

# Clean Water Investment Report and Roads

To: Senate Committee  
on Transportation

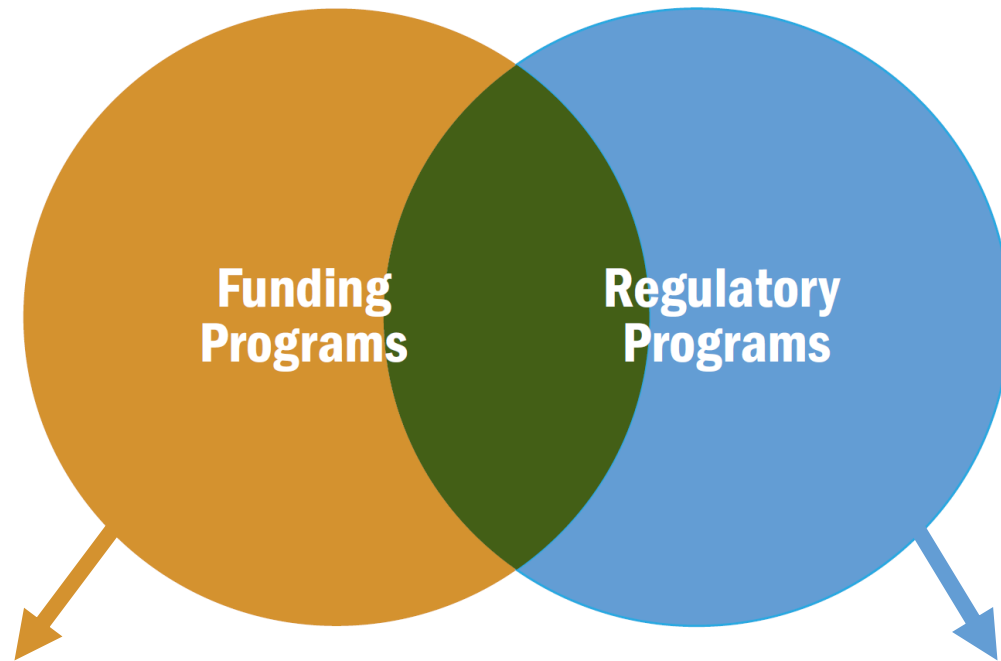
From: Kari Dolan  
Emily Bird  
Jim Ryan  
Vermont DEC

On: February 20, 2018



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

# Tracking Clean Water Activities



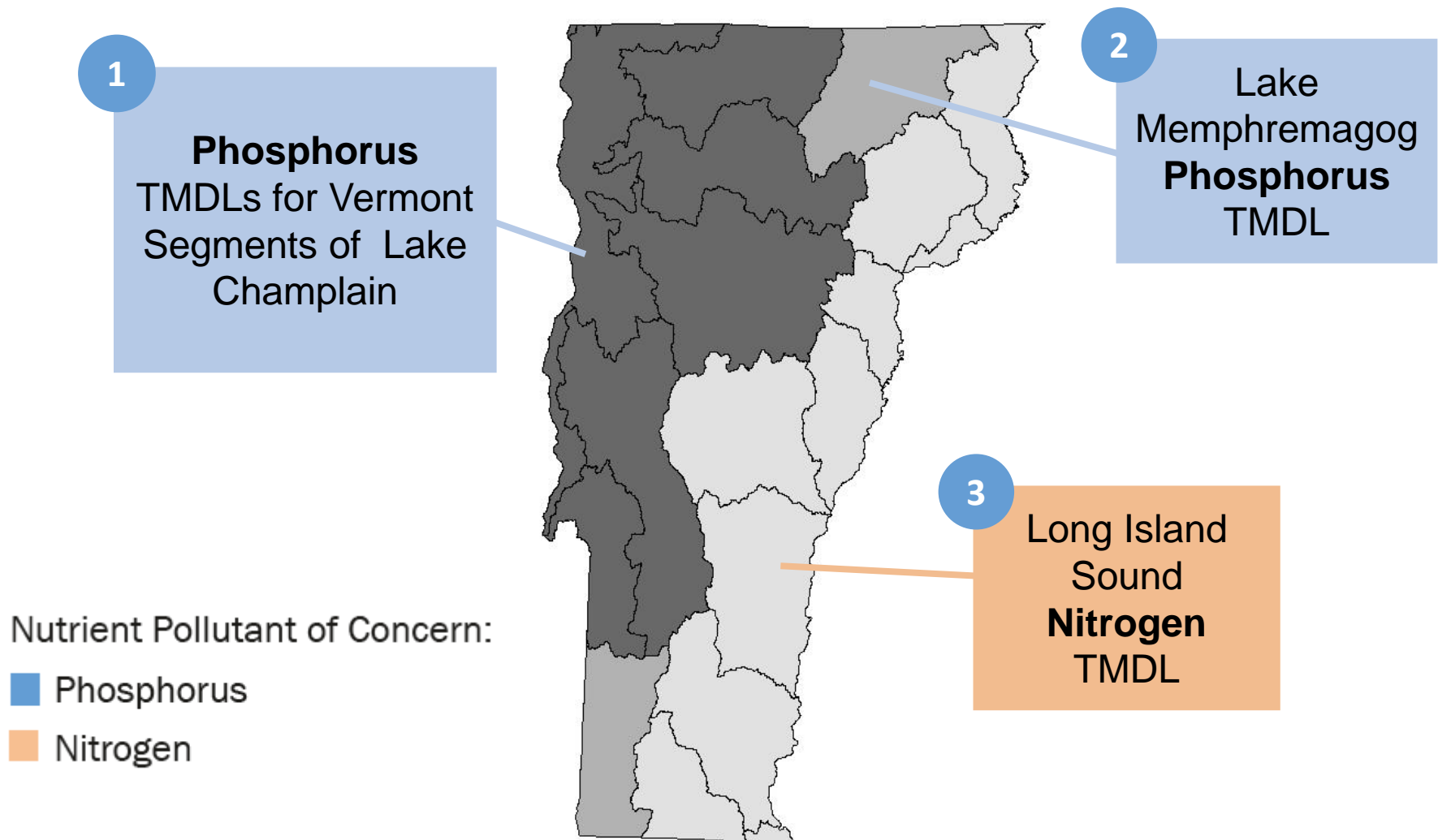
## **Funding Programs**

Projects/best management practices completed through state funding programs and other programs where data available (e.g., federal, local)

## **Regulatory Programs**

Projects/best management practices completed to comply with water quality regulations for agriculture, stormwater, and wastewater

# Nutrient Pollutant Reductions Required by Pollution Control Plans (i.e., TMDLs)



# SFY 2016

## Establishing our baseline

### VERMONT CLEAN WATER INITIATIVE 2016 INVESTMENT REPORT



Agency of Administration  
Agency of Agriculture, Food and Markets  
Agency of Commerce and Community Development  
Agency of Natural Resources  
Agency of Transportation

# SFY 2017

## Measuring progress over time

### 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



# Vermont Clean Water Initiative Annual Investment Report



**Outreach and technical assistance measures** to evaluate the level of clean water outreach and technical assistance provided by state agencies to support implementation of clean water funding and projects;



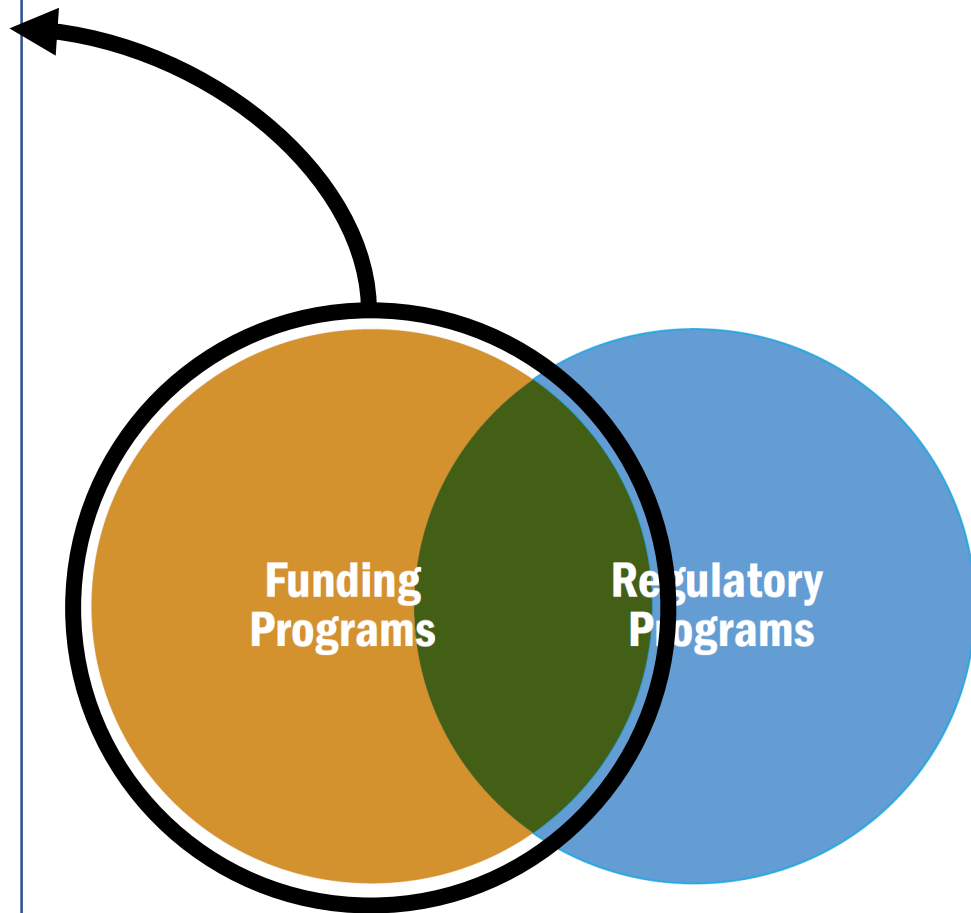
**Investment measures** on dollars invested in clean water restoration projects, addressing planning, design, and implementation of water quality improvement practices;



Measures of **project outputs**, quantifying the results of clean water restoration projects completed by project type; and



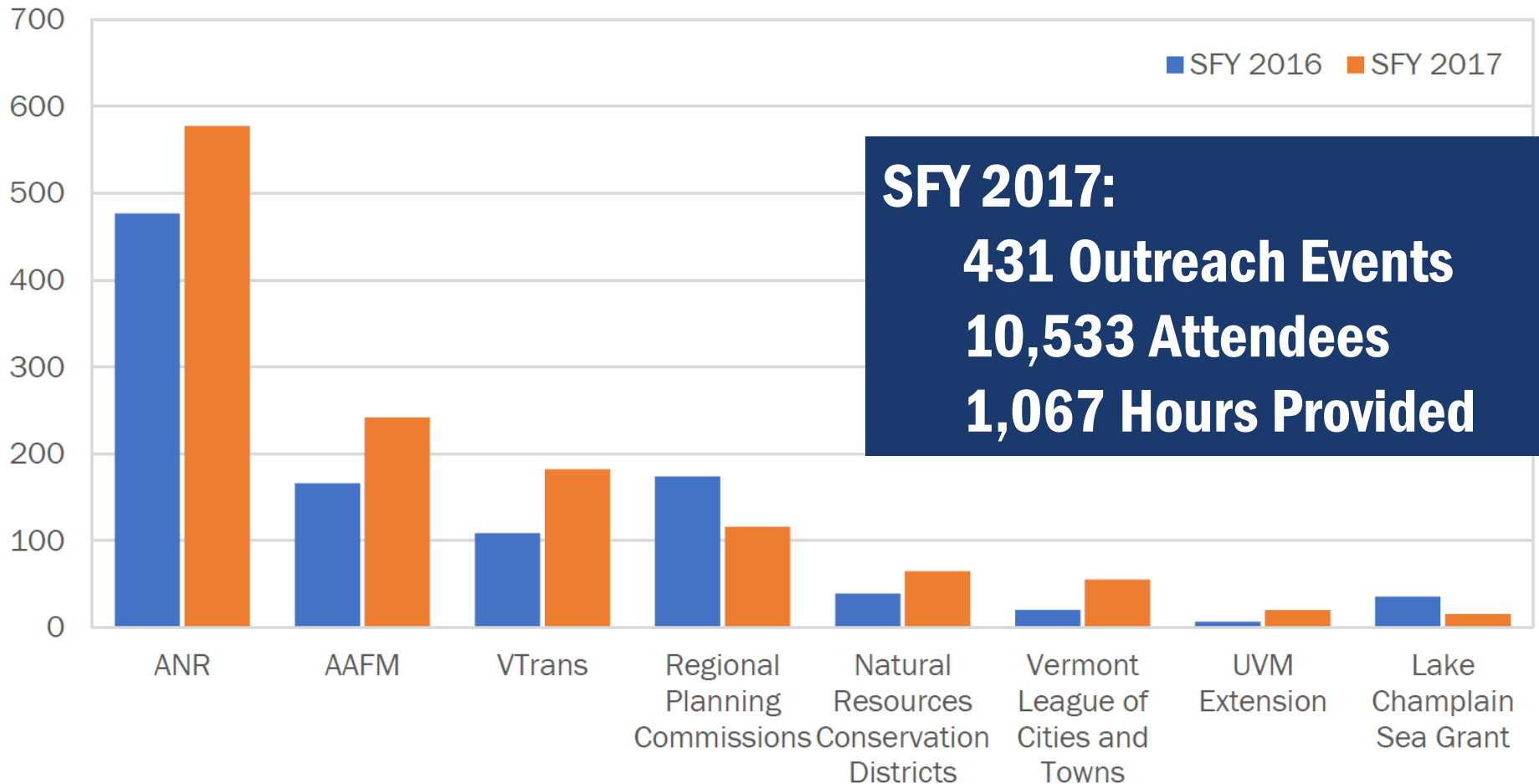
Measures of **environmental outcomes**, quantifying nutrient reductions achieved through State-funded clean water restoration projects.





# Outreach and Technical Assistance Measures

Figure 2. Total hours of outreach provided to participants of workshops, trainings, and public/stakeholder meetings in SFY 2016 and 2017, by organization (excludes organizations reported as “other”)





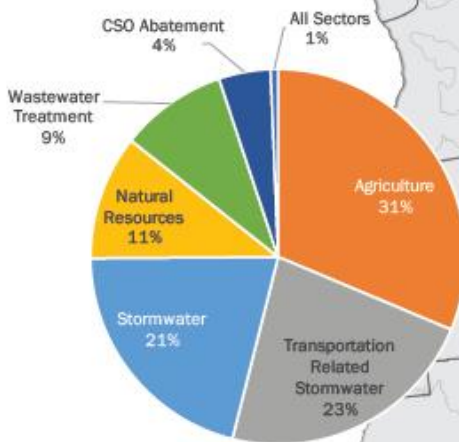
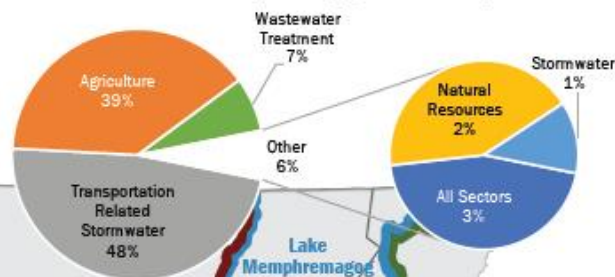
# Investment Measures

# 114%

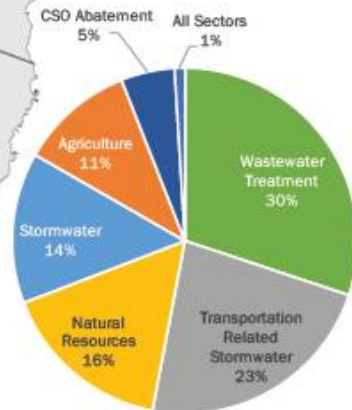
## Increase in funds invested in clean water projects from 2016 to 2017

## Total state funds invested in clean water projects in SFY 2017: \$22,976,188

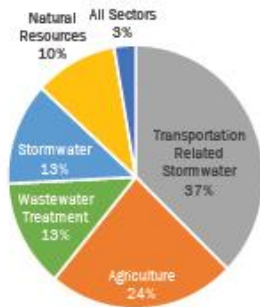
**Funds awarded for clean water projects in the Lake Memphremagog Basin: \$607,164**



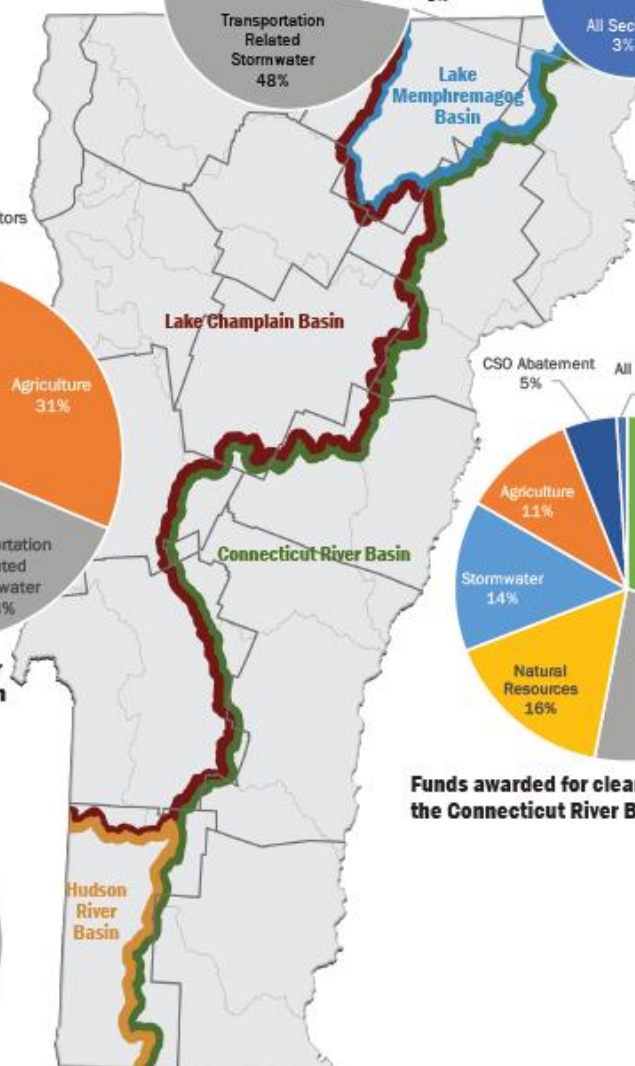
**Funds awarded for clean water projects in the Lake Champlain Basin: \$14,303,867**

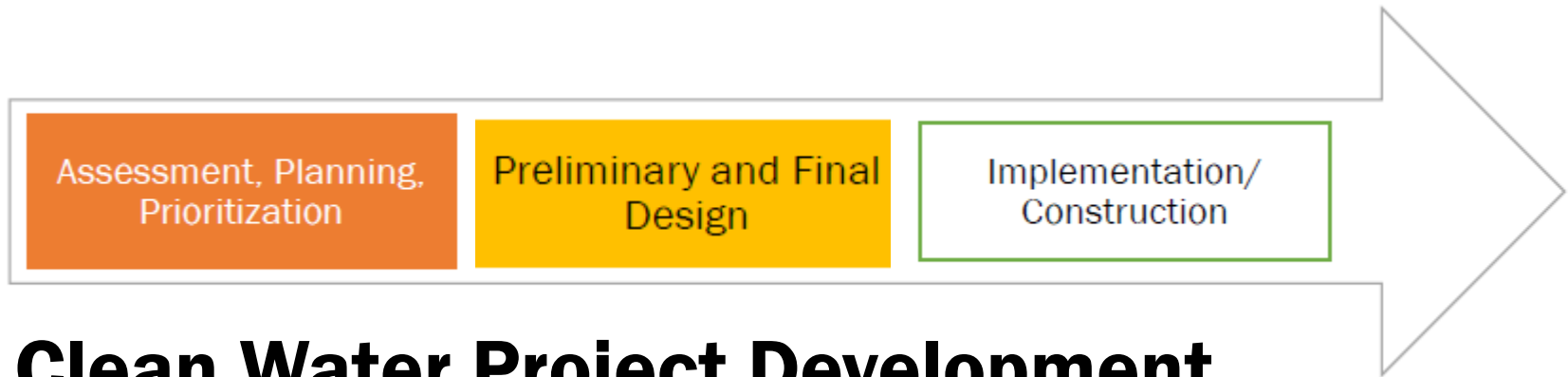


**Funds awarded for clean water projects in the Connecticut River Basin: \$7,734,114**



**Funds awarded for clean water projects in the Hudson River Basin: \$331,243**





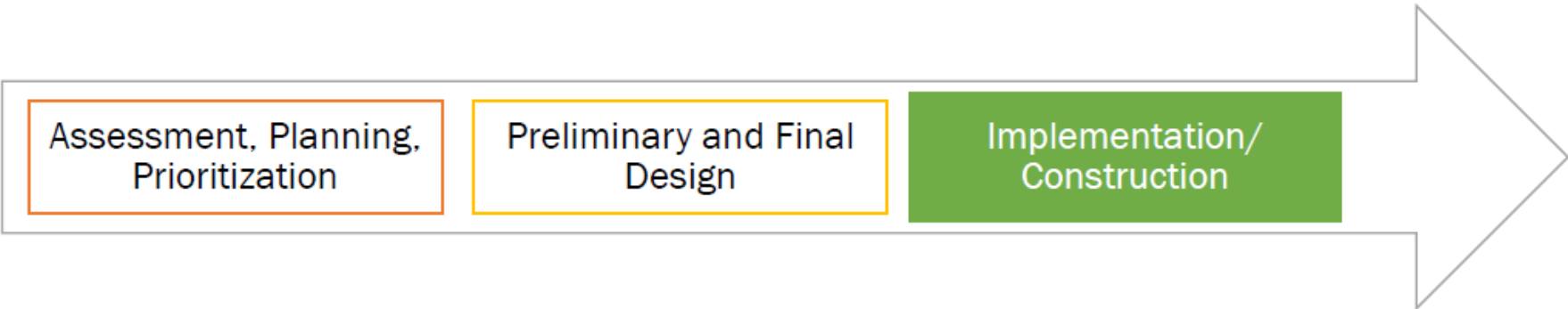
## **Clean Water Project Development**

176 priority projects recommended for future design and/or implementation

116 road miles assessed and identified for future improvements

22 preliminary and 44 final designs completed for future implementation work





Assessment, Planning,  
Prioritization

Preliminary and Final  
Design

Implementation/  
Construction

## Why are these measures important?

- ✓ Implementation of TMDL requirements
- ✓ Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements
- ✓ Compliance with Required Agricultural Practices
- ✓ Compliance with municipal stormwater permits
- ✓ Compliance with Municipal Roads General Permit
- ✓ Compliance with municipal wastewater discharge permits
- ✓ Compliance with the 2016 Combined Sewer Overflow (CSO) Rule
- ✓ Improved flood resiliency and flood hazard mitigation for public health and safety
- ✓ Support outdoor recreation, tourism, and property values
- ✓ Supports agricultural working lands
- ✓ Improved habitat function



# Results of Transportation Related Stormwater Projects

## Results of transportation related stormwater projects implemented in SFY 2017, statewide.<sup>1</sup>

PROJECT RESULTS			BENEFITS					
Performance Measures	2016	2017	TMDL <sup>2</sup> Implementation	Act 64 (2015) Implementation	MRGP <sup>2</sup> Compliance	Municipal Stormwater Compliance	Flood Resiliency	Habitat Function
Miles of municipal road drainage improvements	1*	13**	✓	✓	✓	✓	✓	
Number of municipal road drainage structures installed	176*	68	✓	✓	✓	✓	✓	
Number of municipal road drainage and stream culverts replaced	4*	109**	✓	✓	✓	✓	✓	✓
Stream miles enhanced and reconnected due to replaced stream culverts (also supports aquatic organism passage)	27*	2.4*					✓	✓

\* Represents results of ANR-funded projects only, therefore, results are likely underreported. Data were not tracked/reported by VTrans for applicable reporting periods.

\*\* Data available for, and represent, two-thirds of projects completed in SFY 2017.



# Results of Transportation Related Stormwater Projects

## Results of transportation related stormwater projects implemented in SFY 2017, statewide.<sup>1</sup>

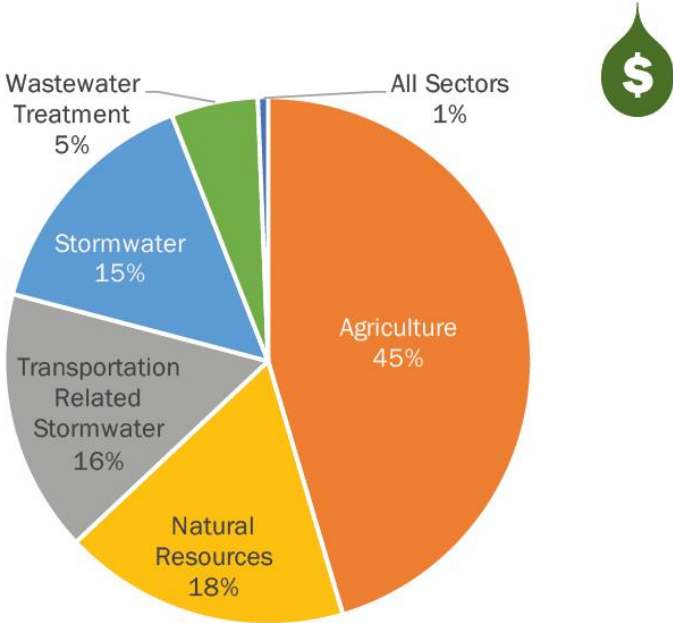
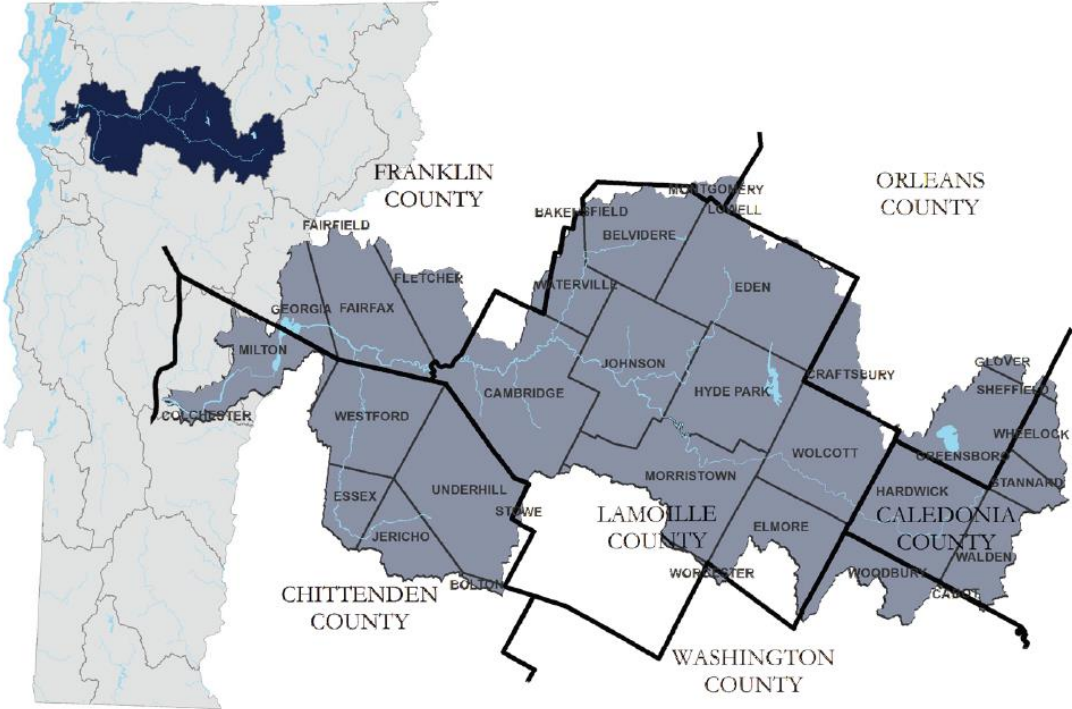
POLLUTANT REDUCTION				EXTENT OF LOAD REDUCTION QUANTIFIED
Total Phosphorus Reduced (Kilograms per Year)	2016	2017	Cumulative	Pollutant reductions quantified for 38 percent of municipal road miles improved (projects in the Lake Champlain basin)
Road erosion control practices	4	22	26	

Figure 28. Before (left) and after (right) installation of a stone-lined ditch along Finel Hollow, Highland Gray, and Watkins Hill Roads in Poultney, completed by the Town of Poultney.



# Watershed Summaries – New this Year

## Lamoille River Watershed Summary



**State funding awarded in the Lamoille River watershed in SFY 2017, by sector**  
**Total: \$1,589,446**

**STATE FUNDS AWARDED IN SFY 2017**



# Watershed Summaries – New this Year

## RESULTS OF PROJECTS COMPLETED IN SFY 2017



Results of projects completed in SFY 2017, by sector, in the Lamoille River watershed.

### AGRICULTURE PROJECT RESULTS

Acres of cropland and pasture treated by annual conservation practices	87
Acres of cropland and pasture treated by crop rotation and associated practices	NA
Acres of cropland and pasture treated by forested buffers	14
Number of barnyard/production area practices installed	29
Acres of water quality protections within conserved agricultural lands	NA

### TOTAL PHOSPHORUS REDUCED (kilograms per year)

Annual agricultural conservation practices	21
Agricultural crop rotation and associated practices	NA
Forested riparian buffer restoration on agricultural lands	9

### NATURAL RESOURCES PROJECT RESULTS

Acres of forested riparian buffer restored through buffer planting	NA
Acres of river corridor conserved through easements	35
Acres of floodplain restored	NA
Stream miles enhanced and reconnected due to dam removal (also supports aquatic organism passage)	NA
Acres protected for public access, recreation, forest conservation, and water quality	179
Acres of water quality protections within conserved land (forested buffer area and wetland protection zones)	15

### TOTAL PHOSPHORUS REDUCED (kilograms per year)

Forested riparian buffer restoration on non-agricultural lands	NA
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### TRANSPORTATION RELATED STORMWATER PROJECT RESULTS

Miles of municipal road drainage improvements	0.4
Number of municipal road drainage structures installed	NA
Number of municipal road drainage and stream culverts replaced	2
Stream miles enhanced and reconnected due to replaced stream culverts (also supports aquatic organism passage)	NA

### TOTAL PHOSPHORUS REDUCED (kilograms per year)

Road erosion control practices	2
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### PROJECT RESULTS: STORMWATER

Acres of impervious surface treated	4
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### TOTAL PHOSPHORUS REDUCED (kilograms per year)

Stormwater treatment practices	4
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# Clean Water Initiative Projects Dashboard

## Prior State (Pre-January 2018)

Listing of projects with basic identifiers

VERMONT OFFICIAL STATE WEBSITE

### Watershed Projects

Name  Status  Grade

Project Type  County  Project ID

Basin Plan  Town

Grade Type  Grade


ID	Project Name	Project Type
1	St. Johnsbury Stormwater Master Planning	Stormwater Master Planning
7	Towle Neighborhood Road Erosion Control - Planning and Design	Road Project - Final Design
9	Erosion Reduction at Hayes Road Stream Crossing	Floodplain/Stream Restoration - Implementation
11	Preparing Local Watersheds for Flood Resilience and Reducing Runoff in Lewis Creek	Stormwater - Preliminary Design
12	Whitney Brook and Black River Riparian Buffer Restoration	River - Planting
13	Lake Bomoseen Stormwater Master Planning	Stormwater Master Planning
15	Constructing Green Stormwater Infrastructure at the Waitsfield Town Office	Stormwater - Implementation
19	Enhancing Nutrient Management Plan Implementation with goCrop Software	Agricultural Pollution Prevention - Implementation
24	Moulton River Corridor Easement	River Corridor Easement Implementation
25	Nulhegan River Confluence Easements	River Corridor Easement Implementation

## Good State/Phase 1 (Complete)

Individual project summaries

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

**Project Status:** Completed

**Results:**

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



**Northfield Parking Lot Before**

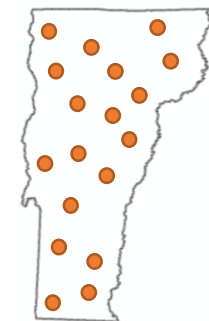
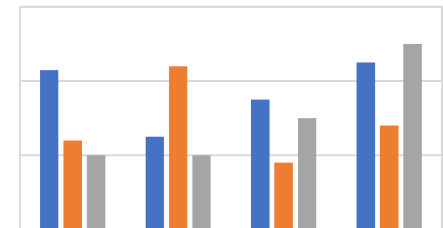
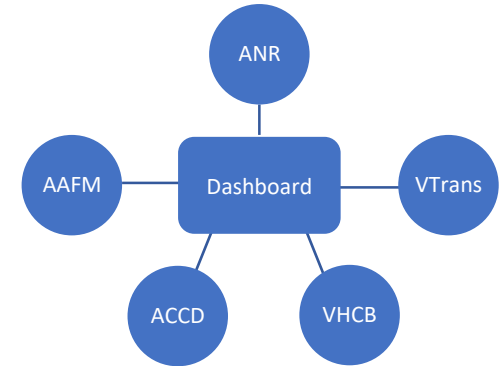
The back third of the parking lot covered by pavement before construction of the bio-retention area, behind the American Legion Hall.

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>

## Great State/Phase 2-3 (2018)

Interagency data and data visualization






# Clean Water Initiative Projects Dashboard

## Good State/Phase 1 (Complete): Individual project summaries

**Stormwater - Implementation**

**Northfield Village Green Bioretention Installation**





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**County:** Washington  
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## 2017 Ecosystem Restoration Project Summaries

Access one-page summaries of Ecosystem Restoration projects funded or completed during State Fiscal Year 2017 (July 1, 2016 - June 30, 2017)

Available here: <http://dec.vermont.gov/watershed/cwi/projects>

# Municipal Roads Grants-in-Aid Overview

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Partners: Regional Planning Commissions (RPCs)  
coordinated by Northwest RPC

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Participation: 186 municipalities (75% participation)

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Funding: \$2.65 million  
\$2.5 million Capital Funds  
\$150,000 Clean Water Funds

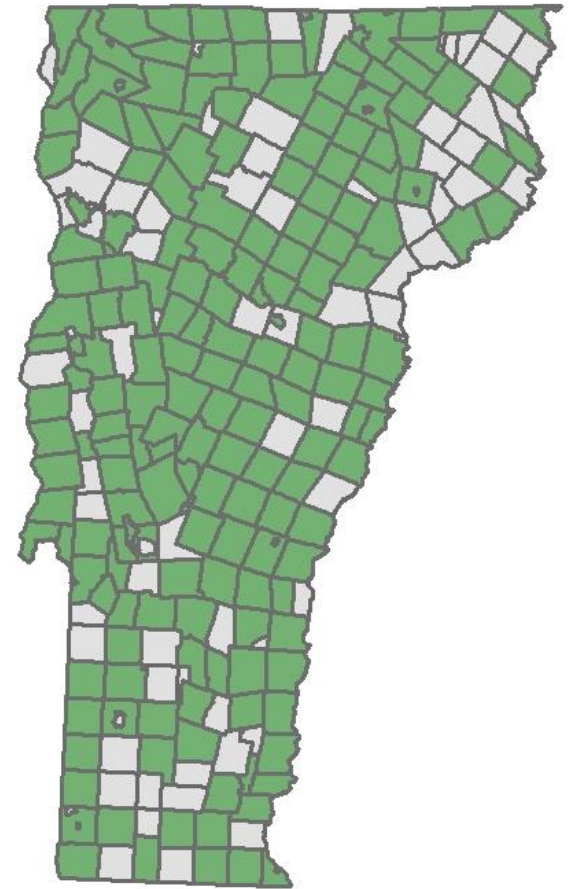
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Description: Implementation of best management practices to bring hydrologically connected municipal roads into compliance with the Municipal Roads General Permit (MRGP) standards to improve water quality

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Anticipated Results: 42 road miles achieve MRGP compliance

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# WEEKLY LEGISLATIVE REPORT

The Vermont League of Cities and Towns' **Weekly Legislative Report** is published each Friday during Vermont's legislative session.

The Municipal Roads Grants-in-Aid Pilot Program that the Agency of Natural Resources (ANR) instituted in 2017 is one example of this collaborative, flexible, and efficient approach to state and local cooperation. The program provided municipalities with money to help implement best management practices on municipal roads to help achieve water quality goals. **It was implemented quickly, efficiently, and without undue administrative or oversight burdens placed on towns and cities.** No grant applications were necessary. Municipalities could simply sign a letter of intent that specified the expectations under the pilot program. With the help of regional planning commissions, municipalities needed to show a minimum 20 percent local match, which could include in-kind contributions such as local labor, staff time, and use of road equipment. Examining the number of hydrologically connected road segments in municipalities that needed treatment to come up to mandated clean water road standards, **the state was able to get money to communities very quickly to get projects up and running.** Over 70 percent of Vermont's towns and cities submitted letters of intent; \$2.1 million was subsequently distributed to them. **Within a few short months, municipalities were able to successfully start and finish projects and use in-kind funding to meet the requisite local match.** The \$2.1 million was only able to bring 30 miles of roads into compliance with the MRGP, a sobering example of how much more money will be needed to fully implement the permit. Still, local officials hope that the state will continue to support these types of programs in the future.

*VLCT Weekly Legislative Report No. 1* ♦ December 15, 2017, pp7-8

Link: [https://www.vlct.org/sites/default/files/wlr\\_01\\_2.pdf](https://www.vlct.org/sites/default/files/wlr_01_2.pdf)

# Municipal Roads Grants-in-Aid Benefits

Targets hydrologically connected roads

Pre-construction meetings

Water quality education and technical assistance

Familiarizes municipalities with MRGP standards

Constructed projects count towards permit compliance and TMDL targets

Post-project field verification

Reporting assistance to track and account for results



**Municipal  
Roads  
General  
Permit  
compliance**



# Municipal Roads Grants-in-Aid Partners

RPCs

Municipalities

VTrans District Offices

VTrans Better Roads

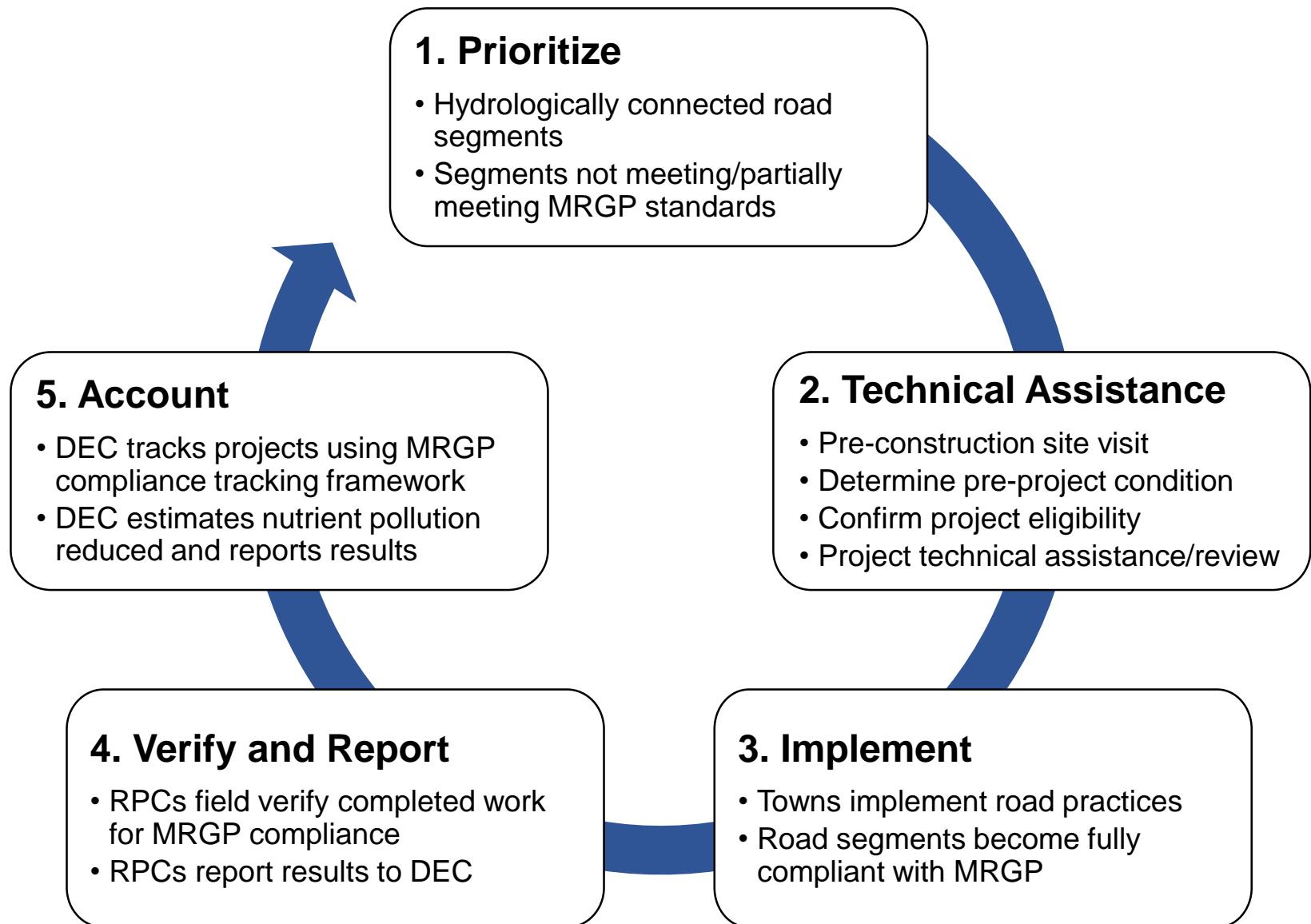


# Municipal Roads Grants-in-Aid Helps Reduce Administrative Overhead

Partner	Disburse Funds	Enroll	Assist	Implement	Track	Report
DEC Staff	✓					✓
RPCs		✓	✓		✓	✓
Municipalities		✓		✓		
VTrans			✓			



# Municipal Roads Grants-in-Aid Project Process





# For more information:

Website [cleanwater.vermont.gov](http://cleanwater.vermont.gov)

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

Projects <http://dec.vermont.gov/watershed/cwi/projects>

Grants <http://dec.vermont.gov/watershed/cwi/grants>

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Jim Ryan

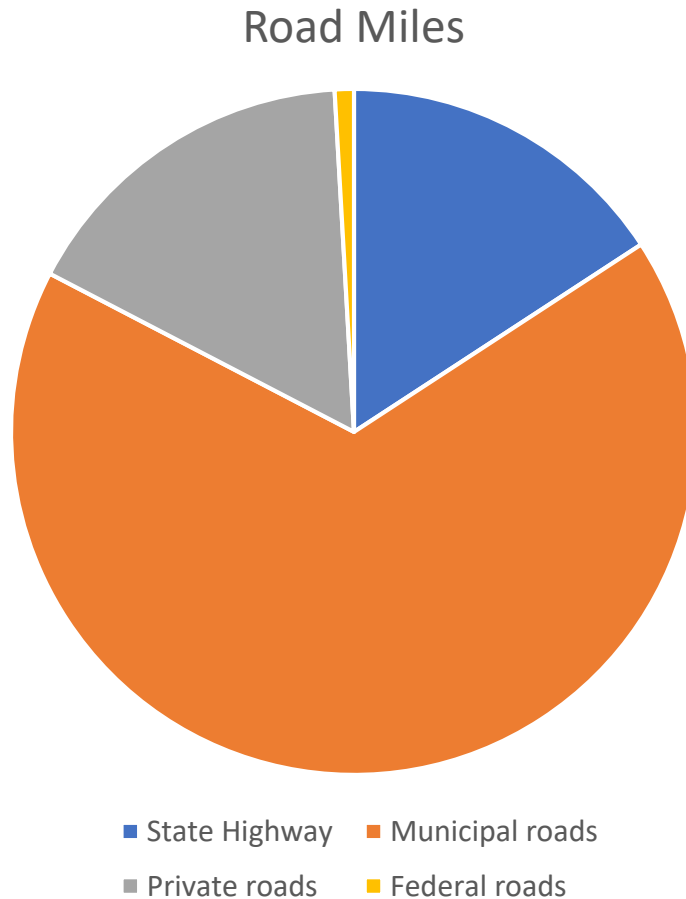


VERMONT DEPARTMENT OF  
ENVIRONMENTAL CONSERVATION  
**WATERSHED**  
MANAGEMENT DIVISION  
STORMWATER PROGRAM

# DEC's Municipal Roads General Permit



# Vermont Road Mileage



- 18,777 total road miles
- 155 miles of federal roads-1%
- 2,709 miles of state highway- 14%
- 2,823 miles of private roads-15%
- 13,090 miles of town highway (Classes 1-4)- 70%

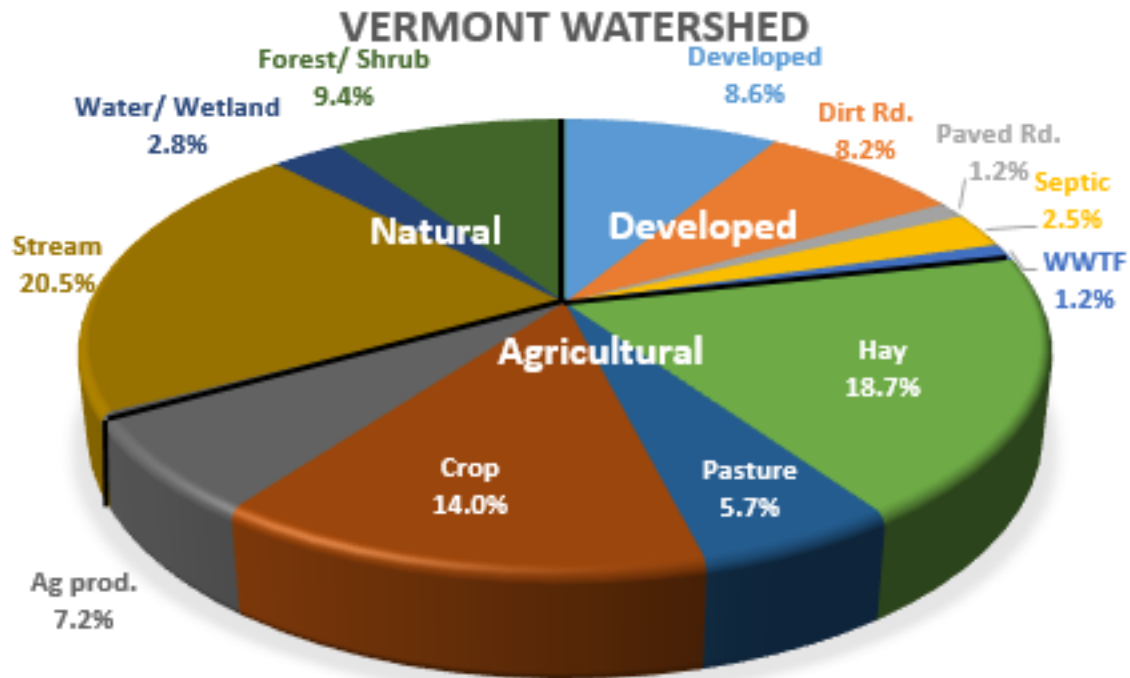
# Potential Road Pollutants

- Nutrients – Phosphorus
- Sediment
- Trace heavy metals
- Hydrocarbons
- Road salt



# Modeled phosphorus loading to Lake Memphremagog

(Municipal roads approximately 6.6% of total P)





# Secondary benefits: Flood resilience and reducing town road maintenance and costs



Photo Credits: Beverley Wemple



Wemple



Bryan Pfeiffer



# MRGP Coverage

Discharges of Stormwater (SW) from municipal roads including:

- Town highways, Classes 1-4
- SW infrastructure associated with town highways under the operational control of the municipality

Exemptions:

- **Unorganized towns and gores exempt** from MRGP permit
- **MS4 towns-** exempt from MRGP fee and permit application but MRGP standards implementation will be required in future SW Management Plans

# Hydrologically-Connected Road Segments

The screenshot displays the Vermont Natural Resources Atlas web application. The browser address bar shows the URL <http://enr.vermont.gov/maps/nr-atlas>. The application interface includes a navigation menu on the left with the following items: About Us, Planning and Permitting, Maps and Mapping, Natural Resources Atlas, Web Maps, GIS Data, Downloadable Maps, You and the Environment, and Contact Us. The main map area features a satellite view of a region in Vermont, with several road segments highlighted in purple to indicate hydrological connectivity. These segments are located along Tamarack Brook, Keeler Brook, Tucker Brook, and the road network surrounding Wolcott Pond. The map includes a 'Quick Tools...' button, a scale bar (0 to 0.6 km), and a copyright notice for DigitalGlobe and USGS. The Windows taskbar at the bottom shows the system time as 3:46 PM on 8/25/2016.

# Hydrologically-Connected Roads

## Connected Criteria:

- Municipal roads within 100' of a water resource
- Municipal road that bisects (crosses) and drains to a water resource
- Municipal road located within the DEC river corridor
- Segments can be re-classified as connected, or not connected, during the inventories
- Catch basin outfalls within 500' of a water resource and those segments associated with those outfalls

## Water Resources:

- Perennial streams
- Intermittent streams
- Wetlands
- Lakes and Ponds

# Road Stormwater Management Plan Components

## Inventory



## Prioritize – Implementation Table

Segment ID	TH Number	Road Name	Change in Elevation	Road Type	Segment Slope %	Date of Assessment	Assessor	Organization	Assessment Reason	Assessment Reason Notes	Roadway Crown/Travel Lane	Roadway Crown/Travel Lane Erosion	Grader Berm /Window Assessment	Grader Berm /Window Erosion	Road Drainage Assessment	Rt Bit
1	VT-001			Gravel-ditched	6	5/13/2017	John Snow		Initial Assessment		Fully Meets	Bill	Fully Meets	Bill	Partially Meets	Bill
3	VT-002			Gravel-ditched	10	5/13/2017	John Snow		Initial Assessment		Partially Meets	None	Partially Meets	None	Fully Meets	Yes
4	VT-003			Gravel-ditched	11	5/13/2017	John Snow		Re Assessment	Storm Damage	Down Not Meant	Gully	Does Not Meet	Gully	Does Not Meet	Yes
5	VT-004			Class 4	5	5/13/2017	John Snow		Re Assessment	Storm Damage						
6	VT-005			Class 4	9	5/13/2017	John Snow		Work Done							
7	VT-006			Gravel-ditched	4	5/13/2017	John Snow		Work Done	Rock lined Ditches					Partially Meets	No
8	VT-007			Paved-ditched	12	5/13/2017	John Snow		Work Done	Rock lined Ditches					Partially Meets	Yes
9	VT-008			Paved-ditched	12	5/13/2017	John Snow		Work Done	Rock lined Ditches					Partially Meets	Yes
10	VT-009			Paved-ditched	12	5/13/2017	John Snow		Work Done	Rock lined Ditches					Partially Meets	No

## Implement





# Road Erosion Inventories (REIs)

## Separate REIs and standards for:

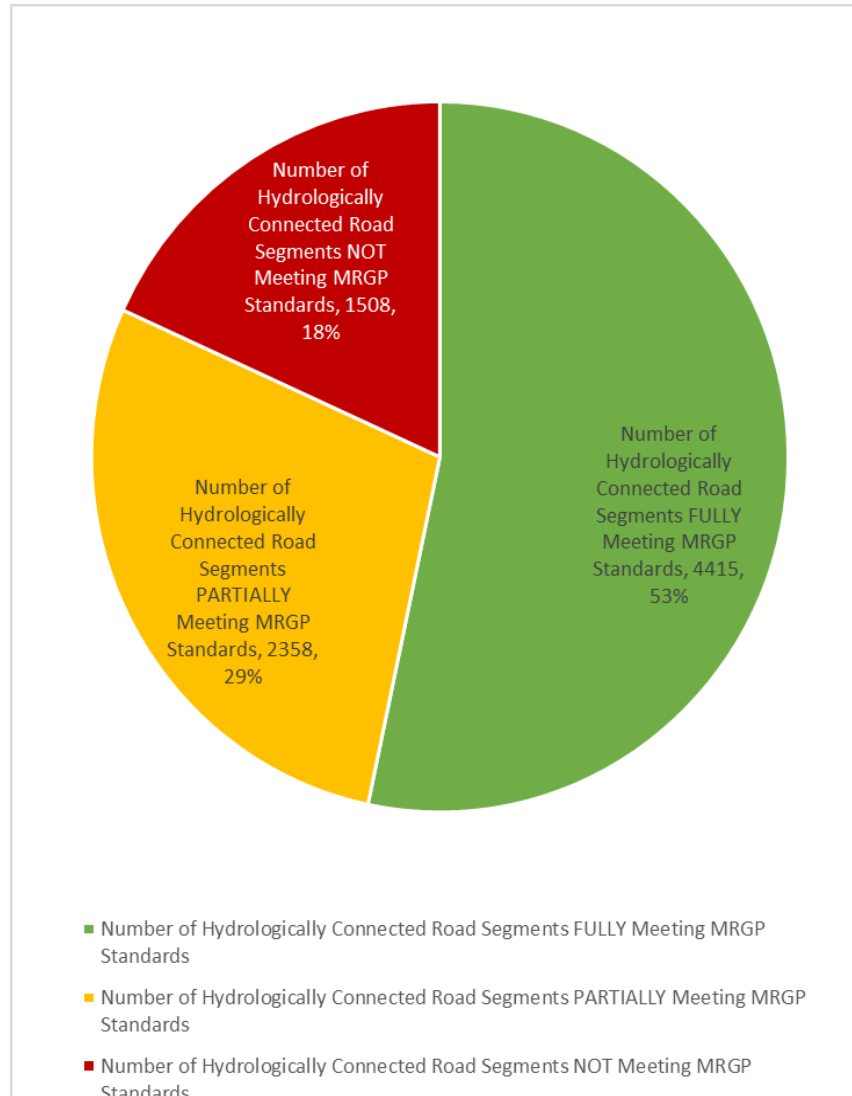
- Paved and gravel roads with ditches
- Paved roads with catch basins
- Class 4 roads

## REI “scores” for each 328 foot segment:

- *Fully Meets*
- *Partially Meets* or
- *Does Not Meet*



# Approximately half of connected roads already meet the MRGP Standards



# Implementation Prioritization

- Towns will submit REI results and Implementation Tables by 12/31/2020
- All “connected” roads brought up to MRGP standards no later than 12/31/2036



# MRGP Implementation Example

**Town A. has 52 total road miles** (VT average)

- 26 road miles are **hydrologically-connected** road segments
- 26 miles not considered **connected** (no BMP work needed)
- 13 **connected** road miles currently fully meet MRGP standards (maintenance of BMPs only)
- 13 remaining **connected** miles – required to be brought up to MRGP Standards before 2036
- 15% of 13 miles = 1.95 miles or 31.2 segments will be brought up to standards over a 2 year period 2021 and 2022



# Implementation “Triggers”

**Required baseline standards- no matter what existing conditions are:**

- Road grading/crowning
- Grass and stone-lined ditching (based on slope) or distributed flow
- Removal of grader berm
- Lowering of shoulders
- Stable turnouts

**Practices are required when moderate (rill) to severe (gully) erosion present and for new construction:**

- 18” drainage culvert minimum-  
(Culvert sizing information for intermittent streams available)
- 15” drive culvert
- Culvert headwalls/headers
- Culvert outlet stabilization
- Class 4 roads- gully erosion present
- Catch basin outfall erosion

# MRGP Summary for Municipalities:

- **July 31, 2018:** MRGP application coverage – Notice of Intent and annual fees begin
- **April 1, 2019:** Annual Reporting begins
- **December 31, 2020:** Road Erosion Inventories and Implementation Plans due
- **2021 Field Season** (or sooner): Road upgrades begin
- **December 31, 2025** (or sooner): All *Very High Priority* segments brought up to standards, except Class 4's
- **December 31, 2028** (or sooner): All *Very High Priority* Class 4 roads brought up to standards
- **December 31, 2036** (or sooner): all connected roads meet MRGP standards

# Assistance to Towns



- Funding – *New*  
Municipal Grant-in-Aid
- Outreach and Technical Assistance
- Shared Equipment

# VTrans and DEC Road Roundtable Trainings

- 5 Roundtable Forums per year across the state
- 125 municipal road crew attendees in 2017
- Cover practice implementation, equipment, and practice costs





# For Additional Information:

<http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program#Development of Permit>

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**(802) 490-6140**



VERMONT DEPARTMENT OF  
ENVIRONMENTAL CONSERVATION

**WATERSHED  
MANAGEMENT DIVISION**

STORMWATER PROGRAM