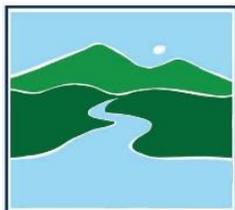
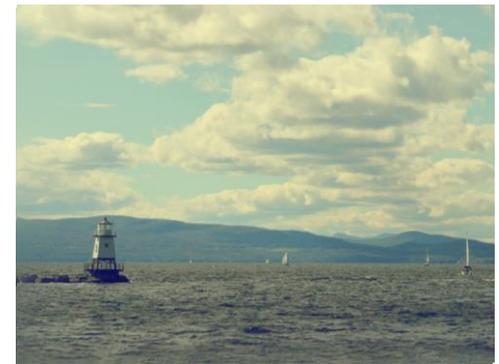


# Basin Planning to Implementation: Vermont's Clean Water Roadmap

Ethan Swift, DEC Monitoring,  
Assessment & Planning Program  
Manager

Emily Bird, DEC Clean Water  
Initiative Program

February 1, 2018

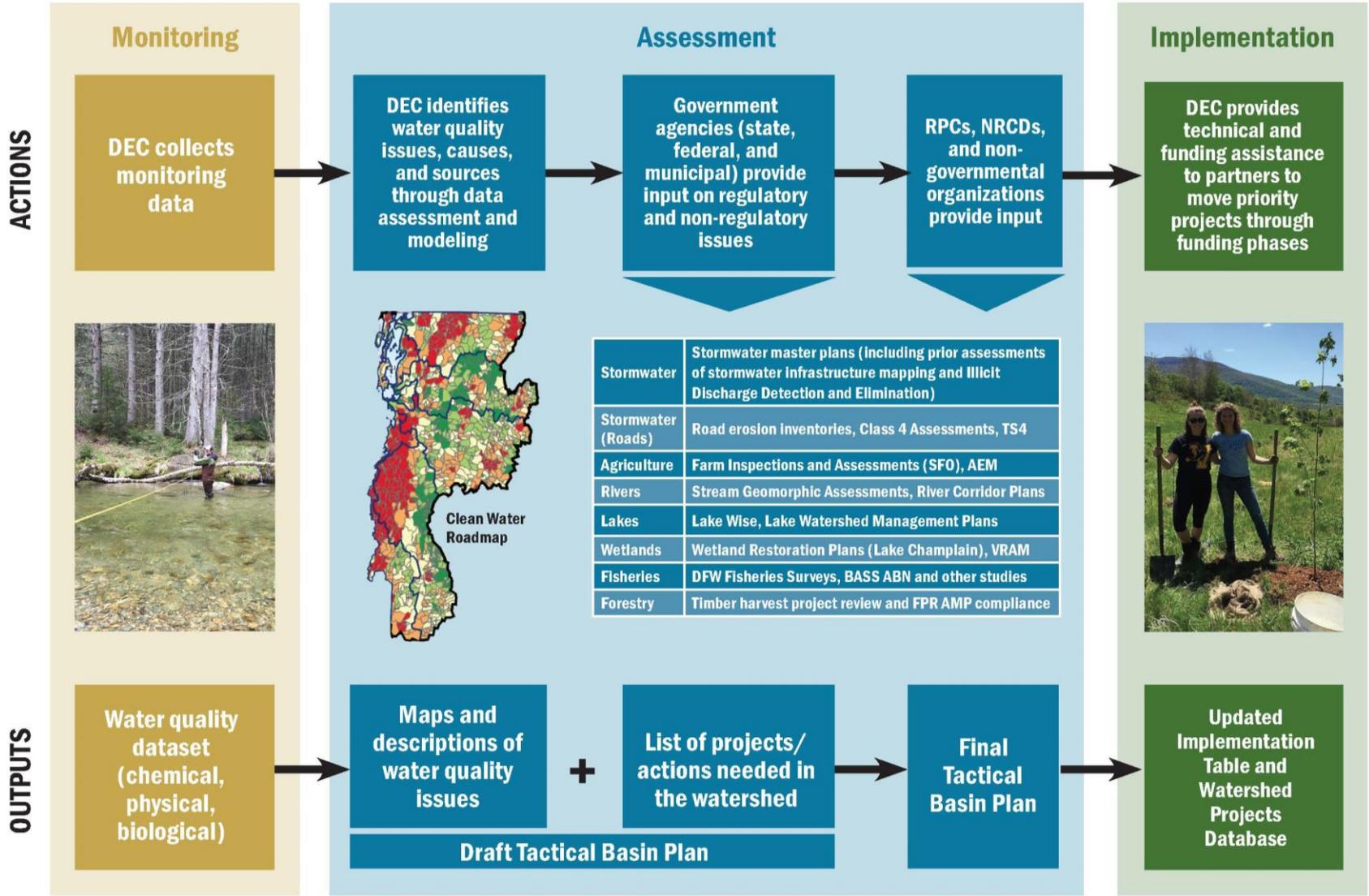


VERMONT DEPARTMENT OF  
ENVIRONMENTAL CONSERVATION  
**WATERSHED**  
MANAGEMENT DIVISION  
MONITORING, ASSESSMENT &  
PLANNING PROGRAM



VERMONT

## TACTICAL BASIN PLANNING PROCESS



For more information, visit: <http://dec.vermont.gov/watershed/map/basin-planning>

- |  |   |   |   |
|--|---|---|---|
| <b>ABN</b> Ambient Biomonitoring Network         | <b>BASS</b> Biomonitoring and Aquatic Studies       | <b>FPR</b> Department of Forests, Parks, and Recreation | <b>SFO</b> Small Farm Operation                       |
| <b>AEM</b> Agricultural Environmental Management | <b>DEC</b> Department of Environmental Conservation | <b>NRC</b> Natural Resources Conservation District      | <b>TS4</b> Transportation Separate Storm Sewer System |
| <b>AMP</b> Accepted Management Practices         | <b>DFW</b> Department of Fish and Wildlife          | <b>RPC</b> Regional Planning Commission                 | <b>VRAM</b> Vermont Rapid Assessment Method           |

# Tactical Basin Planning identifies projects for prioritization & Implementation to meet TMDL Targets



## Tactical Basin Plan Implementation Tables

ID	Project Name	Project Type
NEW 94	Upper Lamoille Bridge and Culvert Upgrades	Road Project
NEW 98	Bryan Pond Dam Removal	Dam Removal
NEW 111	Stannard Road Erosion Inventory	Road Erosion Control Inventory
NEW 113	Wheelock Road Erosion Inventory	Road Erosion Control Inventory
NEW 116	Westford Road Erosion Inventory	Road Erosion Control Inventory
NEW 118	Milton Road Erosion Inventory	Road Erosion Control Inventory
NEW 119	Georgia Road Erosion Inventory	Road Erosion Control Inventory
NEW 120	Fletcher Road Erosion Inventory	Road Erosion Control Inventory
NEW 121	Fairfax Road Erosion Inventory	Road Erosion Control Inventory
NEW 125	Woodbury Road Erosion Inventory	Road Erosion Control Inventory
NEW 159	Elmore Garage Stormwater Project	Stormwater
NEW 162	Seymour River Watershed Stream Geomorphic Assessment and River Corridor Plan	Corridor Planning
NEW 290	Mapping and baseline data (in lieu of a full Phase 2) for the tributaries to the Upper Lamoille	Corridor Planning
NEW 291	Proofing Culvert Inventory for Upper Lamoille	Road Project
NEW 292	Watershed Education Projects	Education & Outreach
NEW 295	Lamoille River Paddlers' Trail Support	Public Engagement
NEW 296	Flood Resiliency Workshop and Related Projects	Education & Outreach
NEW 297	Lamoille County Planning Commission Water Quality Database Updates	Technical Assistance
NEW 302	Rodman Brook Remediation Project	Floodplain/Stream Restoration
NEW 303	Lowell asbestos mine- Hutchins Brook	Floodplain/Stream Restoration
NEW 304	Johnson State College Monitoring Project	Water Quality Sampling
NEW 305	Garage Seep in Waterville Village	Floodplain/Stream Restoration
NEW 314	Mapping and baseline data (in lieu of a full Phase 2) for the tributaries to the Upper Lamoille	Corridor Planning
NEW 315	Cabot Road Culvert Replacement, Walden	Road Project
NEW 323	Berm Mapping for Cemetery Brook	Floodplain/Stream Restoration
NEW 324	Culvert Replacement Project, Lakeshore Road Greensboro	Road Project
NEW 325	Restoration Project Bachelor Brook, Greensboro	Road Project
NEW 326	Buffer Plantings on Tate Brook, Greensboro	Riparian Planting - River
NEW 327	Upstream Buffer Planting, Tate Brook, Greensboro	Riparian Planting - River
NEW 328	The North Shore Road culvert replacement, Greensboro	Road Project
NEW 329	Dry Culvert stabilization, Greensboro	Road Project
NEW 330	Porter Brook Buffer Planting, Caspian Lake Tributary in Greensboro	Riparian Planting - River

## Database to Track TMDL Implementation

Road Project - Implementation

### Erosion Reduction along Fayston Road

**Project Status:**  
Completed

**Town:** Fayston  
**County:** Washington  
**Watershed:** Mad River  
**Funding Amount:** \$30,614  
**Funding Source:** Capital Grant FY2014

**Description:** Installation of roadside best management practices to improve drainage and reduce erosion along Center Fayston Road, Kew Vasseur Road, and Tucker Hill Road in Fayston, VT. Involved reducing road width, drainage ditch improvements and stone lining/hydroseeding, and culvert work.

**Partners:** Friends of the Mad River

**Results:**

- 2.2 kg/year phosphorus reduction
- 18 drainage structures installed/repaired
- 2600 linear feet of drainage improved

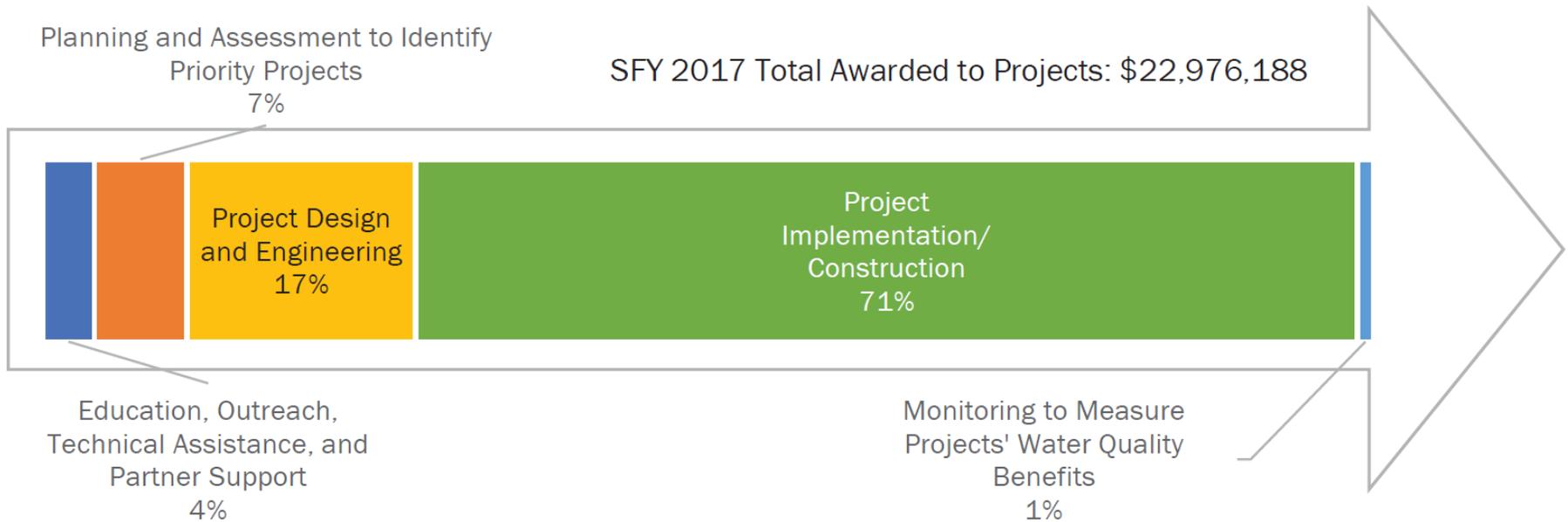
Roadside area eroding from road runoff creating a narrow ditch with major downcutting.

After installation of properly sized, stone-lined ditch to prevent roadside erosion and sediment/nutrient pollution.



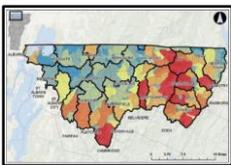
# Investment Measures

Figure 10. Clean water project development process and proportion of dollars awarded in SFY 2017 by project step

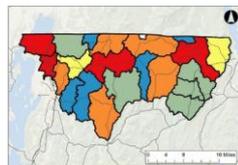


# The Clean Water Roadmap: DEC's modeling Tool to assist in targeting & tracking TMDL, Act 64 implementation

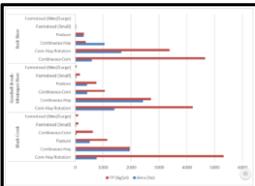
Forests



State roads/facilities



Agriculture



Wastewater treatment facilities

Watershed	Facility Name	Capacity	Current Loading	Remaining Capacity	Notes
Eden	Eden	1000	1000	0	Full Capacity
	Eden	1000	1000	0	Full Capacity
Highgate	Highgate	1000	1000	0	Full Capacity
	Highgate	1000	1000	0	Full Capacity
Jay	Jay	1000	1000	0	Full Capacity
	Jay	1000	1000	0	Full Capacity
Lowell	Lowell	1000	1000	0	Full Capacity
	Lowell	1000	1000	0	Full Capacity
Montgomery	Montgomery	1000	1000	0	Full Capacity
	Montgomery	1000	1000	0	Full Capacity
Richford	Richford	1000	1000	0	Full Capacity
	Richford	1000	1000	0	Full Capacity
Swanton	Swanton	1000	1000	0	Full Capacity
	Swanton	1000	1000	0	Full Capacity
Troy	Troy	1000	1000	0	Full Capacity
	Troy	1000	1000	0	Full Capacity
Winofield	Winofield	1000	1000	0	Full Capacity
	Winofield	1000	1000	0	Full Capacity

Local roads

Town	Parcel	Impervious	Town	Parcel	Impervious
	(Acres)	(Acres)		(Acres)	(Acres)
Barre	322.5	264.4	Jay	205.5	211.1
Bellevue	291.5	144.4	Montgomery	302.7	119.5
Cambridge	108.4	55.9	Newport	296.2	508.4
Eden	4.7	---	Richford	280.3	81.0
Ennsburgh	307.8	177.4	St. Albans	240.9	56.7
Fairfax	0.1	---	St. Albans	482.1	413.5
Fairfield	398.4	232.1	Swanton	398.6	27.0
Helmer	11.0	10.6	Troy	230.2	58.1
Franklin	247.9	104.4	Winofield	196.7	43.9
Highgate	402.9	464.4			
Total loading from all roads (kg/yr)					4374
Total reduction based on overall					2180

Developed lands

Town	Parcels (#)	Impervious (acres)
Eden	1	0.1
Highgate	8	75.5
Jay	4	74.0
Lowell	2	22.0
Montgomery	2	15.8
Richford	4	25.6
Swanton	8	38.1
Troy	1	3.6
<b>Total</b>	<b>30</b>	<b>254.7</b>

- Allows each tactical basin plan to express the estimated total nutrient pollutant load by sector as part of the TMDL
- Identifies critical subwatersheds for targeting by sector
- Identifies nutrient pollution reductions needed at the subwatershed scale
- Identifies nutrient pollution reduction associated with targeted projects
- Helps in targeting cost-effective actions
- Helps to track other key co-benefits, such as flood resilience & habitat function

# Clean Water Roadmap

- Supports Tactical Basin Planning by:
  - Providing a framework for prioritizing actions that are strategic and cost-effective in reducing nutrient pollution delivery into state waters
- Developed as part of a collaboration among key partners:



# Key Input Components

1. 'Downscaled' annualized total phosphorus loads (kg/yr) and yields (kg/ha/yr)
  - Estimated for land units at NHDPlus catchment scale based on USEPA SWAT modeling
  - Loads aggregated to HUC-12 and Tactical Basin levels
2. Water Quality Blueprint scores:
  - Conservation Value
  - Water Quality Impact
  - Combined scores
3. Relevant spatial layers (streams, teams)
4. Landscape features (soils, slopes, land use)



# CWR Capabilities

## The Clean Water Roadmap does:

1. Leverage results from USEPA's TMDL modeling effort (SWAT major basin models, Scenario Tool)
2. Summarize "baseline" TP loads at multiple basin scales (Tactical, HUC-12, NHDPlus)
3. Allow BMP applications at various scales and estimate and aggregate associated TP load reductions
4. Integrate the Water Quality Blueprint to highlight opportunities for restoration and conservation to improve water quality and achieve co-benefits

# CWR Limitations/Caveats

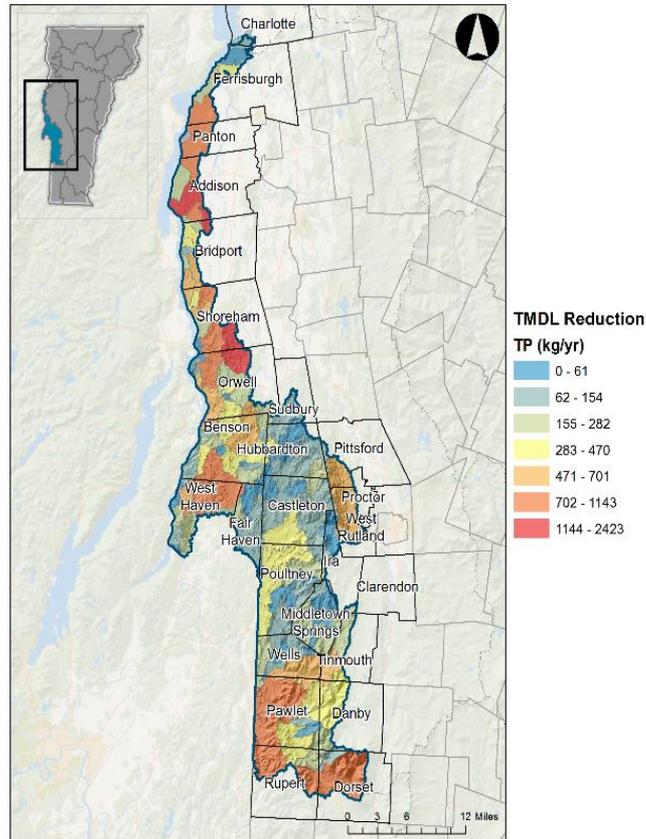
The Clean Water Roadmap does not:

1. Provide TP loading estimates at defined spatial scales finer than NHDPlus catchments
2. Directly support specification of site/parcel-level management projects
3. Separately estimate soluble reactive P (SRP) loading (TP only)
4. Estimate routing/delivery of TP exported from landscape to Lake Champlain

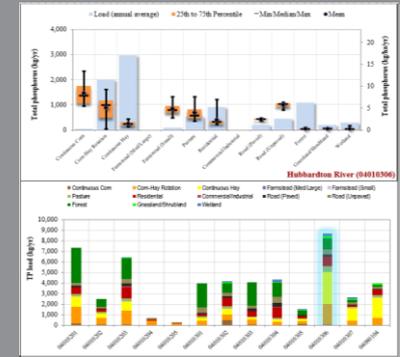
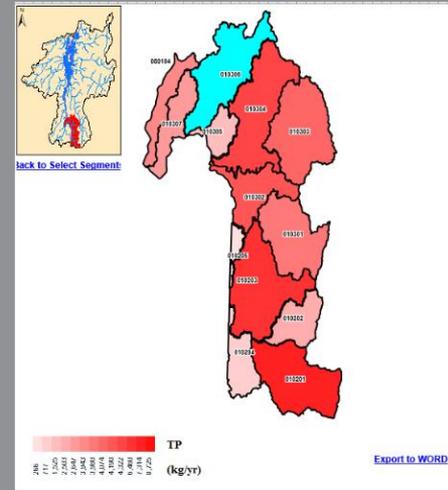
# Champlain TMDL – Phase 2 Content

per the Lake Champlain TMDL Phase I Implementation Plan

Potential TMDL Reduction



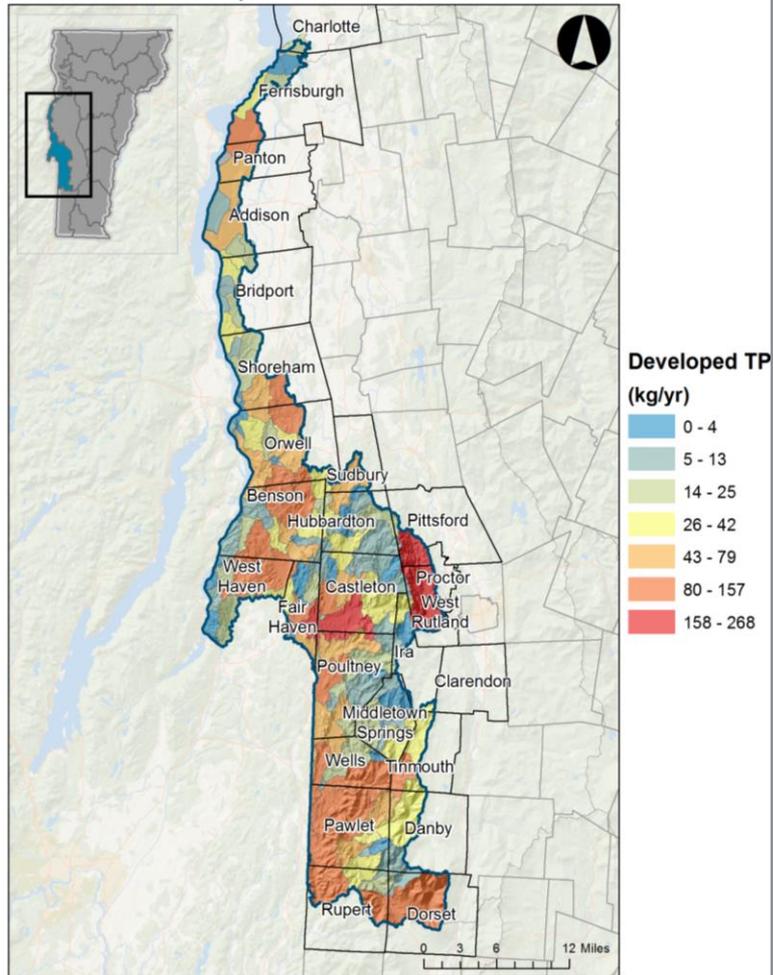
- All assessments are critical, but not all areas of a watershed have assessments completed.
- TMDL’s scenario tool presents one set of BMP’s, but where do they go?
- DEC has invested in modeling – The “Clean water Roadmap” to:
  - Identify critical areas on the landscape where additional assessment is needed.
  - identify nutrient reductions at the subwatershed and project scale.
  - Set regulatory targets for load reductions for agricultural lands, forested lands, developed lands (stormwater), roads, wastewater



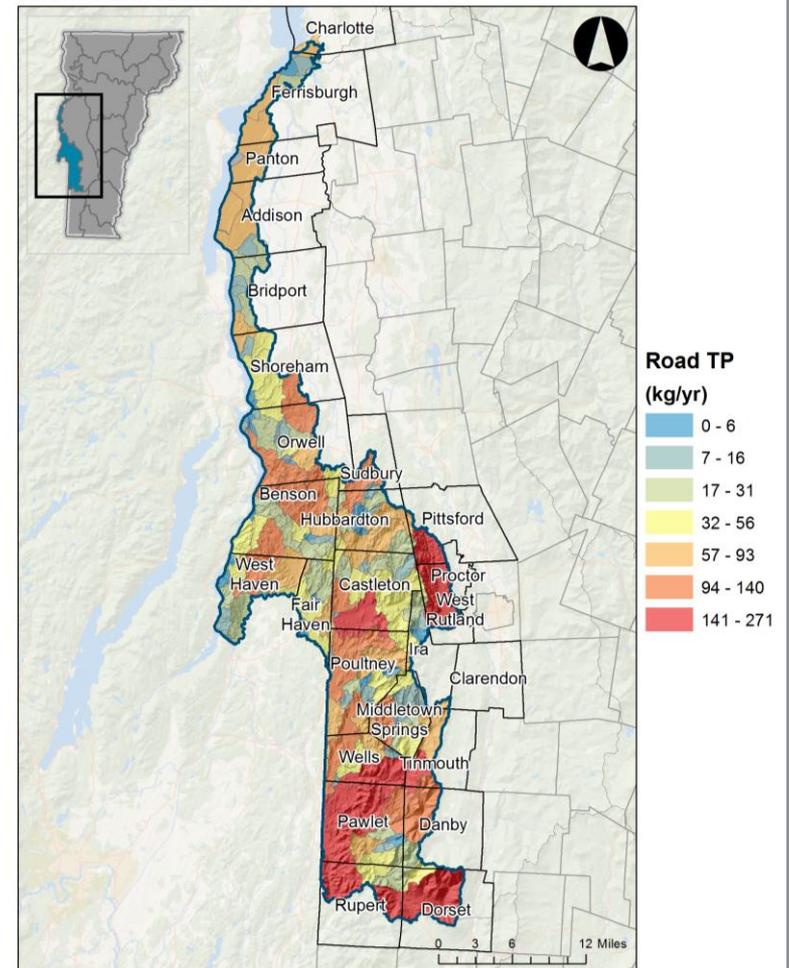
# Champlain TMDL – Phase 2 Content

per the Lake Champlain TMDL Phase I Implementation Plan

### Estimated Developed Land TP



### Estimated Road TP



# Scenario Mode: BMP Load Reductions

Change in phosphorus loading based on practices implemented in the scenario appear in red

Compare baseline and scenario phosphorus loading

Factors higher phosphorus loads from steeper slopes

**Clean Water Roadmap Tools**

Overview Topics

Visualize Basin Results

Select map options:

Map type: Baseline

Basin scale: Tactical Basin

Land type(s): All Land Types

Variable: TP Yield (kg/ha/y)

Color scheme: Green to red

Manage Scenarios

Baseline mode

Scenario mode

Create/select scenario: Demonstration

Publish status:

**Catchment Dashboard**

Tactical Basin Name: Southern Lake Champlain

Tactical Basin: Baseline Summary

Metric	Value	(Tactical Basin)	(LC Basin)
TP Load (kg/y)	80,861	n/a	n/a
Mean Yield (kg/ha/y)	0.61	n/a	n/a
Area (ha)	131,834	n/a	n/a
WQB Conserv. Value	n/a	n/a	n/a
WQB WQ Impact	n/a	n/a	n/a
WQB Combined Score	n/a	n/a	n/a

**Tactical Basin Scenario Loading**

Tactical Basin Load (75,940 kg/y, -6.1%)

- Cropland (30,921 kg/y, -13.6%)
  - AGRR: General Agricultural Land (1,365 kg/y)
  - CRNC: Corn (non-clay) (556 kg/y)
  - SCNC: Soybeans (non-clay) (18.1 kg/y)
  - SPAS: Fallow/Idle Cropland (1,373 kg/y)
  - CHNC / HCNC: Corn/Hay (non-clay) (5,600 kg/y)
  - CRCL: Corn (clay) (5,358 kg/y)
  - SCCL: Soybean (clay) (264 kg/y)
  - CHCL / HCCL: Corn/Hay (clay) (16,388 kg/y, -22.9%)
    - HSG D (16,374 kg/y, -22.9%)
      - 0-5% (5,777 kg/y, -11.4%)
      - 5-10% (6,366 kg/y, -29.9%)
      - > 10% (4,232 kg/y, -25.0%)
    - HSG Water (13.8 kg/y, -21.1%)
  - Pasture / Hay (18,268 kg/y)
  - Farmsteads (684 kg/y)
  - Developed (4,961 kg/y)
  - Roads (6,779 kg/y)
  - Forest (11,806 kg/y)
  - Grass/Shrub Land (1,180 kg/y)

**Annual TP Load Comparison - Cropland**

Annual TP Load (kg/yr)

Baseline: ~30,921 kg/yr

Scenario: ~28,828 kg/yr

**Tactical Planning Basin**

Basin Name: Southern Lake Champlain

Zoom to

Legend:

- Developed
- Roads
- Forest
- Grass/Shrub Land
- Wetlands

# Online

- CWR: <https://anrweb.vt.gov/DEC/CWR/cwr-tool.vbhtml>
- Webinar: <https://www.youtube.com/watch?v=-8JbFMRt24k>

The screenshot displays the Clean Water Roadmap web application. The interface includes a navigation menu with 'Home', 'Documents', 'Contact', and 'Log In'. The main content area is divided into several sections:

- Clean Water Roadmap Tools:** Includes 'Overview Topics', 'Visualize Basin Results', and 'Select Scenario' (with 'Baseline mode' selected).
- Map Layers:** A list of layers such as 'Streams', 'Village Boundaries', 'Town Boundary', 'County Boundary', 'Lake Champlain Basin', 'Tactical Basins', 'HUC-12 Basins', 'NHDPlus Catchments', and 'Water Quality Blueprint (WQB)'. 'Lake Champlain Basin', 'Tactical Basins', and 'NHDPlus Catchments' are checked.
- Map:** A map of Vermont showing various catchments. A search bar is present. A tooltip for 'NHDPlus Catchment (1 of 2)' shows 'Feature ID: 4586536' and 'Catchment Name: Roaring Brook'.
- Catchment Dashboard:** A detailed view for the 'Roaring Brook (4586536)' catchment. It includes a table for 'NHDPlus Catchment: Baseline Summary' and two pie charts for 'Annual TP Load by LULC Group' and 'Land Area (ha) by LULC Group'.

Metric	Value	Percent Rank (Tactical Basin)	Percent Rank (LC Basin)
TP Load (kg/y)	267	85	72
Mean Yield (kg/ha/y)	0.27	50	40
Area (ha)	991	84	80
WQB Conserv. Value	20.38	22	19
WQB WQ Impact	6.19	35	30
WQB Combined Score	42.23	58	60

**Annual TP Load by LULC Group**

**Land Area (ha) by LULC Group**

**LULC Legend:** Cropland, Pasture / Hay, Farmsteads, Developed, Roads, Forest, Grass/Shrub Land, Wetlands.

# Georgetti Park Stormwater Mitigation Project (Rutland City)

- Water Quality Data condition:

VT03-14	01	EAST CREEK, MOUTH TO 0.2 MI (BELOW CSO DISCHARGE PTS #2 AND #9)	E. COLI	CR, AES	RUTLAND CITY COLLECTION SYSTEM CSO
		TENNEY BROOK, FROM EAST CREEK UPSTREAM	TEMP, STORMWATER, CHANGED HYDROLOGY	ALS	URBAN IMPACTS

- East Creek impaired (nutrients, sediment, and pathogens from CSO, stormwater)
- Tenney Brook (tributary to East Creek) also stressed (nutrient enrichment, sedimentation, thermal modification)

# Sector Based Assessment Reports



## TENNEY BROOK / EAST CREEK WATERSHED – STORMWATER MASTER PLAN

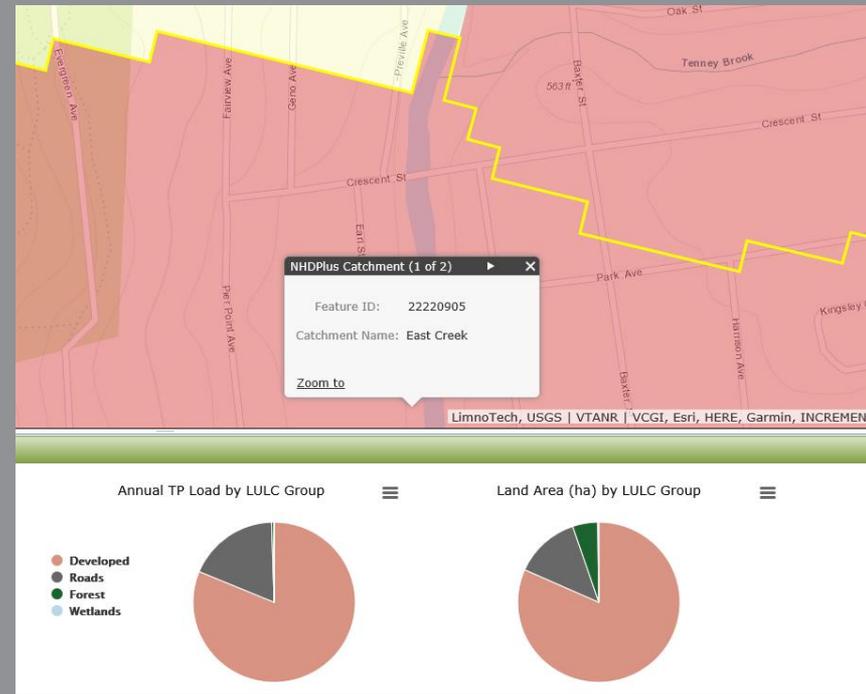
RUTLAND, VERMONT

FINAL REPORT  
December 2014

Criteria	Quality	Score
Impervious Acres Managed (ac)	> 20 acres	5
	10-20 ac	4
	2-10 acres	3
	1-2 acres	2
	< 1 acre	1
Channel Protection Volume Mitigated	>80%	2
	<80%	0
Relative Project Cost	<\$10K	6
	\$10-20K	5
	\$20-50K	4
	\$50-100K	3
	\$100-500K	2
	\$500K+	1
Volume Treated (ac-ft)	<1 ac-ft	1
	1-2 ac-ft	2
	2-5 ac-ft	3
	5-10 ac-ft	4
	10+ ac-ft	5
Annual TSS Load Mitigation (pounds)	<100 lbs	1
	100 - 1,000 lbs	2
	1,000 - 5,000 lbs	3
	5,000 - 10,000 lbs	4
	10,000 - 20,000 lbs	5
	20,000+ lbs	6
Annual TP Load Mitigation (pounds)	0-0.5 lbs	1
	0.5 - 1.0 lbs	2
	1 - 5 lbs	3
	5 - 10 lbs	4
	10 - 20 lbs	5
	20+ lbs	6

GAP	Giorgetti Arena Parking Lot	Bioretention	Bioretention practice and vegetated filter strip conveyances will be created to manage SW runoff from parking lot and part of adjacent roadway.	29	3
-----	-----------------------------	--------------	---	----	---

# Modeling data (CWR) supports project



## WDP Projects

Home

**Name**       **Status**       **FED Step**

**Project Type**       **County**

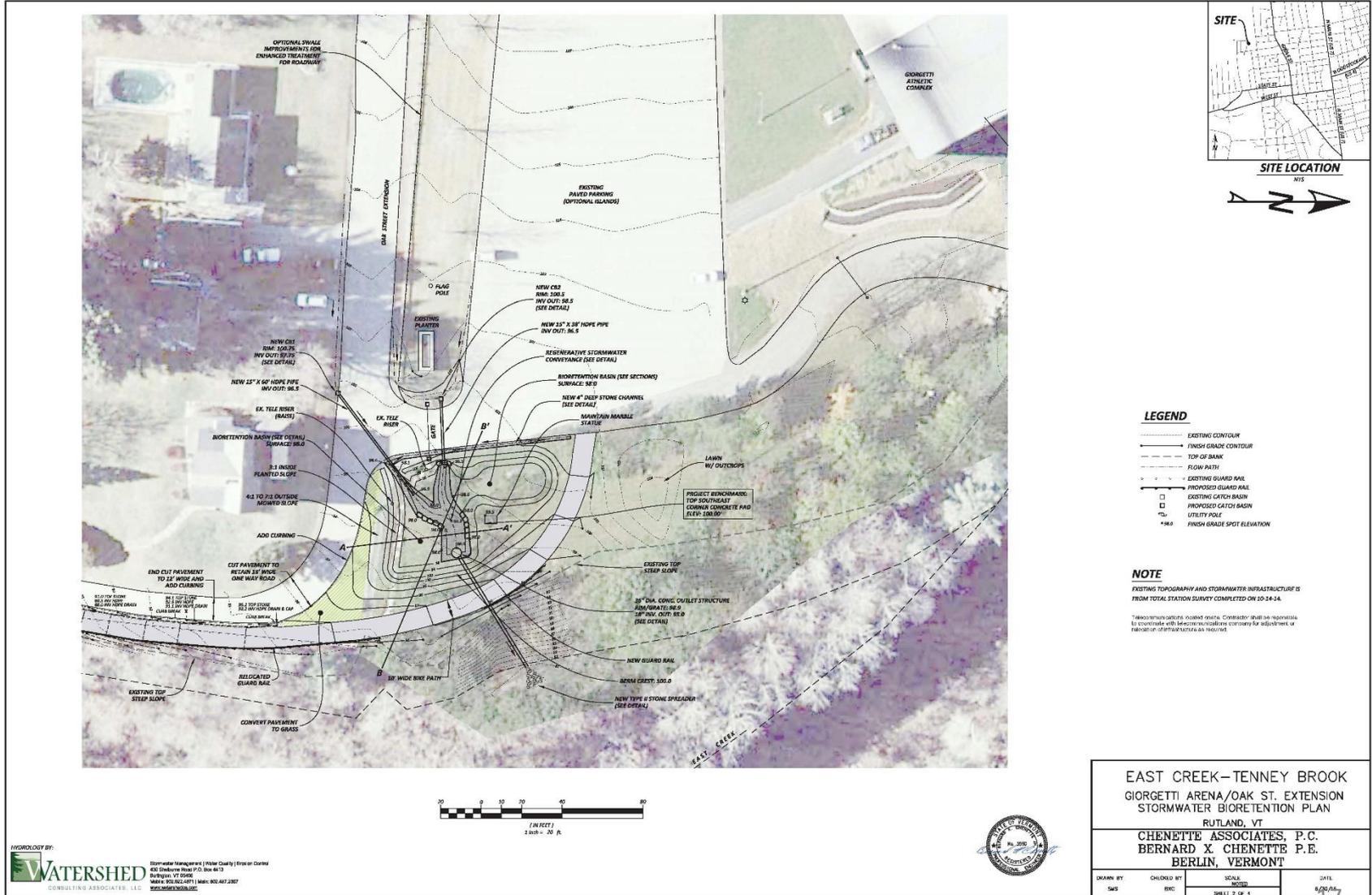
**Basin Plan**       **Town**

**Grade Type**       **Grade**

ID	Project Name	Project Type	Status	FED Step	Grant Number(s)
<a href="#">Edit</a> <a href="#">View</a> 74	Stormwater Reduction in the East Creek Watershed	Stormwater - Implementation	Funded	3	2015-ERP-2-26
<a href="#">Edit</a> <a href="#">View</a> 2133	Green Stormwater Infrastructure in the East Creek Watershed	Stormwater - Final Design	Completed	2	2016-CWF-1-21
<a href="#">Edit</a> <a href="#">View</a> 2693	LCBP Stormwater Reduction in East Creek Watershed	Stormwater - Implementation	Funded	3	
<a href="#">Edit</a> <a href="#">View</a> 3140	Stormwater Reduction & Watershed Restoration in East Creek Watershed	Stormwater - Implementation	Funded	3	

# ERP funded Stormwater Design (2015)

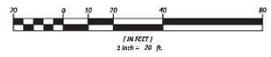


**LEGEND**

- EXISTING CONTOUR
- FINISH GRADE CONTOUR
- TOP OF BANK
- FLOW PATH
- EXISTING GUARD RAIL
- PROPOSED GUARD RAIL
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- UTILITY POLE
- \*+0.0 FINISH GRADE SPOT ELEVATION

**NOTE**

EXISTING TOPOGRAPHY AND STORMWATER INFRASTRUCTURE IS FROM TOTAL STATION SURVEY COMPLETED ON 10-14-14.  
 Takeover contours overlaid on site. Contractor shall be responsible to coordinate with local municipalities concerning any adjustments or relocation of infrastructure as required.



EAST CREEK-TENNEY BROOK			
GIORGETTI ARENA/OAK ST. EXTENSION			
STORMWATER BIORETENTION PLAN			
RUTLAND, VT			
CHENETTE ASSOCIATES, P.C.			
BERNARD X. CHENETTE P.E.			
BERLIN, VERMONT			
DRAWN BY	CHECKED BY	SCALE	DATE
SWS	BXC	AS SHOWN	8/28/15
SHEET 2 OF 4			17

HYDROLOGIST BY:  
**WATERSHED**  
 CONSULTING ASSOCIATES, LLC  
 Stormwater Management | Water Quality | Erosion Control  
 435 Shelburne Road P.O. Box 813  
 Burlington, VT 05408  
 Water: (802) 251-1111 Fax: (802) 487-2307  
 www.watershedinc.com

# VTDEC ERP funded Implementation

Rutland NRCD and Rutland City DPW, Rec  
ERP funded VYCC crew plants the bio-infiltration basin

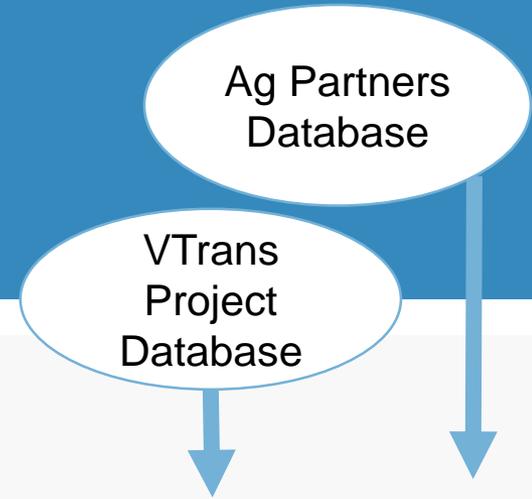




GIORGETTI ARENA

# Vermont Clean Water Tracking Systems

- Tactical Basin Plan Implementation Tables
- Work completed through funding and regulatory programs
- BMP Accounting and Tracking Tool (BATT)



**Projects**

Name  Status  Grant Number

Project Type  County  Project ID

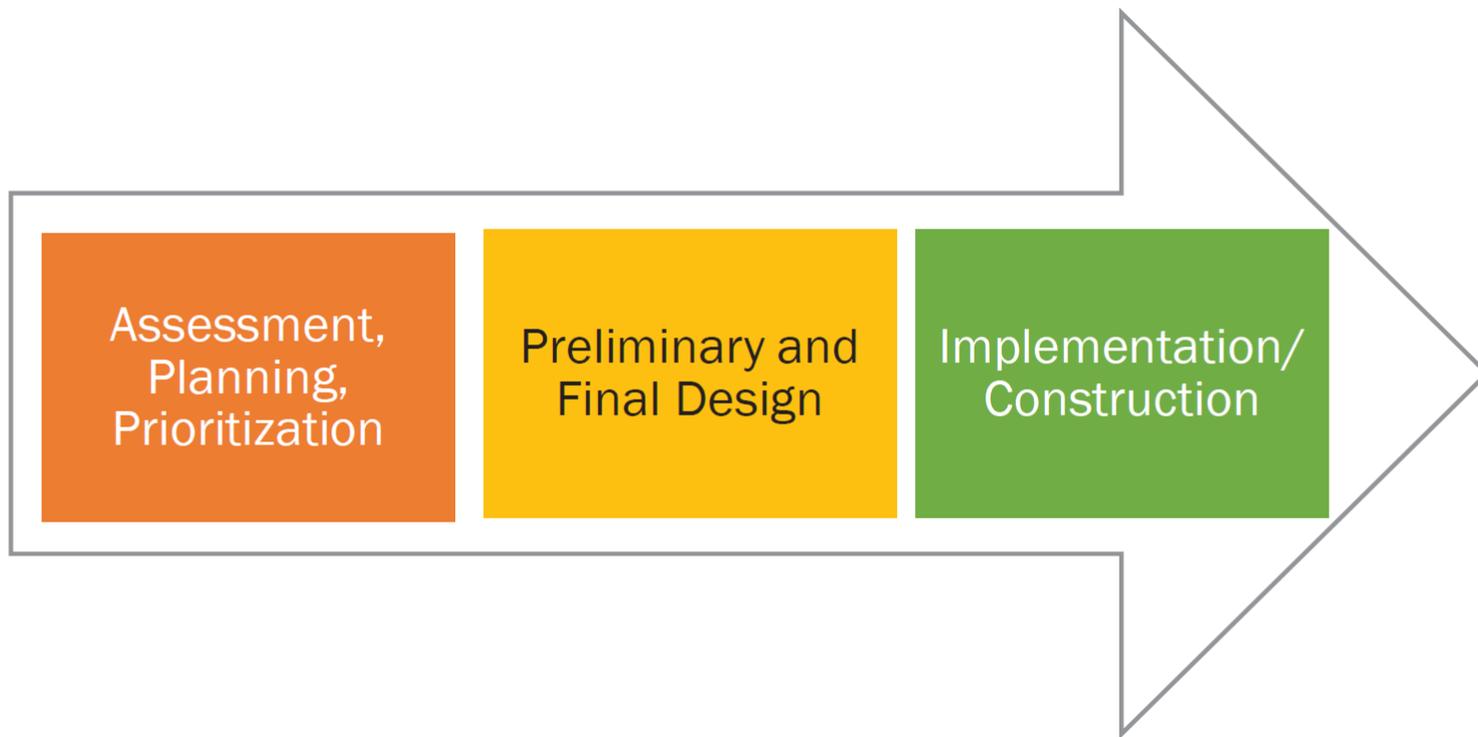
Basin Plan  Town

Grade Type  Grade

		ID	Project Name	Project Type	Status	Grant Number(s)
<a href="#">Edit</a>	<a href="#">View</a>	89	Better Back Roads projects	Road Project	Implementation Funded	MOA-2015-ERP-01
<a href="#">Edit</a>	<a href="#">View</a>	155	Upper Winooski River Illicit Discharge Detection and Elimination - Follow-up Investigation	Stormwater - IDDE	Scoping Funded	Contract-31083
<a href="#">Edit</a>	<a href="#">View</a>	154	Crooked Creek Gully Restoration	Agricultural Pollution Prevention	Implementation Funded	Contract-31018
<a href="#">Edit</a>	<a href="#">View</a>	153	Montpelier Illicit Discharge Detection and Elimination	Stormwater - IDDE	Scoping Funded	Contract-30772
<a href="#">Edit</a>	<a href="#">View</a>	152	White River Illicit Discharge Detection and Elimination	Stormwater - IDDE	Scoping Funded	Contract-30768
<a href="#">Edit</a>	<a href="#">View</a>	66	Upper and Middle Connecticut River and Pasumpsic River Illicit Discharge Detection and Elimination	Stormwater - IDDE	Scoping Funded	Contract-29218
<a href="#">Edit</a>	<a href="#">View</a>	65	Memphamagog Illicit Discharge Detection and Elimination Completion	Stormwater - IDDE	Scoping Completed	Contract-28937
<a href="#">Edit</a>	<a href="#">View</a>	46	Crooked Creek Gully Restoration Designs	Agricultural Pollution Prevention	Design Completed	Contract-28911
<a href="#">Edit</a>	<a href="#">View</a>	69	Project Prioritization and Design for Implementation of the Cold River Corridor Plan	Floodplain/Stream Restoration	Design Completed	Contract-28843
<a href="#">Edit</a>	<a href="#">View</a>	35	Bennington and Pawlet Illicit Discharge Detection and Elimination Study	Stormwater - IDDE	Completed	Contract-28665
<a href="#">Edit</a>	<a href="#">View</a>	34	Bennington Infrastructure Stormwater Mapping Project	Stormwater - IDDE	Scoping Completed	Contract-27744
<a href="#">Edit</a>	<a href="#">View</a>	91	Follow-up on Illicit Discharges in the Otter Creek, Poultney River, and Lamoille River	Stormwater - IDDE	Scoping Funded	Contract-27743
<a href="#">Edit</a>	<a href="#">View</a>	2054	McKenzie Brook Nutrient Management Planning Project- UVM Extension (2016)	Technical Assistance	Completed	29109
<a href="#">Edit</a>	<a href="#">View</a>	2130	Green River Floodplain Attenuation Enhancement	Floodplain/Stream Restoration	Implementation Funded	2017-ERP-2-10
<a href="#">Edit</a>	<a href="#">View</a>	2129	Blackberry Ridge Streambank Erosion Grant	Road Project	Implementation Funded	2017-ERP-2-07
<a href="#">Edit</a>	<a href="#">View</a>	2128	Gully Stabilization, Mill Brook	Floodplain/Stream Restoration	Implementation Funded	2017-ERP-2-02
<a href="#">Edit</a>	<a href="#">View</a>	2145	Town Highway Garage Stormwater - Franklin	Stormwater	Scoping Funded	2017-ERP-1-22
<a href="#">Edit</a>	<a href="#">View</a>	2127	Dishmill Brook Stormwater Master Plan Phase 2	Stormwater Master Planning	Scoping Funded	2017-ERP-1-21



# Project Output Measures





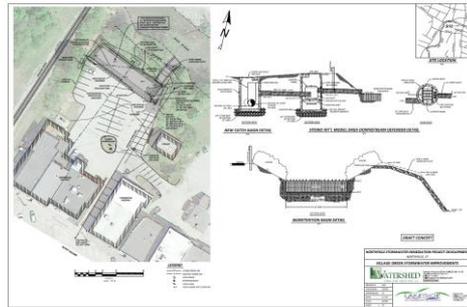
# Project Output Measures



Northfield Stormwater Remediation Project  
Development  
Grant # 2013-ERP-1-15

4 projects identified

3 preliminary designs completed



Northfield Stormwater Mitigation  
Site Construction  
Grant # 2015-ERP-2-04

2 final designs completed

2.9 acres impervious treated  
2.9 kg/yr phosphorus reduced



Northfield Village Green  
Bioretention Installation  
Grant # 2016-ERP-2-13

1 final design completed

5 acres impervious treated  
4 kg/yr phosphorus reduced



**Project ID** 138  
**Project Name** Northfield Village Green Bioretention Installation  
**Grant Number(s)** 2016-ERP-2-13

# Project Description and Location

- Project**
- Events
- Measures
- Grading
- TMDL
- Related Projects
- Records

## Project Edit

**Project Name** Northfield Village Green Bioretention Installation

**Description**  
This project is located behind the Village Green in Northfield. The result is the construction of a large bioretention basin which captures and treats surface stormwater runoff from 14 acres of the downtown, including 5 acres of impervious surface.

**Project Type** Stormwater - Implementation ?

**SGA Reach**

**Latitude** 44.14962 **Longitude** -72.65694

**Notes**  
CVRPC has been helping the Village of Northfield map its stormwater systems since 2011. In 2013 we were awarded an Ecosystem Restoration grant to identify and design stormwater structures in the Village of Northfield using the mapping and reports that CVRPC had previously completed. Then in 2013 we were awarded a construction grant to install one of the smaller designed stormwater sites on Central St. This application is the next step in the 2013 and 2014 work to construct one of the larger identified and designed stormwater sites. The site that has been selected is behind the Village Green in Northfield. This site has local support from the Town of Northfield Manager and Utilities Superintendent.

**Link**  [Link](#)

[Save](#) [Exit](#)

### Towns & Regions

[Add Town/Region](#)

	Town
<a href="#">Delete</a>	Northfield

### Basin/Sub Basins

[Add Basin](#)

	Sub Basin
<a href="#">Delete</a>	Dog River

### Partners

[Add Partner](#)

		Partner	Status
<a href="#">Edit</a>	<a href="#">Delete</a>	Central Vermont Regional Planning Commission	Potential
<a href="#">Edit</a>	<a href="#">Delete</a>	Northfield Town	Potential

# Project Events and Funding Information

Project ID 138  
 Project Name Northfield Village Green Bioretention Installation  
 Grant Number(s) 2016-ERP-2-13

- Project
- Events**
- Measures
- Grading
- TMDL
- Related Projects
- Records

## Events

Status: Completed

- Add Event
- Add Other Funding
- Add Proposal
- Add Proposal Event
- Add New Grant
- Add Grant Event

		Date	Event	Type	Proposal ID	Amount	Grant Amount	Grant Number	Partner	Notes
<a href="#">Edit</a>	<a href="#">Delete</a>	1/13/2016	Proposal Submitted	Proposal	192	\$110,695.00		2016-ERP-2-13	Central Vermont Regional Planning Commission	Migrated from old Financial Tracking FED Managed FY2016 round 1
<a href="#">Edit</a>	<a href="#">Delete</a>	1/13/2016	Proposal Selected	Grant	192			2016-ERP-2-13	Central Vermont Regional Planning Commission	
<a href="#">Edit</a>	<a href="#">Delete</a>	1/13/2016	Grant Executed	Grant	192			2016-ERP-2-13	Central Vermont Regional Planning Commission	
		4/20/2016	Project Created in Database	Basic						
<a href="#">Edit</a>	<a href="#">Delete</a>	12/30/2016	Funding Reported	Basic						SFY2016 Investment Report
<a href="#">Edit</a>	<a href="#">Delete</a>	2/24/2017	Pending Closeout	Basic						Closed based on Grant Tracking Spreadsheet and Emails
<a href="#">Edit</a>	<a href="#">Delete</a>	2/24/2017	Project Completed	Basic						
<a href="#">Edit</a>	<a href="#">Delete</a>	7/28/2017	Proposal Changed	Proposal	192	\$110,695.00		2016-ERP-2-13	Central Vermont Regional Planning Commission	documented match
<a href="#">Edit</a>	<a href="#">Delete</a>	1/15/2018	Results Reported	Basic						SFY2017 Investment Report

# Project Outputs/ Performance Measures

**Project ID** 138  
**Project Name** Northfield Village Green Bioretention Installation  
**Grant Number(s)** 2016-ERP-2-13

- Project
- Events
- Measures**
- Grading
- TMDL
- Related Projects
- Records

## Measures

[Add Measure](#)

		Event	Unit	Value	Status	Start Date	Notes
<a href="#">Edit</a>	<a href="#">Delete</a>	# of acres of impervious area treated	acres	8.33	P	1/13/2016	
<a href="#">Edit</a>	<a href="#">Delete</a>	# of acres of impervious area treated	acres	5	A	2/2/2017	

# Related Projects

**Project ID** 138  
**Project Name** Northfield Village Green Bioretention Installation  
**Grant Number(s)** 2016-ERP-2-13

Project

Events

Measures

Grading

TMDL

**Related Projects**

Records

## Parent Projects

[+ Add Parent Project](#)

			ID	Project Name	Status
<a href="#">Edit</a>	<a href="#">View</a>	<a href="#">Delete</a>	2381	Northfield Stormwater Remediation Project Development	Completed
<a href="#">Edit</a>	<a href="#">View</a>	<a href="#">Delete</a>	83	Northfield Stormwater Mitigation Site Construction (Central Street and Main Street)	Completed

## Child Projects

[+ Add Child Project](#)

# BMP System

**Current** | **Prior Use** | **Linked Projects**

**Name** Northfield Village Green Bioretention VG5  
**Latitude** 44.14962 **Longitude** -72.65694  
**Drainage Area** 5 - Winooski River

**Notes**

**Completed?**

**Best Management Practice (BMP) Data and Pollutant Reduction**

**Land Use**

[+ Add Land Use](#)

		ID	Land Use	Acres	Soil	Slope	P Load
<a href="#">Edit</a>	<a href="#">Delete</a>	442	Developed Impervious (WA)	5	NA	NA	5.5835
<a href="#">Edit</a>	<a href="#">Delete</a>	443	Developed Pervious (WA)	9	NA	NA	2.0745

**BMP's**

[+ Add BMP](#)

		ID	Type
<a href="#">Edit</a>	<a href="#">Delete</a>	1289	Bioretention

**O&M**

[+ Add O&M](#)

**Loads and Reductions**

**Total Phosphorus Load**  kg/year

**Computed Phosphorus Reduction**  kg/year

**Override Phosphorus Reduction**

**Phosphorus Reduction**  kg/year

[Update](#) [Cancel](#)

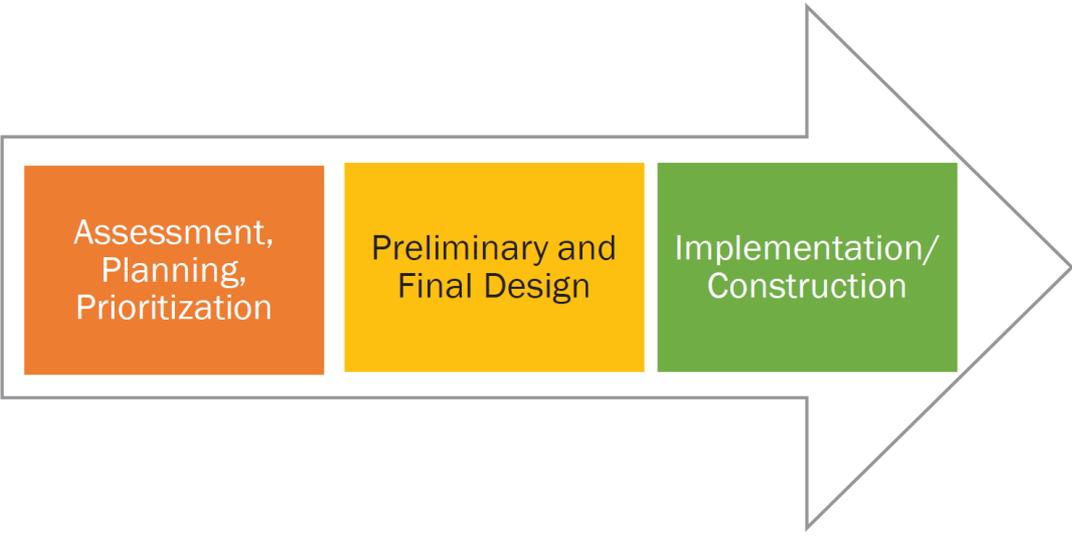


# Project Output Measures

## VERMONT CLEAN WATER INITIATIVE 2017 INVESTMENT REPORT



AGENCY OF ADMINISTRATION  
AGENCY OF AGRICULTURE, FOOD & MARKETS  
AGENCY OF COMMERCE & COMMUNITY DEVELOPMENT  
AGENCY OF NATURAL RESOURCES  
AGENCY OF TRANSPORTATION



<http://dec.vermont.gov/watershed/cwi/cwf#report>

# Clean Water Initiative Projects Dashboard

Stormwater - Implementation

## Northfield Village Green Bioretention Installation



**Town:** Northfield

**County:** Washington

**Watershed:** Winooski

**Funding Amount:** \$110,695

**Funding Source:** DEC Ecosystem Restoration Grant (Capital Fund, SFY 2016)

**Description:** This project is located behind the Village Green in Northfield. The result is the construction of a large bioretention basin which captures and treats surface stormwater runoff from 14 acres of the downtown, including 5 acres of impervious surface.

**Partners:** Central Vermont Regional Planning Commission

Northfield Parking Lot Before



The back third of the parking lot covered by pavement before construction of the bio-retention area, behind the American Legion Hall.

After construction of the bio-retention area, with grass established, guardrail installed, and willow trees planted to capture and treat stormwater from in and around Northfield Commons.

For more information visit: <http://dec.vermont.gov/watershed/cwi/projects>

**Project Status:**  
Completed

### Results:

- 4 kg/year phosphorus reduction
- 5 acres of impervious area treated

Stormwater - Implementation

## Northfield Stormwater Mitigation Site Construction (Central Street and Main Street)



**Town:** Northfield

**County:** Washington

**Watershed:** Winooski

**Funding Amount:** \$59,842

**Funding Source:** DEC Ecosystem Restoration Grant (Capital Fund, SFY 2015)

**Description:** This project will serve to improve water quality by installing practices that will allow nutrients and pollutants to settle out from stormwater runoff before it enters the Dog River, serving the dual purpose of protecting the State's water quality and supporting the Grantee's goal to protect and restore the Winooski River and its tributaries. The project implements the following stormwater best management practices: 1) a rain garden at Kenyon's hardware store designed to capture parking lot runoff, and 2) a flow through planter at Central designed to capture and treat roadway runoff.

**Partners:** Central Vermont Regional Planning Commission

**Project Status:**  
Completed

### Results:

- 2.9 acres of impervious area treated
- 2.9 kg/year phosphorus reduction



Before construction of rain garden and installation of grass swale in the parking lot of Kenyon's Hardware.

Completed construction of a rain garden capturing runoff from parking area and Water street installed at Kenyon's Hardware Store in Northfield, VT.

For more information visit: <http://dec.vermont.gov/watershed/cwi/projects>

# For more information:

Website	<a href="http://cleanwater.vermont.gov">cleanwater.vermont.gov</a>
Roadmap	<a href="https://anrweb.vt.gov/DEC/CWR/Home.vbhtml">https://anrweb.vt.gov/DEC/CWR/Home.vbhtml</a>
Reports	<a href="http://dec.vermont.gov/watershed/cwi/cwf#reports">http://dec.vermont.gov/watershed/cwi/cwf#reports</a>
Projects	<a href="http://dec.vermont.gov/watershed/cwi/projects">http://dec.vermont.gov/watershed/cwi/projects</a>

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