develop a program that uses an adaptive management approach towards the integration and implementation of GSI systems and practices into its existing programs to the maximum extent practicable, given financial and resource constraints, barriers and challenges to GSI implementation, and to the extent that it does not interfere with VTrans' Mission.

The short-term strategy is to enhance existing initiatives and under the guidance of an internal GSI working group focus on:

A. Developing strategic policy recommendations and specific actions addressing the issues, barriers, questions, and opportunities put forth in this GSI Work Plan.
B. Implementing the GSI Work Plan and preparing annual reports addressing accomplishments and challenges in that year and opportunities and strategies moving forward in the coming year.

The purpose of the GSI Work Plan is to highlight current initiatives, identify barriers, challenges, and opportunities to the implementation of GSI and set a direction for the promotion and adoption of GSI in the years ahead. Note that this plan is the first step towards greater integration of GSI concepts into State Transportation processes, programs, and projects.

TAKE HOME MESSAGE
VTrans Response to Current Stormwater Regulations

- VTrans response over the past 15 years to growing stormwater regulations requires an ongoing investment and high level of training and education, internal collaboration, commitment of resources and financial support, and collaboration with municipalities and ANR.

- Our response has been targeted and directly related to the growing need to address increasing and more complicated stormwater regulations.

- We have been successful in maintaining compliance under all stormwater programs sometimes at the cost of efficient project delivery, operation and maintenance activities and inspection/reporting.

- **We passed a 2015 EPA Audit of our stormwater compliance programs.**

- What is on the horizon will move us in the right direction in achieving water quality standards statewide.

VT ANR and EPA Plan for Restoring Lake Champlain
"Vermont's Clean Water Initiative"

Enhance or establish new regulatory programs, permits and standards at ANR, VAAFM and VTrans, in order to:

- Update the Accepted Agricultural Practices (AAPs) administered by VAAFM;
- Increase effectiveness of nutrient management planning under the AAPs;
- Establish small farm certification and manure applicator certification programs at VAAFM;
- Add phosphorus reduction obligations and continue flow monitoring requirements in the municipal separate storm sewer system program (MS4);

❑ **Establish a new statewide transportation separate storm sewer system permit (TS4);**

❑ **Issue a new general permit with standards for management of stormwater on municipal roads (requiring VTrans Technical Assistance on multiple levels);** and

- Require stormwater retrofit obligations for existing developed lands to the extent not covered under the MS4 or TS4 permits or municipal roads general permit (aka "3 acre impervious surface permit program").

TS4…..what is it?

Statewide Transportation Separate Storm Sewer System Permit (TS4)

A Statewide Transportation Separate Storm Sewer System (TS4) Permit is:

- Federal NPDES (National Pollutant Discharge Elimination System – Clean Water Act) permit issued under the MS4 (Municipal Separate Storm Sewer System) program
- Specific to VTrans Transportation Sector and unique linear nature of its infrastructure
- Ability to roll multiple stormwater programs under one permit (MS4, TMDL, MSGP, Op'l Stormwater)
- Encompasses the entire VTrans roadway system statewide and all VTrans owned non-road developed lands

Possible benefits of a TS4?

- Increase Program effectiveness (for both VTrans and ANR)
- Reduce duplicative administrative burdens (inspections and reporting)
- Cost Savings in project delivery due to streamlined permitting
- Increased predictability and consistent statewide approach
- Targeted resources and prioritized asset management
- Address the fact that the Transportation Sector is unique
- Co-Benefits (flood resilience, aquatic organism passage, nutrient removal)
- Proactive approach to addressing "stressed" waters in an attempt to keep them from having a TMDL

Major Elements VTrans will undertake with TS4

TS4 would essentially take what we are currently doing and apply it across the entire state to varying levels resulting in:

- ❑ Increased asset management, mapping, operation, maintenance, inventory, inspection, reporting and tracking activities
- ❑ Increased demand to considering stormwater management on all projects early in the project delivery process
- ❑ Building more stormwater treatment practices especially on projects that may not have previously considered doing so
- ❑ Building stormwater treatment targeting a variety of pollutants (sediment, phosphorus, nitrogen, bacteria, other)
- ❑ Fully integrating Green Stormwater Infrastructure into VTrans project delivery process
- ❑ Building a stormwater retrofit program addressing environmental mitigation/restoration for legacy impervious surfaces
- ❑ Further reaching and more robust public education and outreach
- ❑ Increased demand for internal and external training
- ❑ Increased need for research
- ❑ Increased need to partner with municipalities on Flow Restoration & Phosphorous Reduction Planning and TMDL implementation
- ❑ Increased demand for VTrans to provide municipal technical assistance and funding
- ❑ Increased need to address source control, pollution prevention, and stormwater management at all of the Transportation Maintenance Facilities (65 plus sites)
- ❑ Increased need to manage “run-on” and enforce against illegal connections and illicit discharges into the ROW
- ❑ Putting the necessary funding, resources and staff in place to support these efforts

Craig DiGiammarino

Environmental Program Manager

Maintenance & Operations Bureau

VTrans Highway Division

802-922-4681 craig.digiammarino@Vermont.gov

Presented to House NRF&W on January 19, 2017