# VERMONT CLEAN WATER INITIATIVE
# 2017 INVESTMENT REPORT

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VERMONT

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

# VERMONT CLEAN WATER INITIATIVE 2017 INVESTMENT REPORT

## Summary of the Vermont Clean Water Initiative
## Describing State Fiscal Year (SFY) 2017 State Investments, Actions, and Outcomes

## Submitted by the Vermont Agency of Administration
## January 15, 2018

| Relevant Statutory Reporting Requirements: | Fulfilled by: |
|---|---|
| **Act 64 (2015),[1] Section 36, codified at 10 V.S.A. § 1386(d)** Execution of the Implementation Plan for the Lake Champlain Total Maximum Daily Load (TMDL) | Vermont Clean Water Investment Report, Appendix C |
| **Act 64 (2015),[1] Section 36, codified at 10 V.S.A. § 1386(e)** Activities and Progress of Water Quality Ecosystem Restoration Programs | Vermont Clean Water Investment Report, Appendix B |
| **Act 64 (2015),[1] Section 37, codified at 10 V.S.A. § 1389a (a)** The Report shall summarize all investments, including their cost-effectiveness, made by the Clean Water Fund Board and other State agencies for clean water restoration over the prior calendar year. | Vermont Clean Water Investment Report, Chapters 3-5; reported by SFY[2] |
| **Act 64 (2015),[1] Section 37, codified at 10 V.S.A. § 1389a (b)(1)** Documentation of progress or shortcomings in meeting established indicators for clean water restoration | Future reports will include interim targets to evaluate progress |
| **Act 64 (2015),[1] Section 37, codified at 10 V.S.A. § 1389a (b)(2)** A summary of additional funding sources pursued by the Board, including whether those funding sources were attained; if it was not attained, why it was not attained; and where the money was allocated from the Fund | Vermont Clean Water Investment Report, Appendix D |
| **Act 64 (2015),[1] Section 37, codified at 10 V.S.A. § 1389a (b)(3)** A summary of water quality problems or concerns in each watershed basin of the State, a list of water quality projects identified as necessary in each basin of the State, and how identified projects have been prioritized for implementation | Vermont Clean Water Investment Report, Appendix A |
| **Act 64 (2015),[1] Section 37, codified at 10 V.S.A. § 1389a (b)(4-5)** A summary of any changes to applicable federal law or policy related to the State's water quality improvement efforts, including any changes to requirements to implement total maximum daily load plans in the State; a summary of available federal funding related to or for water quality improvement efforts in the State | Vermont Clean Water Investment Report, Appendix E |

[1] Act 64 or the "Vermont Clean Water Act;" 2015 Vt. Acts & Resolves 975, amended in 2017.

[2] The SFY reporting period aligns with agencies' budget/grant cycles and allows sufficient time to compile and present data between the end of the SFY (June 30th) and legislative reporting deadline (January 15th).

## ACKNOWLEDGMENTS

This report was prepared by the Vermont Clean Water Initiative partner agencies on behalf of the Vermont Secretary of Administration. The Vermont Agency of Natural Resources Department of Environmental Conservation (DEC) Clean Water Initiative Program coordinated with staff of the Vermont Agency of Administration; Vermont Agency of Agriculture, Food and Markets; Vermont Agency of Commerce and Community Development; Vermont Agency of Transportation; Vermont Fish and Wildlife Department; Vermont Department of Forests, Parks and Recreation; DEC's Facilities Engineering Division; and Vermont Housing and Conservation Board to complete this report.

Report available electronically at: http://dec.vermont.gov/watershed/cwi/cwf#report

## VERMONT CLEAN WATER INITIATIVE - cleanwater.vermont.gov

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## COVER PHOTOS

Randolph Dam removal completed by the White River Partnership (see Figure 25)

Stream culvert replacement completed by the Town of Cambridge (see Figure 29)

Stabilized concrete walkway completed by Poultney Mettowee Conservation District (see Figure 23)

Bioretention system on Morey Road, Hyde Park completed by Lamoille County Conservation District (see Figure 27)

Livestock exclusion fence and improved laneway completed by Poultney Mettowee Conservation District (see Figure 21)

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# Clean Water Initiative 2017 Investment Report: Executive Summary

Clean water supports fishing, swimming, boating, and other recreational uses, bolsters tourism, helps to maintain property values and provides access to safe drinking water. Vermont's residents, visitors, and businesses care about clean water and benefit from continued investments in restoring and protecting our waters.

The Vermont Clean Water Initiative 2017 Investment Report summarizes: (a) state investments made in clean water improvement projects through grants, contracts, and loans, and (b) the results of state-funded clean water restoration activities completed within State Fiscal Year (SFY) 2017, covering July 1, 2016 through June 30, 2017.

The Vermont Clean Water Initiative Investment Report uses four categories of accountability measures:

**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** of dollars invested in clean water projects, addressing planning, design, and implementation of clean water improvement practices;

**Project output measures** that quantify the results of state-funded clean water restoration projects completed; and

**Environmental outcome measures** that quantify water pollution reductions achieved through state-funded clean water projects.

This executive summary of the SFY 2017 Investment Report summarizes state investments in clean water projects in SFY 2017 and results achieved by clean water projects implemented or constructed in SFY 2017 by sector:

**Agricultural Pollution Prevention Projects**
Installation or application of conservation practices that reduce sources of nutrient and sediment pollution from agricultural lands.

**Natural Resources Restoration Projects**
Restoration of floodplains, rivers/streams, lakeshore, wetlands, and forest lands to natural conditions that prevent and abate nutrient and sediment pollution.

**Developed Lands Stormwater Treatment Projects**
Installation of stormwater practices that treat sources of nutrient and sediment pollution caused by stormwater runoff from developed lands.

**Transportation-Related Stormwater Treatment Projects**
Installation of stormwater and roadside erosion control practices that prevent erosion and treat road-related sources of nutrient and sediment pollution.

The Investment Report also contains results of project development work, addressing project planning, design, and engineering that leads to high priority and cost effective clean water implementation or construction projects. The report also summarizes the extent of state-provided outreach and technical assistance. Highlights of project development work and outreach/technical assistance are summarized below.

### Outreach and Technical Assistance Highlights

Extent of state-provided clean water outreach and technical assistance

State agencies and partners conducting State-funded outreach held 431 outreach events in SFY 2017, including workshops, trainings, and public/stakeholder meetings. Outreach efforts reached 10,533 attendees and provided 1,067 hours of education on clean water. Agency staff reviewed 4,857 projects to maximize water quality improvements and minimize water quality impact; provided 5,300 hours of engineering and technical assistance for stormwater and wastewater projects; conducted 700 farm visits farms; provided technical assistance on 1,032 logging operations/forest properties; assisted 78 communities in urban and community forestry; and provided 1,483 hours of technical assistance to municipalities on transportation-related stormwater projects.

### Project Development Highlights

Extent of state-provided clean water outreach and technical assistance

State-funded planning and assessment work resulted in identification of 176 priority projects recommended for future design and/or implementation in SFY 2017, covering agricultural pollution prevention, river/floodplain restoration, and stormwater treatment projects. More than 116 road miles were assessed and identified for future improvements to comply with clean water regulations. 22 preliminary and 44 final clean water project designs were completed for future implementation work.

Investments made in clean water projects and results of clean water projects implemented in SFY 2017 are summarized by sector in the following sections.

# State Investments in Clean Water

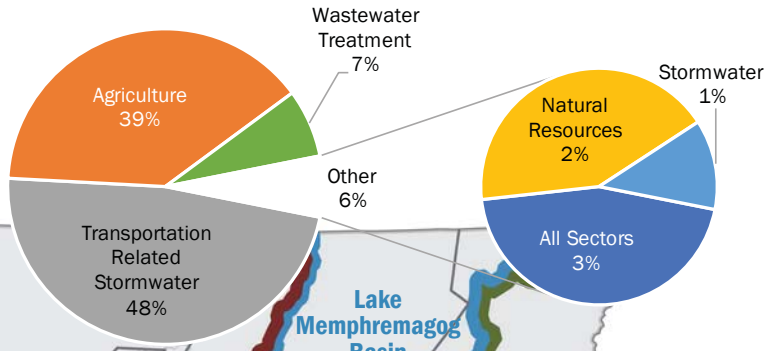
**State funding awarded in SFY 2017, by major basin.**

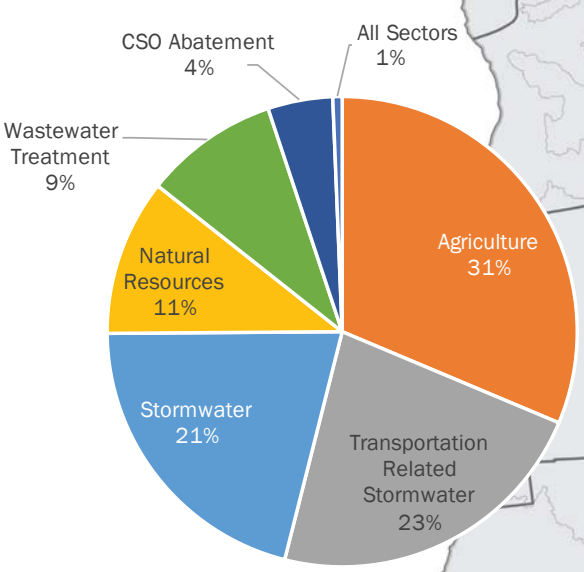
**114%**

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

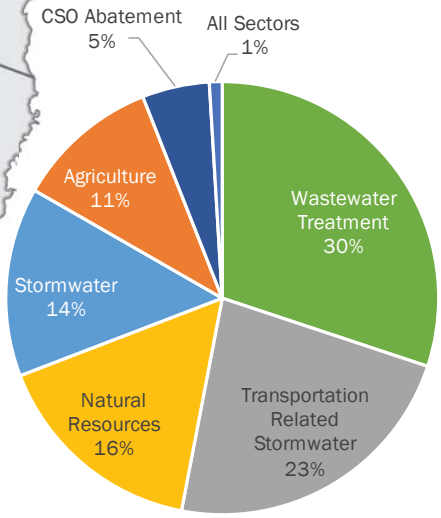
**Total state funds invested in clean water projects in SFY 2017: $22,976,188**

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

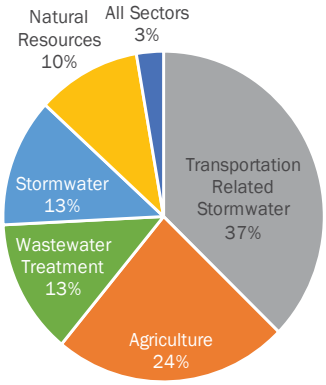


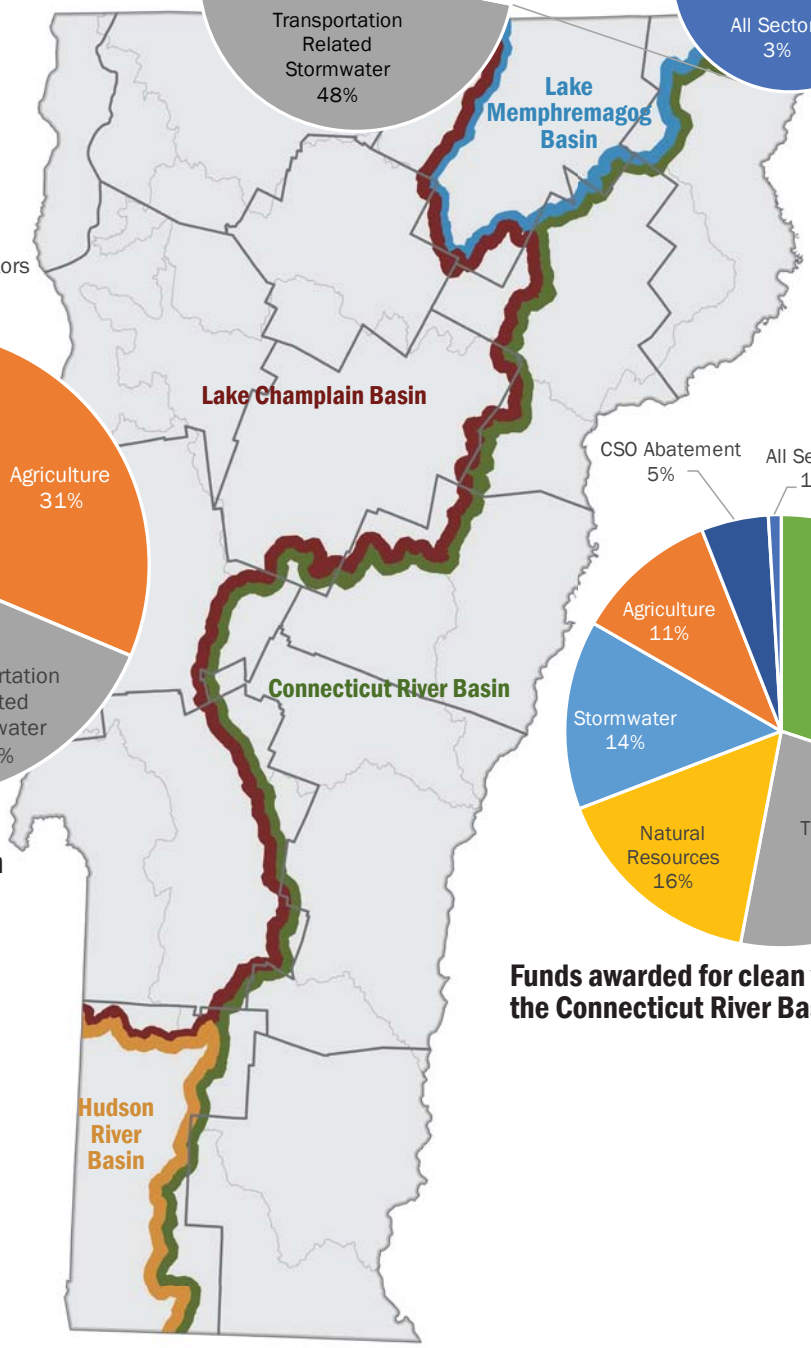

**Funds awarded for clean water projects in the Lake Champlain Basin: $14,303,667**




**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**



# Investments in Agricultural Pollution Prevention

**Agricultural Pollution Projects:** Installation or application of conservation practices that reduce sources of nutrient and sediment pollution from agricultural lands.

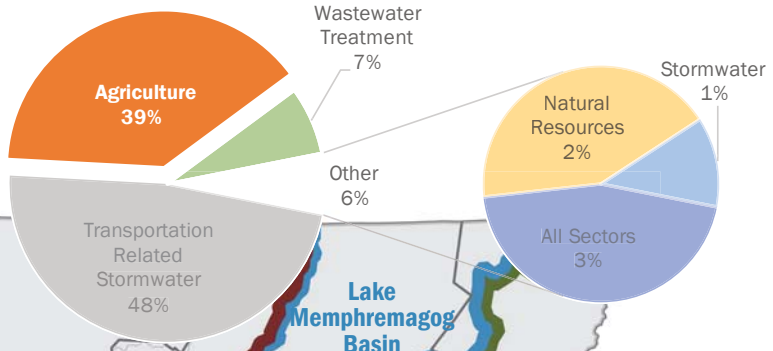
**State funding awarded in SFY 2017, by major basin.**

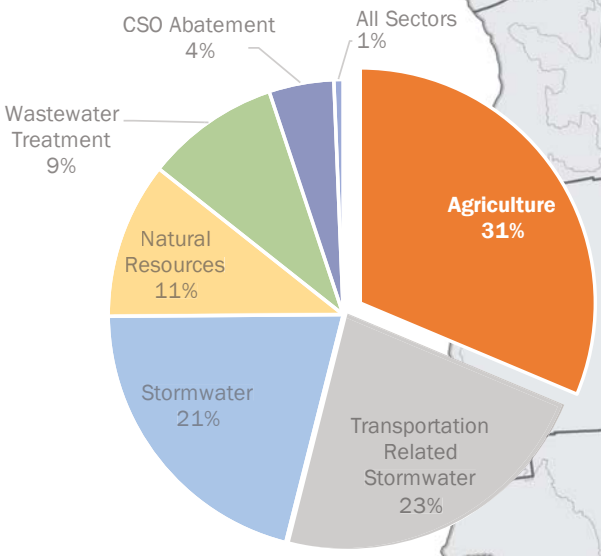
**104%**

**Increase in funds invested in agricultural pollution prevention projects from 2016 to 2017**

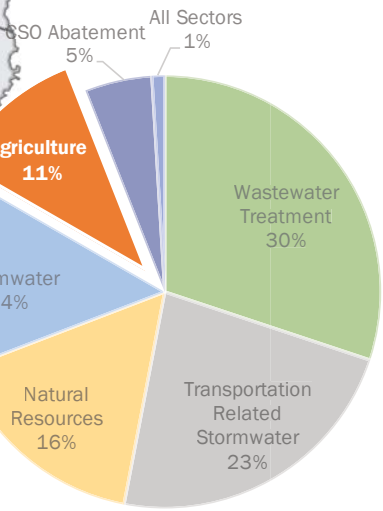
**Total state funds invested in agricultural pollution prevention projects in SFY 2017: $5,626,722**

**Funds awarded for agricultural pollution prevention projects in the Lake Memphremagog Basin: $237,053**

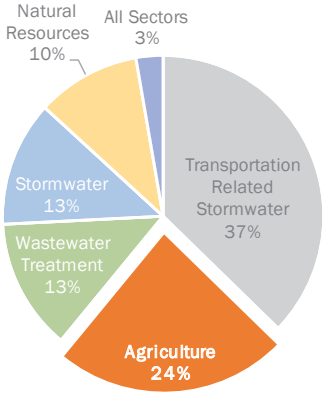



**Funds awarded for agricultural pollution prevention projects in the Lake Champlain Basin: $4,481,846**




**Funds awarded for agricultural pollution prevention projects in the Connecticut River Basin: $829,427**




**Funds awarded for agricultural pollution prevention projects in the Hudson River Basin: $78,396**

# Results of Agricultural Projects

**Results of agricultural pollution prevention projects implemented in SFY 2017, statewide.**

| PROJECT RESULTS | | | BENEFITS | | | | | |
|---|---|---|---|---|---|---|---|---|
| Performance Measures | 2016 | 2017 | TMDL[1] Implementation | Act 64 (2015) Implementation | RAP[1] Compliance | Flood Resiliency | Working Landscape | Habitat Function |
| Acres of cropland and pasture treated by annual conservation practices | 3,865 | 2,486* | ✓ | ✓ | ✓ | | ✓ | |
| Acres of cropland and pasture treated by crop rotation and associated practices | 572 | 0* | ✓ | ✓ | ✓ | | ✓ | |
| Acres of cropland and pasture treated by forested buffers | 366 | 178* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Number of barnyard/production area practices installed | 39 | 87 | ✓ | ✓ | ✓ | | ✓ | |
| Acres of water quality protections within conserved agricultural lands | New in 2017 | 89 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

* USDA NRCS prioritized federal funding for field-based practices in SFY 2017, therefore, state-funded field practices decreased relative to SFY 2016, while state-funded barnyard/production area practices increased by more than 50 percent relative to SFY 2016. Federally funded projects are outside the scope of this report.

| POLLUTANT REDUCTION | | | | |
|---|---|---|---|---|
| Total Phosphorus Reduced (Kilograms per Year) | 2016 | 2017 | Cumulative | Extent of Load Reduction Quantified |
| Annual agricultural conservation practices (active for at least 1 year) | 443 | 283 | 283 | 53 percent of acres quantified in 2017 (projects in the Lake Champlain basin) |
| Agricultural crop rotation and associated practices (active for at least 5 years) | 271 | 0 | 271 | 100 percent of acres quantified (cumulative) (projects in the Lake Champlain basin) |
| Forested riparian buffer restoration on agricultural lands (active for at least 15 years) | 199 | 34 | 234 | 69 percent of acres quantified (cumulative) (projects in the Lake Champlain basin) |

**AGRICULTURAL HIGHLIGHTS**

**Updated Required Agricultural Practices (RAPs) regulations became effective December 2016, and are expected to drive demand for additional projects in 2018**

**Before (left) and after (right) installation of livestock exclusion fencing and improved laneway and water crossing in Pawlet, completed by Poultney Mettowee Conservation District with Agency of Natural Resources funding**

1 - Definition of acronyms: Total Maximum Daily Load (TMDL); Required Agricultural Practices (RAP)

# Investments in Natural Resources Restoration

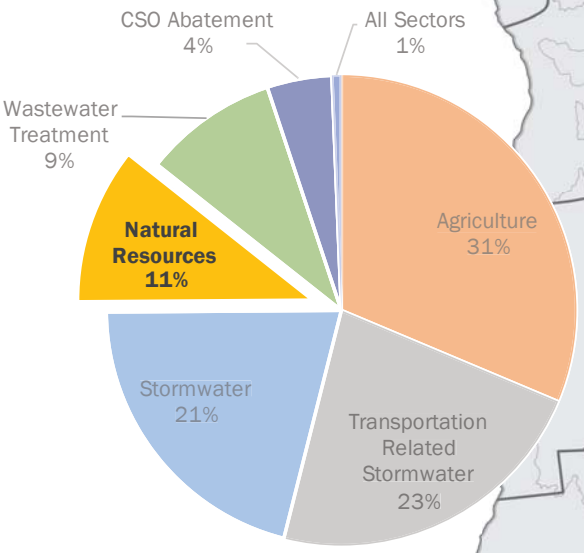
**Natural Resources Restoration Projects:** Restoration of floodplains, rivers/streams, lakeshore, wetlands, and forest lands to natural conditions that prevent and abate nutrient and sediment pollution.

**State funding awarded in SFY 2017, by major basin.**

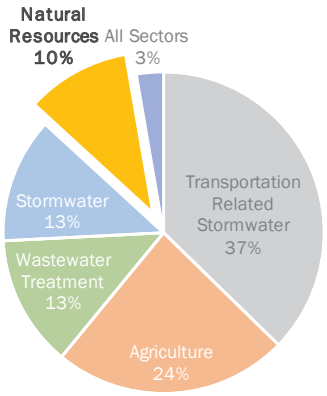
**154%**

**Increase in state funds invested in natural resources restoration projects from 2016 to 2017**

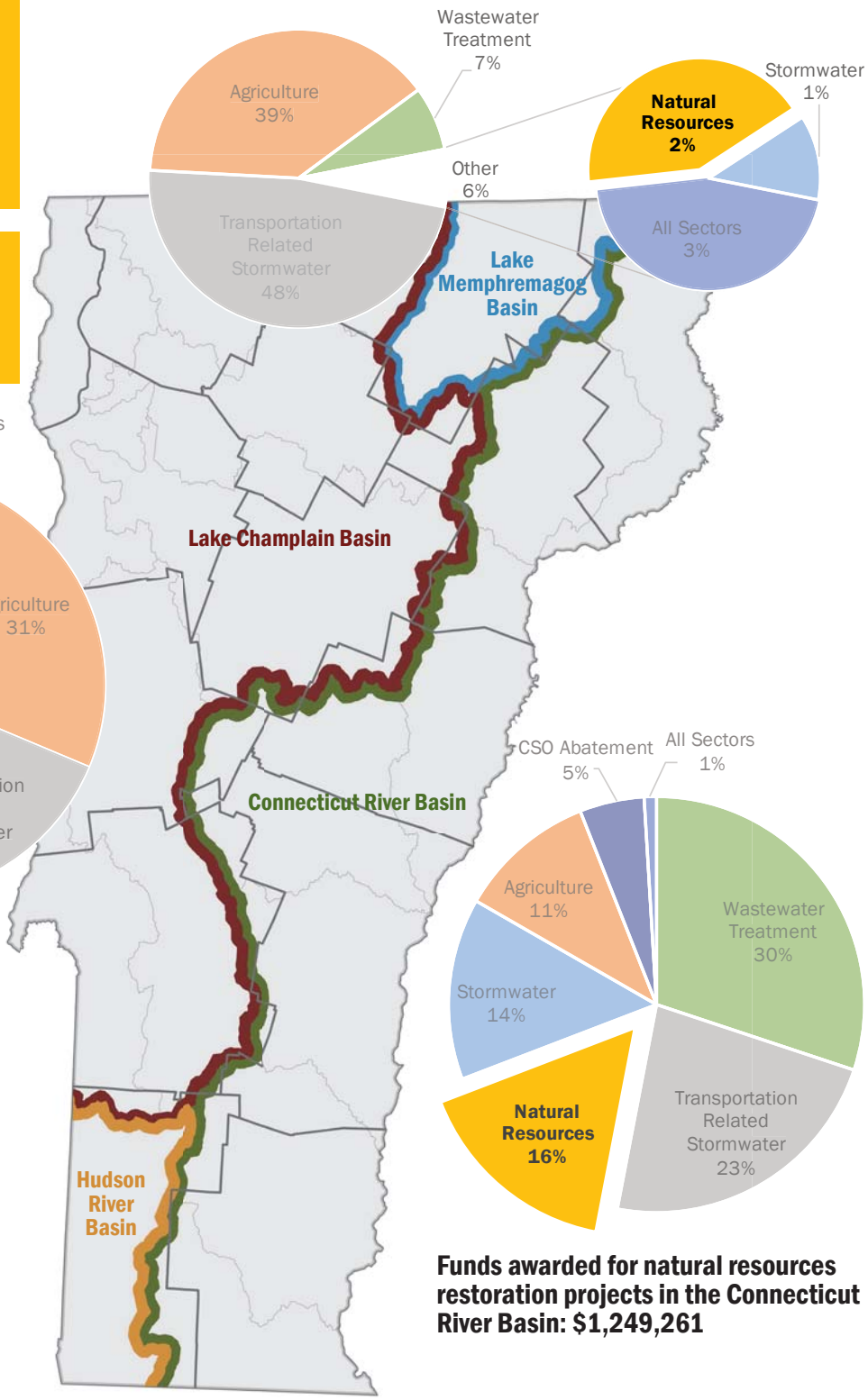
**In SFY 2017, total funds invested in:**
- **Natural resources restoration projects: $2,002,670**
- **Forest conservation: $837,000**




**Funds awarded for natural resources restoration projects in the Lake Champlain Basin: $1,539,613***




**Funds awarded for natural resources restoration projects in the Hudson River Basin: $34,698**




**Funds awarded for natural resources restoration projects in the Lake Memphremagog Basin: $16,098**







**Funds awarded for natural resources restoration projects in the Connecticut River Basin: $1,249,261**

* Forest conservation represents 2% of total funds awarded in the Lake Champlain basin

# Results of Natural Resources Projects

**Results of natural resources restoration projects implemented in SFY 2017, statewide.**

| PROJECT RESULTS | | | BENEFITS | | | |
|---|---|---|---|---|---|---|
| Performance Measures | 2016 | 2017 | TMDL[1] Implementation | Flood Resiliency | Outdoor Recreation | Habitat Function |
| Acres of forested riparian buffer restored through buffer planting | 88 | 16 | ✓ | ✓ | ✓ | ✓ |
| Acres of river corridor conserved through easements | 141 | 209 | ✓ | ✓ | ✓ | ✓ |
| Acres of floodplain restored | 0 | 2 | ✓ | ✓ | ✓ | ✓ |
| Stream miles enhanced and reconnected due to dam removal (also supports aquatic organism passage) | 0 | 98 | ✓ | ✓ | ✓ | ✓ |
| Acres protected for public access, recreation, forest conservation, and water quality | New in 2017 | 4,906 | | ✓ | ✓ | ✓ |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | New in 2017 | 98 | ✓ | ✓ | ✓ | ✓ |

| POLLUTANT REDUCTION | | | | EXTENT OF LOAD REDUCTION QUANTIFIED |
|---|---|---|---|---|
| Total Phosphorus Reduced (Kilograms per Year) | 2016 | 2017 | Cumulative | Pollutant reductions quantified for 25 percent of buffer acres in 2016 and 34 percent in 2017 (projects in the Lake Champlain and Memphremagog basins) |
| Forested riparian buffer restoration on non-agricultural lands | 74 | 12 | 86 | |

**NATURAL RESOURCES HIGHLIGHTS**

**Natural resources restoration projects reduce nutrient and sediment pollution, as well as improve flood resiliency, support outdoor recreational opportunities, and improve habitat function**

**Before (above, right) and after (below, right) relocation of 1,100 feet of Stowe's Recreation Path outside of the river hazard zone and restoration/planting of two acres of floodplain, completed by Town of Stowe with Agency of Natural Resources funding**

1 - Definition of acronyms: Total Maximum Daily Load (TMDL)

# Investments in Transportation Related Stormwater Treatment

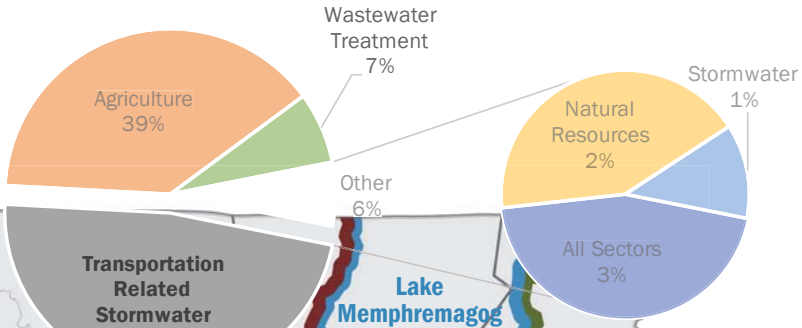
**Transportation Related Stormwater Treatment Projects:** Installation of stormwater and roadside erosion control practices that prevent erosion and treat road-related sources of nutrient and sediment pollution.

**State funding awarded in SFY2017, by major basin.**

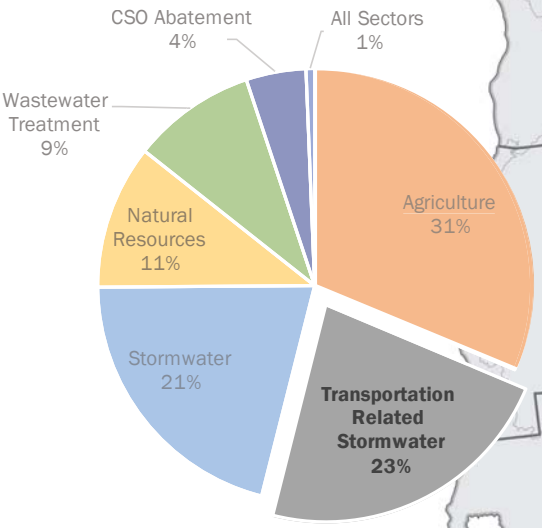
**216%**

**Increase in state funds for road and transportation related stormwater projects from 2016 to 2017**

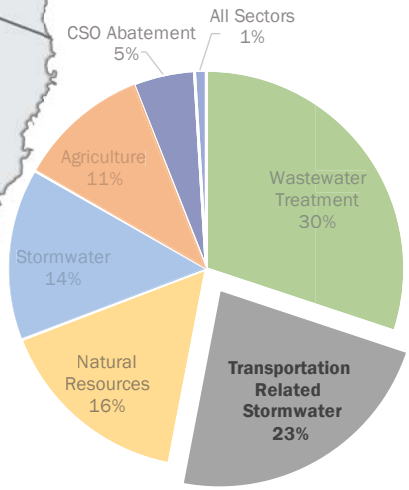
**Total funds invested in transportation related stormwater treatment projects in SFY 2017: $5,419,354**



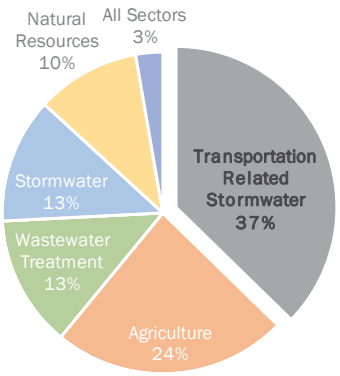

**Funds awarded for transportation related stormwater treatment projects in the Lake Memphremagog Basin: $289,788**



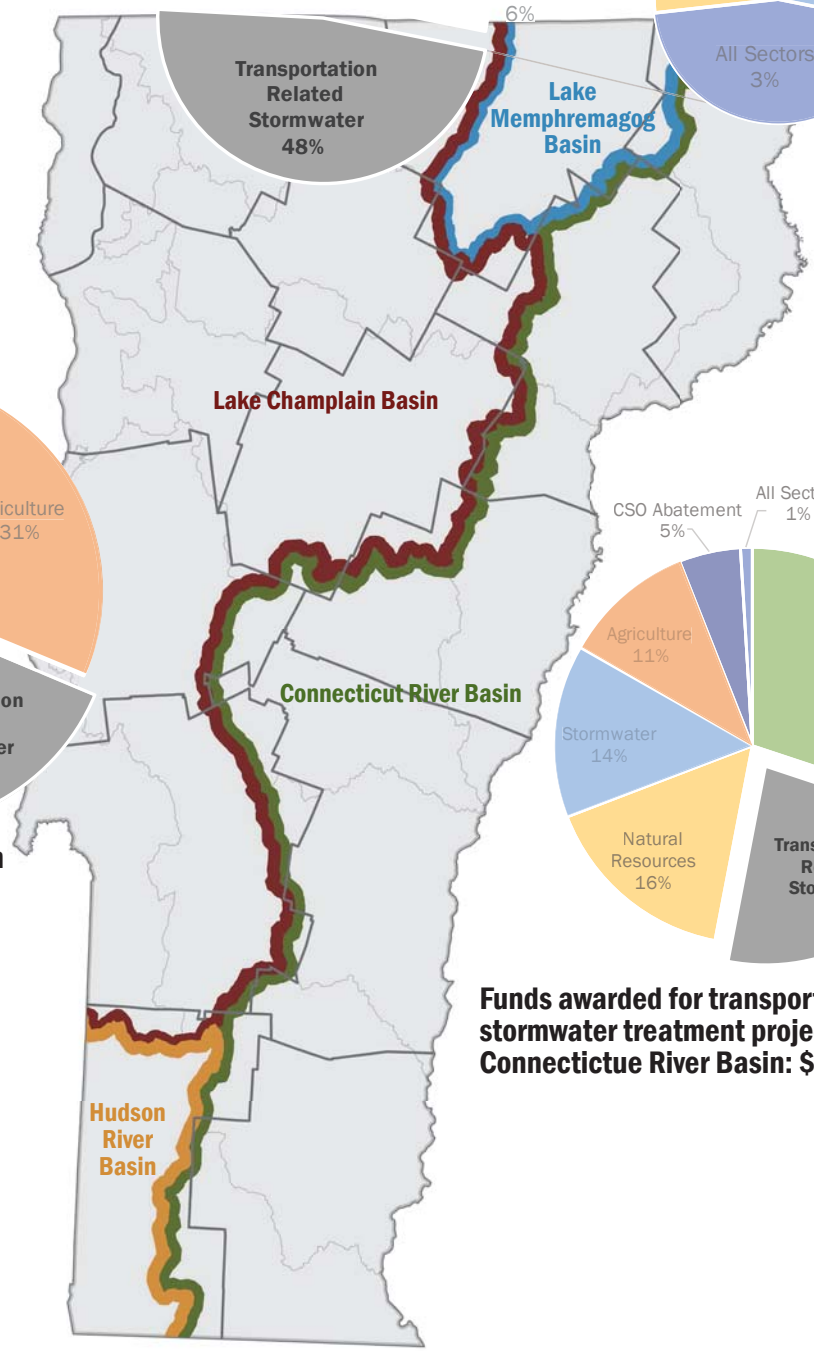

**Funds awarded for transportation related stormwater treatment projects in the Lake Champlain Basin: $3,233,158**




**Funds awarded for transportation related stormwater treatment projects in the Connectictue River Basin: $1,772,878**




**Funds awarded for transportation related stormwater treatment projects in the Hudson River Basin $123,531**



# Results of Transportation Related Stormwater Projects

**Results of transportation related stormwater projects implemented in SFY 2017, statewide.[1]**

| PROJECT RESULTS | | | BENEFITS | | | | | |
|---|---|---|---|---|---|---|---|---|
| Performance Measures | 2016 | 2017 | TMDL[2] Implementation | Act 64 (2015) Implementation | MRGP[2] 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.

| 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 | |

**TRANSPORTATION RELATED STORMWATER HIGHLIGHTS**

**Roadside erosion/nutrient pollution controls required by the Municipal Roads General Permit are expected to drive implementation of additional projects in future years**

**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 with VTrans funding**

1 - Results of projects completed by VTrans to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report.

2 - Definition of acronyms: Total Maximum Daily Load (TMDL); Municipal Roads General Permit (MRGP)

# Investments in Stormwater Treatment

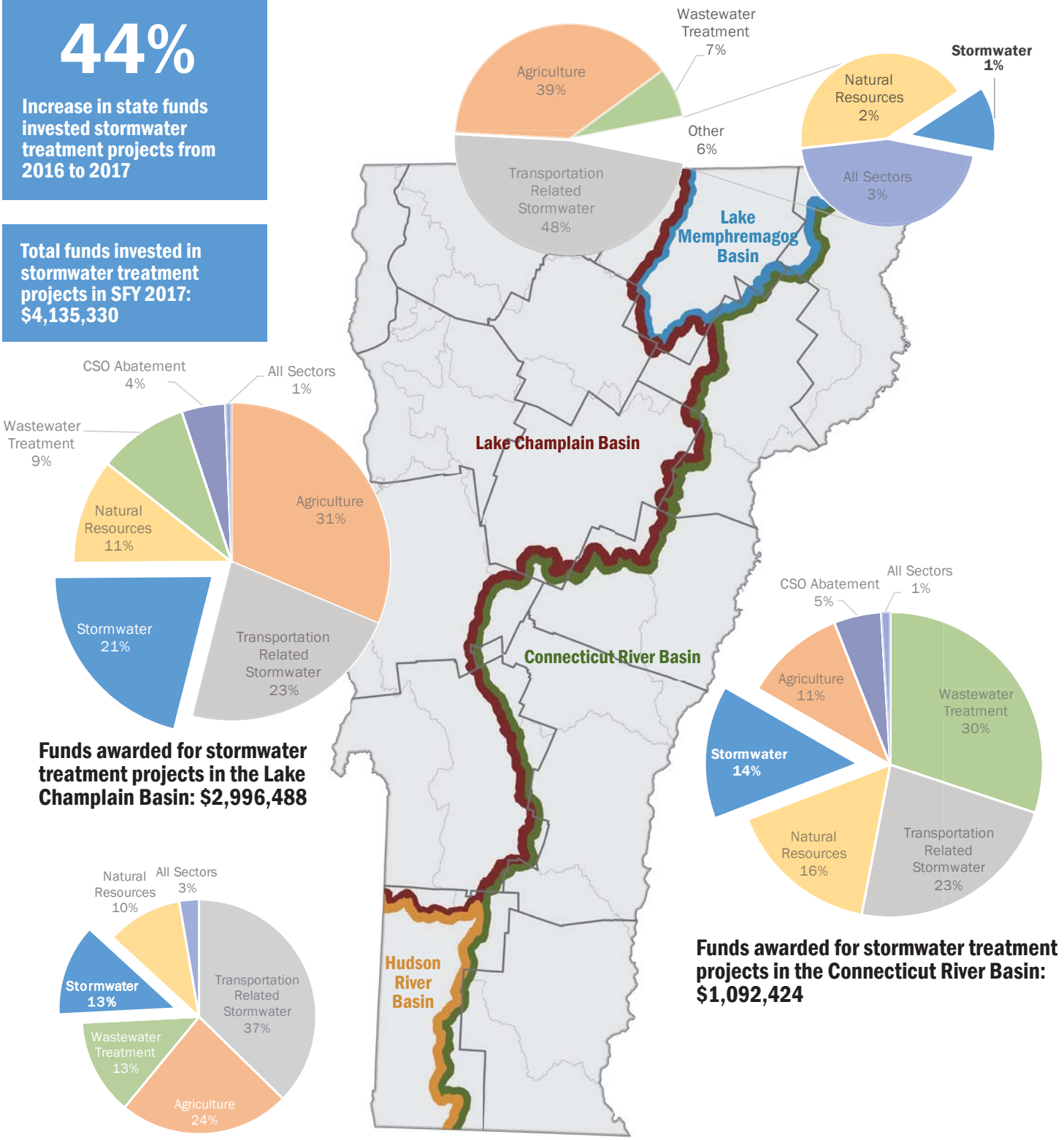
**Stormwater Treatment Projects:** Installation of stormwater practices that treat sources of nutrient and sediment pollution caused by stormwater runoff from developed lands.

**State funding awarded in SFY 2017, by major basin.**

**44%**

**Increase in state funds invested stormwater treatment projects from 2016 to 2017**

**Total funds invested in stormwater treatment projects in SFY 2017: $4,135,330**




**Funds awarded for stormwater treatment projects in the Lake Memphremagog Basin: $4,656**

**Funds awarded for stormwater treatment projects in the Lake Champlain Basin: $2,996,488**

**Funds awarded for stormwater treatment projects in the Connecticut River Basin: $1,092,424**

**Funds awarded for stormwater treatment projects in the Hudson River Basin: $41,763**

# Results of Stormwater Projects

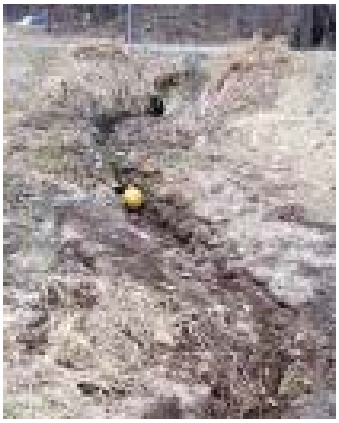
**Results of stormwater treatment projects implemented in SFY 2017, statewide.**

| PROJECT RESULTS | | | BENEFITS | | |
|---|---|---|---|---|---|
| Performance Measures | 2016 | 2017 | TMDL[1] Implementation | Act 64 (2015) Implementation | Municipal Stormwater Compliance |
| Acres of impervious surface treated | 0.3 | 86.3 | ✓ | ✓ | ✓ |

| LOAD REDUCTION | | | | EXTENT OF LOAD REDUCTION QUANTIFIED |
|---|---|---|---|---|
| Total Phosphorus Reduced (Kilograms per Year) | 2016 | 2017 | Cumulative | Pollutant reductions quantified for 41 percent of impervious acres treated (projects in the Lake Champlain basin) |
| Stormwater treatment practices | 0.3 | 15.0 | 15.3 | |

**STORMWATER HIGHLIGHTS**

**Nutrient pollution controls, required by updated/new stormwater permits are expected to drive demand for additional projects in future years**



**Before (left) and after (right) installation of bioretention system on Morey Road in Hyde Park, completed by Lamoille County Conservation District**

1 - Definition of acronyms: Total Maximum Daily Load (TMDL)

# 1. Introduction

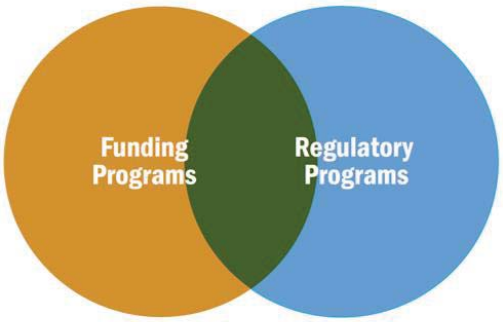
## ABOUT THIS REPORT

Pursuant to 10 V.S.A. §1389a, herein after referred to as Act 64 of 2015,[3] the Secretary of the Agency of Administration has prepared this annual investment report. The report covers State Fiscal Year (SFY) 2017 (July 1, 2016 – June 30, 2017) and summarizes: (a) state investments made in clean water improvement projects through grants, contracts, and loan financing; and (b) the results of state-funded clean water restoration activities completed in SFY 2017.

Agencies and boards that contributed to this report include: Agency of Administration (AoA); Agency of Agriculture, Food and Markets (AAFM); Agency of Commerce and Community Development (ACCD); Agency of Natural Resources (ANR); Agency of Transportation (VTrans); and Vermont Housing and Conservation Board (VHCB).

This report presents information related to state investments through grant funding and loan financing only. Federal agencies and programs continue to serve a critical role in helping to leverage local and state clean water investments. Federal funds, such as funds from the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), are outside the scope of this report, unless awarded by state agencies through a grant or contract, or leveraged as match against a state grant. Work completed to comply with water quality-related regulations without state-funded grants, contracts, and loans are also outside the scope of this report.[4]

Funding and regulatory programs are important drivers of clean water improvement projects, and the state is tracking the results of this work. As new regulations come on line, and as funding programs grow to support the costs of compliance, the work accomplished through funding and regulatory programs is also expected to grow and become increasingly overlapping.




Funding and regulatory programs aid in TMDL implementation and can overlap, as funds become available to support compliance with regulatory programs

Given the significant costs of restoring and safeguarding water quality, it is critical for the state to spend its resources in the most cost-effective manner. Vermont's Tactical Basin Planning process builds a technical framework for targeting and prioritizing clean water projects. Tactical Basin Plans integrate the results of assessments and plans at the basin-scale, resulting in a prioritized list of projects necessary to achieve clean water goals for each basin.[5] State agencies utilize Tactical Basin Plans as the scientific framework to target cost-effective projects to achieve clean water targets. Those targets are described in clean water restoration plans, known as Total Maximum Daily Loads (TMDLs), the Vermont Clean Water Act, and the 2016 Combined Sewer Overflow (CSO) Rule.

[3] Act 64 or the "Vermont Clean Water Act;" 2015 Vt. Acts & Resolves 975.

[4] VTrans' investments in clean water projects to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report because this report focuses on state-provided grant funding and loan financing only. However, Appendix F of this report summarizes VTrans' clean water improvement activities.

[5] Tactical Basin Plan priority project lists are updated continuously and available online in the Watershed Projects Database: https://anrweb.vt.gov/DEC/IWIS/ARK/ProjectSearch.aspx.

## TRACKING THE STATE'S INVESTMENTS

Tracking the connection between clean water dollars invested,[6] actions taken, and outcomes achieved enables the state to provide meaningful information to the public about the importance of clean water restoration activities. Moreover, tracking actions and outcomes is consistent with the State of Vermont's adoption of a results-based accountability framework to measure governmental performance.[7]

The Vermont Clean Water Initiative Investment Report uses four categories of accountability measures:

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

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

**Project output** measures that quantify the results of state-funded clean water restoration projects completed; and

**Environmental outcome measures** that quantify water pollution reductions achieved through state-funded clean water projects.

The CWI partner agencies have been working since October 2015 to establish tracking protocols to account for these outreach and technical assistance, investment, project output, and environmental outcome measures statewide. The CWI partner agencies are coordinating the development of databases to support tracking, including the ANR-DEC Watershed Projects Database, the AAFM Agricultural Partners' Database (currently under development), and the VTrans Municipal Mitigation Assistance Program database.

## ENHANCING THE STATE'S INVESTMENT REPORTING

This report is the second in the annual Investment Report series, and begins to measure progress made by state-funded clean water activities over time. The SFY 2016 Investment Report established a baseline for evaluating future actions and outcomes. This Investment Report evaluates actions and outcomes relative to SFY 2016, therefore, data are presented for SFY 2016 and 2017.

Vermont's clean water tracking systems are a "work-in-progress." Future Investment Reports will include interim targets to evaluate clean water progress over multiple years. Additionally, some of the projects completed during this reporting period were funded in years prior to the development of these new tracking systems. Therefore, in this second year of reporting, gaps still exist in the state's tracking, as well as limitations in accounting for nutrient pollution reductions of all project types, statewide. The state is addressing these gaps and limitations by continuously improving tracking and reporting processes and methodologies.

[6] State investments are defined as dollars obligated/awarded to clean water projects through grants and contracts, or financed through loans, administered by the State of Vermont.

[7] http://humanservices.vermont.gov/improving-outcomes-for-vermonters/results-based-accountability/

## SUMMARY OF SFY 2017 INVESTMENT REPORT SCOPE

Included in this Report

Outreach and technical assistance provided by state agency staff and external partners under a state grant or contract.

State agencies' investments in clean water projects through state grants, contracts, or loans awarded in SFY 2017.

Results of clean water projects, funded by state agencies, completed in SFY 2017.

Outside the Scope of this Report[8]

Outreach and technical assistance provided by external partners without a state grant or contract.

Federal agencies' direct investments in clean water projects, and the results of those projects, unless projects are also funded by a state grant or financed by a state loan.

Municipal and private investments in clean water projects necessary to comply with water regulations, and the results of those projects, unless projects are also funded by a state grant or financed by a state loan.

VTrans' investments in clean water projects to comply with water quality regulations on state highways and VTrans non-road developed lands, and the results of those projects.

Planned Report Improvements

The SFY 2017 Investment Report evaluates actions and outcomes relative to actions and outcomes reported in SFY 2016; future Investment Reports will include interim targets to evaluate clean water progress over multiple years.

Continuous improvements to tracking and reporting processes and methodologies will reduce gaps in data on clean water projects results, including measures of project outputs and nutrient pollution reduced.

[8] The state will track results of federally-funded clean water projects and projects necessary to comply with water quality regulations. The state will report on its progress in future publications.

# 2. Outreach and Technical Assistance Measures

Reducing nutrient and sediment pollution sources fundamentally means changing or adjusting our land uses and employing sound land use management practices, which requires education. Individuals from all sectors – farmers, municipal road crews and highway departments, commercial business owners with large parking lots, developers at construction sites, loggers and foresters, and residential homeowners – need opportunities to learn about the problems caused by polluted runoff, understand their options to address the problems, and subsequently act to support clean water.

The state's outreach and technical assistance programs support all sectors in planning and securing resources to implement clean water projects. These efforts raise awareness and change attitudes and behavior, thus increasing acceptance of new and changing policies and willingness to adopt best management practices. In addition, the state's outreach and technical assistance efforts support all sectors in preparing to meet new regulatory requirements in the most cost-effective manner. Outreach and technical assistance measures, summarized in this report, show the extent of outreach and technical assistance provided by state agencies, as well as partners with state financial support.

The state's outreach, education, and technical assistance activities in SFY 2017 are summarized through the following measures:

- Extent of outreach provided to target audiences;
- Hours of education provided by state agencies;
- Extent of technical assistance provided by agency.

## SCOPE OF THIS CHAPTER

Included in this Report

Outreach and technical assistance provided by state agency staff and external partners under a state grant or contract in SFY 2016 and 2017.

Outside the Scope of this Report

Outreach and technical assistance provided by external partners without a state grant or contract.

Planned Report Improvements

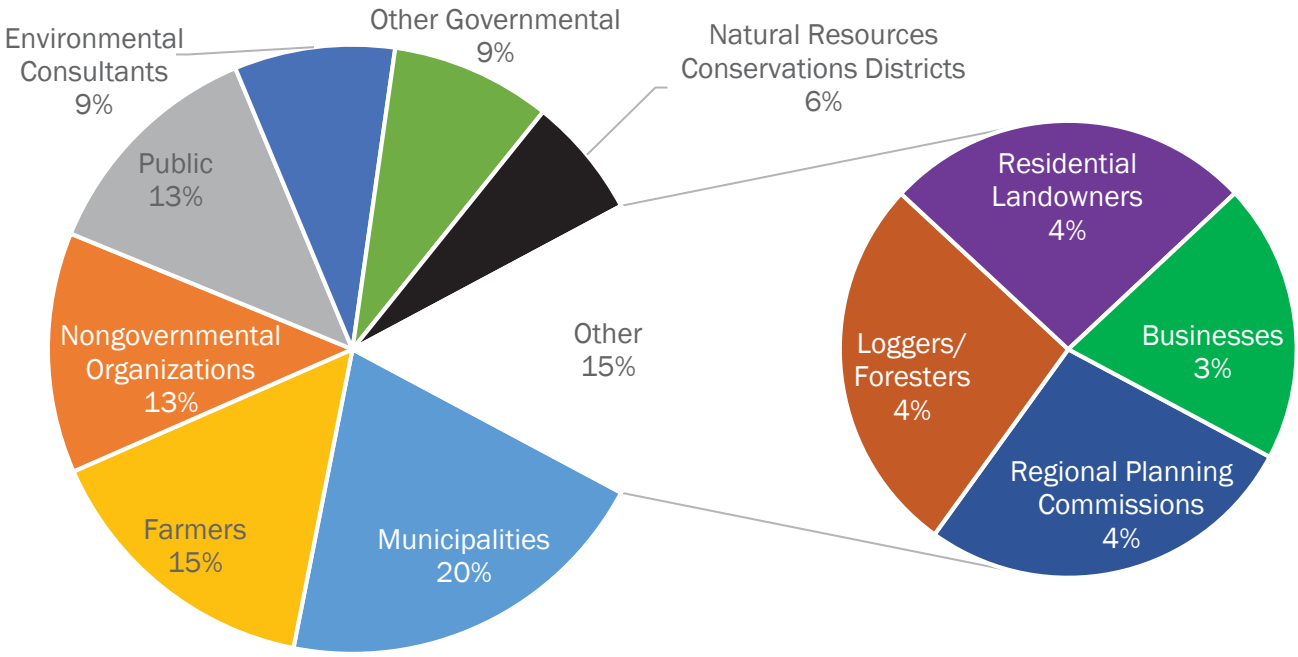
The State of Vermont is piloting the use of additional measures to quantify the impact of outreach efforts in driving changes in knowledge, behavior, and increased implementation of clean water projects.

In 2018, agricultural partners are evaluating how outreach and technical assistance increase ease of farmer participation in grant programs to implement agricultural projects.

## OUTREACH AND TECHNICAL ASSISTANCE MEASURE #1: EXTENT OF OUTREACH PROVIDED TO TARGET AUDIENCES

All sectors play an important role to improve clean water statewide, and the state's goal is to educate all sectors on funding opportunities, new or changing regulations, and actions to improve water quality. Outreach efforts reported include workshops, trainings, and public or stakeholder meetings. Figure 1 demonstrates how the state's outreach efforts target different sector-based audiences by the number of attendees. Most outreach activities targeted municipalities (20 percent) and farmers (15 percent), followed by the public (13 percent) and non-governmental organizations (13 percent).

Figure 1. Target audiences reached through the state's clean water outreach efforts in SFY 2017

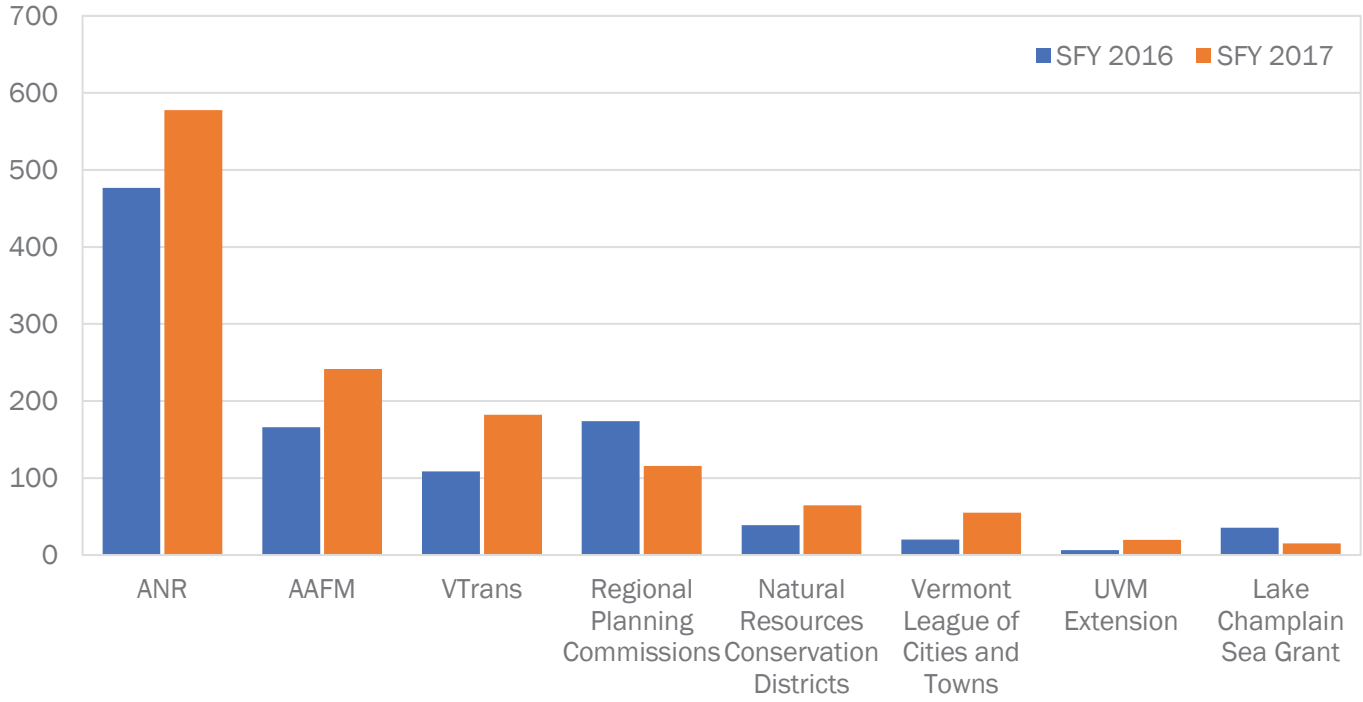



One of the state's water quality priorities is to support municipalities and farmers in addressing stormwater, wastewater, and agricultural sources of nutrient pollution, which is why outreach to these audiences is so important. In addition, nongovernmental organizations, such as watershed groups, regional planning commissions, and natural resources conservation districts, play a very important role working with municipalities, farmers, and other landowners securing funds to implement priority clean water projects. Outreach to these groups is important. It is also important to keep the public engaged for broader support of the state's clean water efforts.

## OUTREACH AND TECHNICAL ASSISTANCE MEASURE #2: HOURS OF OUTREACH PROVIDED BY STATE AGENCIES

The state tracks the hours of clean water-related outreach provided to participants of workshops, trainings, and public or stakeholder meetings to better quantify the extent of its outreach. Total hours of outreach provided represent the total duration of all outreach events held. The 431 outreach events, reported in SFY 2017, reached 10,533 attendees and provided 1,067 hours of education on clean water. Figure 2 shows the total hours of outreach provided to attendees in SFY 2016 and 2017 by state agency staff or partners that conducted outreach with state funding.

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")




## OUTREACH AND TECHNICAL ASSISTANCE MEASURE #3: EXTENT OF TECHNICAL AND COMPLIANCE ASSISTANCE PROVIDED

In addition to outreach, state agencies and partners provide targeted technical assistance to advise and support municipalities, farmers, loggers and foresters, and other landowners or managers in implementing water quality improvement practices. Technical assistance plays a critical role in advancing the state's clean water goals in the most targeted and cost-effective manner. State agencies provide a range and variety of technical assistance which is summarized by agency, in the following sections.

### Agency of Agriculture, Food and Markets Technical and Compliance Assistance

AAFM conducts regulatory farm visits to ensure compliance with Vermont's Required Agricultural Practices (RAPs), as well as non-regulatory farm visits to support the implementation of conservation practices on farms. In SFY 2017, AAFM staff conducted 352 regulatory farm visits, shown in Figure 3 by farm size, representing more than 2,400 hours of staff time. AAFM staff conducted 348 technical assistance farm visits, shown in Figure 4 by farm size and AAFM grant program. Farm visits are defined as follows.

Regulatory farm visits to ensure compliance with RAPs:

- **Inspection** visits ensure compliance with RAPs and the General Permit for the Medium Farm Operations (MFO) and Large Farm Operations (LFO) Rule and individual LFO Permits. Inspections occur at least every year for LFOs and every three years for MFOs, and, beginning in July 2017, at least once every seven years for Certified small farm operations (SFOs);
- **Follow-up inspection** visits involve returning to a farm to ensure compliance issues found during prior inspections have been remediated;

- **Regulatory** visits involve assisting farmers completing MFO and LFO permit notices of intent to comply and other permit materials;
- **Compliance** visits are conducted to ensure farms meet conditions of enforcement actions to address water quality issues; these visits may involve delivery of enforcement actions to farms when necessary.

Non-regulatory farm visits to support implementation of conservation practices:

- **Technical assistance** farm visits help farmers identify water quality issues and implement conservation practices to address those issues through AAFM grant programs; AAFM staff then conduct field visits to ensure practices were implemented.

Figure 3. Number and type of regulatory/compliance assistance farm visits conducted by AAFM to ensure RAP compliance in SFY 2017, by farm size

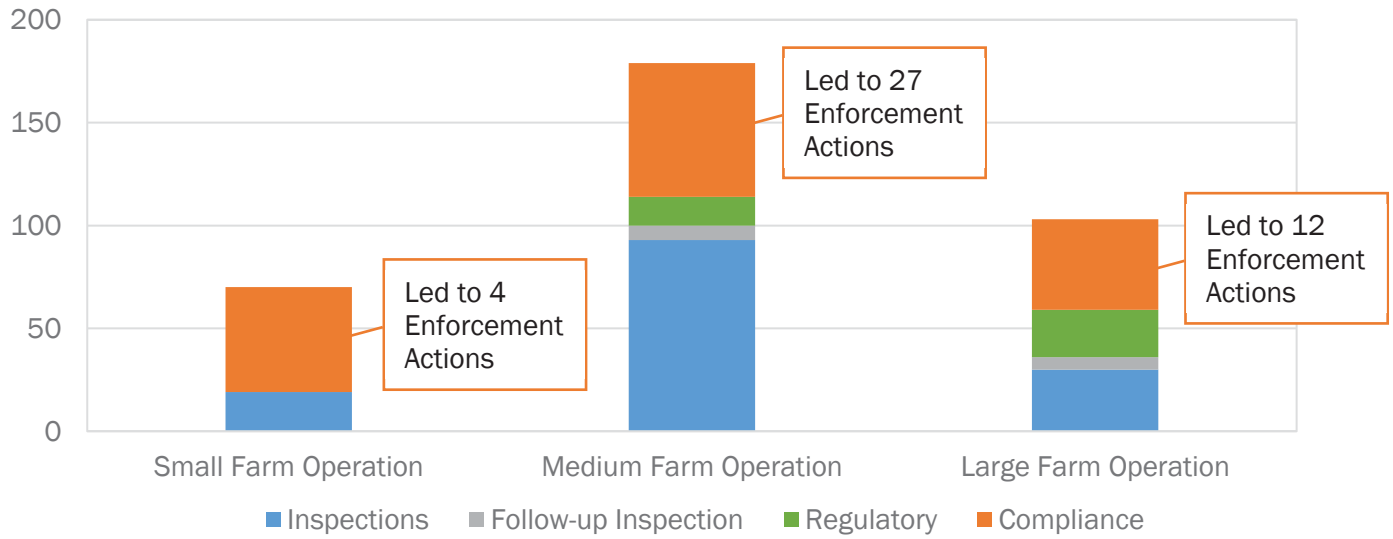
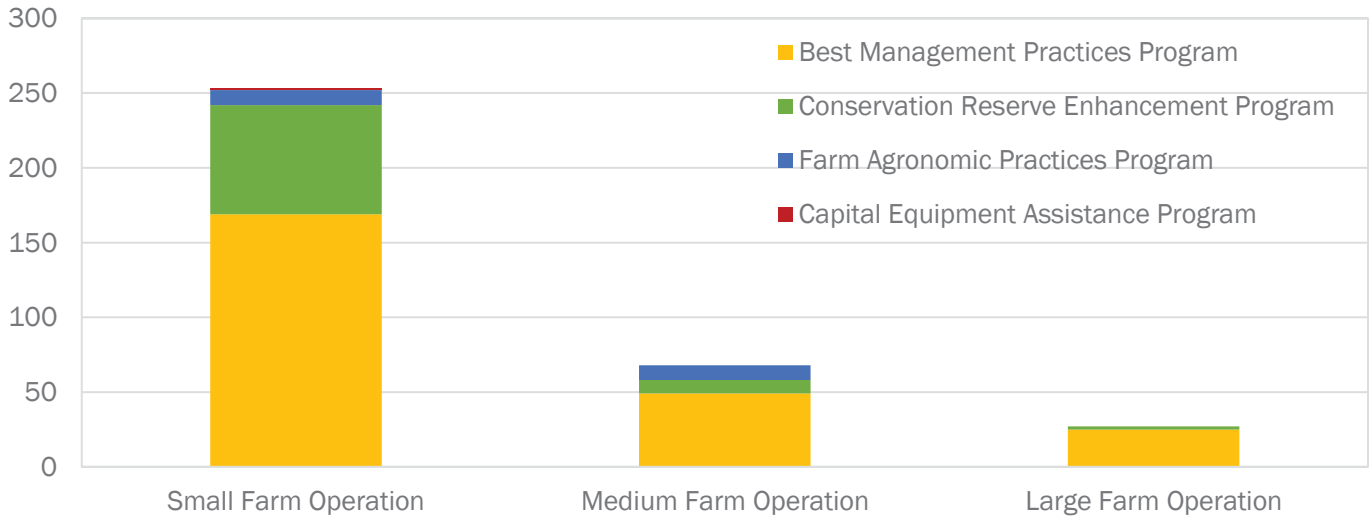



Figure 4. Number and type of non-regulatory/technical assistance visits to support implementation of conservation practices through AAFM grant programs in SFY 2017, by farm size



## Agency of Natural Resources, Department of Environmental Conservation, Watershed Management Division Technical Assistance

The Department of Environmental Conservation (DEC) Watershed Management Division (WSMD) provides technical assistance to municipalities, landowners, developers, and partner organizations (e.g., lake and watershed associations). Technical assistance activities are intended to ensure regulatory and non-regulatory projects support water quality improvements, and to minimize water quality impacts of land use activities. Technical assistance activities take many forms, including site visits, inspections, and project review. These activities can be advisory and collaborative to support local partners in the design and implementation of projects, or regulatory to ensure permit compliance.

The WSMD has been tracking its technical assistance efforts since 2012 as part of the state's Results Based Accountability initiative. Figure 5 shows the number of projects for which WSMD Staff provided technical assistance from SFY 2012 to 2017. In SFY 2017, the WSMD reviewed 4,857 projects. Project review involves determinations of whether permits are required, review of permit applications and renewals, municipal and partner project support, bylaw reviews, illicit discharge detection and elimination efforts, and grant application review. Technical assistance in the form of project review is critical to ensure projects are designed, implemented, and maintained in a cost-effective manner.

State agencies also utilize, where possible, WSMD-developed Tactical Basin Plans to identify the highest-priority opportunities to reduce water pollution. The process involves coordinating watershed assessments and planning to identify and prioritize cost-effective pollution controls. The process then involves targeting support – educational, technical and financial assistance – to implement projects.

Figure 5. Number of projects reviewed by ANR-DEC WSMD staff, SFY 2012-2017

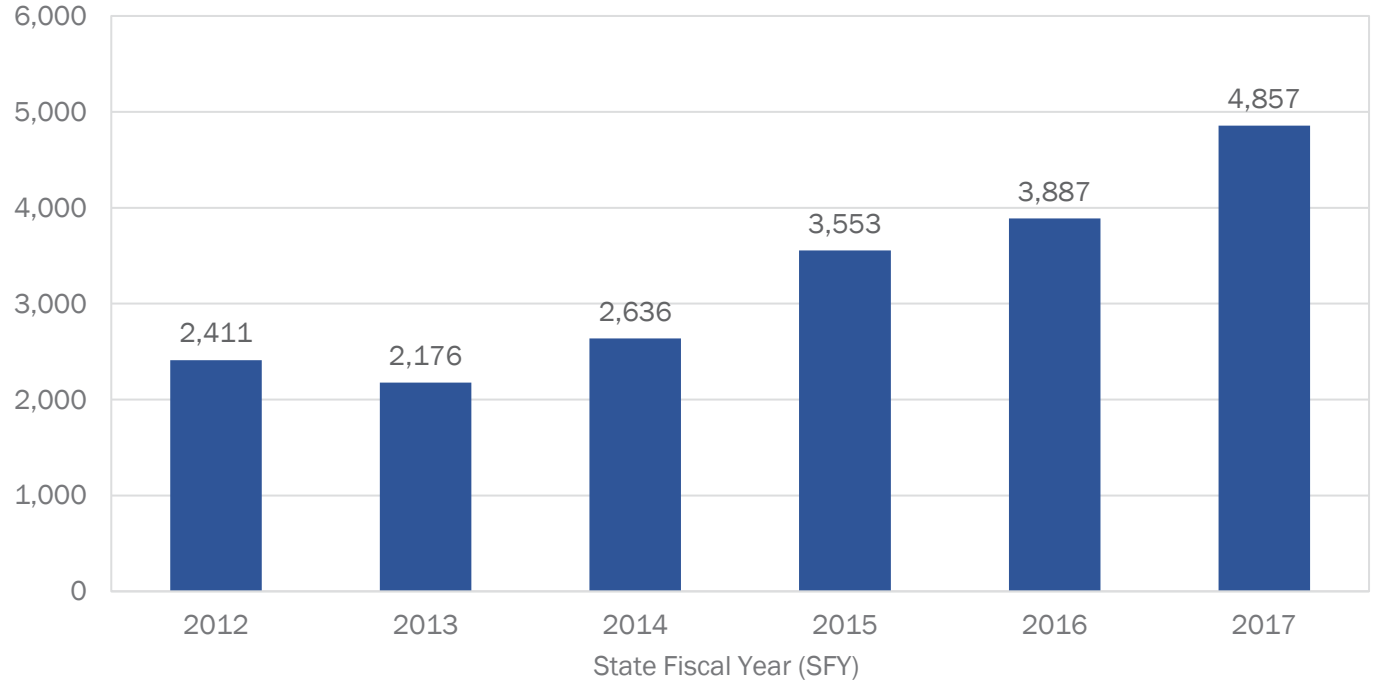


Table 1. Summary of FED Design and Construction Engineering Section staff technical assistance for stormwater and wastewater projects, SFY 2017

| Measures of Technical Assistance | 2016 Value | 2017 Value |
|---|---|---|
| Hours of technical assistance provided to municipalities by FED Design and Construction Engineering Section staff for stormwater and wastewater projects | New in 2017 | 5,300 |

Table 2. Summary of FPR AMP technical assistance for water quality, calendar year 2015-2016

| Measures of Technical Assistance | 2015 Value | 2016 Value |
|---|---|---|
| Number of logging operation site visits to provide Acceptable Management Practices (AMP) technical assistance | 11 | 11 |
| Number of site investigations conducted for Acceptable Management Practices (AMP) compliance (complaint driven) | 37 | 31 |
| Number of logging operation site visits with discharges remediated | 16 | 18 |
| Number of Use Value Appraisal (UVA) site inspections | 630 | 990 |
| Acres of forest lands covered by UVA site inspections | 107,534 | 189,733 |

## Agency of Natural Resources, Department of Environmental Conservation, Facilities Engineering Division Technical Assistance

ANR-DEC's Facilities Engineering Division (FED) Design and Construction Engineering Section staff assist municipalities (and owners of municipally-sponsored projects) in the engineering and construction of stormwater and wastewater projects. These assistance efforts focus on projects financed by Vermont Clean Water State Revolving Fund (CWSRF) loans and funded by Municipal Pollution Control grants. FED staff review engineering reports, plans, and specifications to ensure projects employ appropriate technologies, are biddable and constructible, and comply with local, state, and federal funding requirements. Staff also monitor progress during construction to ensure projects are completed on time and within budget. In SFY 2017, FED Design and Construction Engineering Section staff began tracking hours of technical assistance provided for municipal stormwater and wastewater projects. In SFY 2017, FED staff provided 5,300 hours of technical assistance on projects (see Table 1 above).

## Agency of Natural Resources, Department of Forests, Parks and Recreation Technical Assistance for Logging Jobs and Forestry

The Acceptable Management Practices (AMPs) for Maintaining Water Quality on Logging Jobs in Vermont are intended to prevent discharges of sediment from soil erosion and other water pollutants associated with logging from entering Vermont's waterways. The state updated the AMPs in October of 2016.[9] The Vermont Department of Forests, Parks and Recreation (FPR) provides training on the new AMPs to loggers, foresters and landowners to help them comply with the AMPs. Table 2, above, summarizes FPR's AMP-related technical assistance efforts.

[9] FPR is undergoing a second rulemaking process to make minor AMP modifications in 2018.

FPR foresters responded to 42 AMP calls around the state as part of the AMP Monitoring Program in calendar year 2016.[10] Eleven of these calls were requests for technical assistance and 31 were in response to AMP complaints. Of those complaints, 18 of the logging operations inspected revealed evidence of discharges of sediment into waterbodies and 13 logging operations had no evidence of discharge. Remedial actions were prescribed by the FPR forester and immediately implemented by the logger to stop any on-going discharge.

FPR also provides AMP technical assistance to landowners enrolled in the Use Value Appraisal (UVA) Program during site inspections to ensure compliance with AMPs. In calendar year 2016, FPR inspected 990 UVA-enrolled parcels spanning 189,733 acres of private forest lands. FPR county foresters provided technical assistance on AMPs during an estimated 20 percent of UVA inspections, which includes, areas with risk of erosion.

The Lake Champlain Regional Conservation Partnership Program (RCPP) provides financial assistance to forest landowners to make water quality improvements. ANR-FPR county foresters (one of many RCPP partners) use UVA Program inspections as an opportunity to inform forest landowners on financial and technical resources available through RCPP. Landowners were provided information based on the conditions of forest roads and stream crossings and likelihood of eligibility for the RCPP program. An estimated 5-10 percent of landowners visited in the Lake Champlain basin received information on RCPP resources. FPR continues to modify how county foresters document technical assistance, which will allow for more accurate and efficient delivery of assistance in future years.

## Agency of Natural Resources, Department of Forests, Parks and Recreation Urban and Community Forestry Program Technical Assistance

FPR also provides technical assistance through its Urban and Community Forestry Program. This program is designed to help communities build capacity to plan, plant, and care for trees in and around developed areas as a "green stormwater management strategy." The program focuses on installing trees along streets and municipally-owned forests, village greens, schools and other community green spaces. Incorporating and maintaining trees in developed areas provides multiple community benefits, including aesthetic and socioeconomic values, habitat function, and water quality improvement by reducing stormwater runoff.

In SFY 2017, the Urban and Community Forestry Program provided technical assistance to 78 communities and recorded 17,150 volunteer service hours (summarized in Table 3). Volunteers work in their communities to advance urban and community forestry programs, including tree planting and care, policy development, and public awareness campaigns.

Table 3. Summary of FPR Urban and Community Forestry Program technical assistance, SFY 2016-2017

| Measures of Technical Assistance | 2016 Value | 2017 Value |
|---|---|---|
| Number of communities receiving Urban and Community Forestry Program technical assistance | 94 | 78 |
| Hours of Urban and Community Forestry Program volunteer service | 15,800 | 17,150 |

[10] Given the timeline of this report, calendar year 2017 data are not yet available. FPR annual statewide summary reports are available here: http://fpr.vermont.gov/forest/vermonts_forests/amps.

## Agency of Transportation Technical Assistance on Road Erosion Control Practices

VTrans staff help municipalities install stormwater best management practices on roads to reduce road runoff and erosion. VTrans' technical assistance efforts may involve meeting with municipalities in the field and identifying potential projects for grant funding, recommending cost-effective fixes to address road runoff and erosion-driven issues, providing technical expertise during project construction, and inspecting newly constructed projects. In SFY 2017, VTrans district, stormwater, environmental, and Municipal Assistance Bureau staff provided 1,483 hours of technical assistance to municipalities, shown in Table 4.

Hours of technical assistance is a new measure established by VTrans in SFY 2017. Therefore, data were unavailable for this measure in SFY 2016. However, in SFY 2016, VTrans Better Roads Program staff conducted 78 site visits with 54 municipalities to provide the services described above.

VTrans and DEC staff visiting a stone-lined ditch during a site visit

Table 4. Summary of VTrans technical assistance to municipalities on road erosion control practices, SFY 2017

| Measures of Technical Assistance | 2016 Value | 2017 Value |
|---|---|---|
| Hours of water quality municipal technical assistance provided by District Technicians | New in 2017 | 393 |
| Hours of water quality municipal technical assistance provided by stormwater and environmental staff | New in 2017 | 89 |
| Hours of water quality municipal technical assistance provided by Municipal Assistance Bureau Staff | New in 2017 | 1,001 |

# 3. Investment Measures

Restoring Vermont's clean water requires investments at the state, federal, municipal, and private-level. State investments are channeled through grant, loan, and assistance programs to strategically and cost-effectively restore and safeguard the state's rivers, streams, lakes, ponds, and wetlands. These funds are used to conduct assessments to help identify and prioritize projects, as well as to design and implement projects. This work helps municipalities, farmers, and other landowners comply with regulations, and encourages voluntary actions necessary to address runoff from unregulated sources.

Vermont's clean water investments[11] made in SFY 2017[12] are summarized through the following measures:

- State investments by agency and funding source;
- State investments by project step;
- State investments by sector and funding recipient category;
- Geographic distribution of investments by watershed and county;
- Match or in-kind funds leveraged by state-funded projects.

Results of state-funded projects are captured by project output and environmental outcome measures, once projects are completed, in Chapters 4 and 5 of the Investment Report. These results are only reported once projects are fully implemented, and therefore, may be captured in future years' reports. It is important to note that some projects may require multiple years to fully complete.

## SCOPE OF THIS CHAPTER

Included in this Report

State agencies' investments in clean water projects through state administered grants, contracts, or loans awarded in SFY 2017.

Outside the Scope of this Report

Federal agencies' direct investments in clean water projects, unless projects are also funded by a state grant or financed by a state loan.

Municipal and private investments in clean water projects necessary to comply with water regulations, unless projects are also funded by a state grant or financed by a state loan.

VTrans' investments in clean water projects to comply with water quality regulations on state highways and VTrans non-road developed lands.

[11] State investments are defined as dollars obligated/awarded to clean water projects through grants and contracts, or financed through loans, administered by the State of Vermont. Investments reported include state and federal dollars awarded to projects by state agencies, but excludes federal funds awarded to projects directly by federal agencies.

[12] In October 2017, the Secretary of Administration moved the overall responsibility of financial reporting on Clean Water initiatives to the Secretary's Office. All departments are now working with the Secretary's Office to develop a consistent and standardized financial reporting structure to improve accuracy, transparency and a comprehensive view of the State's investment in clean water initiatives.

## INVESTMENT MEASURE #1: FUNDS AWARDED BY AGENCY AND FUNDING SOURCE

This Investment Report summarizes total investments made in clean water by the State of Vermont across agencies. These investment measures show state investments in clean water in SFY 2017 by agency, funding source, and the types of investments made (including grants and contracts, loans, and operational funding). These investment data are based on dollars awarded to projects through the various state agency funding programs in SFY 2017. The scope of funding programs reported are summarized in Table 5 by agency.

The State of Vermont invested more than $23 million to support clean water restoration activities across four agencies in SFY 2017. This represents a 114 percent increase in the level of investment from 2016. Figure 6 shows clean water investments by agency in SFY 2016 and 2017.[13]

Table 5. Funding programs reported by agency

| Agency | Funding Programs Reported |
|---|---|
| Agency of Agriculture, Food and Markets (AAFM) | Best Management Practice (BMP) Program |
| | Capital Equipment Assistance Program (CEAP) |
| | Clean Water Fund Grants and Contracts |
| | Clean Water Fund Operational Funds |
| | Conservation Reserve Enhancement Program (CREP) |
| | Farm Agronomic Practice (FAP) Program |
| | Water Quality (WQ) Grants |
| Agency of Natural Resource (ANR) | Clean Water State Revolving Fund (CWSRF) Loans |
| | Ecosystem Restoration Grants |
| | Fish and Wildlife Department Watershed Grants |
| | Municipal Pollution Control Grants |
| Agency of Transportation (VTrans) | Better Roads Program |
| | Transportation Alternatives Program (TAP) |
| Vermont Housing and Conservation Board (VHCB) | Conservation Grants |
| | Farmland Protection Grants |

[13] SFY 2017 is the first year that VHCB data were included in this report.

Figure 6. Dollars awarded by agency, SFY 2016-2017

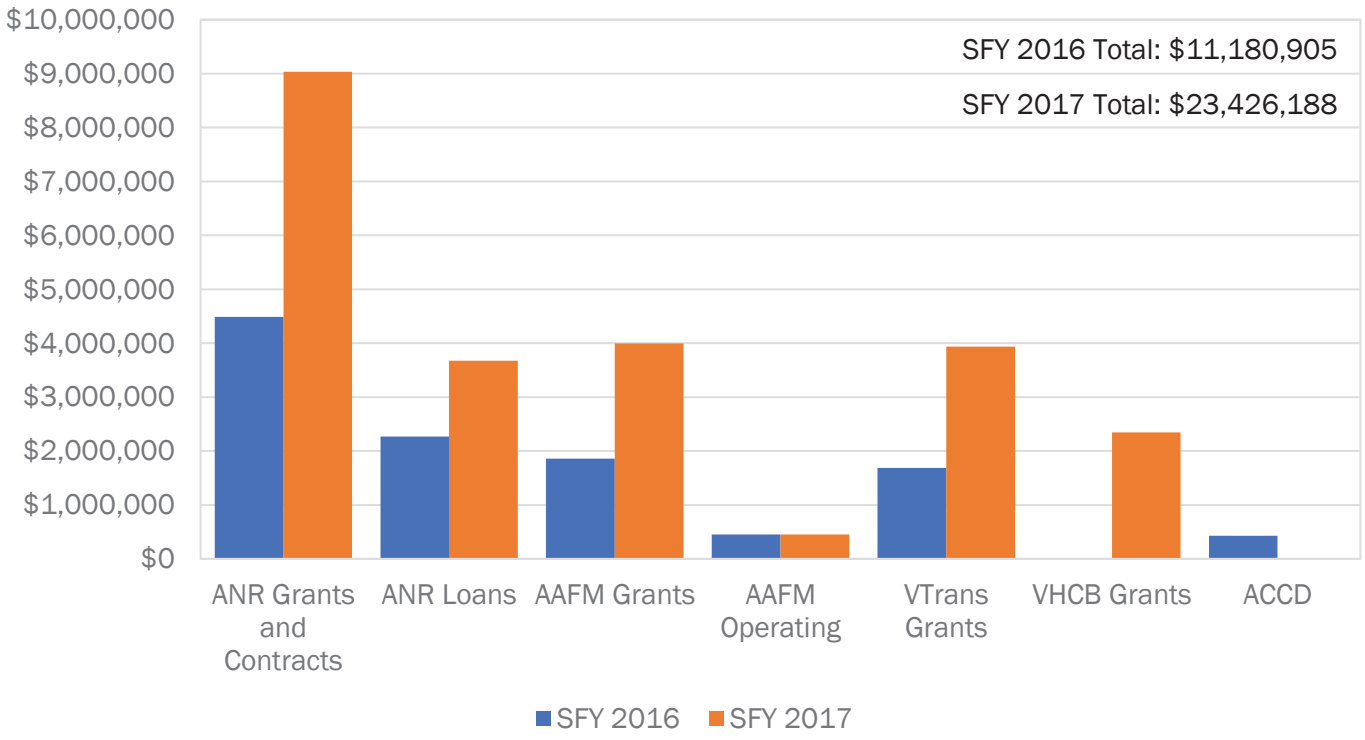
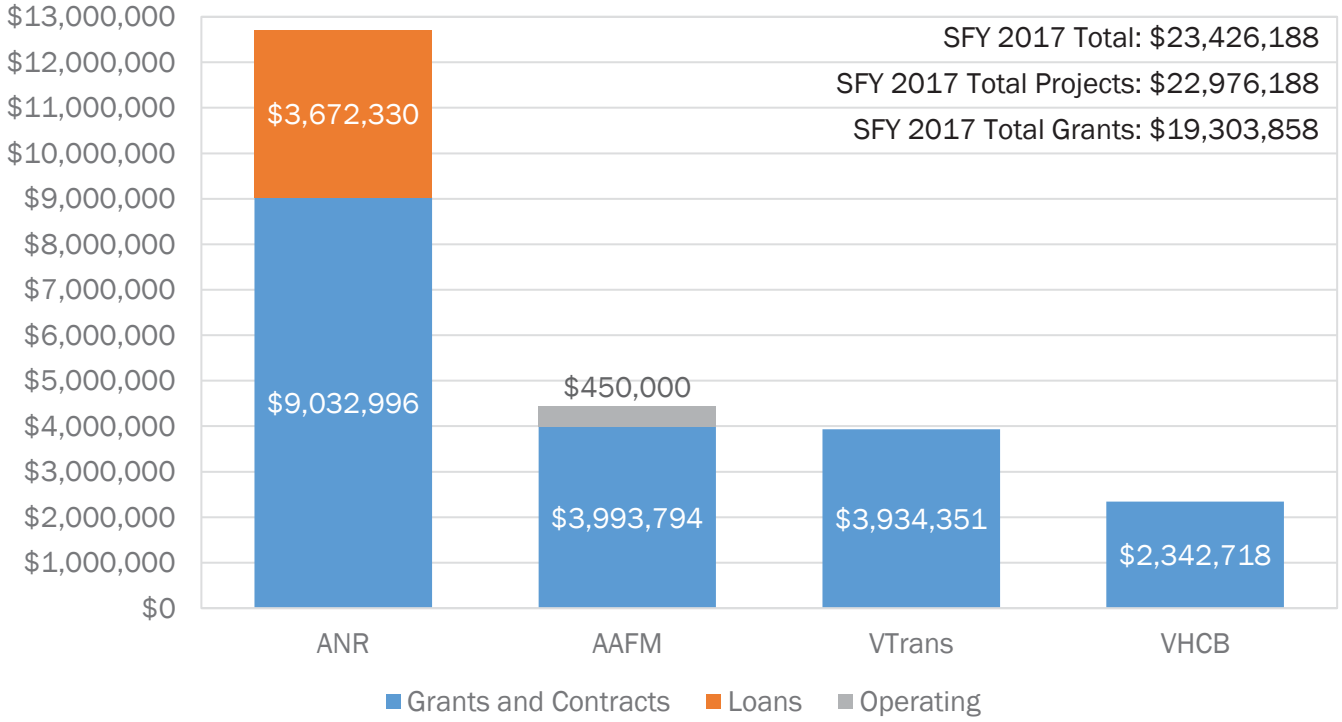



Figure 7. Dollars awarded in SFY 2017 through grants and contracts, loans, and short term operational funds for capacity building



Funds awarded through grants and contracts, loans, and operational funds are shown in Figure 7. Most of the funds (approximately $19.3 million) were awarded through grants and contracts to address nonpoint pollution sources, stormwater management, natural resources restoration, and municipal wastewater treatment. Approximately $3.7 million were provided as low-interest loans through the Clean Water State Revolving Fund (CWSRF) to municipalities for wastewater treatment facility (WWTF) improvements and combined sewer overflow (CSO) abatement, of which approximately 17 percent are state funds and 83 percent are U.S. Environmental Protection Agency federal funds. In addition to grants and contracts, $450,000 were directed from the Clean Water Fund to AAFM as operational funds for agency staff. The purpose of these funds is to build AAFM's capacity for increased on-farm oversight to enforce water quality regulatory requirements. This ensures greater compliance with the state's RAPs and other water quality regulations.

State agencies' clean water investments are supported by a variety of funding sources. Figure 8 shows the percent of total dollars awarded in SFY 2017 by funding source across agencies, and Figure 9 shows the percent of total dollars awarded by funding source for each agency. Of the total funds awarded, 81 percent are state funds and 19 percent are federal funds. Federal funding sources include federal transportation funds, USDA-NRCS Agricultural Conservation Easement Program, and approximately 83 percent of the CWSRF loan financing.

Figure 8. Total dollars awarded in SFY 2017 by funding or financing source

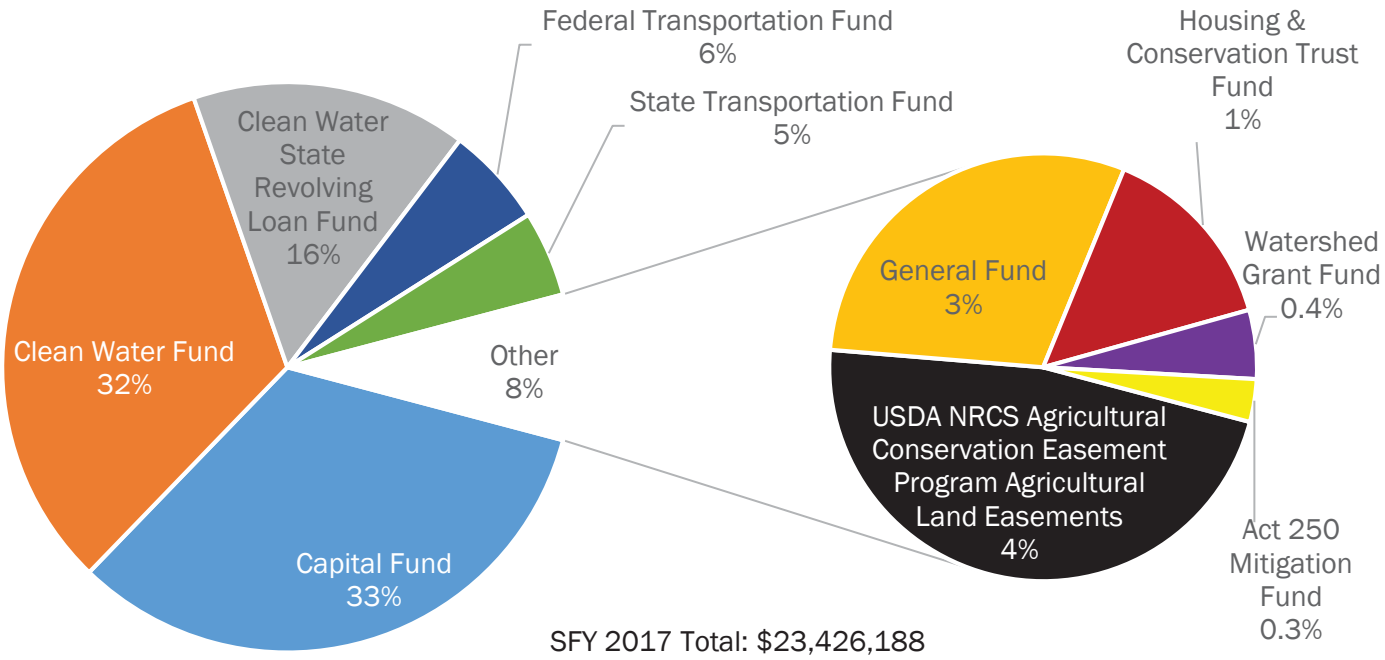
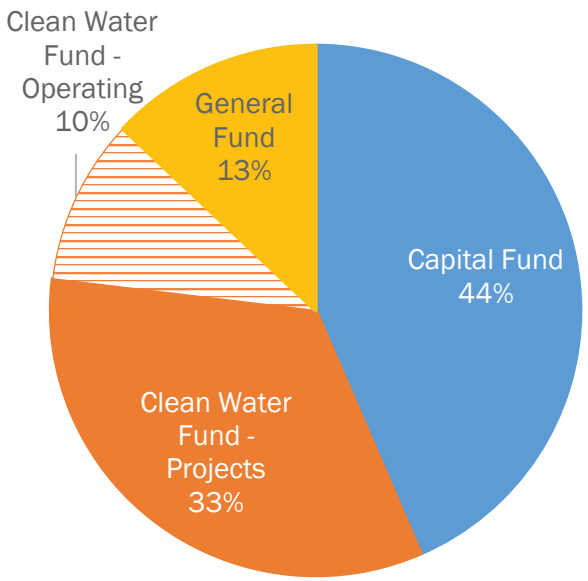
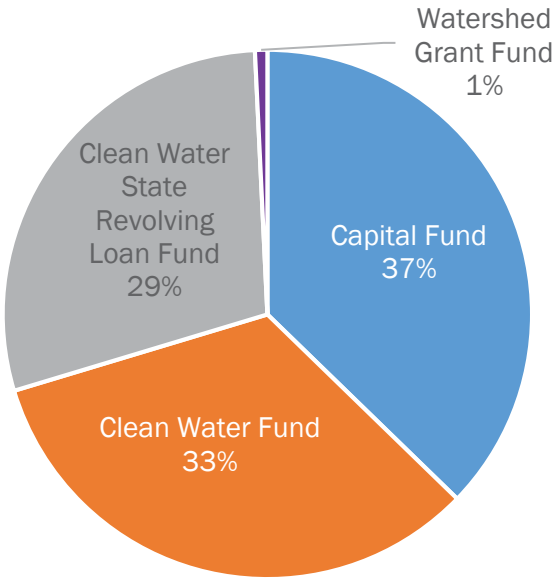


Figure 9. Dollars awarded in SFY 2017 by agency and funding or financing source

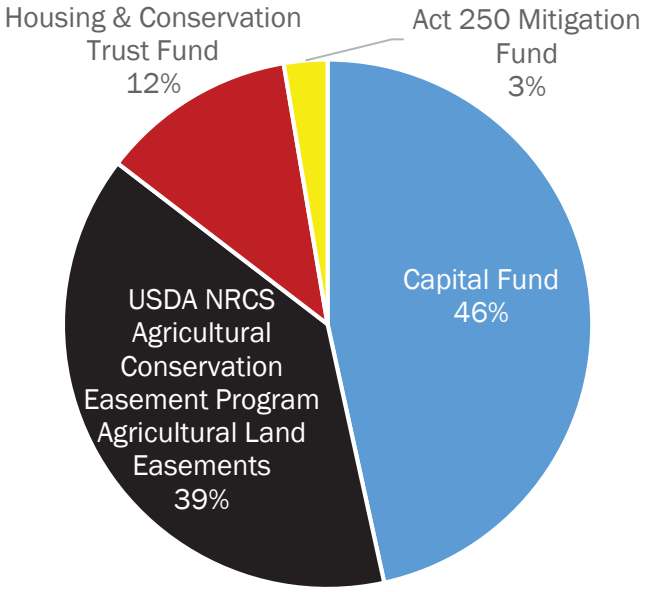
Agency of Agriculture Food and Markets
SFY 2017 Total: $4,443,794



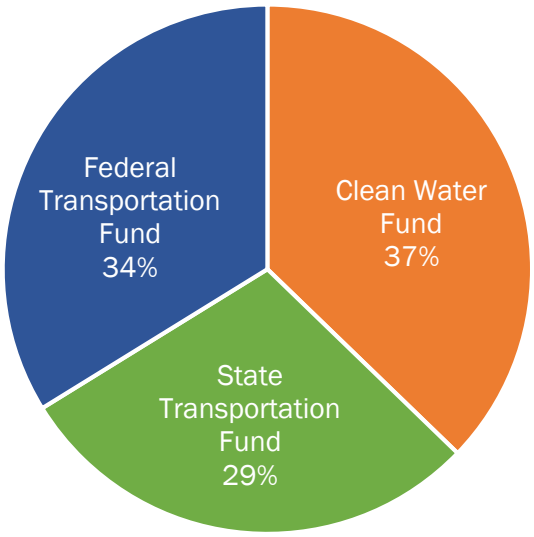

Agency of Natural Resources
SFY 2017 Total: $12,705,325




Vermont Housing and Conservation Board
SFY 2017 Total: $2,342,718




Agency of Transportation[14]
SFY 2017 Total: $3,934,351




[14] VTrans' investments in clean water projects to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report because this report focuses on state-provided grant funding and loan financing only. However, Appendix F of this report summarizes VTrans' clean water improvement activities.

## Vermont's Clean Water Fund

The Vermont Clean Water Act (Act 64 of 2015), signed into law in 2015, established Vermont's Clean Water Fund. The purpose of the Clean Water Fund is to provide additional state funds to help municipalities, farmers and others implement actions that will reduce water pollution. The Fund is supported by a property transfer tax surcharge that generates approximately $5 million annually (which, beginning in SFY 2017, supports $4 million for clean water and $1 million for state housing bonds). The 2017 legislative session extended the Clean Water Fund revenue source to 2027.[15]

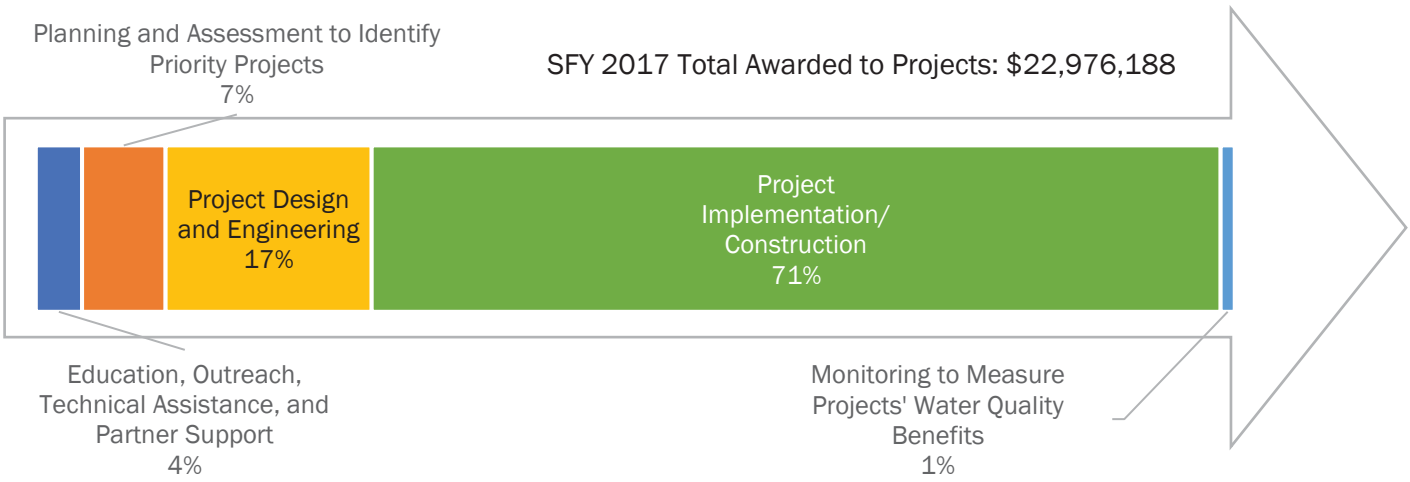
The Clean Water Fund is administered by the Clean Water Fund Board, with representation from AoA, AAFM, ACCD, ANR, and VTrans. The Clean Water Fund Board allocates Clean Water Fund dollars each year following a budget process with multiple opportunities for public participation. More information is available here: http://dec.vermont.gov/watershed/cwi/cwf/budget-process.

## INVESTMENT MEASURE #2: FUNDS AWARDED BY PROJECT STEP

Making wise investments in cost-effective clean water projects requires education and outreach and thorough project planning. Investing in the project development process is key to ensure the state invests in projects that will yield the greatest water quality improvement per dollar. Figure 10 shows the project development process, and the proportion of state funds invested in each project step in SFY 2017.

The state awarded 4 percent of funds to partners to provide education, outreach, and technical assistance to support municipalities, farmers, and other landowners in planning and implementing projects. Planning and assessment efforts to identify priority, cost-effective projects were supported by 7 percent of the funds, and project design and engineering accounted for 17 percent of funds. Most (71 percent) of clean water dollars invested supported the implementation of clean water projects. The remaining one percent supported monitoring to measure the effectiveness of projects in improving water quality.

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

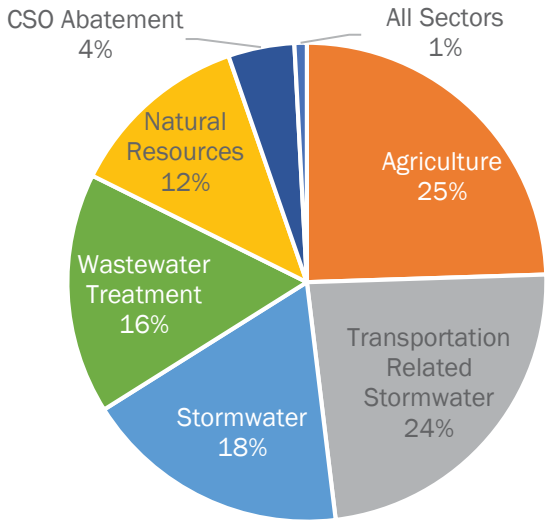



[15] Act 85 (2017), Section I.9 32 V.S.A. § 9602(a)

## INVESTMENT MEASURE #3: FUNDS AWARDED BY SECTOR AND RECIPIENT CATEGORY

Providing clean water for Vermonters and visitors to use and enjoy is a shared responsibility. Reaching our clean water goals of reducing nutrient and sediment pollution from precipitation-driven runoff, as well as improving wastewater and stormwater infrastructure, requires an "all-in" approach. Mirroring this need, the state invests in clean water projects across sectors through grants, contracts, and loans, targeting funds to the greatest water quality needs. Figure 11 summarizes the proportion of state investments in clean water by sector in SFY 2017. Figure 12 shows the proportion of state investments by grant, contract, and loan recipient category.

Figure 11. Proportion of dollars awarded in SFY 2017 by sector[16] (natural resources restoration includes rivers, lakes, wetlands, and forests)[17]




SFY 2017 Total Awarded to Projects: $22,976,188

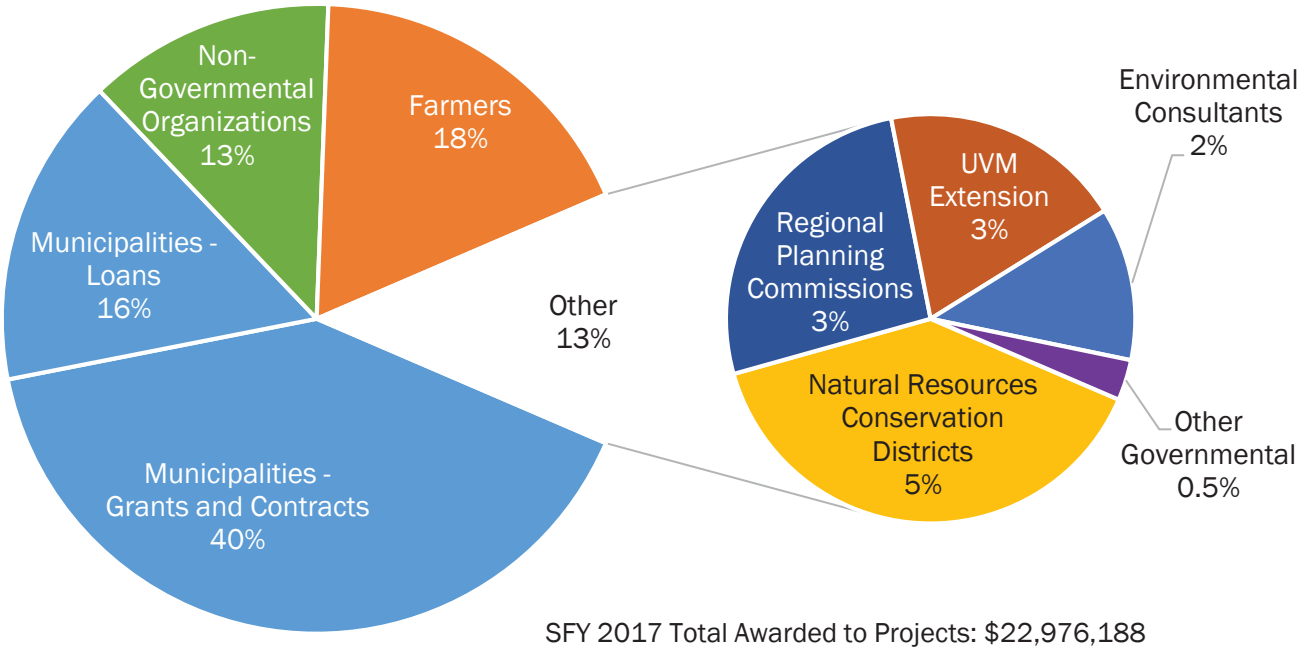
In SFY 2017, 42 percent of the state's investments targeted stormwater runoff from roads (24 percent) and other paved surfaces (18 percent), followed by 25 percent of the funds invested in agriculture. Approximately 12 percent of funds were invested in natural resources restoration projects, addressing river and floodplain, lake shoreland, wetland, and forest restoration. About 20 percent of funds were invested, primarily through low-interest loans, for municipal wastewater infrastructure improvements (16 percent) and combined sewer overflows (CSOs) abatement (4 percent). The remaining 1 percent of funds were invested across sectors for water quality monitoring and analysis before and after project implementation to determine the degree of water quality improvements made, as well as to promote clean water education and outreach. Results of water quality monitoring before and after project implementation will be reported in the SFY 2018 Investment Report.

Vermont's clean water funds are awarded to partners – municipalities, farmers, non-governmental organizations, regional planning commissions and natural resources conservation districts – to complete clean water projects. These partners play a key role in identifying, designing, and implementing priority clean water projects. Figure 12 shows how state dollars were awarded to the different types of entities that receive grants, contracts, and loans. In SFY 2017, the majority (56 percent) of funds were awarded to municipalities with 40 percent of the funds awarded as grants and contracts and the remaining 16 percent awarded through loans.

[16] VTrans' investments in clean water projects to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report because this report focuses on state-provided grant funding and loan financing only. However, Appendix F of this report summarizes VTrans' clean water improvement activities.

[17] Natural resources investments include: (a) natural resources restoration (represents 8 percent of total) and (b) forest conservation with water quality protections (represents 4 percent of total).

Figure 12. Proportion of dollars awarded in SFY 2017 by recipient category of grants, contracts, and loans




## INVESTMENT MEASURE #4: GEOGRAPHIC DISTRIBUTION OF FUNDS INVESTED

Each region of the state has local clean water priorities to address. Figure 14 shows the geographic distribution of state funds invested in clean water restoration activities by watershed. Figure 15 shows the geographic distribution of state funds invested in clean water restoration activities by county. In SFY 2017, each of Vermont's 15 major river basins and 14 counties benefited from the state's investments in local, regional, and statewide clean water projects. As shown in Figure 13, approximately 62 percent ($14.3 million) of investments occurred in the Lake Champlain basin, followed by 34 percent ($7.7 million) in the Connecticut River basin (drains to Long Island Sound), 3 percent ($607,164) in the Lake Memphremagog basin, 1 percent ($331,243) in the Batten Kill-Walloomsac-Hoosic River basin (drains to the Hudson River).

Figure 13. Dollars awarded to clean water projects by basin in SFY 2017

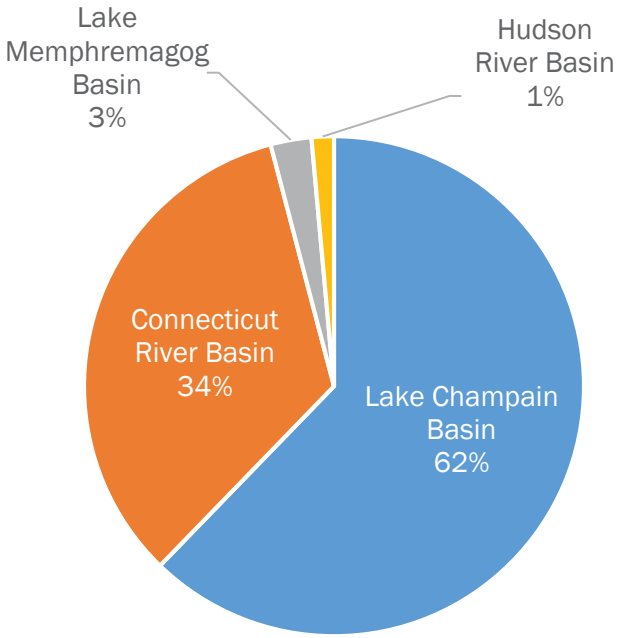


Figure 14. Map of dollars awarded to clean water projects by watershed in SFY 2017

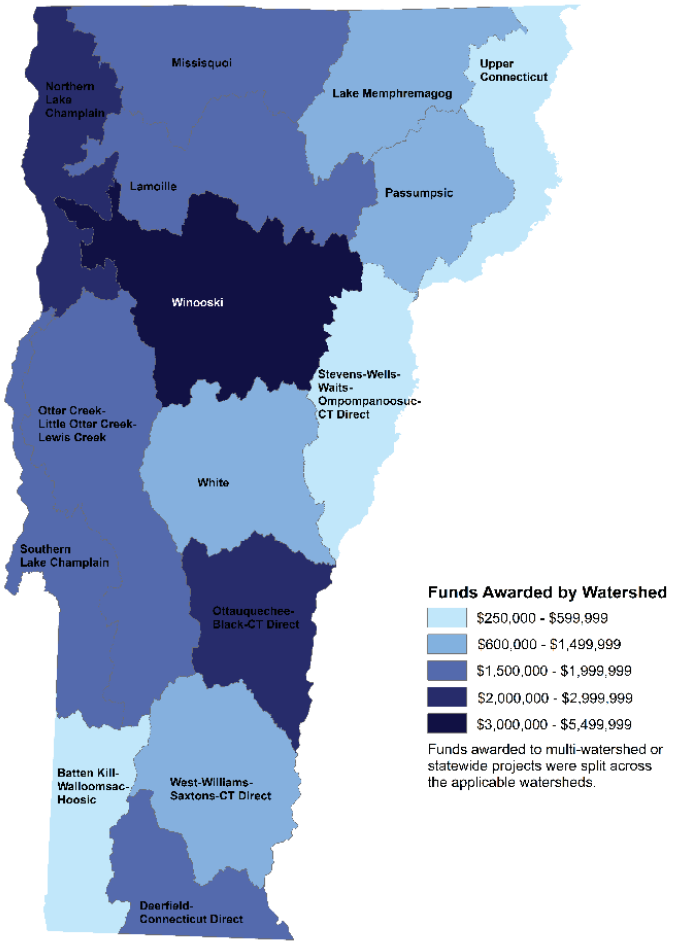
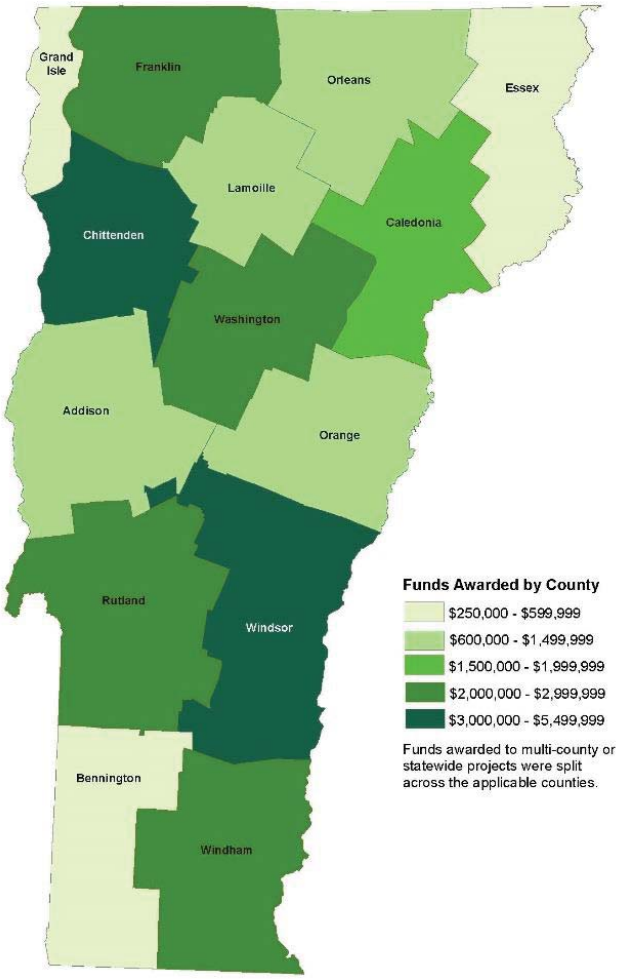



Figure 15. Map of dollars awarded to clean water projects by county in SFY 2017

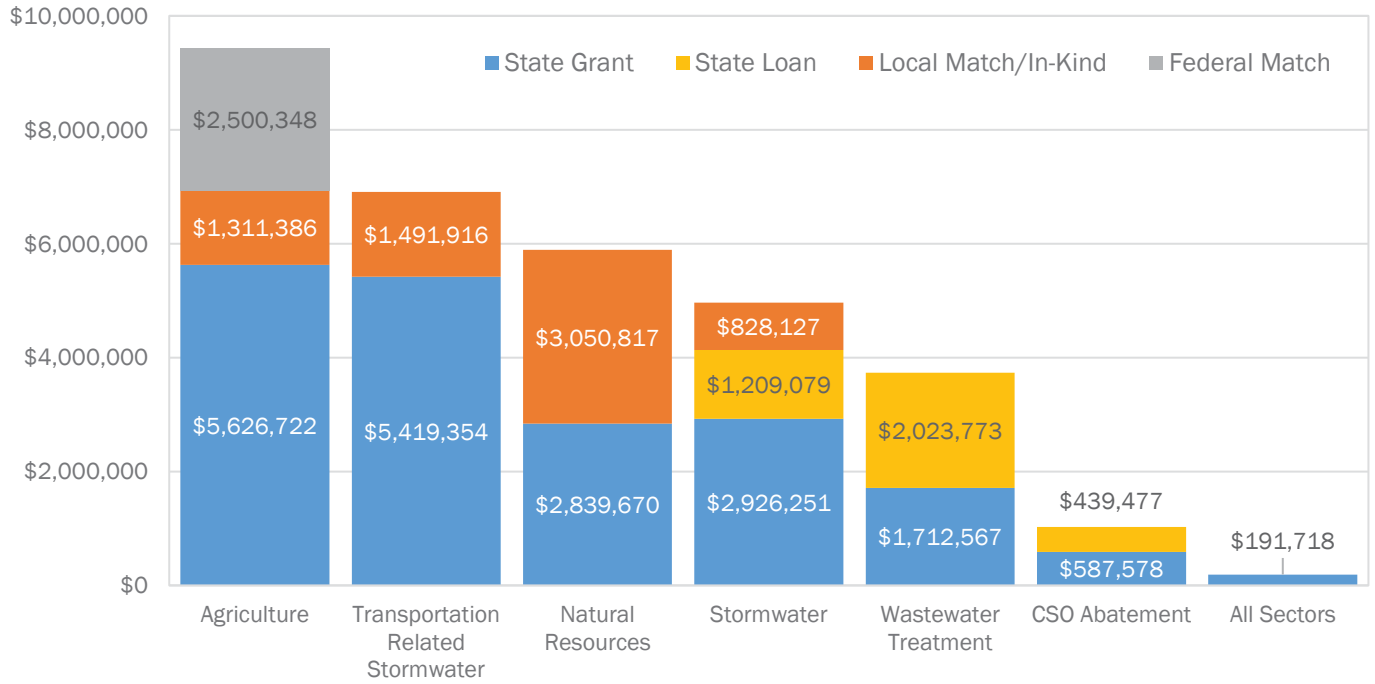


## INVESTMENT MEASURE #5: MATCH OR IN-KIND FUNDS LEVERAGED BY STATE-FUNDED PROJECTS

State-funded clean water projects leverage local and federal contributions to cover project costs and to further clean water efforts in Vermont. Figure 16 shows local match or in-kind and federal match dollars that contributed to state-funded clean water projects in SFY 2017 by sector. In SFY 2017, state agencies awarded $19.3 million in grant funds to support clean water projects. State grants leveraged $6.7 million in local match or in-kind and $2.5 million in federal match. CWSRF loans, also shown in Figure 16, are repaid by municipalities, and therefore, represent municipal contributions to clean water projects. Municipal Pollution Control grants are often coupled with CWSRF loans to fund municipal wastewater and stormwater improvements, with grants covering, on average, 30 percent of project costs and loans covering the remaining 70 percent.

State grant programs leverage match or in-kind contributions to projects through a mix of match incentives and requirements. ANR's Ecosystem Restoration Grants incentivize local match and require 50 percent match on municipal stormwater permit projects. VTrans' Better Roads and Transportation Alternatives grant programs require 20 percent local match for all projects. CWSRF loan forgiveness may be offered for 10 to 40 percent of project costs to incentivize priority projects. AAFM and VHCB grant programs combined $1.6 million in state project funds with $3.4 million in U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) federal funds to maximize funds available to farmers. USDA NRCS programs, in total, awarded over $22 million to agriculture pollution control projects in Vermont in federal fiscal year 2017. For more information on USDA NRCS programs, visit: https://www.nrcs.usda.gov/wps/portal/nrcs/main/vt/programs/.

Figure 16. Local match/in-kind and federal match contributing to state-funded clean water projects by sector in SFY 2017

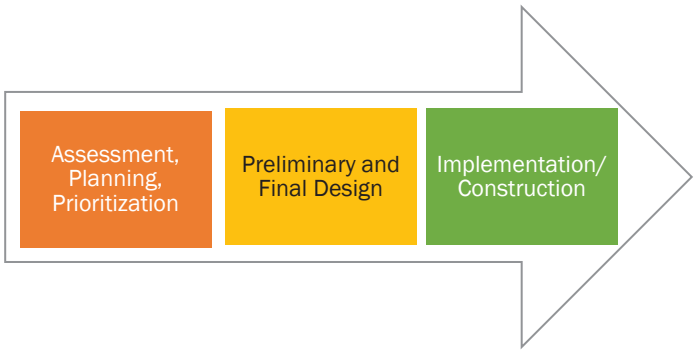


# 4. Project Output Measures

This report quantifies accomplishments of clean water projects completed in SFY 2016 and 2017 by measuring and summarizing project outputs.[18] The state has developed standard project "performance" measures for each type of clean water project. These measures are tracked project-by-project, but are summarized by project-type for reporting purposes. Measures of project outputs help the state evaluate the cost-effectiveness of the state's clean water investments over time, and represent a major improvement in the state's accountability for clean water investments in projects.

Project outputs completed in SFY 2017 are summarized in this chapter by project step:

1. Results of assessment and planning projects;
2. Results of design projects; and
3. Results of implementation projects.




## SCOPE OF THIS CHAPTER

Included in this Report

Results of clean water projects, funded by state agencies, completed in SFY 2017.

Outside the Scope of this Report[19]

Results of federally, municipally, or privately-funded clean water projects, unless also funded by a state grant or financed by a state loan.

Results of municipal and private clean water projects completed to comply with water regulations, unless funded by a state grant or financed by a state loan.

Results of VTrans funded clean water projects completed to comply with water quality regulations on state highways and VTrans-owned non-road developed lands.

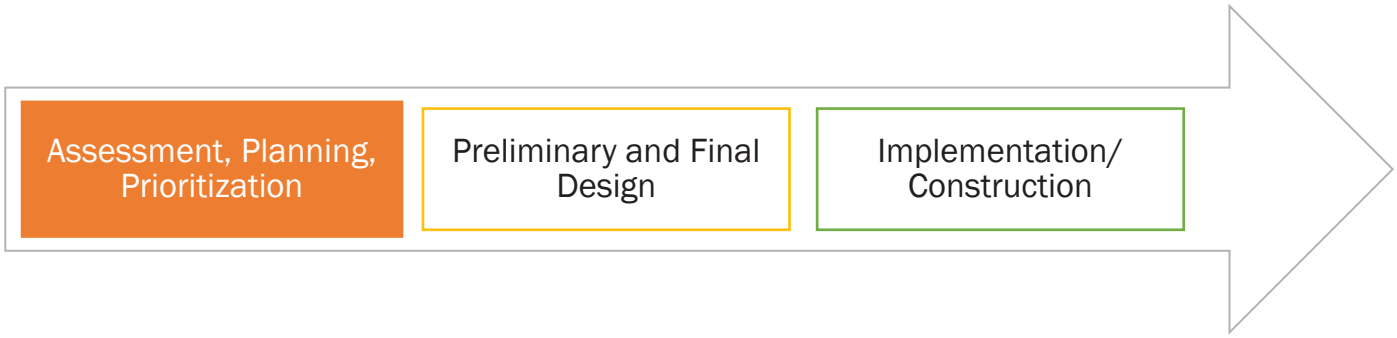
Planned Report Improvements

The SFY 2017 Investment Report evaluates actions and outcomes relative to actions and outcomes reported in the SFY 2016 Investment Report; however, future Investment Reports will include interim targets to evaluate clean water progress over multiple years.

Continuous improvements to tracking and reporting processes and methodologies will reduce gaps in data on clean water projects results.

[18] Work completed in the reporting period of state fiscal year 2017 includes funding agreements closed out (all deliverables completed/approved and final payments made) between July 1, 2016 and June 30, 2017.

[19] The state will track results of federally-funded clean water projects and projects necessary to comply with water quality regulations. The state will report on its progress in future publications.




## PROJECT OUTPUT MEASURES #1: RESULTS OF ASSESSMENT AND PLANNING PROJECTS

### Why are these measures important?

- ✓ Project identification and prioritization to address nutrient and sediment pollution
- ✓ Supports cost-effective implementation to address nutrient and sediment pollution

Given the significant costs of restoring and safeguarding water quality, it is critical for the state to spend its resources in the most cost-effective manner. Assessment and planning work identifies and prioritizes projects to improve clean water. These activities apply across multiple sectors, including stormwater, rivers/streams, roads, and wastewater treatment. Vermont's Tactical Basin Plans integrate the results of assessments and plans at the basin-scale, resulting in a prioritized list of projects necessary to achieve clean water goals for each basin.[20]

### What are we doing?

State agencies use Tactical Basin Plans to target investments in the most important and cost-effective projects to achieve clean water targets. Those targets are described in clean water restoration plans, known as Total Maximum Daily Loads (TMDLs), the Vermont Clean Water Act, and the 2016 Combined Sewer Overflow (CSO) Rule.

### What progress has been made?

Results of state-funded planning and assessment projects completed in SFY 2016 and 2017 are summarized in the following sections by sector.

[20] Tactical Basin Plan priority projects lists are updated continuously and available online in the Watershed Projects Database: https://anrweb.vt.gov/DEC/IWIS/ARK/ProjectSearch.aspx.

## Agriculture Project Planning Results

### Why are these measures important?

- ✓ Project identification and prioritization to address nutrient and sediment pollution
- ✓ Supports cost-effective implementation to address nutrient and sediment pollution
- ✓ Supports farmer compliance with required agricultural practices

### What are we doing?

Information gathered from AAFM's technical assistance efforts has led to significant project planning. In SFY 2016-2017, AAFM prioritized 28 farms to focus project planning, design, and implementation. In addition, AAFM's Conservation Reserve Enhancement Program (CREP) completed planning for 21 new riparian corridor restoration projects, of which 11 have secured funding for implementation in SFY 2018. AAFM completed work assisting agricultural producers in identifying 18 new priority projects and beginning the process to enroll in cost-share programs.

### What progress has been made?

Table 6 summarizes agriculture project planning results. In SFY 2017, AAFM staff and contractors increased efforts to assist farmers in planning and implementing conservation practices. These planning efforts will continue, and project implementation resulting from these plans will be captured in future years' reports.

Table 6. Summary of state-funded agriculture project planning results, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Number of CREP riparian buffer projects planned | 8 | 21 |
| Number of priority projects assisted to enroll in cost share | 10 | 18 |

## River and Stream Assessment and Planning Results

### Why are these measures important?

- ✓ Project identification and prioritization to address nutrient and sediment pollution
- ✓ Supports cost-effective implementation to address nutrient and sediment pollution
- ✓ Supports improved flood resiliency/flood hazard mitigation
- ✓ Supports improved habitat function

### What are we doing?

River, stream, and floodplain restoration and protection projects are primarily identified and prioritized through Stream Geomorphic Assessments and River Corridor Plans. These plans and assessments identify where stream condition may be causing erosion, contributing to nutrient and sediment pollution and flood hazards. Follow-up field-based assessments are completed to identify projects to improve stream condition. Potential projects are compiled, ranked, and prioritized for water quality, flood resiliency, and habitat benefits. Projects prioritized include river and floodplain restoration projects and river corridor protection easements.

### What progress has been made?

Table 7 summarizes river assessment and planning results. In SFY 2016 and 2017, thirteen state-funded river assessments and plans were completed resulting in 142 stream miles assessed; 121 priority river restoration or protection projects identified; and 195 acres scoped to prepare river corridor easements. River assessment and planning efforts decreased from SFY 2016 to 2017 due to: (a) limited availability of flexible funds to support planning; and (b) a shift of efforts to implement plans completed in prior years. While stream/river planning efforts decreased from SFY 2016 to 2017, Stream Geomorphic Assessments have been completed for over 2,200 river miles in Vermont since 2009.

Table 7. Summary of state-funded stream/river assessment and planning results, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Stream miles assessed through Stream Geomorphic Assessments and River Corridor Plans | 113 | 29 |
| Number of priority river and floodplain projects identified | 104 | 17 |
| Acres scoped to prepare river corridor easements | 181 | 14 |

## Stormwater Assessments and Planning Results

### Why are these measures important?

- ✓ Project identification and prioritization to address nutrient and sediment pollution
- ✓ Supports cost-effective implementation to address nutrient and sediment pollution
- ✓ Supports compliance with municipal stormwater permits

### What are we doing?

Stormwater treatment opportunities are identified and prioritized primarily through three types of assessments: stormwater infrastructure mapping, stormwater master plans, and illicit discharge detection and elimination (IDDE). Stormwater master plans identify and prioritize projects to address stormwater runoff, and municipalities typically sponsor IDDE assessments to identify unauthorized or illegal discharges of sewage and other chemicals into surface waters via storm drains and sewers. These assessments may be completed at the municipal or regional-level.

### What progress has been made?

Table 8 summarizes stormwater assessment and planning results. In SFY 2017, state-funded stormwater master planning efforts covered 201 square miles and identified 120 priority projects – a significant increase from the previous year. IDDE assessments identified and confirmed 9 unauthorized or illegal discharges of sewage or other chemicals into surface waters that are required to be addressed by the responsible municipality or landowner.

Table 8. Summary of state-funded stormwater assessment and planning results, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Square miles covered by stormwater master plans | 13 | 201 |
| Number of priority projects identified | 52 | 120 |
| Number of unauthorized or illegal discharges confirmed (to be eliminated) | 40 | 9 |

## Road Erosion Inventory Results

### Why are these measures important?

| | |
|---|---|
| ✓ | Project identification and prioritization to address nutrient and sediment pollution |
| ✓ | Supports cost-effective implementation to address nutrient and sediment pollution |
| ✓ | Supports compliance with Municipal Roads General Permit |
| ✓ | Supports improved flood resiliency and flood hazard mitigation |

### What are we doing?

Road erosion inventories assist municipalities in identifying road segments contributing to water quality issues, and prioritizing specific projects to address those issues. Municipalities have been completing road erosion inventories for many years with VTrans grant funds. Beginning in 2020, municipalities will be required to complete road erosion inventories to comply with Vermont's new Municipal Roads General Permit (MRGP). These inventories will serve as the basis for municipalities to develop implementation schedules to meet the MRGP and address sediment and nutrient pollution from roads. In preparation for the upcoming MRGP, many municipalities have secured VTrans grant funds, often working with their Regional Planning Commission, to complete inventories.

### What progress has been made?

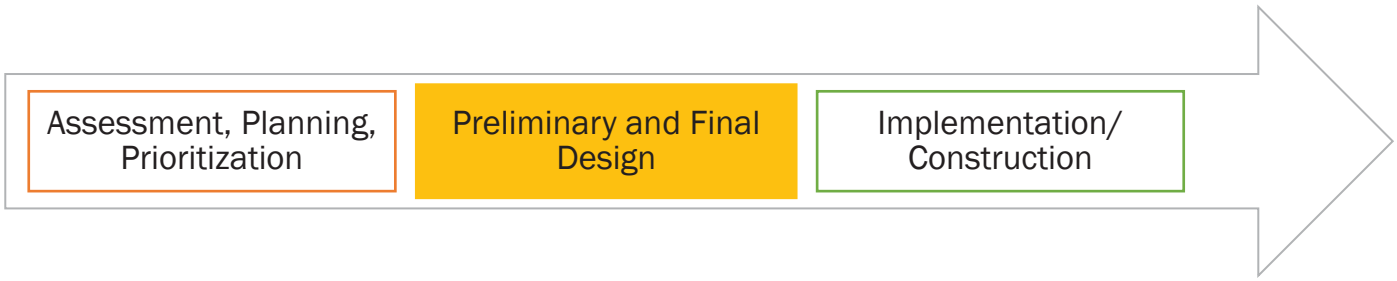
Table 9 summarizes the results of road erosion inventories completed in SFY 2016 and 2017. VTrans-funded inventories were completed by 12 municipalities in SFY 2016 and 48 municipalities in SFY 2017. Of the inventories completed in SFY 2017, about half were completed following draft MRGP standards based on data reported by Regional Planning Commissions to DEC. Inventories covered 290 road miles adjacent/bisecting waterways, of which 174 miles (60 percent) fully met draft permit standards, and 116 miles (40 percent) will require improvements to comply with draft permit standards.

Table 9. Summary of state-funded road erosion inventory results, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Number of municipalities that completed road erosion inventories | 12 | 48 |
| Number of hydrologically connected road miles inventoried | New in 2017 | 290* |
| Number of hydrologically connected road miles meeting MRGP draft standards | New in 2017 | 174* |
| Number of hydrologically connected road miles identified for improvements | New in 2017 | 116* |

*Data available for, and represents about half of the inventories completed in SFY 2017

## PROJECT OUTPUT MEASURES #2: RESULTS OF DESIGN PROJECTS




### Why are these measures important?

- ✓ Project prioritization to address nutrient and sediment pollution
- ✓ Supports cost-effective implementation to address nutrient and sediment pollution

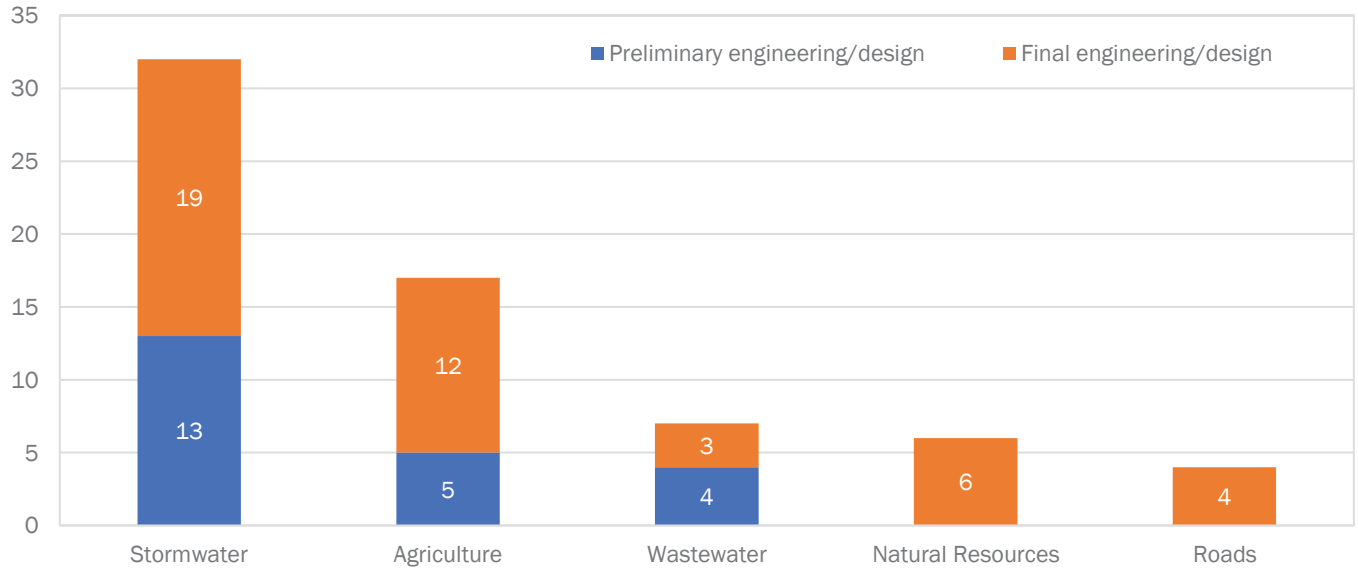
### What are we doing?

Once priority projects are identified through assessments and planning activities, the next step is to develop project designs (if necessary). Preliminary design involves securing landowner commitment to implement the project, identifying site/design considerations and permitting needs, and completing conceptual designs and cost estimates. Final design involves securing required permits for construction, determining parties responsible for operations and maintenance, and completing final engineering designs and cost estimates. Some project types, such as road erosion control or agricultural conservation practices, do not require designs to construct/implement.

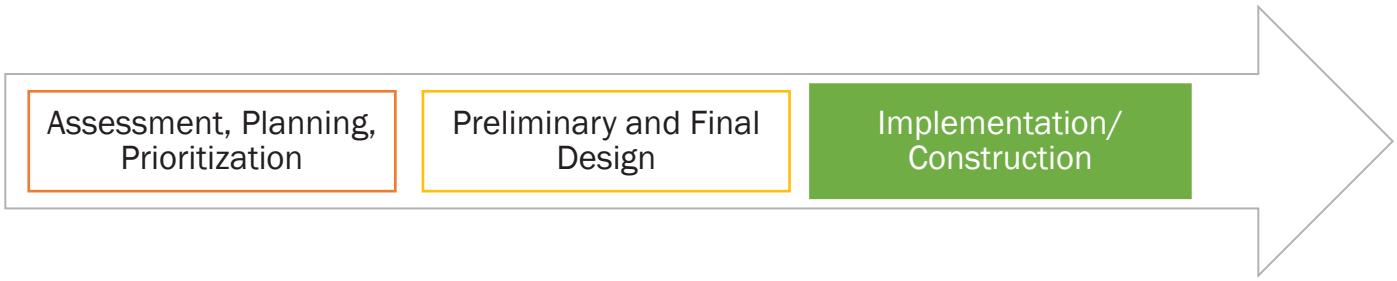
### What progress has been made?

Figure 17 shows the number and level of designs completed by sector in SFY 2017. In SFY 2017, 66 state-funded designs were completed, including 22 preliminary and 44 final designs.

Figure 17. Number and level of state-funded clean water project designs completed in SFY 2017



## PROJECT OUTPUT MEASURES #3: RESULTS OF IMPLEMENTATION PROJECTS




### 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

The goal of the state's outreach, technical assistance, assessment, planning, and design efforts is to support the implementation of projects that reduce harmful nutrient and sediment pollution. Clean water project implementation contributes to and count toward progress for the requirements and co-benefits listed above.

#### What are we doing?

In SFY 2017, 278 state-funded implementation projects were completed: 134 addressed agricultural pollution prevention, 101 addressed municipal road erosion controls, 28 addressed natural resources restoration, 13 addressed stormwater treatment, and two addressed municipal wastewater improvements. The number of projects implemented increased from 245 projects in SFY 2016 to 278 projects in SFY 2017.

### What progress has been made?

Results of state-funded implementation projects completed in SFY 2016 and 2017 are summarized in the following sections by sector.

## Agricultural Pollution Prevention Projects

### Why are these measures important?

Agricultural pollution prevention projects contribute to and count toward progress for a combination of the following requirements and co-benefits:

| | |
|---|---|
| ✓ | Implementation of TMDL requirements |
| ✓ | Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements |
| ✓ | Compliance with Required Agricultural Practices |
| ✓ | Improved flood resiliency and flood hazard mitigation for public health and safety |
| ✓ | Supports agricultural working lands |
| ✓ | Improved habitat function |

### What are we doing?

Addressing agricultural water pollution is a high priority for the state of Vermont. In SFY 2017, 118 state-funded agricultural pollution prevention projects were constructed or implemented. These practices minimize polluted runoff from barnyards, livestock heavy use areas, croplands, pasture, access roads, and livestock trails and laneways.

### What progress has been made?

Table 10 summarizes the results of agricultural pollution prevention projects completed in SFY 2016 and 2017. Figure 18 shows the number of projects implemented in SFY 2016 and 2017, as well as the cumulative number of active projects in SFY 2017. Structural practices, such as forested agricultural buffers, livestock exclusion, and production area management practices typically remain in place for at least ten years, or longer with proper maintenance. Crop rotation practices typically remain in place for at least five years. Annual conservation practices, such as cover crop and conservation tillage, are only considered active for one year. Thus, prior year (SFY 2016) annual practices do not count toward cumulative values.

Acres of cropland and pasture treated by state-funded practices decreased in SFY 2017 relative to SFY 2016 because USDA NRCS prioritized federal funding for these types of practices (i.e., annual conservation practices, crop rotation, and buffers). Therefore, AAFM prioritized more state funds for barnyard and production area management practices, which increased by more than 50 percent in SFY 2017 relative to SFY 2016.

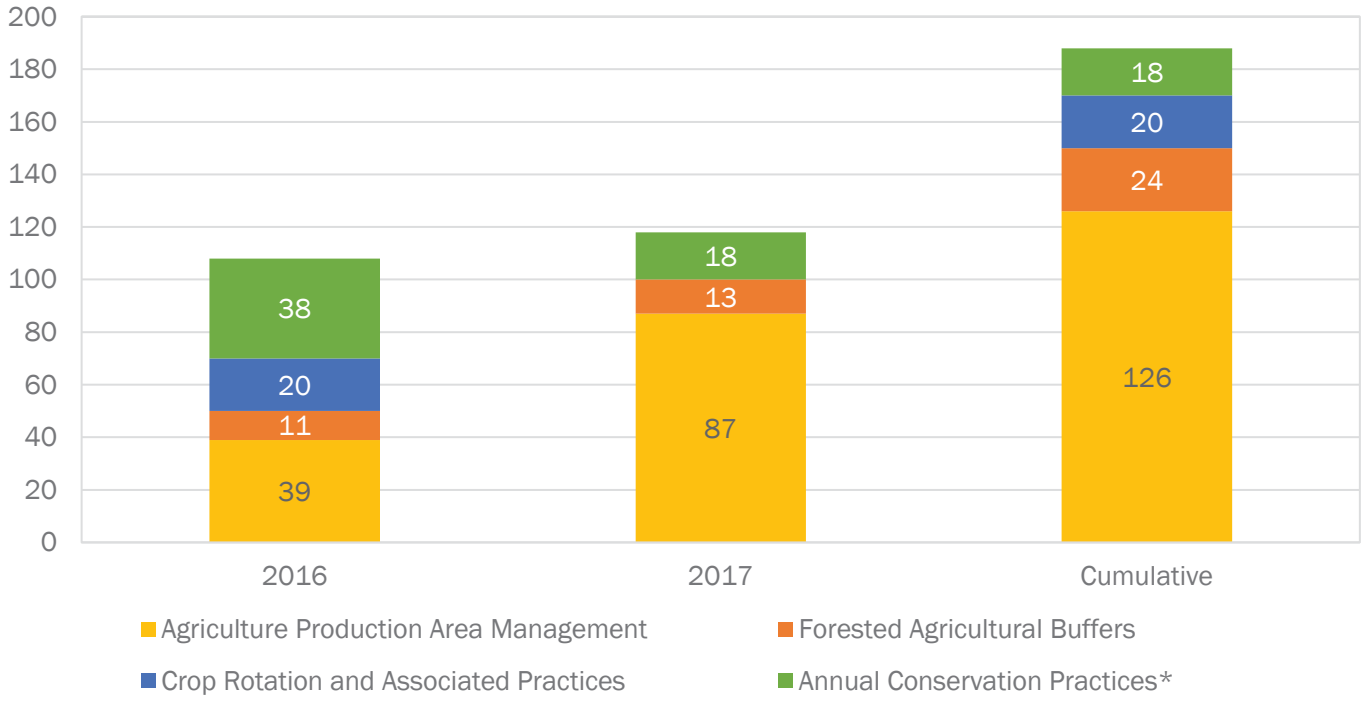
Project outputs associated with field-based practices (i.e., cropland and pasture) are measured by acres, shown in Figure 19. In SFY 2017, state-funded annual conservation practices were applied to 2,486 acres of cropland (i.e., corn and hay) and pasture to improve soil health and reduce soil erosion and nutrient pollution. An additional 36 acres of forested riparian buffer were restored and planted to filter runoff from 178 acres of adjacent cropland and pasture before entering waterways, while also improving floodplain and habitat function. Acre data are not available for barnyard and production area, access road, and livestock trail and laneway improvement projects. Examples of projects completed in SFY 2017 are shown in Figures 20-23.

Table 10. Summary of state-funded agricultural pollution prevention project results, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Acres of cropland and pasture treated by annual conservation practices (active for at least 1 year) | 3,865 | 2,486* |
| Acres of cropland and pasture treated by crop rotation and associated practices (active for at least 5 years) | 572 | 0* |
| Acres of cropland and pasture treated by forested buffers (active for at least 15 years) | 366 | 178* |
| Number of barnyard and production area practices installed (active for at least 10 years) | 39 | 87 |

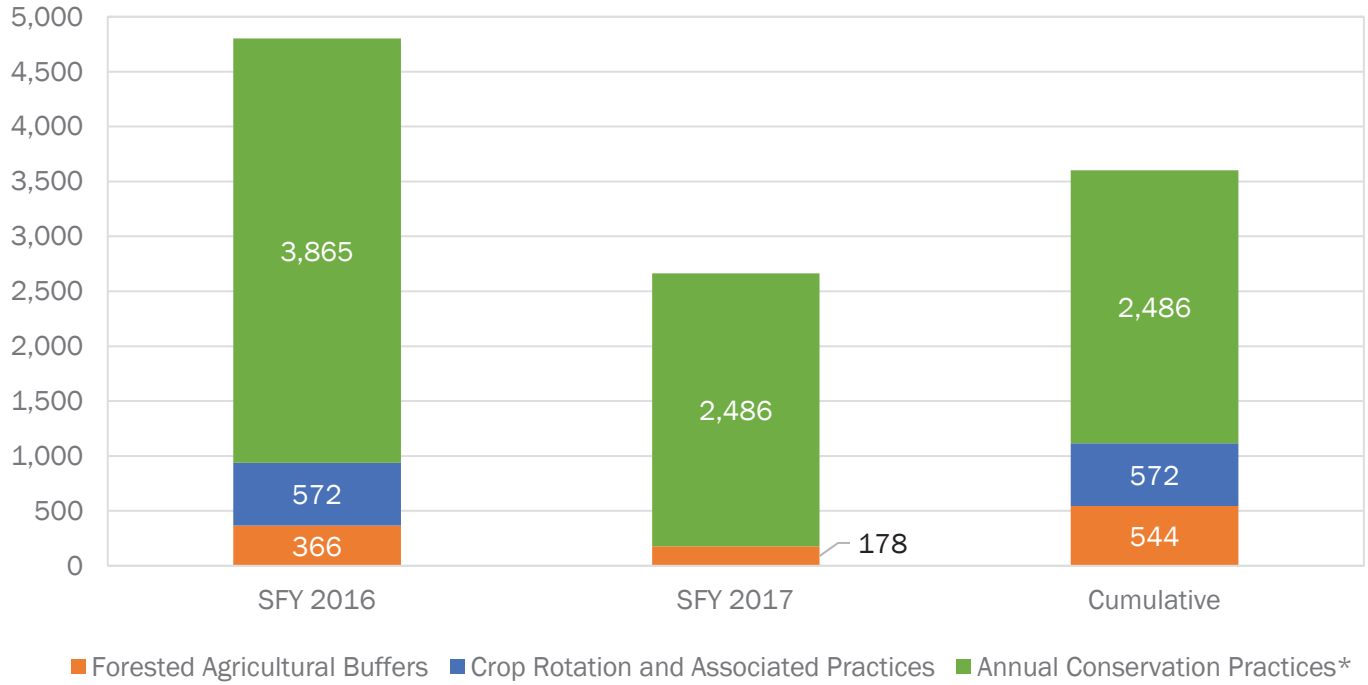
*USDA NRCS prioritized federal funding for field-based practices in SFY 2017. Therefore, state-funded field practices decreased relative to SFY 2016, while state-funded barnyard and production area practices increased by more than 50 percent relative to SFY 2016. Federally funded projects are outside the scope of this report.

Figure 18. Number of state-funded agricultural pollution prevention projects installed and applied, SFY 2016-2017




*Annual conservation practices are only considered active for one year. Prior year annual practices do not count toward cumulative values.

Figure 19. Acres of agricultural cropland and pasture treated by state-funded agricultural pollution prevention projects, SFY 2016-2017




*Annual conservation practices are only considered active for one year. Prior year annual practices do not count toward cumulative values.

Figure 20. Before (left) and after (right) restoration of a forested riparian buffer on agricultural lands one year after implementation (will mature into fully forested buffer over time)

Figure 21. Before (left) and after (right) installation of livestock exclusion fencing and improved laneway and water crossing, completed by Poultney Mettowee Conservation District with ANR funding

Figure 22. Before (left) and after (middle and right) installation of barnyard roof runoff diversion practices, completed by Poultney Mettowee Conservation District with ANR funding

Figure 23. Before (top) and after (below) installation of concrete walkway to stabilize pathway from hoop barn to milking barn, completed by Poultney Mettowee Conservation District with ANR funding

It is important to note that the extent of implementation of agriculture pollution prevention projects, summarized here, is under-reported. State funding programs have funding caps per practice type, and many farmers implemented practices on more acres, but only reported the acreage implemented with state funding. In addition, these data only reflect state-funded practices. The USDA NRCS obligated over $22 million in funding to Vermont landowners to implement agricultural pollution prevention projects in federal fiscal year 2017.

In future years, the new agricultural partners' database will improve the accuracy and comprehensiveness in reporting agricultural implementation outputs. The partners' database will be used by federal, state, and local partners to collaboratively track financial and technical assistance provided to farmers. The database will capture work implemented through state and federal funding programs, along with some voluntary projects reported by technical assistance providers. It is expected to be online in calendar year 2018.

## Agricultural Easements for Water Quality

### Why are these measures important?

Agricultural easements for water quality contribute to and count toward progress for a combination of the following requirements and co-benefits:

- ✓ Implementation of TMDL requirements
- ✓ Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements
- ✓ Compliance with Required Agricultural Practices
- ✓ Improved flood resiliency and flood hazard mitigation for public health and safety
- ✓ Supports agricultural working lands
- ✓ Improved habitat function

### What are we doing?

Vermont Housing and Conservation Board (VHCB) funds agricultural easements, which prohibit commercial uses unrelated to agriculture and forestry. In some cases, these easements take a portion of the farmland out of production, or limit agricultural uses to enhance water quality in challenging locations. VHCB-funded easements generally require a 50-foot forested riparian buffer, and do not allow agricultural uses within the buffer area. Agricultural land easements specify required water quality protections, and are reviewed and approved by USDA NRCS. AAFM inspects farms prior to closing of agricultural land easements to ensure compliance with RAPs. After closing of easement, the easement is monitored by the Vermont Land Trust to ensure water quality protections required by the easement are in place. Farms with agricultural land easements are also subject to AAFM inspections to ensure RAP compliance.

### What progress has been made?

Table 11 summarizes the results of agricultural easements for water quality completed in SFY 2017. In SFY 2017, VHCB completed 13 agricultural easements for water quality covering 1,628 acres of agricultural lands. These easements included 89 acres of water quality protections, such as riparian buffer areas and wetland protection zones.

Table 11. Summary of state-funded agricultural easements for water quality results, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Acres of water quality protections within conserved agricultural lands (riparian buffer and wetland protection zones) | New in 2017 | 89 |

## Natural Resources Restoration

### Why are these measures important?

Natural resources restoration projects contribute to and count toward progress for a combination of the following requirements and co-benefits:

| | |
|---|---|
| ✓ | Implementation of TMDL requirements |
| ✓ | Improved flood resiliency and flood hazard mitigation for public health and safety |
| ✓ | Support outdoor recreation, tourism, and property values |
| ✓ | Improved habitat function |

### What are we doing?

Natural resources restoration is critical in achieving Vermont's water quality goals. These projects help to prevent and reduce nutrient and sediment pollution, improve flood resiliency by mitigating flood hazards, enhance habitat function, and support Vermont's outdoor recreational opportunities.

### What progress has been made?

Natural resources restoration projects completed in SFY 2017 include 3 floodplain restoration projects, 7 conservation projects for water quality, 9 riparian buffer restoration and plantings, 9 river corridor easements. Accomplishments of natural resources restoration projects completed in SFY 2016 and 2017 are summarized in Table 12.

Natural resources restoration work completed in SFY 2017 resulted in the restoration of 16 acres of riparian buffer by planting native trees and shrubs. Buffer plantings improve soil stability, reduce erosion, filter runoff from adjacent lands, and restore and enhance habitat function. A floodplain restoration project resulted in the relocation of the Stowe Recreational Path outside the flood hazard zone and restored and planted 2 acres of floodplain, shown in Figure 24. The Randolph Dam removal, funded in part by an ANR Fish and Wildlife Department Watershed Grant, pictured in Figure 25, enhanced and reconnected 98 stream miles, which improves floodplain and river function, reduces streambank erosion, and restores aquatic organism (e.g., fish) passage.

Natural resources restoration may also be accomplished cost-effectively through conservation. In SFY 2017, 209 acres of river corridor were conserved through river corridor easements. Easements protect river corridors and allow rivers and streams to restore to naturally stable and least erosive condition over time (referred to as equilibrium conditions). In SFY 2017, VHCB conservation projects protected 4,906 acres of forest and riparian corridors, including areas surrounding headwater streams and drinking water sources. VHCB conservation easements prohibit agricultural uses, commercial uses, and development. Of the acres conserved, 98 require additional water quality protections, including 50-foot no-touch riparian buffer and wetland protection zones. Many of these projects also enhance public access for recreation in the areas protected.

Table 12. Summary of state-funded natural resources restoration project results, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Acres of forested riparian buffer restored through buffer planting | 88 | 16 |
| Acres of river corridor conserved and restored through easements | 141 | 209 |
| Acres of floodplain restored | 0 | 2 |
| Stream miles enhanced and reconnected due to dam removal | 0 | 98 |
| Acres protected for public access, recreation, forest conservation, and water quality (limits agricultural uses, commercial uses, and development) | New in 2017 | 4,906 |
| Acres of water quality protections within conserved lands (includes forested buffer area and wetland protection zones) | New in 2017 | 98 |

Figure 24. Before (left) and after (right) relocation of 1,100 feet of Stowe's Recreation Path outside of fluvial erosion hazard zone and restoration and planting of 2 acres of floodplain, completed by Town of Stowe

Figure 25. Before (left) and after (right) removal of the Randolph Dam, enhancing and reconnecting 98 stream miles, completed by the White River Partnership with ANR Watershed Grant funds

## Stormwater Treatment Practices

### Why are these measures important?

Stormwater treatment practices contribute to and count toward progress for a combination of the following requirements and co-benefits:

| | |
|---|---|
| ✓ | Implementation of TMDL requirements |
| ✓ | Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements |
| ✓ | Compliance with municipal stormwater permits |
| ✓ | Compliance with Municipal Roads General Permit (road related stormwater) |
| ✓ | Improved flood resiliency and flood hazard mitigation for public health and safety |

### What are we doing?

Rain and snowmelt from hard (i.e., impervious) surfaces and developed lands, also known as "stormwater," transport nutrient and sediment pollution to waterways. Addressing stormwater sources of pollution is among the highest priorities for improving water quality in Vermont. For example, developed lands, including roads, contribute approximately 20 percent of phosphorus pollution in the Lake Champlain and Lake Memphremagog basins.

### What progress has been made?

Table 13 summarizes results of stormwater treatment projects, including municipal transportation related stormwater projects, completed in SFY 2016 and 2017.

Table 13. Summary of state-funded stormwater treatment project results, including municipal transportation related projects, SFY 2016-2017

| Measures of Project Results | 2016 Value | 2017 Value |
|---|---|---|
| Acres of impervious surface treated | 0.3 | 86 |
| 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 | 27* | 2.4* |

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

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

[21] Results of projects completed by VTrans to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report. However, Appendix F of this report summarizes VTrans' clean water improvement activities.

## Stormwater Treatment Practices

Thirteen state-funded stormwater treatment practices were installed in SFY 2017 to absorb and treat stormwater runoff from developed lands. These projects resulted in the treatment of 86 impervious acres through the installation of green stormwater infrastructure and stormwater treatment practices. Green stormwater infrastructure employs natural hydrologic processes to absorb and treat stormwater runoff. These practices reduce the impact of the built environment, while providing additional societal benefits, such as green space in urban areas. Examples of stormwater treatment practices installed are shown in Figure 26 and Figure 27.

Figure 26. Before (top) and after (bottom) installation of bioretention system on Main Street in Northfield, completed by Central Vermont Regional Planning Commission

Figure 27. Before (top) and after (bottom) installation of bioretention system on Morey Road in Hyde Park, completed by Lamoille County Conservation District

### Transportation Related Stormwater

Transportation related stormwater treatment is a major component of addressing stormwater pollution in Vermont. Roads represent an estimated 42 percent of all impervious surfaces (e.g., roads, parking lots, driveways, and rooftops) contributing to stormwater runoff in Vermont.[22] Reducing runoff and erosion associated with roads is critical to meeting the state's clean water goals. In SFY 2017, 101 municipal transportation or road-related stormwater projects were completed and resulted in 13 miles of road drainage improvements, 68 road drainage structures installed, and replacement of 109 road drainage and stream culverts.[23]

Miles of road drainage improved represent the total length of stoned-lined ditches, grass-lined ditches, road shoulder berm removal, and slope and shoreline stabilization. The number of road drainage structures improved represents the number of culvert headers and outlets, water bars, and check-dams installed or repaired. Figure 28 shows before (left) and after (right) installation of a stone-lined ditch in Poultney.

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.

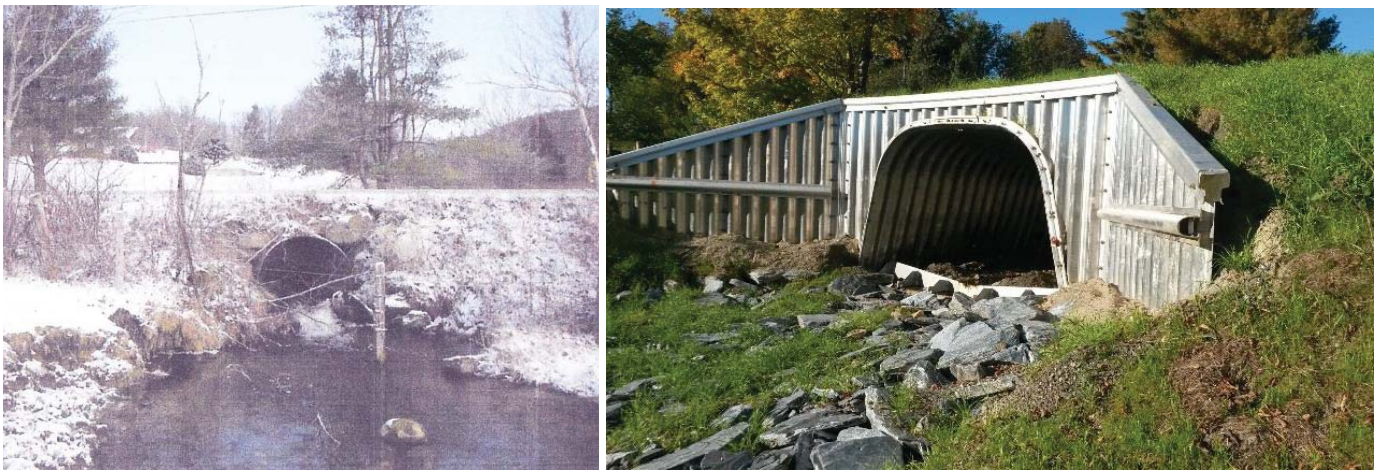
[22] Estimate based on the Lake Champlain Basin Program impervious surfaces data layer (2011).

[23] Results of projects completed by VTrans to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report. However, Appendix F of this report summarizes VTrans' clean water improvement activities.

Stream and road drainage culverts, when properly sized with stabilized headers and outlets, reduce erosion and nutrient pollution and improve flood resiliency. Stream culvert replacements have the added benefit of improving floodplain and river function to better accommodate flood waters, reducing streambank erosion, and reconnecting upstream and downstream waters to restore aquatic organism (e.g., fish) passage. In SFY 2017, VTrans' municipal project tracking did not distinguish between stream culverts and road drainage culverts. Figure 29 shows a VTrans funded municipal project, which resulted in the replacement of a perched and undersized stream culvert (left) with an arched culvert (right), spanning the stream-width and maintaining the natural stream bed. In SFY 2016 and 2017, four ANR-funded stream culvert replacement projects enhanced and reconnected 30 stream miles, which improves floodplain function, reduces streambank erosion, and restores aquatic organism (e.g., fish) passage.

Since 2016, VTrans has implemented a new project tracking database, which began capturing data that is needed to quantify water quality benefits for projects funded in SFY 2017. In SFY 2016 no data were available related to water quality benefits of VTrans-funded projects. In SFY 2017, water quality data were available for approximately two-thirds of the applicable projects, since some of the projects completed were funded prior to SFY 2017.

Figure 29. Before (left) and after (right) replacement of stream culvert at Junction Hill Road in Cambridge, completed by the Town of Cambridge



## Wastewater Treatment Facility Improvements and Combined Sewer Overflow Abatement

### Why are these measures important?

Municipal wastewater improvement projects contribute to and count toward progress for a combination of the following requirements and co-benefits:

| | |
|---|---|
| ✓ | Implementation of TMDL requirements |
| ✓ | Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements |
| ✓ | Compliance with municipal wastewater discharge permits |
| ✓ | Compliance with the 2016 Combined Sewer Overflow (CSO) Rule |

### What are we doing?

State grants using capital funds and low interest loans capitalized through the Vermont and EPA Clean Water State Revolving Fund (CWSRF) finance municipal wastewater improvements. Projects include wastewater treatment facility and collection system upgrades and refurbishments, and CSO abatement.

Figure 30. Construction of the Waterbury WWTF phosphorus removal upgrade, completed in 2016

### What progress has been made?

In SFY 2016 and 2017, eight municipal wastewater improvements and CSO abatement projects were completed. This work included:

- Upgrade of the Waterbury municipal WWTF for phosphorus, which reduced the total phosphorus discharge from the plant by 58 percent (see Figure 30).
- Installation of three decentralized wastewater treatment systems in Waitsfield to fix water quality issues caused by failed septic systems.
- Disconnection of 50 acres of developed land from Rutland's combined sewer system to abate CSOs.
- Separation of 400 feet of storm and wastewater sewer pipes in Springfield's combined sewer system to abate CSOs.
- Construction of a new sewage collection system to treat wastewater from the Village of Brownsville at the Town of Windsor WWTF, servicing 34 users, with 44 additional residential connections expected in the future.
- Replacement of a sewer under Vermont Route 2A in Williston to increase capacity in the sewer and reduce or eliminate the potential for overflows.

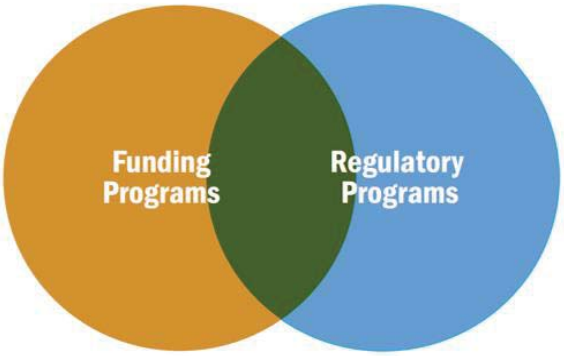
# 5. Project Environmental Outcomes

Project outputs, previously outlined in this report, quantify the extent of work completed with state funding. Environmental outcomes represent the water quality benefit achieved through state-funded work. The state's new tracking system measures water quality benefits by estimating nutrient pollution reductions at the project-level.

The state's tracking goal is to quantify pollution reductions for all types of state-funded clean water projects implemented/constructed, including agriculture, stormwater, road erosion control, natural resources restoration, and forestry and logging erosion control projects. For the Lake Champlain and Lake Memphremagog basins, phosphorus load reductions will be estimated, as phosphorus is the nutrient pollutant of concern for fresh water. In the Connecticut River basin, nitrogen load reductions will be estimated, as the Connecticut River drains to Long Island Sound and nitrogen is the pollutant of concern for salt water. Each of these basins have nutrient pollution reduction targets in their respective TMDL restoration plan. Vermont uses these TMDLs as the basis for tracking progress in meeting nutrient pollution reduction targets.

To provide additional assurances that TMDL targets will be achieved, the Vermont Clean Water Act (Act 64 of 2015)[24] established additional statutory and financial support for restoring Vermont's clean water. The Act enhanced Vermont's clean water funding by establishing the first Vermont Clean Water Fund. It also established new or enhanced regulatory programs that will support clean water, addressing: (a) stormwater controls from municipal and private developed lands and roads; (b) required agricultural practices to minimize runoff and erosion on farms; and (c) adjusted wastewater treatment facility permit limits for phosphorus.

Funding and regulatory programs are important mechanisms for implementing TMDLs. The state is developing methodologies to capture the results of both mechanisms to measure TMDL progress. As new regulations come on line, and as funding programs grow to support the costs of compliance, the work accomplished through funding and regulatory programs is expected to grow and become increasingly overlapping.




Funding and regulatory programs aid in TMDL implementation and can overlap, as funds become available to support compliance with regulatory programs

The scope of this Investment Report focuses on the environmental outcomes of state-funded projects only. The state anticipates a separate report on the state's progress in meeting TMDL targets.

Vermont's new tracking and reporting systems represent a significant improvement in accountability for state investments in clean water. In the past, the state's reporting addressed dollars invested by individual agencies and, separately, water quality monitoring data. These new tracking systems allow the state to measure and report on environmental outcomes at the project-level and evaluate the cost effectiveness of investments in clean water.

[24] Act 64 or the "Vermont Clean Water Act;" 2015 Vt. Acts & Resolves 975, amended in 2017.

## SCOPE OF THIS CHAPTER

Included in this Report

Nutrient pollution reduced by clean water projects, funded by state agencies, completed in SFY 2017.[25]

Outside the Scope of this Report[26]

Nutrient pollution reduced by clean water projects that were not awarded funding by state agencies, including federally, municipally, or privately-funded projects.

Nutrient pollution reduced by clean water projects completed to comply with water quality regulations, including VTrans funded projects to comply with water quality regulations on state highways and VTrans non-road developed lands.

Report Improvements made in SFY 2017

In the first year of reporting (SFY 2016), data on environmental outcomes were only available for wastewater, stormwater, agricultural, and woody buffer restoration and planting projects located in the Lake Champlain basin.

This year (SFY 2017), data on environmental outcomes are now also available for road erosion control projects and projects located in the Lake Memphremagog basin.

Planned Report Improvements

The SFY 2017 Investment Report evaluates actions and outcomes relative to actions and outcomes reported in the SFY 2016 Investment Report; however, future Investment Reports will include interim targets to evaluate clean water progress over multiple years.

Continuous improvements to tracking and reporting processes and methodologies will reduce gaps in data on clean water projects results, including measures of nutrient pollution reduced.

## METHODS TO MEASURE ENVIRONMENTAL OUTCOMES

Estimating nutrient pollution reduced by clean water projects requires two key pieces of data and information:

1. **Data are needed on the rate of nutrient pollution from different land uses.**
   With these data, the state can estimate the total nutrient load treated by a project based on the area of land treated. These data are currently available for the Lake Champlain and Lake Memphremagog basins.
2. **Information is needed on the average annual performance of specific project types in reducing nutrient pollution.**
   This information is based on research of project performance relevant to conditions in Vermont. Project performance is expressed as an average annual percentage of nutrient pollution reduced.

The average annual performance of the project is applied to the nutrient pollution delivered from the land treated to estimate the annual average pollutant reduction. The ability to estimate the pollutant reduction of a project can be limited by lack of data on nutrient pollution loading rates for the land treated and/or lack of information on the performance of a project in treating nutrient pollution. Table 14 summarizes the State of Vermont's current ability to quantify nutrient load reductions by basin and project type.

[25] Work completed in the reporting period of SFY 2017 includes funding agreements closed out (all deliverables completed/approved and final payments made) between July 1, 2016 and June 30, 2017.

[26] The state will track results of federally-funded clean water projects and projects necessary to comply with water quality regulations. The state will report on its progress in future publications.

Table 14. Summary of Vermont's ability in SFY 2017 to account for nutrient pollution reductions by project type, basin, and nutrient of concern

| Key |
|---|
| Currently have ability to account for nutrient pollution reduction **(new this year indicated by asterisk*)** |
| Do not currently have ability to account for nutrient pollution reduction |

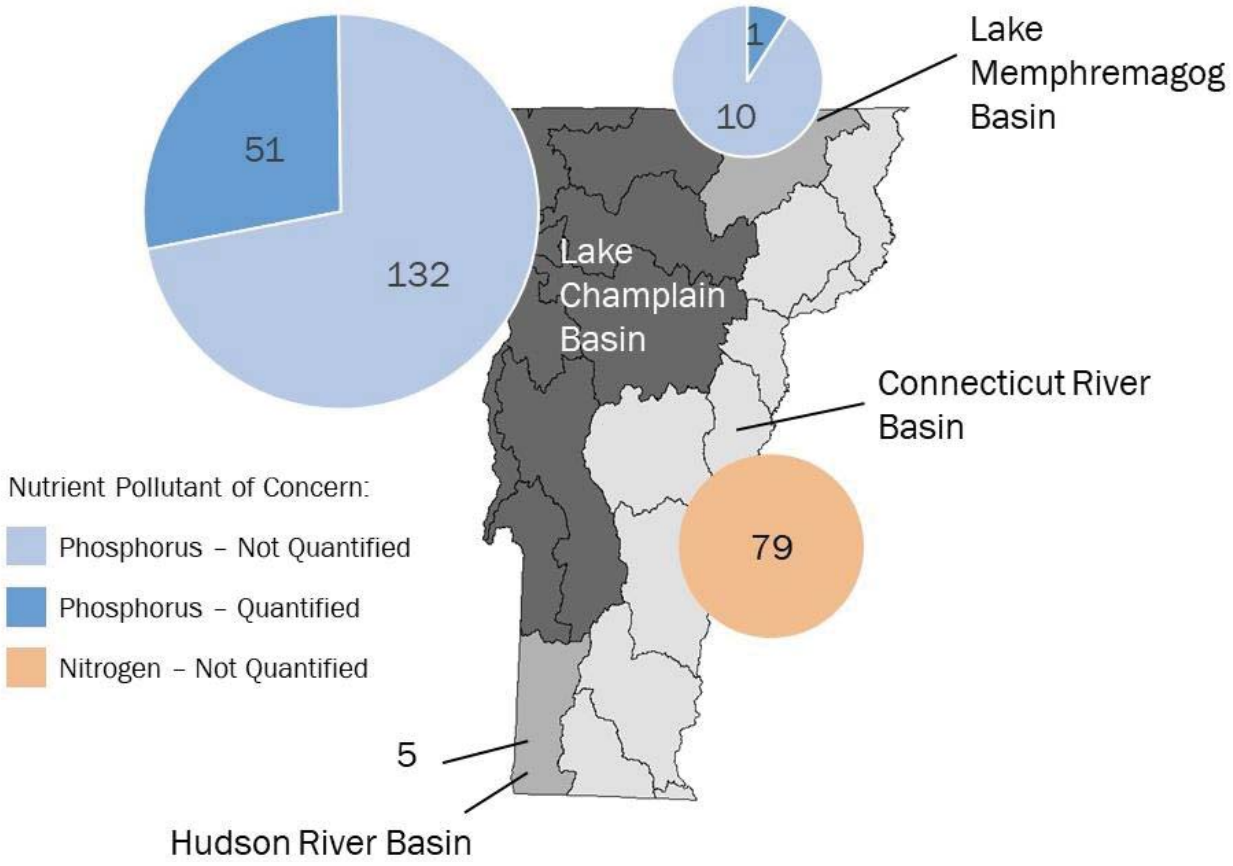
| Project Type | Lake Champlain | Lake Memphremagog | Connecticut River |
|---|---|---|---|
| Agricultural cropland and pasture conservation practices | Phosphorus | **Phosphorus*** | Nitrogen |
| Agricultural forested riparian buffers | Phosphorus | **Phosphorus*** | Nitrogen |
| Barnyard and production area management practices | Phosphorus | Phosphorus | Nitrogen |
| Agricultural easements for water quality | Phosphorus | Phosphorus | Nitrogen |
| River and floodplain restoration | Phosphorus | Phosphorus | Nitrogen |
| Riparian buffer restoration | Phosphorus | **Phosphorus*** | Nitrogen |
| Wetland restoration | Phosphorus | Phosphorus | Nitrogen |
| Forest erosion control | Phosphorus | Phosphorus | Nitrogen |
| Stormwater treatment practices | Phosphorus | **Phosphorus*** | Nitrogen |
| Road erosion control linear practices | **Phosphorus*** | **Phosphorus*** | Nitrogen |
| Road erosion control culvert replacements | Phosphorus | Phosphorus | Nitrogen |
| Wastewater treatment upgrades | Phosphorus | **Phosphorus*** | Nitrogen |
| Combined sewer overflow abatement | Phosphorus | Phosphorus | Nitrogen |
| Summary of status to expand tracking and accounting ability | Developing methodologies to account for phosphorus reductions from all project types (where feasible) in 2017-2018. Expanded ability to quantify road erosion controls in SFY 2017. | Lake Memphremagog TMDL finalized in 2017, providing phosphorus pollution rates for this region. Use Lake Champlain methods to estimate phosphorus reduction efficiencies by project type. | Need Vermont nitrogen land loading rates to quantify the nitrogen load for land treated by practices (depends on timing and results of EPA's regional Nitrogen Reduction Strategy). |

Nutrient pollution loading rates were only available for the Lake Champlain basin in the first year of reporting (SFY 2016). In this second year of reporting (SFY 2017) nutrient pollution loading rates are now available for the Lake Memphremagog basin. Therefore, phosphorus pollution reductions can now be estimated for projects implemented in the Lake Champlain and Lake Memphremagog basins for select project types.

Information on project performance reducing phosphorus pollution is currently available for most agricultural conservation practices, riparian buffer restoration, stormwater treatment practices, and linear road erosion control practices. Work is in progress to quantify nutrient pollution reduced by other clean water project categories.

Gaps, summarized in Table 14, limit the state's ability to quantify nutrient pollution reductions for all projects statewide. Figure 31 shows the number of projects implemented by basin in SFY 2017, and the number of projects with quantified nutrient pollution reductions. A total of 278 projects were implemented in SFY 2017, of which 52 (19 percent) had sufficient data to estimate nutrient pollution reductions. In SFY 2017, 33 more projects were implemented than in SFY 2016. However, most of these projects (226 total) are in regions of the state, or in project categories for which nutrient pollution reduction estimates cannot yet be quantified.

Figure 31. Number of projects implemented by major basin, and number of projects with nutrient pollution reductions quantified



## QUANTIFYING NUTRIENT POLLUTION REDUCTIONS FROM CLEAN WATER PROJECTS

### Why are these measures important?

Quantifying nutrient pollution reductions provides greater accountability for environmental outcomes at the project-level, and measures progress that counts toward the following priorities:

- ✓ Implementation of nutrient and sediment 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

### What are we doing?

In SFY 2016, 78 projects (46 agricultural practices, 28 restored riparian buffers, 2 stormwater treatment practices, and 2 road erosion control projects) reduced an estimated 992 kilograms of total phosphorus annually, of which 548 kilograms will carry into future years' cumulative reductions. In SFY 2017, 52 projects (18 agricultural practices, 7 restored riparian buffers, 9 stormwater treatment practices, and 18 road erosion control practices) reduced an estimated 366 kilograms of total phosphorus annually, of which 83 kilograms will carry into future years' cumulative reductions. The total estimated cumulative phosphorus reduction achieved in SFY 2016 and 2017 is 915 kilograms per year.

Phosphorus load reductions achieved by structural projects are expected to continue in future years, and count toward cumulative phosphorus load reductions, if the projects are properly maintained. The exception is annual agricultural conservation practices, such as cover crop and conservation tillage. These annual practices improve soil health and reduce soil erosion and nutrient pollution, but only last for one year, unless continuously applied each year.

### What progress has been made?

Table 15 summarizes total quantifiable phosphorus pollution reductions of state-funded projects in SFY 2016, 2017, and cumulative. The accomplishments are further described, by sector, in the following sections.

Table 15. Total phosphorus reduction achieved by state-funded projects in kilograms per year (kg/yr) by project type in SFY 2016, 2017, and cumulative

| Project Type | 2016 Estimated Phosphorus Reduction (kg/yr) | 2017 Estimated Phosphorus Reduction (kg/yr) | Cumulative Estimated Phosphorus Reduction (kg/yr) |
|---|---|---|---|
| Annual agricultural conservation practices | 443* | 283* | 283* |
| Agricultural crop rotation and associated practices | 271 | 0 | 271 |
| Forested riparian buffer restoration on agricultural lands | 199 | 34 | 234 |
| Forested riparian buffer restoration on non-agricultural lands | 74 | 12 | 86 |
| Stormwater treatment practices | 0.3 | 15 | 15.3 |
| Road erosion control practices | 4 | 22 | 26 |
| **Total** | **992** | **366** | **915** |

* Annual agricultural conservation practices are only considered active for one year. Prior year annual practices do not count toward cumulative values.

## Agricultural Pollution Prevention Projects

### Why are these measures important?

- ✓ Implementation of nutrient and sediment TMDL requirements
- ✓ Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements
- ✓ Compliance with Required Agricultural Practices

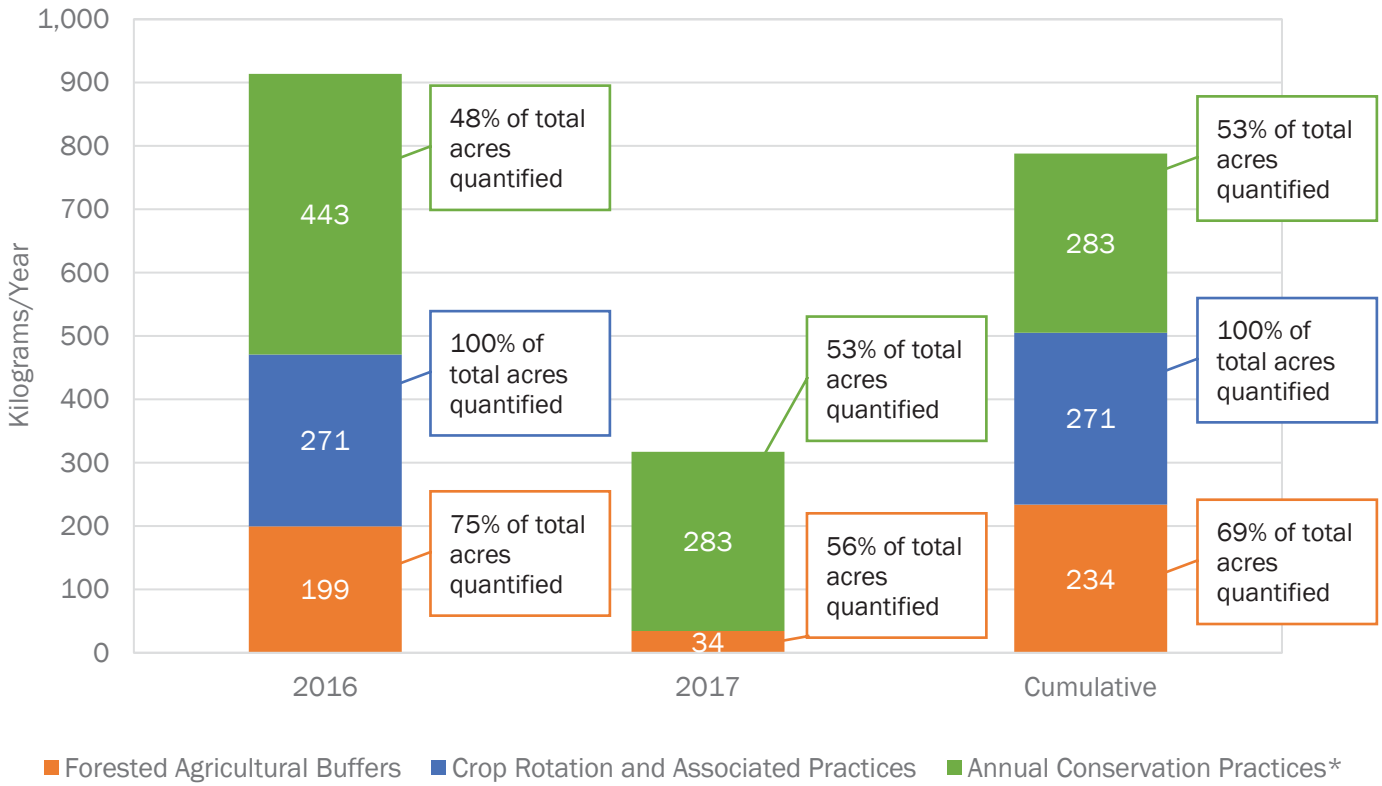
### What are we doing?

The installation or application of 18 state-funded agricultural practices in SFY 2017 resulted in an estimated annual average phosphorus load reduction of 317 kilograms per year. The total cumulative load reduction is 788 kilograms per year. Phosphorus reductions reported in SFY 2017 represent 56 percent of total acres treated by buffers and 53 percent of total acres treated by annual conservation practices. These load reductions do not include the nutrient pollution reduced by 126 barnyard and production area management practices constructed in SFY 2016 and 2017, as insufficient data are available to quantify reductions for these practices this year.

### What progress has been made?

Figure 32 shows kilograms of phosphorus reduced by state-funded agricultural practices in SFY 2016, 2017, and cumulative.

Figure 32. Kilograms of phosphorus reduced by agricultural practices in SFY 2016, 2017, and cumulative




* Annual agricultural conservation practices are only considered active for one year. Prior year annual practices do not count toward cumulative values.

Most the agricultural practices reported with phosphorus reductions quantified are annual conservation practices, including cover crop and conservation tillage. These are important practices for water quality. However, this level of annual effort needs to continue in future years to maintain these phosphorus reductions. Riparian buffers, on the other hand, are considered structural practices that, if maintained, will continue to reduce phosphorus loading over time.

These data only represent a portion of agricultural work implemented in Vermont, and exclude USDA NRCS funded practices. NRCS is the primary funder of agricultural best management practices in Vermont, however, results of federally funded projects are beyond the scope of this report. Results of NRCS-funded projects will be included in Vermont's overall TMDL tracking and accounting.

## Stormwater Treatment and Road Erosion Practices

### Why are these measures important?

| | |
|---|---|
| ✓ | Implementation of nutrient and sediment TMDL requirements |
| ✓ | Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements |
| ✓ | Compliance with municipal stormwater permits |
| ✓ | Compliance with Municipal Roads General Permit |

### What are we doing?

The installation of 9 stormwater treatment practices in SFY 2017 resulted in an estimated annual average phosphorus load reduction of 15 kilograms per year, and completion of 18 road erosion control projects resulted in an estimated annual average phosphorus reduction of 22 kilograms per year. Phosphorus reductions reported in SFY 2017 represent 41 percent of total impervious acres treated by stormwater practices and 38 percent of road miles treated by road erosion control practices. This represents a major increase in both the amount of work implemented and the amount of work with quantified load reductions since SFY 2016.

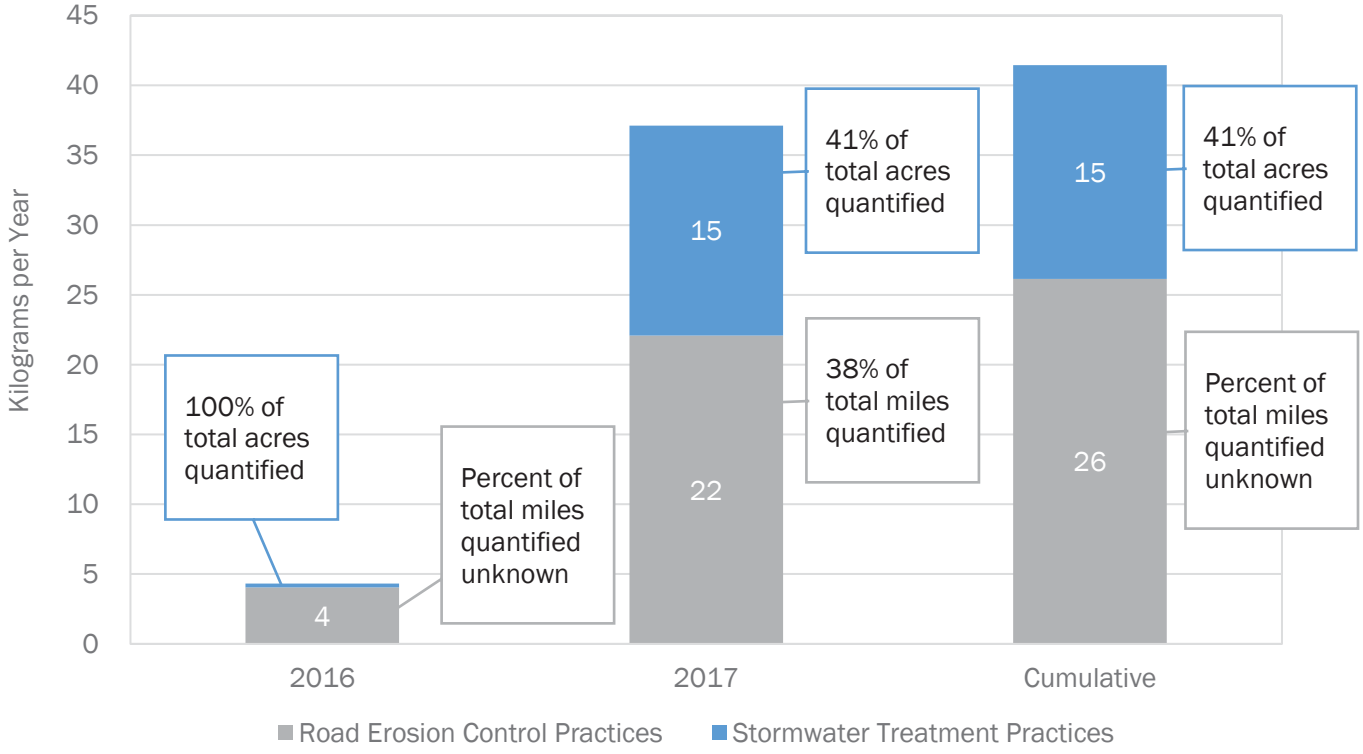
### What progress has been made?

Figure 33 shows kilograms of phosphorus reduced by state-funded stormwater treatment and road erosion control practices in SFY 2016, 2017, and cumulative.[27]

It is important to note that this state-funded work only reflects a portion of the work being implemented to improve water quality for developed lands. In addition to funding programs, stormwater regulatory programs are also driving water quality improvements. The state anticipates issuing new permits in the near future to better manage stormwater runoff from developed lands. The state is currently developing procedures for measuring the results of work implemented under these regulatory programs.

[27] Results of projects completed by VTrans to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report. However, Appendix F of this report summarizes VTrans' clean water improvement activities.

Figure 33. Kilograms of phosphorus reduced by state-funded stormwater treatment practices in SFY 2016, 2017, and cumulative, including municipal road-related stormwater practices



## Riparian Buffer Restoration and Planting

### Why are these measures important?

✓ Implementation of nutrient and sediment TMDL requirements

### What are we doing?

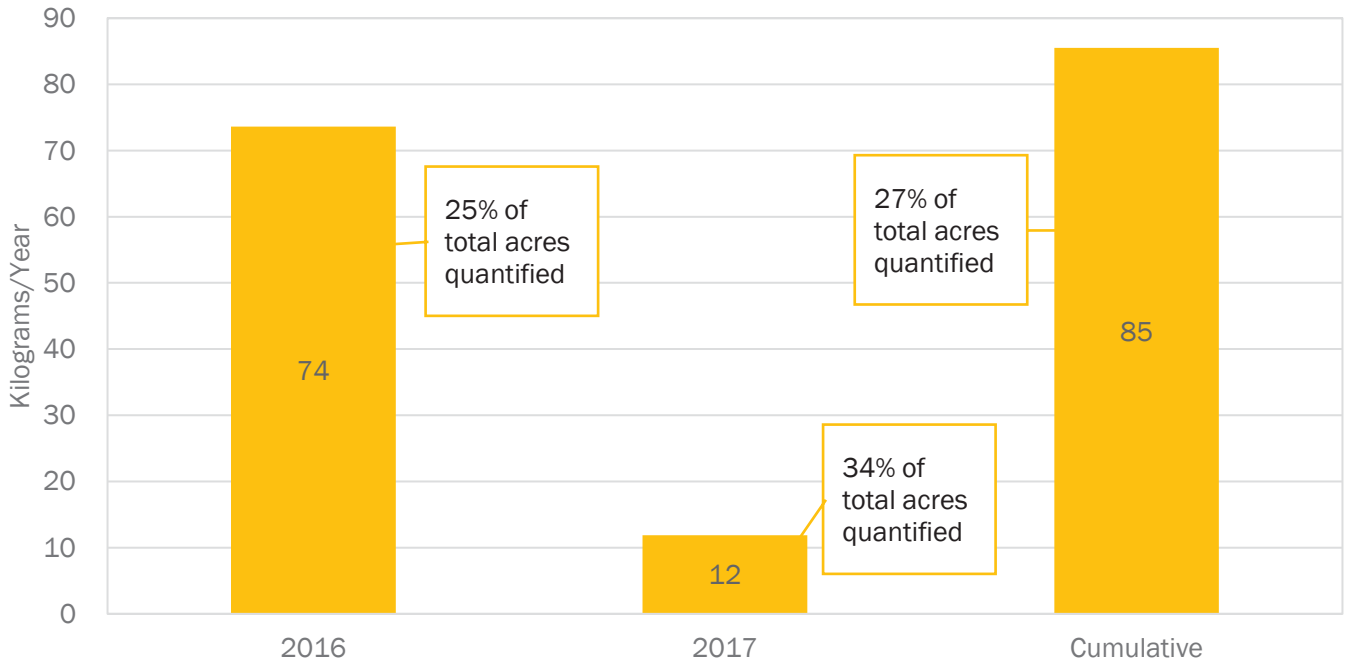
The restoration of 7 forested riparian buffers in SFY 2017 on non-agricultural lands will result in an estimated annual average reduction of 12 kilograms per year, once woody vegetation is fully established (approximately five years). Phosphorus reductions, reported in SFY 2017, represent 34 percent of total non-agricultural buffers acres restored.

### What progress has been made?

Figure 34 shows kilograms of phosphorus reduced by state-funded forested riparian buffers restored in SFY 2016, 2017, and cumulative.

The restoration of riparian buffers is important for treating nonpoint source runoff from the land draining into them. Buffers also provide a range of flood resiliency and habitat benefits. In SFY 2016 and 2017, 58 riparian non-agricultural buffer areas were restored statewide. These buffers begin providing benefits when they are planted. However, once these buffers are fully established (approximately five years) they will begin to fully perform in reducing nutrient pollution. The success in riparian buffers treating nutrient pollution depends on the ability of the buffers to become established and maintained over time.

Figure 34. Kilograms of phosphorus reduced by state-funded non-agricultural forested riparian buffers restored in SFY 2016, 2017, and cumulative



# 6. Moving Forward

Vermonters care deeply about the health of the state's rivers, streams, wetlands, ponds and lakes. Clean water is good for business and supports commercial uses ranging from local farms to international companies. Maintaining clean water creates business opportunities, provides jobs, and supports economic development by investing in clean water infrastructure and natural resources restoration. Clean water supports fishing, swimming, boating, and other recreational uses, bolsters tourism, helps to maintain property values and provides access to safe drinking water. In many cases, business smart solutions are also clean water solutions. For example, collaboration between farmers and electric companies to generate energy from cow manure. The benefits and innovations surrounding clean water highlight the importance of state investments in clean water projects.

Current water quality conditions statewide reflect the investments made over the past few decades to reduce phosphorus and sediment pollution from discharges, runoff and erosion. Despite the years of effort and investment, Vermont still faces significant water quality challenges that are threatening the health and well-being of our communities and economy. These challenges indicate that we still have much more important work to do.

Given the prevalence of the state's water quality challenges and the price of restoring and safeguarding water quality, it is imperative that the state spends its resources in a manner that targets the most strategic and cost-effective projects. Research in the Missisquoi Bay watershed shows that targeting of phosphorus reduction practices, based on site-specific characteristics, can result in two to three times more phosphorus pollution reduction than an untargeted approach. Vermont's Tactical Basin Planning process, and its scientific framework to target the most important pollution sources, will help the state achieve state and federal clean water targets in the most cost-effective way possible.

The Clean Water Initiative Investment Report series summarizes the results of public investments in clean water improvement projects over time and across all sectors. State agencies will continue to work together over the long-term to track this progress in a way that is transparent and accountable to the public. The first report established a baseline for evaluating future actions and outcomes, and this second report begins to present the cumulative results of these efforts. Overall the intent of this report is to help Vermonters make connections between clean water investments made, projects implemented, and outcomes achieved.

# 7. Appendices

## A. VERMONT WATER QUALITY PRIORITIES AND PROJECTS BY WATERSHED

Appendix A fulfills the reporting requirement of Act 64 (2015)[28], Section 36, 10 V.S.A. § 1386 including: (a) a summary of how projects are prioritized for implementation; (b) a summary of water quality problems or concerns in each basin of the state; and (c); (d) a summary of projects funded and completed in each watershed.

## B. ECOSYSTEM RESTORATION GRANT PROGRAM PROJECTS

Appendix B fulfills the reporting requirement of Act 64 (2015)[25], Section 36, codified at 10 V.S.A. § 1386(e) including: activities and progress of water quality Ecosystem Restoration Programs. Appendix B summarizes projects funded in SFY 2017 through the ANR-DEC Ecosystem Restoration Grant Program.

## C. SUMMARY OF CLEAN WATER INITIATIVE MAJOR STATUTORY AND LAKE CHAMPLAIN PHOSPHORUS TMDL PHASE 1 PLAN DELIVERABLES

Appendix C fulfills the reporting requirement of Act 64 (2015)[25], Section 36, 10 V.S.A. § 1386, addressing the execution of the updated *Vermont Lake Champlain Phosphorus TMDL Phase 1 Implementation Plan*. Appendix C, provides a summary of the efforts undertaken to implement the Phase 1 Implementation Plan, including the status of major statutory and Phase 1 Implementation Plan deliverables.

## D. REPORT OF THE WORKING GROUP ON WATER QUALITY FUNDING UNDER 2017 ACT 73

Appendix D fulfills the reporting requirement of Act 64 (2015)[25], Section 36, 10 V.S.A. § 1386, amended in 2017 to include a summary of additional funding sources pursued by the Board. This reporting requirement is fulfilled by the *Report of the Working Group on Water Quality funding under 2017 Act 73, Section 26*, available here: http://anr.vermont.gov/about/special-topics/act-73-clean-water-funding.

## E. SUMMARY OF FEDERAL LAW, POLICY, AND FUNDING RELATED TO CLEAN WATER IN VERMONT

Appendix E fulfills the reporting requirement of Act 64 (2015)[23], Section 36, 10 V.S.A. § 1386, amended in 2017 to include a summary of any changes to applicable federal law or policy related to the state's water quality improvement efforts, including any changes to requirements to implement TMDL plans in the state, as well as a summary of available federal funding related to or for water quality improvement efforts in the state. This reporting requirement is fulfilled by the *Federal Funding Related to Water Quality Improvement Efforts in Vermont, Interim Report*, available here: http://dec.vermont.gov/watershed/cwi/cwf#report. There have been no changes to federal law or policy related to TMDL requirements, and federal funding for water quality has not changed since the interim report was produced in September 2017.

[28] Act 64 or the "Vermont Clean Water Act;" 2015 Vt. Acts & Resolves 975, amended in 2017.

## F. VTRANS CLEAN WATER INITIATIVES AND STORMWATER INVESTMENTS

Results of projects completed by VTrans to comply with water quality regulations on state highways and VTrans non-road developed lands are outside the scope of this report. Appendix F is an informational factsheet, summarizing VTrans' investments and actions to comply with water quality regulations that address stormwater pollution from state highways and non-road developed lands.

# Appendix A: Vermont Water Quality Priorities and Projects by Watershed

Appendix A fulfills the reporting requirement of Act 64 (2015)[1], Section 36, 10 V.S.A. § 1386, and includes:

A. A summary of the Tactical Basin Planning process that prioritizes projects for implementation;
B. A summary of water quality problems or concerns in each major basin of the state; and
C. A summary of projects funded and completed in each Tactical Basin Planning watershed.

Summaries for each of the fifteen Tactical Basin Planning watersheds, organized alphabetically by watershed name, present:

1. Total dollars awarded to projects by sector in SFY 2017;
2. Summary of project results completed by sector in SFY 2017; and
3. Table of projects that were awarded funds in SFY 2017.

Agency, sector, and funding source are abbreviated in the project tables as follows:

**Agencies**

| | |
|---|---|
| AAFM | Agency of Agriculture, Food and Markets |
| ANR | Agency of Natural Resources |
| VTrans | Agency of Transportation |
| VHCB | Vermont Housing and Conservation Board |

**Sector**

| | |
|---|---|
| Ag | Agricultural pollution prevention |
| All | All sectors |
| CSO | Combined sewer overflow |
| NR | Natural resources |
| Roads | Transportation/road-related stormwater |
| SW | Stormwater |
| WW | Wastewater treatment |

**Funding Source**

| | |
|---|---|
| Capital | Vermont Capital Fund |
| CWF | Vermont Clean Water Fund |
| CWSRF | Clean Water State Revolving Fund |
| FTF | Federal Transportation Fund |
| VTTF | Vermont Transportation Fund |
| Other | May include: Act 250 Mitigation Fund, General Fund, Housing and Conservation Trust Fund, U.S. Department of Agriculture Natural Resources Conservation Service Agricultural Conservation Easement Program Agricultural Land Easements, Watershed Grant Fund |

[1] Act 64 or the "Vermont Clean Water Act;" 2015 Vt. Acts & Resolves 975, amended in 2017.

# Vermont Tactical Basin Planning:

## The science-based framework to assess, plan and implement priority clean water projects

Given the significant costs of restoring and safeguarding water quality, the state must spend its resources efficiently and effectively. State agencies utilize Tactical Basin Plans, where possible, to identify projects that will provide the greatest return on investment for clean water.

Tactical Basin Plans identify and prioritize clean water projects across multiple sectors, including stormwater, rivers, roads, and wastewater treatment, based on scientific monitoring data and assessment results. The prioritized lists of projects necessary to achieve clean water goals, found in each Tactical Basin Plan, are complemented by an online Watershed Projects Database, which is continuously updated (visit: anrweb.vt.gov/DEC/IWIS/ARK/ProjectSearch.aspx).

Tactical Basin Planning is integral to identifying priority projects to achieve clean water targets described in clean water restoration plans, known as Total Maximum Daily Loads (TMDLs), the Vermont Clean Water Act, and the 2016 Combined Sewer Overflow (CSO) Rule.

Community and stakeholder engagement is a key component of Tactical Basin Plan development and implementation. Local partners, including municipalities, natural resources conservation districts, regional planning commissions, and watershed organizations, also utilize Tactical Basin Plans to target their clean water activities/projects.

Clean water projects are prioritized in Tactical Basin Plans using the following criteria:

1. Expected environmental benefit and cost effectiveness based on:
   a. Nutrient and sediment pollution reduction;
   b. Improved flood resiliency; and
   c. Improved habitat function.

2. Expected feasibility based on:
   a. Partner capacity and local support; and
   b. Funding availability.

## LAKE CHAMPLAIN BASIN

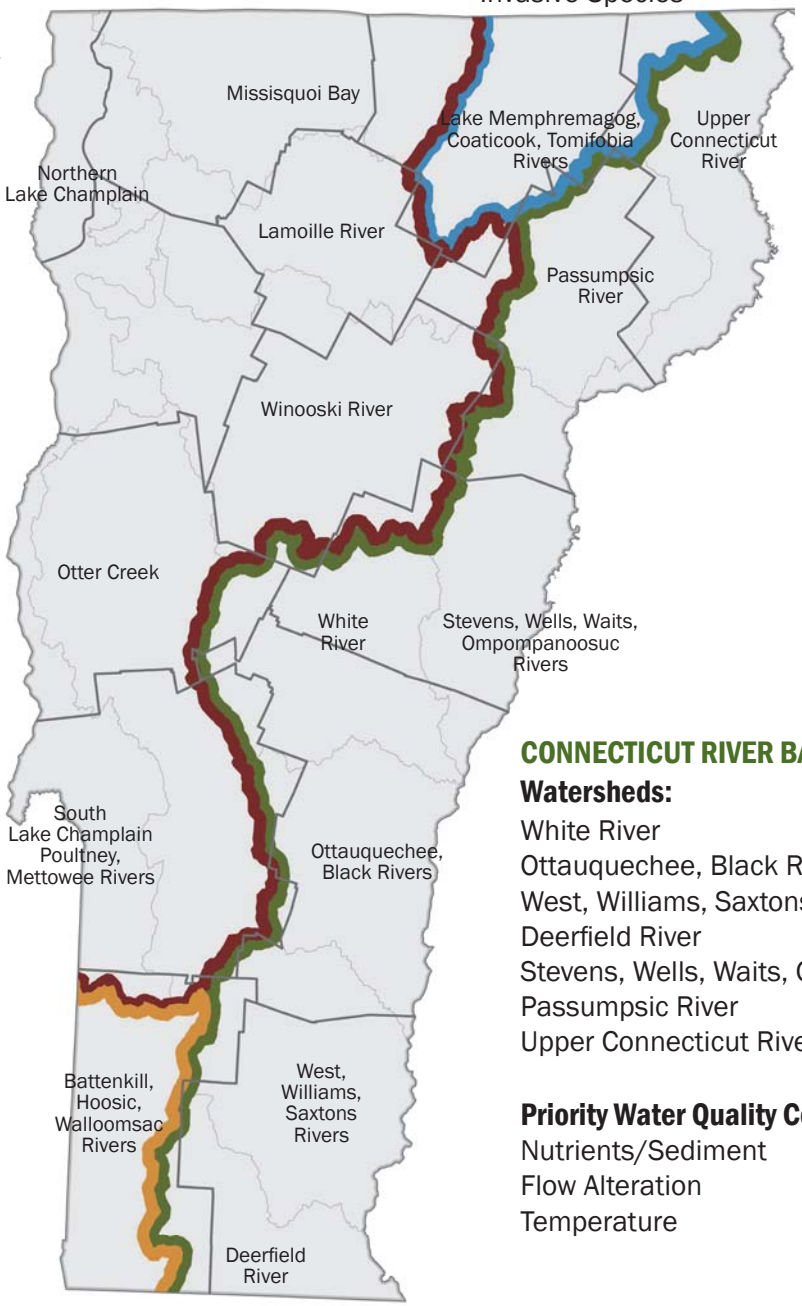
**Watersheds:**
Northern Lake Champlain
Missisquoi Bay
Winooski River
South Lake Champlain, Poultney, Mettowee Rivers
Otter Creek
Lamoille River

**Priority Water Quality Concerns:**
Nutrients/Sediment
Bacteria (*E. coli*)
Invasive Species

## LAKE MEMPHREMAGOG BASIN

**Watersheds:**
Lake Memphremagog, Coaticook, Tomifobia Rivers

**Priority Water Quality Concerns:**
Nutrients/Sediment
Flow Alteration
Invasive Species




## CONNECTICUT RIVER BASIN

**Watersheds:**
White River
Ottauquechee, Black Rivers
West, Williams, Saxtons, Connecticut Rivers
Deerfield River
Stevens, Wells, Waits, Ompompanoosuc Rivers
Passumpsic River
Upper Connecticut River

**Priority Water Quality Concerns:**
Nutrients/Sediment
Flow Alteration
Temperature

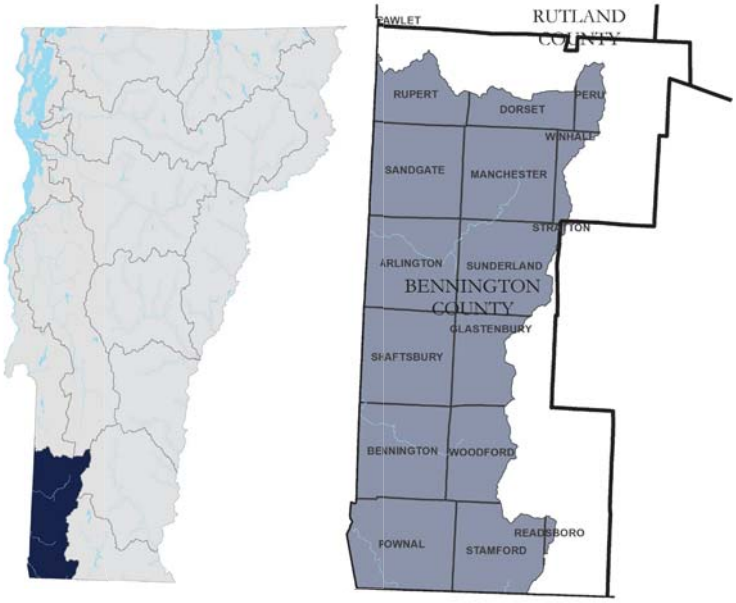
## HUDSON RIVER BASIN

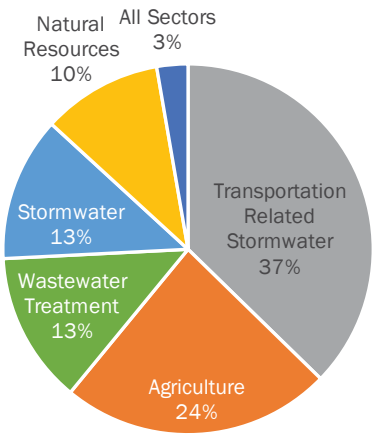
**Watersheds:**
Battenkill, Hoosic, Walloomsac Rivers

**Priority Water Quality Concerns:**
Nutrients/Sediment
Habitat
Temperature

For more information on Tactical Basin Planning, visit: dec.vermont.gov/watersheds/map/basin-planning.
For more information on priority water quality concerns, visit: dec.vermont.gov/watersheds/map/strategy.

# Battenkill, Walloomsac, Hoosic (Hudson) Rivers Watershed Summary




**State funding awarded in the Hudson River watershed in SFY 2017, by sector**
**Total: $331,243**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

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

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | NA |
| Acres of water quality protections within conserved agricultural lands | 3 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | NA |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 0.2 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 5 |
| 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 | No data |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

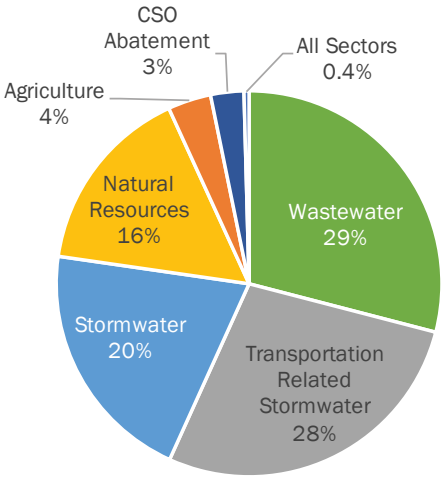
# Battenkill, Walloomsac, Hoosic (Hudson) Rivers Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Hudson River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Arlington | VTrans | Arlington | TH 49 Berwal Road – Correction of Stream Bank Erosion and Culvert Upgrade | Roads | VTTF | $11,240 |
| Bennington | ANR | Bennington | Bennington Wastewater Treatment Facility Refurbishment – Preliminary Design | WW | CWSRF | $32,400 |
| Bennington | ANR | Bennington County Conservation District | Bennington Bedding Mulcher Equipment | SW | CWF | $5,107 |
| Bennington | VTrans | North Bennington | Municipal Road Erosion Inventory | Roads | CWF | $4,000 |
| Bennington County | AAFM | Bennington County Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| Manchester | ANR | Manchester | Manchester Wastewater Treatment Asset Management Program Implementation | WW | CWF | $11,448 |
| Manchester | VTrans | Manchester | TH 11 Three Maple Drive – Municipal Roads Culvert Upgrade | Roads | CWF | $5,536 |
| Manchester | VTrans | Manchester | Municipal Culvert and Road Erosion Inventory | Roads | CWF | $8,000 |
| Pownal | ANR | Bennington County Regional Commission | Tubbs Brook Culvert Replacement | NR | Other | $10,000 |
| Pownal | VTrans | Pownal | Municipal Culvert Inventory | Roads | FTF | $8,000 |
| Rupert | ANR | Bennington County Conservation District | Mill Brook Gully Stabilization – Implementation | NR | CWF | $18,600 |
| Rupert | VTrans | Rupert | TH 23 Youlin Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $18,960 |
| Rupert | VTrans | Rupert | Municipal Culvert and Road Erosion Inventory | Roads | FTF | $7,680 |
| Sandgate | ANR | Bennington County Regional Commission | Sandgate Stormwater Master Plan – Project Identification | SW | CWF | $24,000 |
| Sandgate | VTrans | Sandgate | TH 18 Southeast Corner – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $8,800 |
| Sandgate | VTrans | Sandgate | TH 4 Rupert Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $30,688 |
| Sunderland | VTrans | Sunderland | Municipal Culvert and Road Erosion Inventory | Roads | FTF | $8,000 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# Black, Ottauquechee Rivers Watershed Summary




**State funding awarded in the Black, Ottauquechee Rivers watershed in SFY 2017, by sector**
**Total: $2,119,513**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

**Results of projects completed in SFY 2017, by sector, in the Black, Ottauquechee Rivers watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | NA |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | 1 |
| Acres of river corridor conserved through easements | NA |
| 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 | 1,560 |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | 58 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | No data |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 2 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 4 |
| 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 | No data |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

# Black, Ottauquechee Rivers Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Black, Ottauquechee Rivers watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Baltimore | VTrans | Baltimore | TH 1 Baltimore Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $13,243 |
| Baltimore | VTrans | Baltimore | TH 1 Baltimore & Harris Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $17,894 |
| Bridgewater | VTrans | Bridgewater | Municipal Road Erosion Inventory | Roads | FTF | $5,078 |
| Cavendish | ANR | Cavendish | Cavendish Wastewater Treatment Facility Refurbishment – Preliminary Design | WW | CWSRF | $9,750 |
| Cavendish | VTrans | Cavendish | Municipal Culvert and Road Erosion Inventory | Roads | FTF | $6,910 |
| Chester | VTrans | Chester | TH 11/13 Miner/Pleines Road – Municipal Roads Erosion Control | Roads | VTTF | $15,970 |
| Chester | VTrans | Chester | TH 9/14 Smokeshire/Murdoch Road – Municipal Roads Erosion Control and Correction of Streambank and Slope Erosion | Roads | VTTF | $20,000 |
| Hartford | ANR | Hartford | Hartford Wastewater Collection System Refurbishment and Stormwater Treatment – Preliminary Design | WW, SW | CWSRF | $242,000 |
| Hartford | ANR | Hartford | Hartford Wastewater Collection System Refurbishment and Stormwater Treatment – Preliminary Design | WW, SW | CWSRF | $300,000 |
| Ludlow | ANR | Ludlow | Ludlow Wastewater Treatment Asset Management Program Implementation | WW | CWF | $55,700 |
| Ludlow | VTrans | Ludlow | TH 55 Trailside Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $40,000 |
| Pomfret | VTrans | Pomfret | TH 51 River Road – Municipal Roads Culvert Upgrade | Roads | CWF | $5,488 |
| Reading | VTrans | Reading | TH 8 Town Hill Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Springfield | ANR | Ottauquechee Natural Resources Conservation District | Black River/Springfield Transfer Station Stormwater Treatment – Final Design | SW | Capital | $30,230 |
| Springfield | ANR | Springfield | Springfield Vactor Truck Equipment | Roads | CWF | $375,000 |
| Springfield | ANR | Springfield | Springfield Wastewater Treatment Asset Management Program Implementation | WW | CWF | $34,600 |
| Springfield | ANR | Springfield | Springfield Wastewater Collection System, Combined Sewer Overflow Abatement, and Stormwater Treatment – Construction | WW, SW, CSO | CWSRF | $177,100 |
| Watershed-wide | ANR | Stone Environmental | Ottauquechee-Black Rivers Illicit/Unauthorized Discharge Detection and Elimination | SW | CWF | $69,940 |
| West Windsor | ANR | Southern Windsor County Regional Planning Commission | Mill Brook Dam Removal at West Windsor Firehouse – Implementation | NR | CWF | $19,040 |
| West Windsor | ANR | Southern Windsor County Regional Planning Commission | West Windsor Dam Removal | NR | Other | $10,000 |

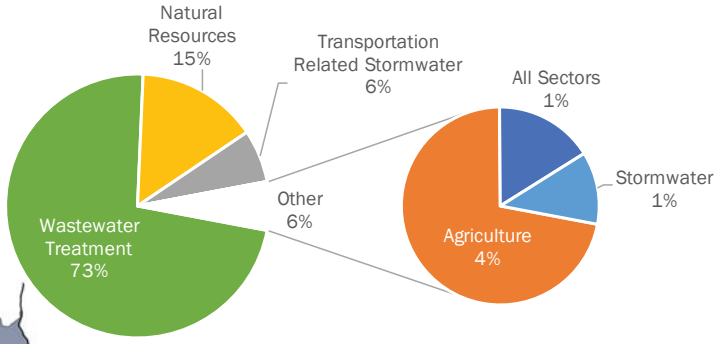
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# Black, Ottauquechee Rivers Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Black, Ottauquechee Rivers watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| West Windsor | ANR | West Windsor | West Windsor Wastewater Collection System Expansion – Construction | WW | Capital | $185,414 |
| West Windsor | VTrans | West Windsor | TH 40 Coaching Lane – Municipal Roads Erosion Control | Roads | CWF | $19,349 |
| Windsor | VHCB | Trust for Public Land | Ascutney Mountain - West Windsor Town Forest with Riparian Buffers | NR | Capital | $300,000 |
| Windsor | VTrans | Windsor | TH 6 Brook Road – Correction of Slope Erosion | Roads | CWF | $24,010 |
| Woodstock | ANR | Vermont Department of Forests, Parks and Recreation | Curtis Hollow Brook/Coolidge State Forest Road Stream Culvert Removal – Implementation | Roads | CWF | $4,060 |
| Woodstock | VTrans | Woodstock | TH 75 Happy Valley Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $8,000 |

# Deerfield River Watershed Summary




**State funding awarded in the Deerfield River watershed in SFY 2017, by sector**
**Total: $1,798,406**

## STATE FUNDS AWARDED IN SFY 2017

## RESULTS OF PROJECTS COMPLETED IN SFY 2017

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

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | NA |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | NA |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 0.1 |
| 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 | No data |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

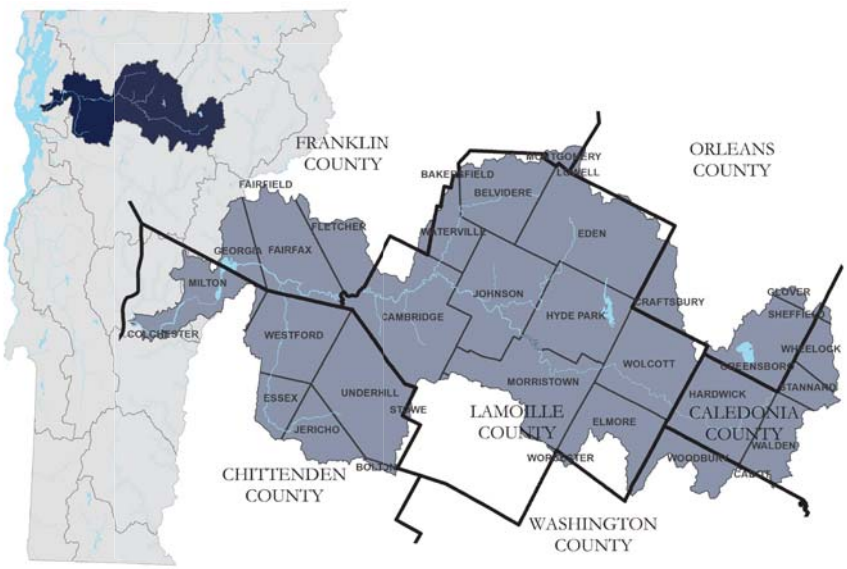
# Deerfield River Watershed Projects

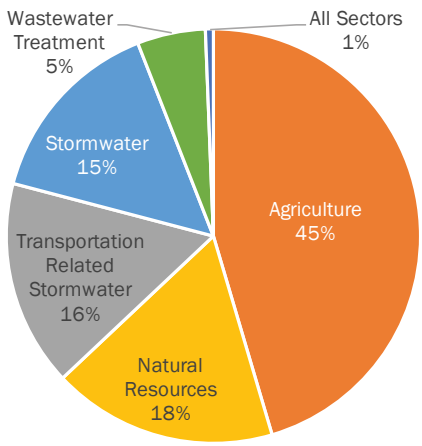
**Clean water projects funded by state agencies in SFY 2017 in the Deerfield River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Brattleboro | ANR | Brattleboro | Brattleboro Wastewater Sludge and Septage Improvements – Construction | WW | Capital | $1,114,153 |
| Brattleboro | ANR | Connecticut River Conservancy | Partner Water Quality Monitoring Pre-and-Post Project Implementation – Whetstone Brook | All | CWF | $8,290 |
| Brattleboro | ANR | Vermont River Conservancy | Whetstone Brook Floodplain Restoration and River Corridor Easement – Implementation | NR | CWF | $84,400 |
| Brattleboro | VHCB | Vermont River Conservancy | Whetstone Brook River Corridor Easement | NR | Capital, Other | $135,000 |
| Guilford | ANR | Connecticut River Conservancy | Green River Corridor Easement/Floodplain Restoration – Final Design | NR | Capital | $8,140 |
| Guilford | ANR | Vermont River Conservancy | Green River Corridor Easement Design | NR | CWF | $2,000 |
| Guilford | ANR | Windham Regional Commission | Green River Corridor Easement, Floodplain Berm Removal, and Buffer Restoration – Implementation | NR | Capital | $32,000 |
| Guilford | VTrans | Guilford | TH 6 Sweet Pond Road – Municipal Roads Erosion Control | Roads | VTTF | $20,000 |
| Guilford | VTrans | Guilford | TH 1 Stage Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $40,000 |
| Halifax | VTrans | Halifax | Municipal Road Erosion Inventory | Roads | FTF | $7,600 |
| Putney | ANR | Putney | Putney Wastewater Treatment Asset Management Program Implementation | WW | CWF | $13,628 |
| Somerset | VTrans | Somerset | TH 1 Somerset Road – Municipal Roads Culvert Upgrade | Roads | CWF | $13,801 |
| Whitingham | ANR | Whitingham | Whitingham Wastewater Treatment Asset Management Program Implementation | WW | CWF | $20,000 |
| Wilmington | ANR | Wilmington | Wilmington Wastewater Treatment Asset Management Program Implementation | WW | CWF | $19,925 |
| Wilmington | VTrans | Wilmington | TH 78 Sturgis Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $14,536 |
| Windsor | VTrans | Windsor | Municipal Culvert and Road Erosion Inventory | Roads | FTF | $7,815 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# 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

## 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 |

| 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 |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | 4 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | 4 |

# Lamoille River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Lamoille River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Belvidere | AAFM | The Green Mountain Maple Sugar | Waste Treatment | Ag | Capital | $20,000 |
| Cambridge | AAFM | Gillilan, Kenneth | Heavy Use Area Protection | Ag | Capital | $25,000 |
| Cambridge | AAFM | Gillilan, Kenneth | Waste Storage Structure | Ag | Capital | $50,000 |
| Cambridge | ANR | Jeffersonville | Jeffersonville Wastewater Treatment Facility Refurbishment – Preliminary Design | WW | CWSRF | $24,800 |
| Cambridge | ANR | Lamoille County Conservation District | Town of Cambridge/Brewster River Floodplain Restoration – Preliminary Design | NR | CWF | $21,250 |
| Cambridge | ANR | Vermont Land Trust | North Branch Lamoille River Corridor Easement (Barup Farm) – Implementation | NR | CWF | $46,494 |
| Cambridge | VHCB | Vermont Land Trust | H & C Barup Farm Agricultural Easement with Riparian Buffers | Ag | Capital, Other | $282,000 |
| Cambridge | VTrans | Cambridge | TH 25 Junction Hill Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $40,000 |
| Cambridge, Underhill | ANR | Lamoille County Planning Commission | Seymour River Stream Geomorphic Assessment/River Corridor Plan – Project Identification | NR | CWF | $34,713 |
| Craftsbury | VTrans | Craftsbury | TH 6 Collinsville Road – Correction of Stream Bank Erosion | Roads | VTTF | $9,600 |
| Elmore | VTrans | Elmore | TH 7 Beach Road – Municipal Roads Erosion Control | Roads | CWF | $10,684 |
| Fletcher | VTrans | Fletcher | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $8,000 |
| Fletcher | VTrans | Fletcher | TH 33 River Road – Municipal Roads Erosion Control | Roads | VTTF | $20,000 |
| Georgia | ANR | Friends of Northern Lake Champlain | Deer Brook/Route 7 and Route 104A, Georgia Gully Remediation – Preliminary Design | SW | CWF | $86,700 |
| Georgia | VHCB | Vermont Land Trust | Georgia Town Forest with Wetland/Riparian Protection | NR | Capital | $132,500 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Underground Outlet | Ag | Capital | $76 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Mulching | Ag | Capital | $151 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Critical Area Planting | Ag | Capital | $166 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Roof Runoff Management | Ag | Capital | $231 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Underground Outlet | Ag | Capital | $253 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Access Road | Ag | Capital | $282 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Underground Outlet | Ag | Capital | $342 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Fencing | Ag | Capital | $371 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Roof Runoff Management | Ag | Capital | $416 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# Lamoille River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Lamoille River watershed.**

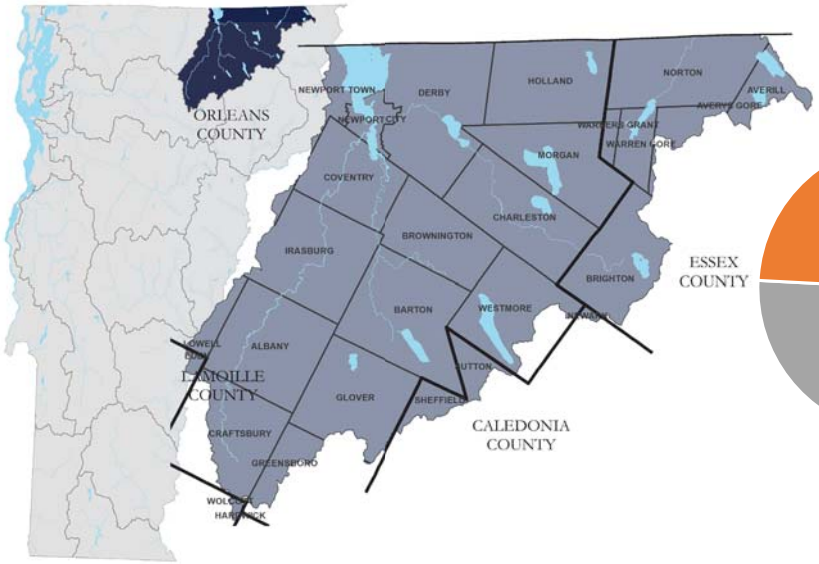
| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Hardwick | AAFM | Lady Bug Farm Partnership | Heavy Use Area Protection | Ag | Capital | $712 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Waste Transfer | Ag | Capital | $714 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Underground Outlet | Ag | Capital | $812 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Waste Transfer | Ag | Capital | $1,031 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Pumping Plant | Ag | Capital | $1,148 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Subsurface Drain | Ag | Capital | $1,346 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Fencing | Ag | Capital | $1,630 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Access Road | Ag | Capital | $2,068 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Access Road | Ag | Capital | $2,583 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Heavy Use Area Protection | Ag | Capital | $3,890 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Waste Transfer | Ag | Capital | $5,301 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Waste Storage Structure | Ag | Capital | $9,583 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Heavy Use Area Protection | Ag | Capital | $9,963 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Waste Storage Structure | Ag | Capital | $12,259 |
| Hardwick | AAFM | Lady Bug Farm Partnership | Waste Storage Structure | Ag | Capital | $19,674 |
| Hardwick | VTrans | Hardwick | Municipal Culvert and Road Erosion Inventory | Roads | FTF | $7,861 |
| Hyde Park | ANR | Hyde Park | Hyde Park Wastewater Treatment Facility and Collection System Refurbishment/Expansion – Preliminary Design | WW | CWSRF | $42,700 |
| Hyde Park | VTrans | Hyde Park | Municipal Road Erosion Inventory | Roads | FTF | $7,680 |
| Hyde Park | VTrans | Hyde Park | TH 17 Bornemann Road – Municipal Roads Erosion Control | Roads | VTTF | $20,000 |
| Hyde Park, Morristown | ANR | Lamoille County Conservation District | Hyde Park and Morristown Stormwater Master Plan – Project Identification | SW | CWF | $30,000 |
| Jericho | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $4,000 |
| Johnson | AAFM | Rankin, Warren | Forested Riparian Buffer Restoration | Ag | Capital | $539 |
| Johnson | AAFM | Rankin, Warren | Forested Riparian Buffer Restoration | Ag | Capital | $2,153 |

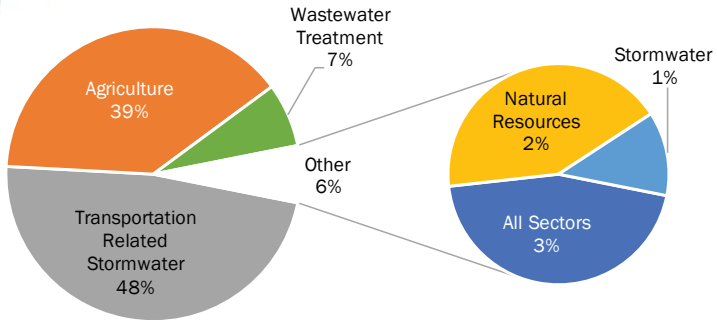
# Lamoille River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Lamoille River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Johnson | ANR | Lamoille County Planning Commission | Gihon River Tributary/Johnson State College Stormwater Treatment – Implementation | SW | Capital | $84,500 |
| Johnson | VTrans | Johnson | TH 25/26 Tree Farm/Ober Hill Road – Municipal Roads Erosion Control | Roads | CWF | $4,380 |
| Johnson | VTrans | Johnson | Th 10 Foote Brook Road – Correction of Stream Bank Erosion and Road Erosion Control | Roads | CWF | $15,937 |
| Johnson | VTrans | Johnson | TH 1 Plot Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $17,874 |
| Morristown | AAFM | Greaves Farms Corp. | Cover Crop | Ag | General | $2,580 |
| Underhill | ANR | Chittenden County Regional Planning Commission | Underhill Stormwater Master Plan – Project Identification | SW | CWF | $16,105 |
| Underhill | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $8,000 |
| Walden | AAFM | Lynd, Geordie | Heavy Use Area Protection | Ag | Capital | $6,400 |
| Walden | AAFM | Lynd, Geordie | Waste Transfer | Ag | Capital | $6,700 |
| Walden | AAFM | Lynd, Geordie | Waste Storage Structure | Ag | Capital | $12,900 |
| Walden | AAFM | Lynd, Geordie | Waste Transfer | Ag | Capital | $49,000 |
| Walden | VTrans | Walden | Municipal Road Erosion Inventory | Roads | FTF | $6,400 |
| Wolcott | ANR | Vermont River Conservancy | Wild Branch Lamoille River Corridor Easement (McCrumb Property) – Implementation | NR | Capital | $37,961 |
| Wolcott | ANR | Wolcott | Lamoille River/Wolcott Town Garage and Fire Station Stormwater Treatment – Implementation | SW | Capital | $15,888 |
| Wolcott | VTrans | Wolcott | TH 19 Sand Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $20,000 |
| Woodbury | VTrans | Woodbury | TH 36 East Hill Road – Municipal Roads Erosion Control | Roads | VTTF | $20,000 |

# Lake Memphremagog Watershed Summary




**State funding awarded in the Lake Memphremagog watershed in SFY 2017, by sector**
**Total: $607,164**

## STATE FUNDS AWARDED IN SFY 2017

## RESULTS OF PROJECTS COMPLETED IN SFY 2017

**Results of projects completed in SFY 2017, by sector, in the Lake Memphremagog watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | 27 |
| Number of barnyard/production area practices installed | 2 |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | 5 |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | NA |
| 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 | 29 |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 3 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 5 |
| 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 | NA |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

# Lake Memphremagog Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Lake Memphremagog watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Albany | VTrans | Albany | TH 8 Shuttsville Road – Municipal Roads Erosion Control | Roads | VTTF | $11,589 |
| Albany | VTrans | Albany | TH 2 County Road – Correction of Slope Erosion and Culvert Upgrade | Roads | VTTF | $18,052 |
| Averill | VTrans | Averill | TH 3 Cottage Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $20,000 |
| Brighton | ANR | Brighton | Brighton Wastewater Treatment Asset Management Program Implementation | WW | CWF | $30,000 |
| Brownington | VTrans | Brownington | Municipal Road Erosion Inventory | Roads | VTTF | $8,000 |
| Charleston | AAFM | Tip Top Tanner Farm | Clean Water Diversion | Ag | Capital | $25,000 |
| Charleston | AAFM | Tip Top Tanner Farm | Waste Facility Cover | Ag | Capital | $50,000 |
| Charleston | VTrans | Charleston | TH 16 Gratton Hill Road - Site 2 – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $18,518 |
| Charleston | VTrans | Charleston | TH 16 Gratton Hill Road - Site 1 – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $19,871 |
| Charleston | VTrans | Charleston | TH 27 East Echo Lake Road – Municipal Roads Erosion Control and Correction of Slope Erosion | Roads | VTTF | $20,000 |
| Charleston | VTrans | Charleston | TH 1 Hudson Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $34,597 |
| Charleston, Morgan | ANR | Northwoods Stewardship Center | Echo and Seymour Lake Shoreland Erosion Assessment – Project Identification | Roads | CWF | $14,960 |
| Coventry | AAFM | Andrew, John | Clean Water Diversion | Ag | Capital | $10,000 |
| Coventry | AAFM | Andrew, John | Heavy Use Area Protection | Ag | Capital | $65,000 |
| Coventry | VTrans | Coventry | Municipal Road Erosion Inventory | Roads | VTTF | $8,000 |
| Derby | AAFM | Fortin, Edward | Aeration Tillage | Ag | General | $3,657 |
| Derby | ANR | Derby | Hall's Creek Culvert Replacement | NR | Other | $10,000 |
| Derby | ANR | Derby Line | Derby Line Wastewater Treatment Facility Refurbishment – Preliminary Design | WW | CWSRF | $12,500 |
| Derby | VTrans | Derby | Municipal Road Erosion Inventory | Roads | FTF | $8,000 |
| Holland, Irasburg, Newport Town | ANR | Orleans County Natural Resources Conservation District | Partner Water Quality Monitoring Pre-and-Post Project Implementation – Tributary Monitoring | All | CWF | $8,062 |
| Irasburg | AAFM | Robillard Flats Farm, Inc | Aeration Tillage | Ag | General | $5,000 |

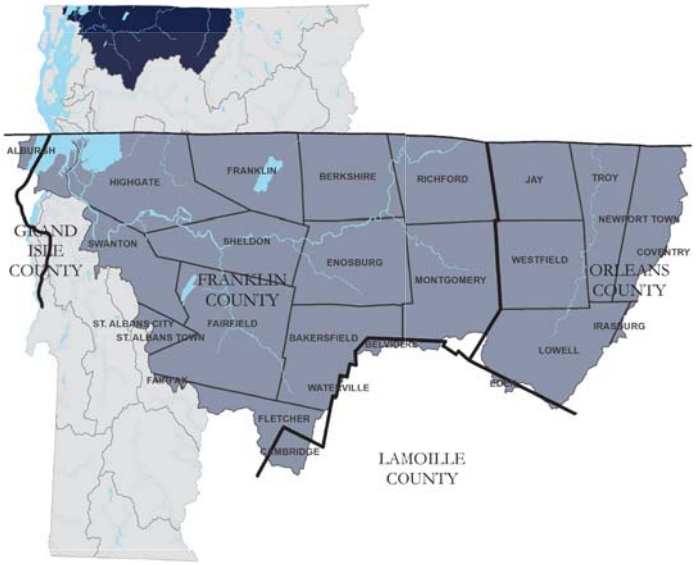
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

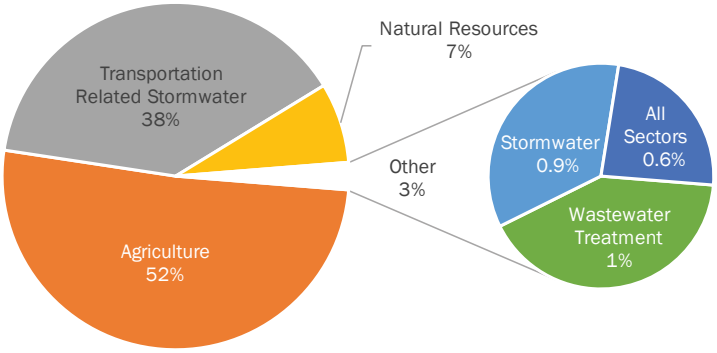
# Lake Memphremagog Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Lake Memphremagog watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Morgan | VTrans | Morgan | TH 27 Oxbow Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $20,354 |
| Orleans County | AAFM | Orleans County Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| Troy | VTrans | Troy | Municipal Road Erosion Inventory | Roads | FTF | $7,680 |
| Westfield | VTrans | Westfield | TH 1 North Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $33,237 |
| Westmore | VTrans | Westmore | TH 10 Job's Pond Camp Road – Municipal Roads Culvert Upgrade | Roads | CWF | $11,283 |

# Missisquoi Bay Watershed Summary




**State funding awarded in the Missisquoi Bay watershed in SFY 2017, by sector**
**Total: $1,677,217**

## STATE FUNDS AWARDED IN SFY 2017

## RESULTS OF PROJECTS COMPLETED IN SFY 2017

**Results of projects completed in SFY 2017, by sector, in the Missisquoi Bay watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | 481 |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | 14 |
| Acres of water quality protections within conserved agricultural lands | 36 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | 15 |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | 38 |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 1 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 10 |
| 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 | 4.1 |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | 20 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | 3 |

# Missisquoi Bay Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Missisquoi Bay watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Bakersfield | VTrans | Bakersfield | TH 3/25 East Bakersfield/King Road – Municipal Roads Erosion Control | Roads | CWF | $3,219 |
| Bakersfield | VTrans | Bakersfield | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $3,462 |
| Bakersfield | VTrans | Bakersfield | TH 37 Waterville Mtn. Road – Municipal Roads Erosion Control | Roads | VTTF | $3,930 |
| Bakersfield | VTrans | Bakersfield | TH 38 Lost Nation Road – Municipal Roads Erosion Control | Roads | VTTF | $5,213 |
| Berkshire | VTrans | Berkshire | TH 15 Ayers Hill Road – Municipal Roads Erosion Control | Roads | VTTF | $9,281 |
| Cambridge | AAFM | Beaudoin, Gregory | Clean Water Diversion | Ag | Capital | $10,000 |
| Cambridge | AAFM | Beaudoin, Gregory | Heavy Use Area Protection | Ag | Capital | $10,000 |
| Cambridge | AAFM | Beaudoin, Gregory | Heavy Use Area Protection | Ag | Capital | $10,000 |
| Cambridge | AAFM | Beaudoin, Gregory | Waste Transfer | Ag | Capital | $20,000 |
| Enosburgh | AAFM | B & T Black Creek Farm Ltd | Alternative Manure Incorporation | Ag | General | $5,000 |
| Enosburgh | AAFM | Lussier, Daniel | Cover Crop | Ag | General | $1,620 |
| Enosburgh | AAFM | Wright Farm | Access Road | Ag | CWF | $20,253 |
| Enosburgh | AAFM | Wright Farm | Heavy Use Area Protection | Ag | CWF | $21,596 |
| Enosburgh | AAFM | Wright Farm | Waste Storage Structure | Ag | CWF | $111,117 |
| Enosburgh | VTrans | Enosburgh | Municipal Salt and Sand Shed Design and Construction | Roads | FTF | $300,000 |
| Enosburgh | VTrans | Enosburgh | TH 11 Woodward Neighborhood Road – Municipal Roads Erosion Control | Roads | VTTF | $10,656 |
| Enosburgh | VTrans | Enosburgh Falls | TH 5 Duffy Hill Road – Municipal Roads Culvert Upgrade | Roads | CWF | $40,000 |
| Enosburgh | VTrans | Northwest Regional Planning Commission | Municipal Road Erosion Inventory | Roads | FTF | $5,238 |
| Fairfield | AAFM | Cream & Sugar Spread | Alternative Manure Incorporation | Ag | General | $1,458 |
| Fairfield | AAFM | Magnan Bros Dairy, Inc. | Alternative Manure Incorporation | Ag | General | $5,000 |
| Franklin | AAFM | Borderview Farm LLC | Heavy Use Area Protection | Ag | Capital | $15,425 |
| Franklin | AAFM | Borderview Farm LLC | Heavy Use Area Protection - Part #2 | Ag | Capital | $17,238 |
| Franklin | AAFM | Borderview Farm LLC | Waste Storage Structure | Ag | Capital | $70,943 |
| Franklin | AAFM | Bridgeman View Farm | Manure Application Record Keeping Equipment | Ag | Capital | $10,000 |
| Franklin | AAFM | Riverview Farm | Waste Transfer | Ag | Capital | $50,000 |
| Franklin | ANR | Franklin Watershed Committee | Lake Carmi Private Camp Roads and Culverts Erosion Assessment – Project Identification | Roads | CWF | $4,000 |
| Franklin | ANR | Franklin Watershed Committee | Lake Carmi/Franklin Roadside Erosion Control – Implementation | Roads | CWF | $8,500 |
| Franklin | ANR | Franklin Watershed Committee | Pike River/Franklin Town Highway Garage Stormwater Treatment – Preliminary Design | SW | Capital | $9,800 |
| Franklin | VTrans | Franklin | TH 5 Swamp Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $11,000 |
| Highgate | AAFM | Rainville Dairy LLC | Closure of Waste Impoundments | Ag | Capital | $22 |

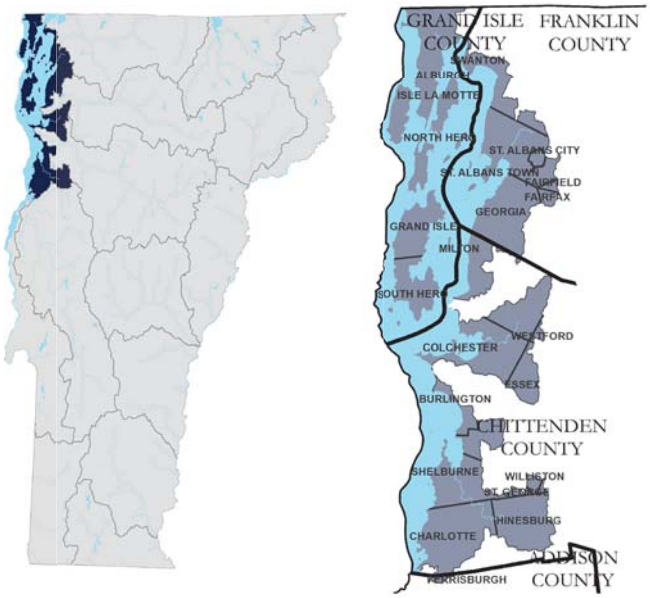
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

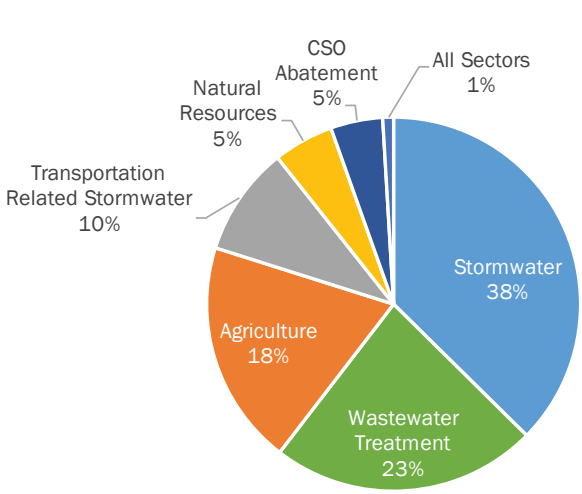
# Missisquoi Bay Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Missisquoi Bay watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Highgate | AAFM | Rainville Dairy LLC | Additional Conservation Practices | Ag | Capital | $8,753 |
| Highgate | AAFM | Rainville Dairy LLC | Waste Treatment - Silage | Ag | Capital | $8,764 |
| Highgate | AAFM | Rainville Dairy LLC | Waste Storage Structure | Ag | Capital | $17,958 |
| Highgate | AAFM | Rainville Dairy LLC | Waste Transfer | Ag | Capital | $19,200 |
| Highgate | AAFM | Rainville Dairy LLC | Waste Storage Structure | Ag | Capital | $20,303 |
| Highgate | ANR | Vermont Land Trust | Rock River Corridor Easement (Choiniere Property) – Implementation | NR | Capital | $46,325 |
| Highgate | VTrans | Highgate | TH 15 Shipyard Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $15,788 |
| Highgate | VTrans | Highgate | TH 22 Tarte Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $23,176 |
| Irasburg | VTrans | Irasburg | TH 4 – Municipal Roads Erosion Control | Roads | VTTF | $12,967 |
| Lowell | AAFM | LeBlanc, Alain | Waste Transfer | Ag | Capital | $6,500 |
| Lowell | AAFM | LeBlanc, Alain | Waste Treatment - Milk House Waste | Ag | Capital | $13,500 |
| Newport City | ANR | Missisquoi River Basin Association | Sleeper Pond/Mud Creek Dam Removal Alternatives Analysis in Newport Center – Preliminary Design | NR | CWF | $32,450 |
| Newport Town | AAFM | Leather, Jeremy | Heavy Use Area Protection | Ag | Capital | $40,000 |
| Norton | VTrans | Norton | TH 3 Churchill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $19,808 |
| Richford | AAFM | Pleasant Valley Farm | Waste Treatment - Silage | Ag | Capital | $15,617 |
| Richford | AAFM | Pleasant Valley Farm | Waste Treatment - Silage (Part #2) | Ag | Capital | $34,383 |
| Richford | VTrans | Richford | TH 8 Berry Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $19,046 |
| Richford | VTrans | Richford | TH 3 North Branch Road – Correction of Stream Bank Erosion | Roads | CWF | $40,000 |
| Richford | VTrans | Richford | TH 11 Corliss Road – Correction of Slope Erosion and Culvert Upgrade | Roads | CWF | $40,000 |
| Swanton | AAFM | Friends of Northern Lake Champlain | Education and Outreach | Ag | General | $1,000 |
| Swanton | AAFM | Manning Dairy LLC | Waste Treatment - Silage | Ag | Capital | $18,600 |
| Swanton | AAFM | Manning Dairy LLC | Waste Transfer | Ag | Capital | $56,400 |
| Swanton | VTrans | Swanton | TH 17 Waugh Farm Road – Correction of Stream Bank Erosion and Road Erosion Control | Roads | CWF | $8,524 |
| Troy | AAFM | J & R Family Farm | Waste Transfer | Ag | Capital | $9,000 |
| Troy | AAFM | Knox Ridge Holsteins | Aeration Tillage | Ag | General | $1,752 |
| Troy | VTrans | Troy | TH 31 Collins Mill Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Westfield | AAFM | Missisquoi Valley Farm LLC | Aeration Tillage | Ag | General | $2,760 |
| Westfield | ANR | Missisquoi River Basin Association | Jay State Forest Restoration and Erosion Control – Implementation | NR | Capital | $37,360 |
| Westmore | VTrans | Westmore | TH 30 Old Cottage Lane – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $20,000 |

# Northern Lake Champlain Watershed Summary




**State funding awarded in the Northern Lake Champlain watershed in SFY 2017, by sector**
**Total: $2,177,984**

## STATE FUNDS AWARDED IN SFY 2017

## RESULTS OF PROJECTS COMPLETED IN SFY 2017

**Results of projects completed in SFY 2017, by sector, in the Northern Lake Champlain watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | 466 |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | 13 |
| Number of barnyard/production area practices installed | 4 |
| Acres of water quality protections within conserved agricultural lands | 20 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | 13 |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | 3 |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | 7 |
| Acres of river corridor conserved through easements | NA |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | 2 |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | NA |
| 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 | NA |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

# Northern Lake Champlain Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Northern Lake Champlain watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Alburgh | AAFM | Reynolds, Newton | Heavy Use Area Protection | Ag | Capital | $7,357 |
| Alburgh | AAFM | Reynolds, Newton | Waste Storage Structure | Ag | Capital | $67,643 |
| Alburgh | ANR | Friends of Northern Lake Champlain | Northern Lake Champlain/Alburgh School Stormwater Treatment – Preliminary Design | SW | Capital | $6,500 |
| Alburgh | VTrans | Northwest Regional Planning Commission | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $5,131 |
| Burlington | ANR | Burlington | Burlington Wastewater Treatment Asset Management Program Implementation | WW | CWF | $50,800 |
| Charlotte | AAFM | M & C Family Farm | Cover Crop | Ag | General | $5,000 |
| Charlotte | ANR | Charlotte | LaPlatte River Riparian Restoration | NR | Other | $2,750 |
| Charlotte | ANR | Lewis Creek Association | Partner Water Quality Monitoring Pre-and-Post Project Implementation – Thorp Brook – South Chittenden River Watch | All | CWF | $6,879 |
| Charlotte | ANR | Lewis Creek Association | Beecher Hill Brook/Hinesburg Town Garage Beecher Hill Rd. Stormwater Treatment – Final Design | SW | Capital | $33,189 |
| Charlotte | VTrans | Charlotte | TH 46 East Thompson's Point Road – Bioretention | Roads | CWF | $12,077 |
| Charlotte | VTrans | Charlotte | TH 46 East Thompson's Point Road - Swale – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $16,000 |
| Fairfield | AAFM | Magnan Bros Maquam Shore Dairy LLC | Alternative Manure Incorporation | Ag | General | $5,000 |
| Greensboro | VTrans | Greensboro | TH 54 Young Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Hinesburg | ANR | Lake Iroquois Association | Lake Iroquois/Pine Shore Road, Hinesburg Stormwater Treatment – Implementation | SW | Capital | $34,000 |
| Hinesburg | ANR | Vermont Land Trust | LaPlatte River Corridor Easement (O'Neil Farm) – Implementation | NR | Capital | $86,633 |
| Hinesburg | ANR | Winooski Natural Resources Conservation District | Lake Iroquois Shoreland Erosion Control – Final Design | NR | CWF | $20,299 |
| Isle La Motte | VTrans | Isle La Motte | TH 2 West Shore Road – Correction of Slope Erosion and Culvert Upgrade | Roads | CWF | $15,922 |
| Shelburne | ANR | Shelburne | Munroe Brook/Brook Lane, Shelburne Stormwater Treatment – Implementation | SW | CWF | $12,395 |
| Shelburne | ANR | Shelburne | Shelburne Wastewater Collection System Refurbishment – Final Design | WW | CWSRF | $94,000 |
| Shelburne, South Burlington | ANR | Shelburne | Shelburne Bay/Nesti Lane, Shelburne and South Burlington Stormwater Treatment – Implementation | SW | CWF | $219,200 |
| South Burlington | ANR | South Burlington | Potash Brook/Commerce Square, Williston Road, South Burlington Stormwater Treatment – Implementation | SW | Capital | $150,000 |

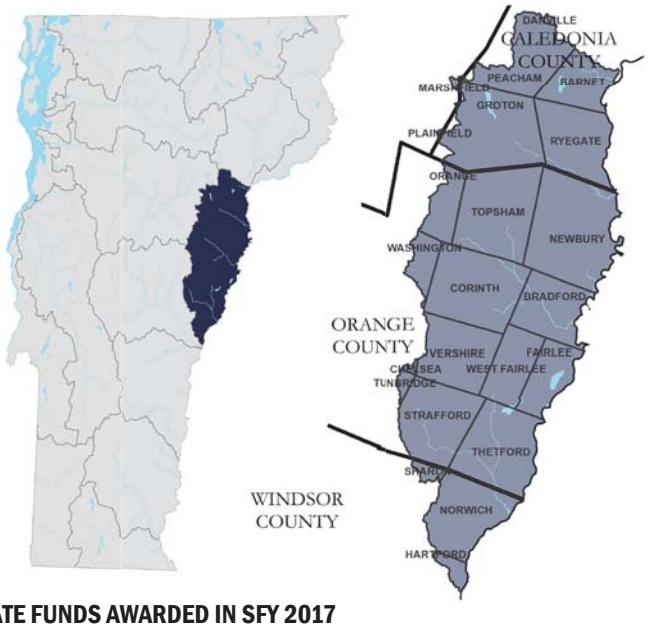
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

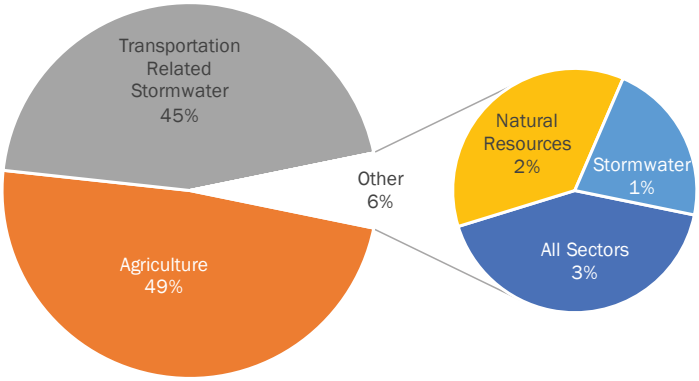
# Northern Lake Champlain Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Northern Lake Champlain watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| South Burlington | ANR | South Burlington | Potash Brook/Kennedy Drive, South Burlington Stormwater Pond Expansion/Retrofit – Preliminary Design | SW | CWF | $20,000 |
| South Hero | AAFM | Health Hero Island Farm | Roof Runoff Management | Ag | Capital | $5,000 |
| St. Albans City | AAFM | Boissoneault, Jeffrey | Alternative Manure Incorporation | Ag | General | $5,000 |
| St. Albans City | AAFM | Scott Magnan's Custom Service | Manure Application Record Keeping Equipment | Ag | Capital | $7,500 |
| St. Albans City | AAFM | Scott Magnan's Custom Service | Education and Outreach | Ag | General | $1,000 |
| St. Albans City | AAFM | Scott Magnan's Custom Service | Alternative Manure Incorporation | Ag | General | $1,665 |
| St. Albans City | ANR | St. Albans City | St. Albans City Street Sweeper Equipment | Roads | CWF | $128,074 |
| Swanton | AAFM | Longway Farms LLC | Heavy Use Area Protection | Ag | Capital | $18,000 |
| Swanton | AAFM | Longway Farms LLC | Heavy Use Area Protection | Ag | Capital | $18,000 |
| Swanton | AAFM | Longway Farms LLC | Clean Water Diversion | Ag | Capital | $27,000 |

# Ompompanoosuc, Stevens, Waits, Wells Rivers Watershed Summary




**State funding awarded in the Ompompanoosuc, Stevens, Waits, Wells Rivers watershed in SFY 2017, by sector**
**Total: $334,020**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

**Results of projects completed in SFY 2017, by sector, in the Ompompanoosuc, Stevens, Waits, Wells Rivers watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | 177 |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | 67 |
| Number of barnyard/production area practices installed | 2 |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | No data |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | No data |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | 32 |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| 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 | 4 |
| 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 | No data |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

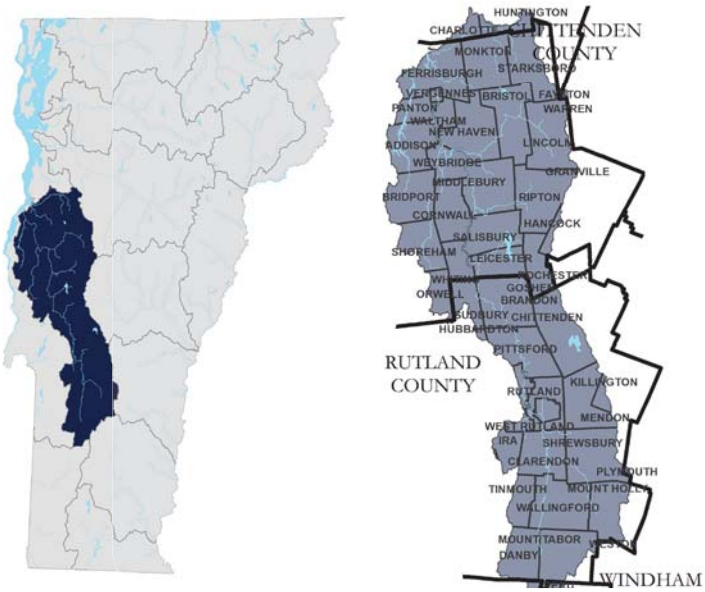
# Ompompanoosuc, Stevens, Waits, Wells Rivers Watershed Projects

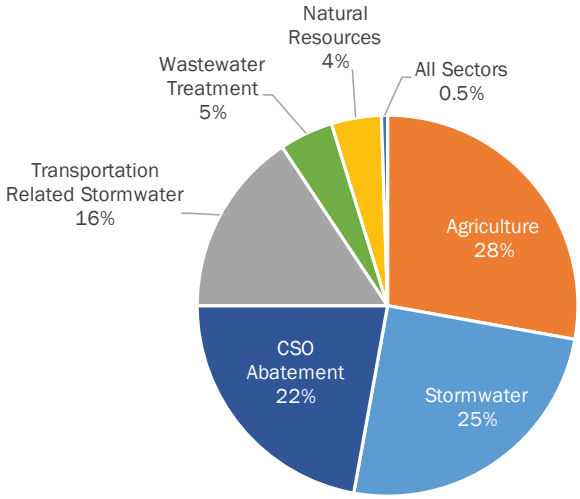
**Clean water projects funded by state agencies in SFY 2017 in the Ompompanoosuc, Stevens, Waits, Wells Rivers watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Corinth | VTrans | Corinth | TH 32 Coppermine Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $13,212 |
| Fairlee | VTrans | Fairlee | TH 18 Quinibeck Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Groton | VTrans | Groton | TH 2/4/27 Minard Hill/Great/Buzzy Road – Municipal Roads Erosion Control and Correction of Streambank and Slope Erosion | Roads | VTTF | $16,104 |
| Peacham | VTrans | Peacham | TH 6 Greenbay Loop – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $20,000 |
| Peacham | VTrans | Peacham | Municipal Road Erosion Inventory | Roads | FTF | $8,000 |
| Ryegate | AAFM | Clough, Rick | Forested Riparian Buffer Restoration | Ag | Capital | $1,386 |
| Ryegate | AAFM | Clough, Rick | Forested Riparian Buffer Restoration | Ag | Capital | $17,202 |
| Ryegate | AAFM | Home Acres Farm | Clean Water Diversion | Ag | Capital | $4,227 |
| Ryegate | AAFM | Home Acres Farm | Clean Water Diversion | Ag | Capital | $45,773 |
| Ryegate | AAFM | Scotch Burn Farm LLC | Cover Crop | Ag | General | $2,709 |
| Ryegate | AAFM | Wayside Meadow Farm | Cover Crop | Ag | General | $4,050 |
| Ryegate | VTrans | Ryegate | TH 7 North Bailey Hazen Road – Municipal Roads Culvert Upgrade | Roads | CWF | $9,600 |
| Thetford | VTrans | Thetford | TH 20 Sawnee Bean Road – Correction of Stream Bank Erosion and Culvert Upgrade | Roads | CWF | $20,000 |
| Thetford | VTrans | Thetford | Municipal Culvert Inventory | Roads | VTTF | $8,000 |
| Watershed-wide | ANR | White River Natural Resources Conservation District | Agricultural Pollution Prevention Project Planning and Design in the Stevens-Wells-Waits-Ompompanoosuc Basin | Ag | CWF | $10,000 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# Otter Creek Watershed Summary




**State funding awarded in the Otter Creek watershed in SFY 2017, by sector**
**Total: $1,912,414**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

**Results of projects completed in SFY 2017, by sector, in the Otter Creek watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | 585 |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | 5 |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | 109 |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | NA |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 0.3 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 18 |
| 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 | 0.7 |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | 10 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

# Otter Creek Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Otter Creek watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Addison | ANR | Addison | Addison New Wastewater Treatment Facility and Collection System – Final Design | WW | CWSRF | $50,000 |
| Brandon | ANR | Brandon | Brandon Stormwater Master Plan – Project Identification | SW | CWF | $30,000 |
| Brandon | VTrans | Brandon | TH 37 Birch Hill Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Brandon | VTrans | Brandon | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $6,888 |
| Bridport | AAFM | Blissful Dairy LLC | Access Road | Ag | Capital | $11,000 |
| Bridport | AAFM | Blissful Dairy LLC | Additional Conservation Practices | Ag | Capital | $5,000 |
| Bridport | AAFM | Blissful Dairy LLC | Heavy Use Area Protection | Ag | Capital | $2,600 |
| Bridport | AAFM | Blissful Dairy LLC | Heavy Use Area Protection | Ag | Capital | $8,000 |
| Bridport | AAFM | Blissful Dairy LLC | Pumping Plant | Ag | Capital | $37,800 |
| Bridport | AAFM | Blissful Dairy LLC | Pumping Plant | Ag | Capital | $15,120 |
| Bridport | AAFM | Blissful Dairy LLC | Waste Storage Structure | Ag | Capital | $26,000 |
| Bridport | AAFM | Blissful Dairy LLC | Waste Storage Structure | Ag | Capital | $9,000 |
| Bridport | AAFM | Blissful Dairy LLC | Waste Transfer | Ag | Capital | $11,000 |
| Bridport | AAFM | Blissful Dairy LLC | Waste Transfer | Ag | Capital | $20,480 |
| Bridport | VTrans | Bridport | TH 24 Market Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Clarendon | AAFM | Grembowicz Farm | Conservation Tillage | Ag | General | $5,000 |
| Clarendon | ANR | Rutland County Natural Resources Conservation District | Cold River Floodplain Restoration and Corridor Easement (Ruane Property) – Implementation | NR | Capital | $75,100 |
| Danby | VTrans | Danby | TH 1 Danby-Pawlet Road – Municipal Roads Culvert Upgrade | Roads | CWF | $29,600 |
| Danby | VTrans | Danby | TH 20 Raymond Road – Municipal Roads Erosion Control and Correction of Slope Erosion | Roads | VTTF | $8,905 |
| Ferrisburg, Starksboro | ANR | Lewis Creek Association | Partner Water Quality Monitoring Pre-and-Post Project Implementation – Livestock Exclusion Practices – Addison County River Watch Collaborative | Ag | CWF | $7,730 |
| Ferrisburgh | AAFM | Allendale Farm | Clean Water Diversion | Ag | Capital | $6,400 |
| Ferrisburgh | AAFM | Allendale Farm | Pumping Plant | Ag | Capital | $12,100 |
| Ferrisburgh | AAFM | Husk, Alice | Use Exclusion | Ag | Capital | $6,300 |
| Hubbardton | VTrans | Hubbardton | TH 4 High Pond Road – Municipal Roads Erosion Control | Roads | VTTF | $20,000 |
| Hubbardton | VTrans | Hubbardton | TH 4 High Pond Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $12,590 |
| Ira | VTrans | Ira | Th 2 West Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $3,518 |
| Ira | VTrans | Ira | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $2,721 |
| Ira | VTrans | Ira | TH 3 Pyka Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $11,333 |
| Ira | VTrans | Ira | TH 7 Cross Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $3,912 |
| Lincoln | VTrans | Lincoln | TH 6/9 York Hill/West Hill/Gove Hill – Municipal Roads Erosion Control, Culvert Upgrade, and Correction of Slope Erosion | Roads | CWF | $20,000 |
| Lincoln | VTrans | Lincoln | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $1,760 |

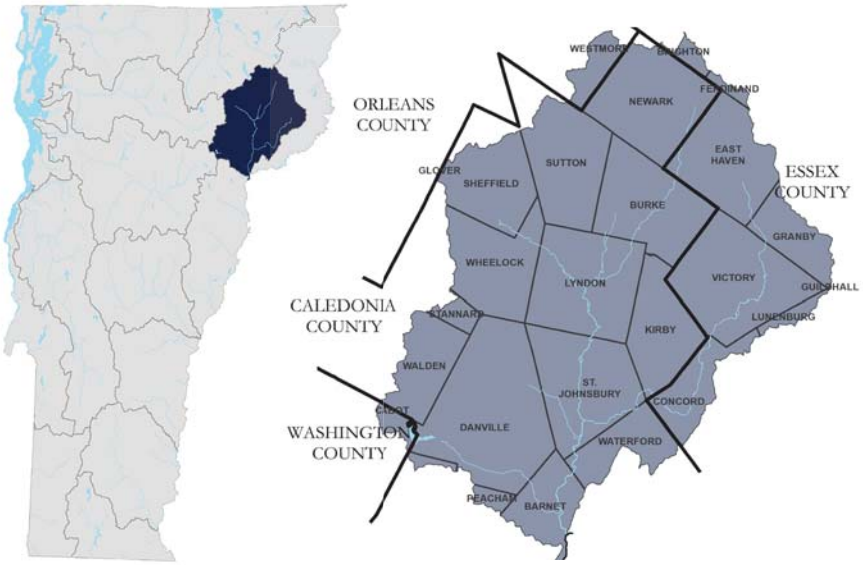
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

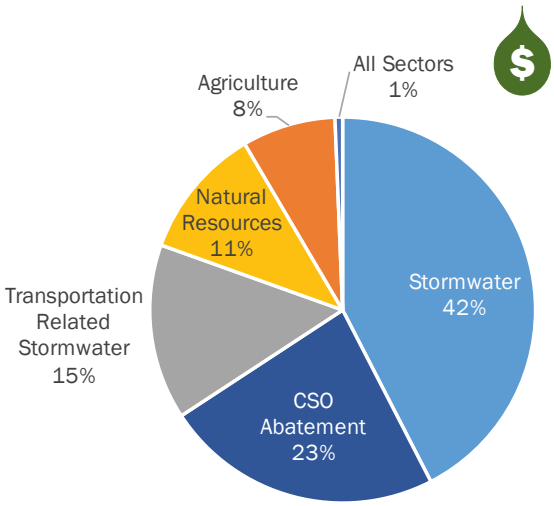
# Otter Creek Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Otter Creek watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Mendon | VTrans | Mendon | TH 14/23 Old Turnpike/Ridge Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $10,810 |
| Mendon | VTrans | Mendon | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $7,168 |
| Mendon | VTrans | Mendon | TH 7 Wheelerville Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $23,457 |
| Monkton | VTrans | Monkton | TH 1 Monkton Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $30,000 |
| Mount Holly | VTrans | Mount Holly | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $5,738 |
| Orwell | AAFM | LaDuc Acres | Access Road | Ag | Capital | $9,000 |
| Panton | AAFM | Vorsteveld Farm | Waste Storage Structure | Ag | Capital | $50,000 |
| Pittsford | VTrans | Pittsford | Municipal Road Erosion Inventory | Roads | FTF | $6,734 |
| Proctor | ANR | Proctor | Proctor Wastewater Collection System Refurbishment – Preliminary Design | WW | CWSRF | $20,300 |
| Proctor | VTrans | Proctor | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $5,126 |
| Ripton | VTrans | Ripton | TH 21 Brooks Road – Correction of Stream Bank Erosion | Roads | CWF | $6,968 |
| Ripton | VTrans | Ripton | Municipal Road Erosion Inventory | Roads | VTTF | $4,147 |
| Rutland City | ANR | Rutland City | Rutland City Combined Sewer Overflow Abatement – Construction | SW, CSO | Capital | $596,376 |
| Rutland City | ANR | Rutland City | Rutland City Wastewater Collection System and Combined Sewer Overflow Abatement – Preliminary Design | SW, CSO | CWSRF | $251,022 |
| Rutland City | ANR | Rutland County Natural Resources Conservation District | Moon Brook/Easterly Avenue, Rutland City Stormwater Treatment – Final Design | SW | Capital | $20,000 |
| Starksboro | AAFM | Clifford Farms LLC | Additional Conservation Practices | Ag | Capital | $11,060 |
| Starksboro | AAFM | Clifford Farms LLC | Waste Storage Structure | Ag | Capital | $81,743 |
| Starksboro | AAFM | Clifford Farms LLC | Waste Storage Structure | Ag | Capital | $2,288 |
| Starksboro | AAFM | Clifford Farms LLC | Waste Transfer | Ag | Capital | $4,908 |
| Wallingford | VTrans | Wallingford | TH 72 Earl Wade Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $13,504 |
| Waltham | VTrans | Waltham | TH 2 Maple St – Municipal Roads Erosion Control | Roads | CWF | $4,920 |
| West Rutland | VTrans | West Rutland | Municipal Culvert and Road Erosion Inventory | Roads | CWF | $7,159 |

# Passumpsic River Watershed Summary




**State funding awarded in the Passumpsic River watershed in SFY 2017, by sector**
**Total: $1,412,001**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

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

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | NA |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | NA |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 1 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 19 |
| 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 | No data |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | 41.3 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | No data |

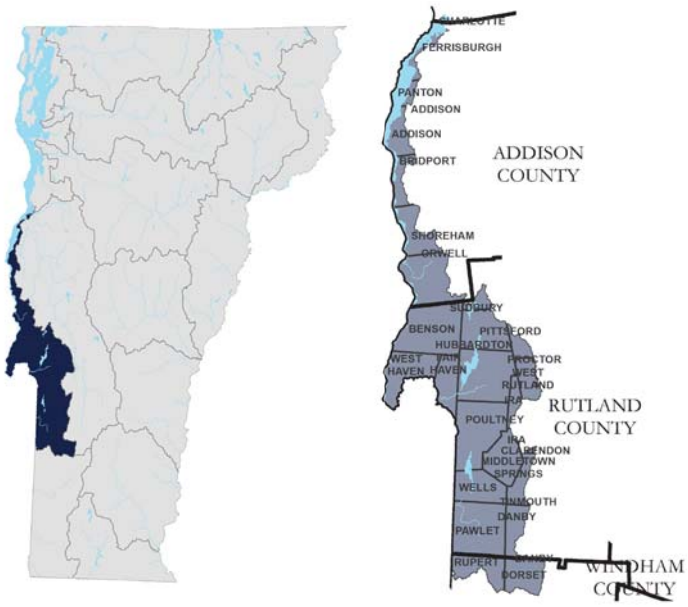
# Passumpsic River Watershed Projects

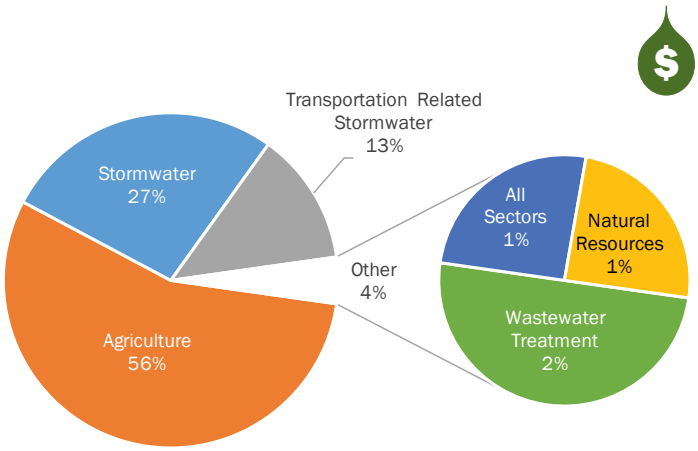
**Clean water projects funded by state agencies in SFY 2017 in the Passumpsic River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Barnet | VTrans | Barnet | Municipal Culvert and Road Erosion Inventory | Roads | FTF | $8,000 |
| Burke | ANR | Caledonia County Natural Resources Conservation District | Dishmill Brook/Burke Mountain Academy Stormwater Treatment – Implementation | SW | Capital | $7,276 |
| Burke | ANR | Caledonia County Natural Resources Conservation District | Dishmill Brook/Burke Stormwater Treatment – Implementation | SW | CWF | $40,970 |
| Burke | ANR | Connecticut River Conservancy | Passumpsic River Dam Removal at Burke Hollow Road in East Burke – Implementation | NR | Capital | $150,000 |
| Burke | VTrans | Burke | TH 14 Carter Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $15,048 |
| Burke | VTrans | Burke | TH 41 Pinkham Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $20,000 |
| Cabot | VTrans | Cabot | TH 59 West Shore Rd, TH 1 VT 215 S – Municipal Roads Culvert Upgrade | Roads | VTTF | $19,280 |
| Charleston | ANR | Northwoods Stewardship Center | Clean Water Projects Planning and Implementation Work Crew (Northwoods Stewardship Center) | SW | CWF | $125,240 |
| Concord | VTrans | Concord | TH 29 Bullard Woods Road – Municipal Roads Erosion Control | Roads | VTTF | $5,888 |
| Concord | VTrans | Concord | TH 5/28 Shadow Lake/Kirby Mountain Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $15,680 |
| Danville | VTrans | Danville | TH 54 Thaddeus Stevens Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $20,000 |
| Danville | VTrans | Danville | TH 78 – Municipal Roads Culvert Upgrade | Roads | VTTF | $40,000 |
| Kirby | VTrans | Kirby | Municipal Road Erosion Inventory | Roads | FTF | $8,000 |
| St. Johnsbury | ANR | Caledonia County Natural Resources Conservation District | Passumpsic River/Oak Street, St. Johnsbury Stormwater Treatment – Implementation | SW | Capital | $91,500 |
| St. Johnsbury | ANR | St. Johnsbury | St. Johnsbury Combined Sewer Overflow Abatement – Construction | SW, CSO | Capital | $578,779 |
| St. Johnsbury | ANR | St. Johnsbury | St. Johnsbury Wastewater Treatment Facility and Collection System Refurbishment and Combined Sewer Overflow Abatement – Final Design | SW, CSO | CWSRF | $80,250 |
| St. Johnsbury | VTrans | St. Johnsbury | TH 69 Lawrence Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $20,000 |
| Sutton | AAFM | Don-Sim Farm LLP | Heavy Use Area Protection | Ag | Capital | $34,000 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# South Lake Champlain, Poultney, Mettowee Rivers Watershed Summary




**State funding awarded in the South Lake Champlain, Poultney, Mettowee Rivers watershed in SFY 2017, by sector**
**Total: $1,564,986**

## STATE FUNDS AWARDED IN SFY 2017

## RESULTS OF PROJECTS COMPLETED IN SFY 2017

**Results of projects completed in SFY 2017, by sector, in the South Lake Champlain, Poultney, Mettowee Rivers watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | 238 |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | 15 |
| Acres of water quality protections within conserved agricultural lands | 28 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | 9 |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | NA |
| 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 | 2,870 |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 2 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 3 |
| 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 | 11 |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

# South Lake Champlain, Poultney, Mettowee Rivers Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the South Lake Champlain, Poultney, Mettowee Rivers watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Addison | AAFM | Chimney Point Farm LP | Critical Area Planting | Ag | Capital | $233 |
| Addison | AAFM | Chimney Point Farm LP | Mulching | Ag | Capital | $240 |
| Addison | AAFM | Chimney Point Farm LP | Subsurface Drain | Ag | Capital | $910 |
| Addison | AAFM | Chimney Point Farm LP | Clean Water Diversion | Ag | Capital | $1,109 |
| Addison | AAFM | Chimney Point Farm LP | Underground Outlet | Ag | Capital | $1,615 |
| Addison | AAFM | Chimney Point Farm LP | Access Road | Ag | Capital | $4,698 |
| Addison | AAFM | Chimney Point Farm LP | Obstruction Removal | Ag | Capital | $4,807 |
| Addison | AAFM | Chimney Point Farm LP | Waste Storage Structure | Ag | Capital | $9,138 |
| Addison | AAFM | Correia Family Limited Partnership | Alternative Manure Incorporation | Ag | General | $5,000 |
| Addison | AAFM | Kayhart Brothers LLC | Water and Sediment Control Basin | Ag | Capital | $35,000 |
| Benson | VHCB | Vermont Land Trust | Lussier Farm Agricultural Easement with Riparian Buffers | Ag | Capital, Other | $156,000 |
| Bridport | AAFM | Black & White Face Ranch | Waste Storage Structure | Ag | Capital | $50,000 |
| Castleton | ANR | Castleton | Castleton Wastewater Collection System Refurbishment – Final Design | WW | CWSRF | $17,800 |
| Castleton | VTrans | Castleton | TH 1 Main St – Municipal Roads Culvert Upgrade | Roads | CWF | $26,952 |
| Dorset, Rupert | ANR | Bennington County Conservation District | Mettowee Watershed Forest Roads Erosion Assessment – Project Identification | NR | CWF | $11,000 |
| Fair Haven | VTrans | Fair Haven | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $4,932 |
| Hubbardton | VTrans | Hubbardton | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $6,465 |
| Middletown Springs | VTrans | Middletown Springs | TH 12 Dayton Hill – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $9,905 |
| Orwell | VTrans | Orwell | TH 39 Singing Cedars Road – Municipal Roads Erosion Control and Correction of Slope Erosion | Roads | CWF | $13,878 |
| Pawlet | AAFM | Deer Flats Farm LLC | Waste Storage Structure | Ag | Capital | $200,000 |
| Pawlet | AAFM | MiLaura Farm | Cover Crop | Ag | General | $1,870 |
| Pawlet | AAFM | Woodlawn Holstein LLC | Stream Crossing | Ag | Capital | $22,500 |
| Pawlet | AAFM | Woodlawn Holstein LLC | Access Road | Ag | Capital | $37,500 |
| Pawlet | VHCB | Vermont Land Trust | Cleveland Farm III Agricultural Easement with Riparian Buffers | Ag | Capital, Other | $144,109 |
| Pawlet | VTrans | Pawlet | TH 24 Rupert Hill Road – Municipal Roads Erosion Control | Roads | CWF | $1,624 |
| Pawlet | VTrans | Pawlet | TH 1 VT 153 – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $13,116 |
| Pawlet | VTrans | Pawlet | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $4,937 |
| Poultney | ANR | Poultney Village | Poultney River/York Street, Poultney Stormwater Treatment – Implementation | SW | CWF | $420,000 |
| Poultney | VTrans | Poultney | TH 34 River St – Correction of Stream Bank Erosion and Road Erosion Control | Roads | CWF | $14,329 |
| Rupert | VTrans | Rupert | TH 17 Rogers Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $23,360 |
| Shoreham | AAFM | Woodnotch Farms Inc. | Crop Rotation, Cover Crop, Alternative Manure Incorporation | Ag | General | $4,628 |

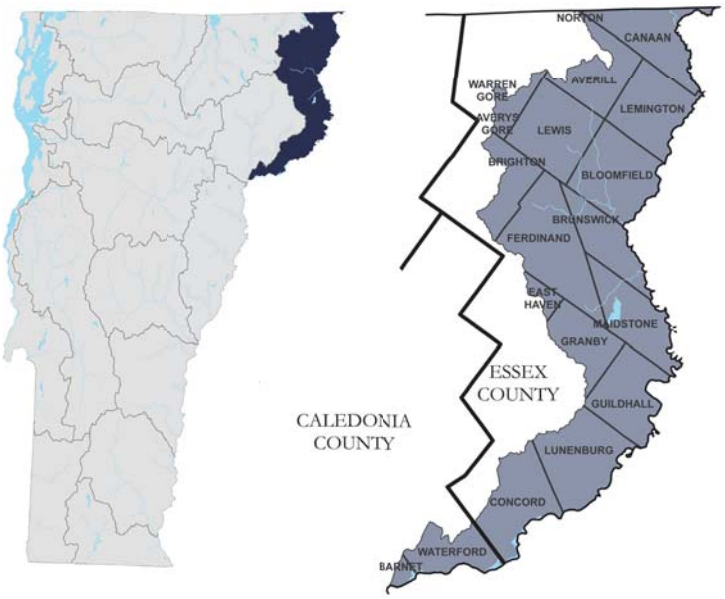
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

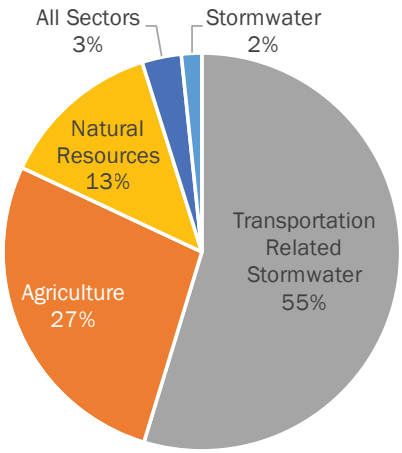
# South Lake Champlain, Poultney, Mettowee Rivers Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the South Lake Champlain, Poultney, Mettowee Rivers watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Shoreham | VTrans | Shoreham | TH 40 Harrington Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $9,885 |
| Tinmouth | VTrans | Tinmouth | TH 28 McCoy Road – Correction of Slope Erosion | Roads | CWF | $24,000 |
| Watershed-wide | ANR | Poultney Mettowee Natural Resources Conservation District | Partner Water Quality Monitoring Pre-and-Post Project Implementation – Mettawee, Castleton, and Hubbardton Rivers, Flower Brook, and Lake Bomoseen | All | CWF | $8,000 |
| Wells | VTrans | Wells | TH 31 Tadmer Road – Correction of Slope Erosion | Roads | CWF | $21,842 |
| Wells | VTrans | Wells | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $6,196 |
| West Haven | VTrans | West Haven | TH 1 Stage Road – Municipal Roads Erosion Control | Roads | CWF | $7,281 |

# Upper Connecticut River Watershed Summary




**State funding awarded in the Upper Connecticut River watershed in SFY 2017, by sector**
**Total: $281,391**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

**Results of projects completed in SFY 2017, by sector, in the Upper Connecticut River watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | NA |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | 7 |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | NA |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 1.5 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 12 |
| 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 | No data |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

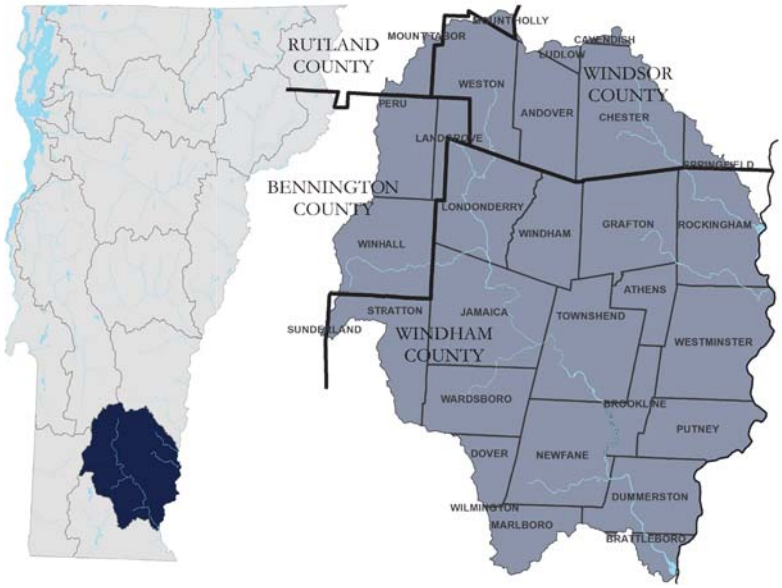
# Upper Connecticut River Watershed Projects

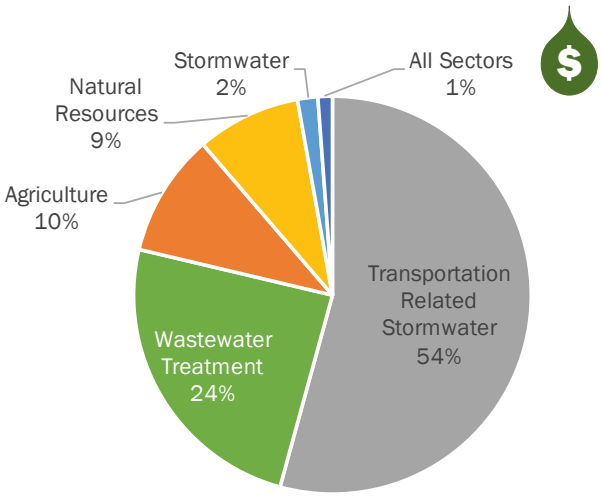
**Clean water projects funded by state agencies in SFY 2017 in the Upper Connecticut River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Bloomfield | VTrans | Bloomfield | TH 2 Mill Brook Road – Correction of Stream Bank Erosion | Roads | VTTF | $30,792 |
| Brighton | VTrans | Brighton | TH 5 Head of the Pond Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $20,000 |
| Brighton | VTrans | Brighton | TH 5 Arthur John & Head of Pond Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $4,600 |
| Brunswick, Canaan | ANR | Essex County Natural Resources Conservation District | Johnson Farm Wetland Restoration | NR | Other | $10,000 |
| Canaan | VTrans | Canaan | TH 15 Canaan Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $20,000 |
| Corinth | VTrans | Corinth | Municipal Road Erosion Inventory | Roads | FTF | $5,392 |
| Granby | VTrans | Granby | Municipal Road Erosion Inventory | Roads | FTF | $5,760 |
| Lemington | VTrans | Lemington | TH 4 Sims Hill Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Maidstone | ANR | Essex County Natural Resources Conservation District | Maidstone Lake Shoreland Erosion Assessment – Project Identification | NR | CWF | $21,000 |
| Newbury | VTrans | Newbury | Municipal Culvert Inventory | Roads | FTF | $7,011 |
| Strafford | VTrans | Strafford | Municipal Road Erosion Inventory | Roads | FTF | $4,746 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# West, Williams, Saxtons, Connecticut Rivers Watershed Summary




**State funding awarded in the West, Williams, Saxtons, Connecticut Rivers watershed in SFY 2017, by sector**
**Total: $766,312**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

**Results of projects completed in SFY 2017, by sector, in the West, Williams, Saxtons, Connecticut Rivers watershed.**

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | NA |
| Number of barnyard/production area practices installed | NA |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | NA |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | 1 |
| Acres of river corridor conserved through easements | 14 |
| 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 | 268 |
| 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 |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 0.2 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 3 |
| 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 | NA |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

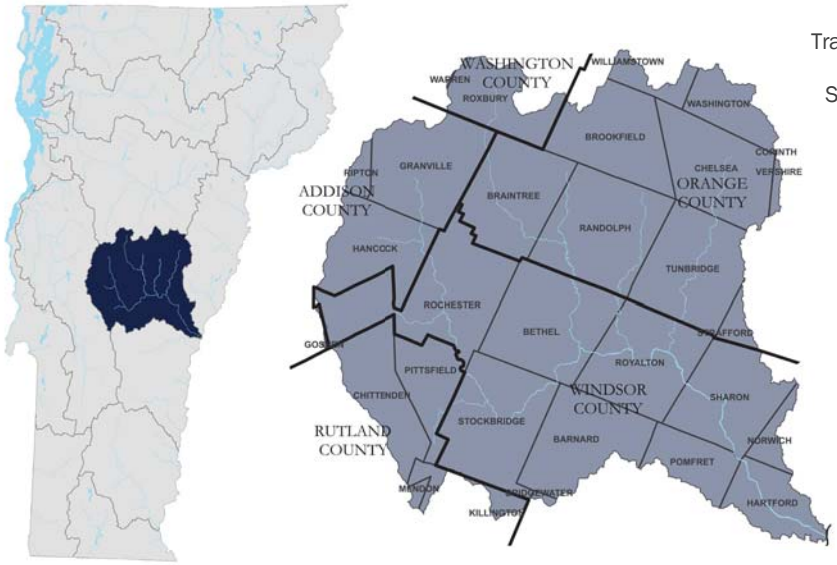
# West, Williams, Saxtons, Connecticut Rivers Watershed Projects

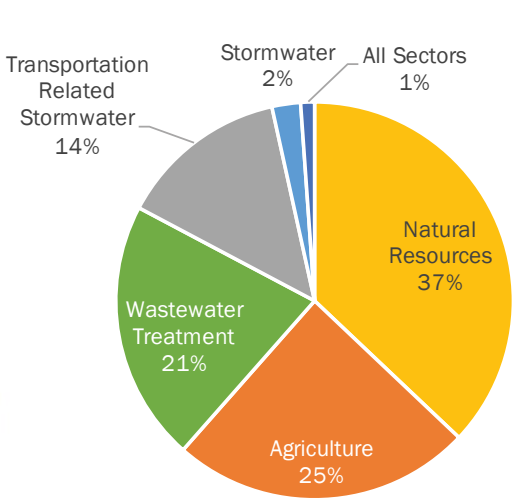
**Clean water projects funded by state agencies in SFY 2017 in the West, Williams, Saxtons, Connecticut Rivers watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Andover | ANR | Southern Windsor County Regional Planning Commission | Trout Brook/Andover Branch River Corridor and Floodplain Restoration – Implementation | NR | Capital | $26,520 |
| Brookline | VTrans | Brookline | TH 10 Grassy Brook Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $20,000 |
| Chester | ANR | Chester | Chester Wastewater Treatment Asset Management Program Implementation | WW | CWF | $20,000 |
| Chester | ANR | Vermont River Conservancy | Williams River Corridor Easement Design | NR | CWF | $6,300 |
| Chester | VTrans | Chester | Municipal Roads Culvert Upgrade | Roads | FTF | $300,000 |
| Grafton | ANR | Vermont River Conservancy | Saxtons River Corridor Easement (Kissel Property) – Implementation | NR | Capital | $21,000 |
| Grafton | ANR | Vermont River Conservancy | Saxtons River Tributary Corridor Easement Design (Howe, Willie, and Stiles Brooks) | NR | CWF | $2,000 |
| Grafton | VTrans | Grafton | Municipal Road Erosion Inventory | Roads | FTF | $8,000 |
| Jamaica | ANR | Connecticut River Conservancy | Winhall River Riparian Buffer Restoration/Planting – Implementation | NR | Capital | $3,000 |
| Londonderry | VTrans | Londonderry | TH 51 Goodaleville Road – Municipal Roads Erosion Control | Roads | CWF | $7,141 |
| Ludlow | VTrans | Ludlow | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $7,332 |
| Putney | ANR | Putney | Putney Wastewater Treatment Facility and Collection System Refurbishment – Preliminary Design | WW | CWSRF | $27,250 |
| Stratton | VTrans | Stratton | Municipal Culvert and Road Erosion Inventory | Roads | FTF | $8,000 |
| Townshend | VTrans | Townshend | TH 32 Plumb Hill Road – Municipal Roads Erosion Control and Correction of Slope Erosion | Roads | CWF | $11,410 |
| Townshend | VTrans | Townshend | Municipal Road Erosion Inventory | Roads | FTF | $8,000 |
| Westminster | VTrans | Westminster | Municipal Road Erosion Inventory | Roads | FTF | $8,000 |
| Weston | VTrans | Weston | TH 2 Lawrence Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $6,766 |
| Windham | VTrans | Windham | Municipal Road Erosion Inventory | Roads | FTF | $7,680 |
| Winhall | VTrans | Winhall | TH 2 Winhall Hollow Road – Municipal Roads Culvert Upgrade | Roads | CWF | $10,794 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# White River Watershed Summary




**State funding awarded in the White River watershed in SFY 2017, by sector**
**Total: $1,022,472**

## STATE FUNDS AWARDED IN SFY 2017

## RESULTS OF PROJECTS COMPLETED IN SFY 2017

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

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | NA |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | 11 |
| Number of barnyard/production area practices installed | 11 |
| Acres of water quality protections within conserved agricultural lands | 2 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | NA |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | No data |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | NA |
| Acres of river corridor conserved through easements | 32 |
| Acres of floodplain restored | NA |
| Stream miles enhanced and reconnected due to dam removal (also supports aquatic organism passage) | 98 |
| Acres protected for public access, recreation, forest conservation, and water quality | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | 10 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | No data |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 0.1 |
| Number of municipal road drainage structures installed | 0 |
| Number of municipal road drainage and stream culverts replaced | 14 |
| 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 | No data |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | NA |

# White River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the White River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Barnard | VTrans | Barnard | TH 28 Fort Defiance Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $8,690 |
| Bethel | ANR | Bethel | Bethel Wastewater Treatment Asset Management Program Implementation | WW | CWF | $23,900 |
| Bethel | VTrans | Bethel | Municipal Road Erosion Inventory | Roads | VTTF | $4,692 |
| Braintree | VTrans | Braintree | TH 4 Thayer Brook Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $37,103 |
| Braintree, Brookfield, Randolph | ANR | Two Rivers-Ottauquechee Regional Commission | Ayers Brook River Corridor Design and Landowner Outreach | NR | CWF | $11,259 |
| Chelsea | AAFM | Sweet Doe Dairy LLC | Waste Storage Structure | Ag | Capital | $8,000 |
| Hancock | ANR | White River Partnership | Upper White River Corridor Easement and Buffer Restoration/Planting (Millard Property) – Implementation | NR | CWF | $56,704 |
| Hartford | ANR | Hartford | Hartford Wastewater Treatment Asset Management Program Implementation | WW | CWF | $30,000 |
| Randolph | AAFM | Beidler Family Farm | Waste Transfer | Ag | Capital | $10,000 |
| Randolph | ANR | Two Rivers-Ottauquechee Regional Commission | Randolph Stormwater Master Plan – Project Identification | SW | CWF | $19,130 |
| Randolph | ANR | Vermont Land Trust | Second Branch White River Corridor Easement (Wortman Farm) – Implementation | NR | CWF | $38,463 |
| Randolph | ANR | White River Partnership | Partner Water Quality Monitoring Pre-and-Post Project Implementation – White River Second Branch | All | CWF | $2,514 |
| Rochester | ANR | Rochester | Rochester Wastewater Treatment Facility Refurbishment – Final Design | WW | CWSRF | $11,068 |
| Rochester | VTrans | Rochester | Municipal Culvert Inventory | Roads | FTF | $8,000 |
| Roxbury | VTrans | Central Vermont Regional Planning Commission | Municipal Road Erosion Inventory | Roads | VTTF | $4,594 |
| Royalton | ANR | Royalton | Royalton Wastewater Treatment Facility Refurbishment – Final Design | WW | CWSRF | $152,200 |
| Sharon | VHCB | The Nature Conservancy | White River Ledges - Schindler Tract Addition with Riparian Protection and Public Access | NR | Capital | $119,500 |
| Sharon | VTrans | Sharon | TH 12 Cross Road – Municipal Roads Culvert Upgrade | Roads | CWF | $6,190 |
| Stockbridge | ANR | White River Partnership | Middle White River Corridor Easement (Hull Property) – Implementation | NR | Capital | $35,671 |
| Stockbridge | ANR | White River Partnership | Middle White River Corridor Easement (Freund/Finn Property) – Implementation | NR | CWF | $70,391 |
| Stockbridge | VTrans | Stockbridge | TH 54 Stockle Drive – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $7,822 |
| Stockbridge | VTrans | Stockbridge | TH 51 & TH 35 Driscolls Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $27,097 |
| Stockbridge | VTrans | Stockbridge | Municipal Road Erosion Inventory | Roads | FTF | $4,998 |

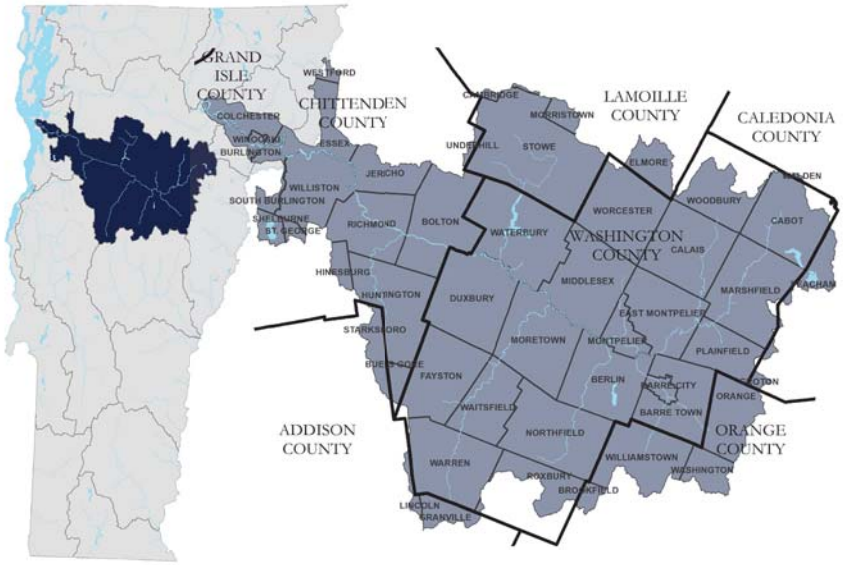
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

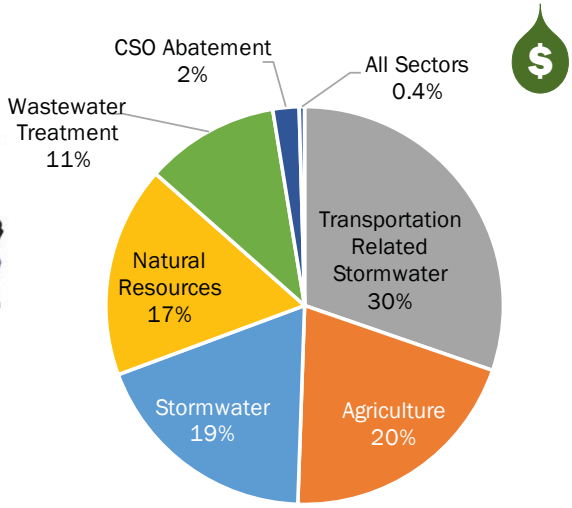
# White River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the White River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Tunbridge | AAFM | Chapman, Randall | Forested Riparian Buffer Restoration | Ag | Capital | $372 |
| Tunbridge | AAFM | Chapman, Randall | Forested Riparian Buffer Restoration | Ag | Capital | $936 |
| Tunbridge | ANR | Vermont Land Trust | Chapman Farm River Corridor Easement – Implementation | NR | CWF | $39,186 |
| Tunbridge | VHCB | Vermont Land Trust | Chapman-Howe Farm Agricultural Easement with Riparian Buffers | Ag | Capital, Other | $154,000 |
| Tunbridge | VTrans | Tunbridge | TH 4 Monarch Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $19,256 |

# Winooski River Watershed Summary




**State funding awarded in the Winooski River watershed in SFY 2017, by sector**
**Total: $5,381,619**

**STATE FUNDS AWARDED IN SFY 2017**

**RESULTS OF PROJECTS COMPLETED IN SFY 2017**

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

| AGRICULTURE PROJECT RESULTS | |
|---|---|
| Acres of cropland and pasture treated by annual conservation practices | 453 |
| Acres of cropland and pasture treated by crop rotation and associated practices | NA |
| Acres of cropland and pasture treated by forested buffers | 46 |
| Number of barnyard/production area practices installed | 5 |
| Acres of water quality protections within conserved agricultural lands | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Annual agricultural conservation practices | 117 |
| Agricultural crop rotation and associated practices | NA |
| Forested riparian buffer restoration on agricultural lands | 18 |

| NATURAL RESOURCES PROJECT RESULTS | |
|---|---|
| Acres of forested riparian buffer restored through buffer planting | 8 |
| Acres of river corridor conserved through easements | 51 |
| Acres of floodplain restored | 2 |
| 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 | NA |
| Acres of water quality protections within conserved land (forested buffer area and wetland protection zones) | NA |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Forested riparian buffer restoration on non-agricultural lands | 11 |

| TRANSPORTATION RELATED STORMWATER PROJECT RESULTS | |
|---|---|
| Miles of municipal road drainage improvements | 1 |
| Number of municipal road drainage structures installed | NA |
| Number of municipal road drainage and stream culverts replaced | 6 |
| Stream miles enhanced and reconnected due to replaced stream culverts (also supports aquatic organism passage) | 2 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Road erosion control practices | 5 |

| PROJECT RESULTS: STORMWATER | |
|---|---|
| Acres of impervious surface treated | 11 |

| TOTAL PHOSPHORUS REDUCED (kilograms per year) | |
|---|---|
| Stormwater treatment practices | 8 |

# Winooski River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Winooski River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Barre City | ANR | Barre City | Gunners Brook Floodplain Restoration – Implementation | NR | CWF | $100,000 |
| Barre City | ANR | Barre City | City of Barre Vacuum Sweeper Equipment | Roads | CWF | $260,750 |
| Barre City | ANR | Barre City | City of Barre Vactor Equipment | Roads | CWF | $340,620 |
| Barre City | ANR | Barre City | Edgewood Brook/Park-Winter Meadow Neighborhood, Barre City Stormwater Treatment – Implementation | SW | CWF | $36,978 |
| Barre Town | VTrans | Barre Town | TH 36 Nuissl Road – Municipal Roads Erosion Control | Roads | VTTF | $19,172 |
| Berlin | AAFM | Rogers Farmstead LLC | Use Exclusion | Ag | Capital | $3,000 |
| Berlin | AAFM | Rogers Farmstead LLC | Additional Conservation Practices | Ag | Capital | $8,387 |
| Berlin | AAFM | Rogers Farmstead LLC | Waste Transfer | Ag | Capital | $11,250 |
| Bolton | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $3,000 |
| Calais | ANR | Vermont Land Trust | Pekin Brook River Corridor Easement (Armstrong Farm) – Implementation | NR | Capital | $23,800 |
| Calais | VHCB | Vermont Land Trust | Armstrong (Betit) Farm Agricultural and River Corridor Easement | Ag | Capital, Other | $130,609 |
| Calais | VTrans | Calais | TH 28 Apple Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $7,228 |
| Calais | VTrans | Calais | TH 33 Jack Hill Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | VTTF | $7,252 |
| Calais | VTrans | Calais | TH 27 Apple Hill Road – Municipal Roads Culvert Upgrade | Roads | VTTF | $39,695 |
| Colchester | AAFM | Cottonwood Stables, LLC | Forested Riparian Buffer Restoration | Ag | Capital | $2,496 |
| Colchester | AAFM | Cottonwood Stables, LLC | Forested Riparian Buffer Restoration | Ag | Capital | $7,887 |
| Colchester | AAFM | Fitzgerald Farm 1 | Use Exclusion | Ag | Capital | $1,800 |
| Colchester | AAFM | Fitzgerald Farm 1 | Heavy Use Area Protection | Ag | Capital | $3,600 |
| Duxbury | ANR | Friends of The Mad River | Lozelle Brook/Harwood Union Middle and High School, Duxbury Stormwater Treatment – Implementation | SW | Capital | $29,040 |
| Elmore, Worcester | ANR | Vermont River Conservancy | North Branch Cascades Stormwater Mitigation and Pedestrian Trail | NR | Other | $9,625 |
| Elmore, Worcester | ANR | Vermont River Conservancy | North Branch Winooski River/Route 12, Elmore and Worcester Stormwater Treatment – Final Design | SW | CWF | $3,000 |
| Essex | ANR | Essex Junction | Indian Brook/Fairview Drive and Main Street, Village of Essex Junction Stormwater Treatment – Implementation | SW | Capital | $147,854 |
| Essex | VHCB | Vermont Land Trust | Whitcomb II Farmland Agricultural Easement with Riparian Buffers | Ag | Capital, Other | $639,000 |
| Essex | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $8,000 |

Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

# Winooski River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Winooski River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Fayston, Waitsfield, Warren | ANR | Friends of The Mad River | Mad River/Fayston and Warren Elementary Schools Stormwater Treatment – Preliminary Design | SW | CWF | $18,685 |
| Huntington | AAFM | Taft's Milk and Maple Farm | Cover Crop | Ag | General | $5,000 |
| Huntington | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $8,000 |
| Huntington | VTrans | Huntington | TH 21 Salvas Road – Municipal Roads Erosion Control | Roads | VTTF | $20,000 |
| Huntington | VTrans | Huntington | TH 11 Texas Hill Circle – Municipal Roads Culvert Upgrade | Roads | VTTF | $40,000 |
| Montpelier | ANR | Friends of The Winooski River | Winooski River Illicit Discharge Detection and Elimination Water Quality Monitoring | SW | CWF | $2,610 |
| Montpelier | ANR | Montpelier | Montpelier Riparian Buffer Restoration | NR | Other | $8,700 |
| Montpelier | ANR | Montpelier | Stevens Branch Winooski River/Route 302 and Berlin Street, Montpelier Stormwater Treatment – Final Design | SW | Capital | $42,000 |
| Montpelier | ANR | Montpelier | Montpelier Wastewater Collection System and Combined Sewer Overflow Abatement – Preliminary Design | SW, CSO | CWSRF | $29,616 |
| Montpelier | ANR | Montpelier | Montpelier Wastewater Collection System Refurbishment – Construction | WW | CWSRF | $36,680 |
| Montpelier | ANR | Montpelier | Montpelier Wastewater Treatment Facility Refurbishment – Preliminary Design | WW | CWSRF | $51,300 |
| Montpelier | VTrans | Central Vermont Regional Planning Commission | Municipal Culvert and Road Erosion Inventory | Roads | CWF | $8,000 |
| Moretown | ANR | Central Vermont Regional Planning Commission | Mad River Corridor Plan – Project Identification | NR | CWF | $27,878 |
| Moretown | VTrans | Moretown | TH 55 Williams Road – Municipal Roads Erosion Control | Roads | CWF | $16,466 |
| Northfield | ANR | Central Vermont Regional Planning Commission | Dog River/Union and Water Street, Northfield Stormwater Treatment – Implementation | SW | Capital | $173,785 |
| Northfield | ANR | Friends of The Winooski River | Dog River Floodplain Restoration – Implementation | NR | Capital | $242,039 |
| Northfield | ANR | Northfield | Northfield Hydroseeder Equipment | Roads | CWF | $6,628 |
| Orange | VTrans | Orange | TH 39 Manning Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Richmond | ANR | Chittenden County Regional Planning Commission | Richmond Stormwater Master Plan – Project Identification | SW | CWF | $39,086 |
| Richmond | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $8,000 |

# Winooski River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Winooski River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Roxbury | VTrans | Roxbury | TH 14 Cruickshank Road – Correction of Stream Bank Erosion | Roads | CWF | $14,066 |
| South Burlington | AAFM | Ethan Allen Farm | Clean Water Diversion | Ag | Capital | $22,500 |
| South Burlington | AAFM | Ethan Allen Farm | Waste Transfer | Ag | Capital | $22,500 |
| South Burlington | VTrans | South Burlington | Picard Circle Stormwater Treatment Design and Construction | Roads | FTF | $229,600 |
| St. George | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $2,000 |
| Stowe | AAFM | Percy, Paul | Cover Crop | Ag | General | $1,356 |
| Stowe | ANR | Stowe | West Branch Little River/Stowe Bike Path Floodplain Restoration – Implementation | NR | Capital | $276,547 |
| Stowe | VTrans | Stowe | TH 95 River Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $17,440 |
| Stowe | VTrans | Stowe | TH 95 River Road – Correction of Stream Bank Erosion | Roads | CWF | $19,640 |
| Waitsfield | AAFM | Neill Farm LLC | Cover Crop | Ag | General | $2,985 |
| Waitsfield | VTrans | Waitsfield | TH 28 Palmer Hill Road – Municipal Roads Erosion Control | Roads | CWF | $12,500 |
| Warren | AAFM | DeFreest Farms Partnership | Cover Crop | Ag | General | $5,000 |
| Warren | ANR | Warren | Mad River/Fuller Hill Road, Warren Stormwater Treatment – Preliminary Design | SW | Capital | $9,600 |
| Warren | VTrans | Central Vermont Regional Planning Commission | Municipal Road Erosion Inventory | Roads | VTTF | $6,660 |
| Warren | VTrans | Warren | TH 9 Airport Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Warren | VTrans | Warren | TH 1 Brook Road – Correction of Slope Erosion | Roads | CWF | $30,000 |
| Warren | VTrans | Warren | TH 1 Brook Road – Municipal Roads Culvert Upgrade | Roads | CWF | $40,000 |
| Warren | VTrans | Warren | Municipal Culvert and Road Erosion Inventory | Roads | VTTF | $6,661 |
| Waterbury | ANR | Vermont River Conservancy | Thatcher Brook River Corridor Easement (Roscioli Property) – Implementation | NR | Capital | $45,800 |
| Waterbury | ANR | Vermont River Conservancy | Thatcher Brook River Corridor Easement Design | NR | CWF | $5,750 |
| Waterbury | VTrans | Waterbury | TH 31 Hubbard Farm Road – Municipal Roads Erosion Control and Culvert Upgrade | Roads | CWF | $40,000 |
| Watershed-wide | ANR | Central Vermont Regional Planning Commission | Mad River and Kingsbury Branch Stormwater Master Plan – Project Identification | SW | CWF | $140,530 |
| Watershed-wide | ANR | Friends of The Mad River | Riparian Education for Landowners along the Mad River | All | Other | $4,945 |
| Watershed-wide | ANR | Friends of The Winooski River | Riparian Restoration along the Winooski River | NR | Other | $10,000 |

# Winooski River Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in the Winooski River watershed.**

| TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|
| Watershed-wide | ANR | Winooski Natural Resources Conservation District | Winooski River Riparian Buffer Restoration/Planting – Implementation | NR | Capital | $18,050 |
| Westford | VHCB | Vermont Land Trust | Westford Town Forest with Wetland/Riparian Protection | NR | Capital, Other | $150,000 |
| Williston | ANR | Williston | Allen Brook Wayside Interpretive Exhibit | All | Other | $4,800 |
| Williston | ANR | Williston | Winooski River/Fontaine Lane and North Williston Road, Williston Roadside Erosion Control – Implementation | Roads | Capital | $18,130 |
| Williston | ANR | Williston | Muddy Brook/Blackberry Ridge and Walker Hill Road, Williston Streambank Erosion Control – Implementation | Roads | Capital | $19,782 |
| Williston | ANR | Williston | Williston Wastewater Collection System Refurbishment – Construction | WW | CWSRF | $132,292 |
| Williston | VTrans | Chittenden County Regional Planning Commission | Municipal Road Erosion Inventory | Roads | CWF | $8,000 |
| Williston | VTrans | Williston | TH 23 East Hill Road – Municipal Roads Erosion Control | Roads | CWF | $20,000 |
| Williston | VTrans | Williston | Lamplite Acres Stormwater Treatment Design and Construction | Roads | FTF | $300,000 |

# Multi-Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 the Connecticut River basin.**

| AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|
| AAFM | Caledonia County Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Essex County Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Ottauquechee Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | White River Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Windham County Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |

**Clean water projects funded by state agencies in SFY 2017 the Lake Champlain basin.**

| AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|
| AAFM | Franklin County Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Grand Isle Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| ANR | Vermont Public Broadcasting Service | Keeping Lake Champlain Great documentary | All | Other | $5,000 |
| ANR | Vermont Rural Water Association | Municipal Wastewater Treatment Facility Technical Assistance to Optimize for Nutrient Treatment | WW | CWF | $103,000 |
| AAFM | Farmers Watershed Alliance | Farm Mentorship Program | Ag | CWF | $19,968 |
| AAFM | Friends of Northern Lake Champlain | Organizational Capacity Building Grant | Ag | CWF | $20,000 |
| AAFM | Missisquoi River Basin Association | Organizational Capacity Building Grant | Ag | CWF | $10,360 |
| AAFM | Missisquoi River Basin Association | Soil Health Seminars | Ag | CWF, General | $4,700 |
| AAFM | Multiple Partners | Environmental Quality Incentives Program State Cost Share | Ag | CWF | $447,034 |
| AAFM | Newtrient, LLC | Strategic Pathway for Inducing Phosphorus Control Technologies | Ag | CWF | $160,000 |
| AAFM | Lamoille County Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Rutland Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Otter Creek Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Poultney Mettowee Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Winooski Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |

# Multi-Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 in multiple watersheds.**

| WATERSHEDS | TOWN | AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|---|---|
| Batten Kill-Walloomsac-Hoosic<br>Deerfield-Connecticut Direct<br>West-Williams-Saxtons | Sunderland | ANR | Bennington County Regional Commission | Sunderland Stormwater Master Plan – Project Identification | SW | CWF | $24,000 |
| Deerfield-Connecticut Direct<br>West-Williams-Saxtons | Dover | ANR | North Branch Fire District #1 | North Branch Fire District #1 Wastewater Treatment Facility Refurbishment – Final Design | WW | CWSRF | $280,098 |
| Lake Memphremagog<br>Lamoille<br>Passumpsic<br>Stevens-Wells-Waits-Ompompanoosuc<br>Upper Connecticut River | Caledonia, Essex, and Lamoille Counties | ANR | Lamoille County Conservation District | Regional Hydroseeder Equipment-Share Program | Roads | CWF | $115,100 |
| Northern Lake Champlain<br>Winooski | Burlington | ANR | Burlington | Burlington Wastewater Collection System Refurbishment and Stormwater Treatment – Preliminary Design | WW, SW | CWSRF | $997,204 |
| Northern Lake Champlain<br>Winooski | Burlington | ANR | Burlington | Burlington Wastewater Treatment Facility, Collection System, and Stormwater Integrated Planning – Preliminary Design | WW, SW, CSO | CWSRF | $600,000 |
| Northern Lake Champlain<br>Winooski | Colchester, Essex | ANR | Winooski Natural Resources Conservation District | Partner Water Quality Monitoring Pre-and-Post Project Implementation – Alder, Indian, Sunderland Brooks | All | CWF | $8,111 |
| Missisquoi<br>Northern Lake Champlain<br>Winooski | Franklin, Highgate, St. Albans Town | ANR | University of Vermont Extension | Equipment to Enhance the Water Quality Benefit of Cover Crops | Ag | Capital | $99,554 |
| Ottauquechee-Black<br>Stevens-Wells-Waits-Ompompanoosuc<br>White | Fairlee, Randolph | ANR | Two Rivers-Ottauquechee Regional Commission | Municipal Outreach on Roadside Ditch Management | NR | Other | $5,000 |

# Multi-Watershed Projects

**Clean water projects funded by state agencies in SFY 2017 the Connecticut River basin.**

| AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|
| AAFM | Caledonia County Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Essex County Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Ottauquechee Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | White River Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |
| AAFM | Windham County Natural Resources Conservation District | Agricultural Conservation Practices Technical Assistance | Ag | General | $6,000 |

# Statewide Watershed Projects

**Statewide clean water projects funded by state agencies in SFY 2017.**

| AGENCY | PARTNER | SUMMARY TITLE | SECTOR | FUNDING SOURCE | AMOUNT |
|---|---|---|---|---|---|
| AAFM | Champlain Valley Farmer Coalition | On-Farm Workshops and Farmer Follow-up | Ag | CWF | $18,606 |
| AAFM | Farmer's Watershed Alliance | Comprehensive Precision Agriculture Forum | Ag | CWF, General | $19,878 |
| AAFM | Natural Resources Conservation Council | Block Grant (Organizational Development, Education and Outreach, Nutrient Pollution Controls) | Ag | CWF, General | $260,778 |
| AAFM | Natural Resources Conservation Council | Agricultural Conservation Practices Technical Assistance (Capacity and Oversight) | Ag | General | $103,000 |
| AAFM | Scott Magnan's Custom Service | Precision Agricultural Management | Ag | CWF, General | $18,750 |
| AAFM | University of Vermont Extension | Block Grant (Organizational Development, Education and Outreach, Nutrient Pollution Controls) | Ag | CWF, General | $462,770 |
| AAFM | University of Vermont Extension | Education and Outreach | Ag | General | $9,500 |
| AAFM | University of Vermont Extension | Agricultural Conservation Practices Technical Assistance | Ag | General | $26,125 |
| AAFM | Vermont Association of Conservation Districts | Education and Outreach | Ag | General | $1,000 |
| AAFM | Vermont Association of Conservation Districts | Land Treatment Planning to Support NMP Development | Ag | General | $119,680 |
| AAFM | Vermont Grass Farmers Association | Strengthening Vermont's Network of Grass-Based Farmers to Protect Soil and Water | Ag | CWF | $18,634 |
| AAFM | Vermont Grass Farmers Association | Grass-Based Farming Education and Outreach | Ag | CWF, General | $17,294 |
| ANR | Beck Pond LLC | LaRosa Laboratory Partner Water Quality Monitoring Analytical Support | All | CWF | $11,195 |
| ANR | Multiple Partners | Citizen Science Volunteer Monitoring Water Quality Sampling LaRosa Laboratory Analysis | All | CWF | $100,000 |
| ANR | South Mountain Research and Consulting | LaRosa Laboratory Partner Water Quality Monitoring Analytical Support | All | CWF | $18,922 |
| ANR | Stone Environmental | Development of Methodologies for Identifying Subsurface Tile Drains on Agricultural Lands | Ag | CWF | $9,926 |
| ANR | Vermont Department of Forests, Parks and Recreation | Vermont State Parks Lake Shoreland Erosion Control – Implementation | NR | Capital | $71,472 |
| ANR | Vermont Department of Forests, Parks and Recreation | Acceptable Management Practices for Water Quality on Logging Jobs Manual Design and Editing | NR | CWF | $20,000 |
| ANR | Vermont Youth Conservation Corps | Clean Water Projects Planning and Implementation Work Crew (Vermont Youth Conservation Corps) | Roads | CWF | $189,399 |
| ANR | Vital Communities | Watershed Education in the White River Watershed | All | Other | $5,000 |
| ANR | Watershed Consulting Associates, LLC | Statewide Illicit/Unauthorized Discharge Detection and Elimination | SW | CWF | $69,835 |

# Appendix B. Ecosystem Restoration Grant Program Projects

Appendix B fulfills the reporting requirement of Act 64 (2015)[1], Section 36, codified at 10 V.S.A. § 1386(e) including: activities and progress of water quality Ecosystem Restoration Programs. Appendix B summarizes projects funded in state fiscal year (SFY) 2017 through the Agency of Natural Resources Department of Environmental Conservation Ecosystem Restoration Grant Program.

Sector is abbreviated in the table as follows:

| | |
|---|---|
| Ag | Agricultural pollution prevention |
| NR | Natural resources |
| Roads | Transportation/road-related stormwater |
| SW | Stormwater |
| WW | Wastewater treatment |

## ECOSYSTEM RESTORATION GRANTS AWARDED IN SFY 2017

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Addison | Hancock | White River Partnership | Upper White River Corridor Easement and Buffer Restoration/Planting (Millard Property) – Implementation | NR | $56,704 | White |
| Bennington | Bennington | Bennington County Conservation District | Bennington Bedding Mulcher Equipment | SW | $5,107 | Batten Kill-Walloomsac-Hoosic |
| Bennington | Dorset, Rupert | Bennington County Conservation District | Mettowee Watershed Forest Roads Erosion Assessment – Project Identification | NR | $11,000 | Southern Lake Champlain |
| Bennington | Rupert | Bennington County Conservation District | Mill Brook Gully Stabilization – Implementation | NR | $18,600 | Batten Kill-Walloomsac-Hoosic |
| Bennington | Sandgate | Bennington County Regional Commission | Sandgate Stormwater Master Plan – Project Identification | SW | $24,000 | Batten Kill-Walloomsac-Hoosic |
| Bennington | Sunderland | Bennington County Regional Commission | Sunderland Stormwater Master Plan – Project Identification | SW | $24,000 | Batten Kill-Walloomsac-Hoosic, Deerfield-CT Direct, West-Williams-Saxtons |

[1] Act 64 or the "Vermont Clean Water Act;" 2015 Vt. Acts & Resolves 975, amended in 2017.

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Caledonia | Burke | Caledonia County Natural Resources Conservation District | Dishmill Brook/Burke Mountain Academy Stormwater Treatment – Implementation | SW | $7,276 | Passumpsic |
| Caledonia | Burke | Caledonia County Natural Resources Conservation District | Dishmill Brook/Burke Stormwater Treatment – Implementation | SW | $40,970 | Passumpsic |
| Caledonia | Burke | Connecticut River Conservancy | Passumpsic River Dam Removal at Burke Hollow Road in East Burke – Implementation | NR | $150,000 | Passumpsic |
| Caledonia | St. Johnsbury | Caledonia County Natural Resources Conservation District | Passumpsic River/Oak Street, St. Johnsbury Stormwater Treatment – Implementation | SW | $91,500 | Passumpsic |
| Caledonia, Essex, Lamoille | Caledonia, Essex, and Lamoille Counties | Lamoille County Conservation District | Regional Hydroseeder Equipment-Share Program | Roads | $115,100 | Lake Memphremagog, Lamoille, Passumpsic, Stevens-Wells-Waits-Ompompanoosuc, Upper Connecticut River |
| Chittenden | Charlotte | Lewis Creek Association | Beecher Hill Brook/Hinesburg Town Garage Beecher Hill Rd. Stormwater Treatment – Final Design | SW | $33,189 | Northern Lake Champlain |
| Chittenden | Essex | Essex Junction | Indian Brook/Fairview Drive and Main Street, Village of Essex Junction Stormwater Treatment – Implementation | SW | $147,854 | Winooski |
| Chittenden | Hinesburg | Lake Iroquois Association | Lake Iroquois/Pine Shore Road, Hinesburg Stormwater Treatment – Implementation | SW | $34,000 | Northern Lake Champlain |
| Chittenden | Hinesburg | Vermont Land Trust | LaPlatte River Corridor Easement (O'Neil Farm) – Implementation | NR | $86,633 | Northern Lake Champlain |
| Chittenden | Hinesburg | Winooski Natural Resources Conservation District | Lake Iroquois Shoreland Erosion Control – Final Design | NR | $20,299 | Northern Lake Champlain |
| Chittenden | Richmond | Chittenden County Regional Planning Commission | Richmond Stormwater Master Plan – Project Identification | SW | $39,086 | Winooski |
| Chittenden | Shelburne | Shelburne | Munroe Brook/Brook Lane, Shelburne Stormwater Treatment – Implementation | SW | $12,395 | Northern Lake Champlain |
| Chittenden | Shelburne, South Burlington | Shelburne | Shelburne Bay/Nesti Lane, Shelburne and South Burlington Stormwater Treatment – Implementation | SW | $219,200 | Northern Lake Champlain |

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Chittenden | South Burlington | South Burlington | Potash Brook/Kennedy Drive, South Burlington Stormwater Pond Expansion/Retrofit – Preliminary Design | SW | $20,000 | Northern Lake Champlain |
| Chittenden | South Burlington | South Burlington | Potash Brook/Commerce Square, Williston Road, South Burlington Stormwater Treatment – Implementation | SW | $150,000 | Northern Lake Champlain |
| Chittenden | Underhill | Chittenden County Regional Planning Commission | Underhill Stormwater Master Plan – Project Identification | SW | $16,105 | Lamoille |
| Chittenden | Williston | Williston | Winooski River/Fontaine Lane and North Williston Road, Williston Roadside Erosion Control – Implementation | Roads | $18,130 | Winooski |
| Chittenden | Williston | Williston | Muddy Brook/Blackberry Ridge and Walker Hill Road, Williston Streambank Erosion Control – Implementation | Roads | $19,782 | Winooski |
| Chittenden, Lamoille | Cambridge, Underhill | Lamoille County Planning Commission | Seymour River Stream Geomorphic Assessment/River Corridor Plan – Project Identification | NR | $34,713 | Lamoille |
| Chittenden, Washington | Watershed-wide | Winooski Natural Resources Conservation District | Winooski River Riparian Buffer Restoration/Planting – Implementation | NR | $18,050 | Winooski |
| Essex | Maidstone | Essex County Natural Resources Conservation District | Maidstone Lake Shoreland Erosion Assessment – Project Identification | NR | $21,000 | Upper Connecticut |
| Franklin | Franklin | Franklin Watershed Committee | Lake Carmi Private Camp Roads and Culverts Erosion Assessment – Project Identification | Roads | $4,000 | Missisquoi |
| Franklin | Franklin | Franklin Watershed Committee | Lake Carmi/Franklin Roadside Erosion Control – Implementation | Roads | $8,500 | Missisquoi |
| Franklin | Franklin | Franklin Watershed Committee | Pike River/Franklin Town Highway Garage Stormwater Treatment – Preliminary Design | SW | $9,800 | Missisquoi |
| Franklin | Franklin, Highgate, St. Albans Town | University of Vermont Extension | Equipment to Enhance the Water Quality Benefit of Cover Crops | Ag | $99,554 | Northern Lake Champlain, Missisquoi, Winooski |
| Franklin | Georgia | Friends of Northern Lake Champlain | Deer Brook/Route 7 and Route 104A, Georgia Gully Remediation – Preliminary Design | SW | $86,700 | Lamoille |

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Franklin | Highgate | Vermont Land Trust | Rock River Corridor Easement (Choiniere Property) – Implementation | NR | $46,325 | Missisquoi |
| Franklin | St. Albans City | St. Albans City | St. Albans City Street Sweeper Equipment | Roads | $128,074 | Northern Lake Champlain |
| Grand Isle | Alburgh | Friends of Northern Lake Champlain | Northern Lake Champlain/Alburgh School Stormwater Treatment – Preliminary Design | SW | $6,500 | Northern Lake Champlain |
| Lamoille | Cambridge | Lamoille County Conservation District | Town of Cambridge/Brewster River Floodplain Restoration – Preliminary Design | NR | $21,250 | Lamoille |
| Lamoille | Cambridge | Vermont Land Trust | North Branch Lamoille River Corridor Easement (Barup Farm) – Implementation | NR | $46,494 | Lamoille |
| Lamoille | Hyde Park, Morristown | Lamoille County Conservation District | Hyde Park and Morristown Stormwater Master Plan – Project Identification | SW | $30,000 | Lamoille |
| Lamoille | Johnson | Lamoille County Planning Commission | Gihon River Tributary/Johnson State College Stormwater Treatment – Implementation | SW | $84,500 | Lamoille |
| Lamoille | Stowe | Stowe | West Branch Little River/Stowe Bike Path Floodplain Restoration – Implementation | NR | $276,547 | Winooski |
| Lamoille | Wolcott | Vermont River Conservancy | Wild Branch Lamoille River Corridor Easement (McCrumb Property) – Implementation | NR | $37,961 | Lamoille |
| Lamoille | Wolcott | Wolcott | Lamoille River/Wolcott Town Garage and Fire Station Stormwater Treatment – Implementation | SW | $15,888 | Lamoille |
| Lamoille, Washington | Elmore, Worcester | Vermont River Conservancy | North Branch Winooski River/Route 12, Elmore and Worcester Stormwater Treatment – Final Design | SW | $3,000 | Winooski |
| Orange | Braintree, Brookfield, Randolph | Two Rivers-Ottauquechee Regional Commission | Ayers Brook River Corridor Design and Landowner Outreach | NR | $11,259 | White |
| Orange | Randolph | Two Rivers-Ottauquechee Regional Commission | Randolph Stormwater Master Plan – Project Identification | SW | $19,130 | White |
| Orange | Randolph | Vermont Land Trust | Second Branch White River Corridor Easement (Wortman Farm) – Implementation | NR | $38,463 | White |

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Orange | Tunbridge | Vermont Land Trust | Chapman Farm River Corridor Easement – Implementation | NR | $39,186 | White |
| Orange | Watershed-wide | White River Natural Resources Conservation District | Agricultural Pollution Prevention Project Planning and Design in the Stevens-Wells-Waits-Ompompanoosuc Basin | Ag | $10,000 | Stevens-Wells-Waits-Ompompanoosuc |
| Orleans | Charleston | Northwoods Stewardship Center | Clean Water Projects Planning and Implementation Work Crew (Northwoods Stewardship Center) | SW | $125,240 | Passumpsic |
| Orleans | Charleston, Morgan | Northwoods Stewardship Center | Echo and Seymour Lake Shoreland Erosion Assessment – Project Identification | Roads | $14,960 | Lake Memphremagog |
| Orleans | Newport City | Missisquoi River Basin Association | Sleeper Pond/Mud Creek Dam Removal Alternatives Analysis in Newport Center – Preliminary Design | NR | $32,450 | Missisquoi |
| Orleans | Westfield | Missisquoi River Basin Association | Jay State Forest Restoration and Erosion Control – Implementation | NR | $37,360 | Missisquoi |
| Rutland | Brandon | Brandon | Brandon Stormwater Master Plan – Project Identification | SW | $30,000 | Otter Creek-Litter Otter Creek-Lewis Creek |
| Rutland | Clarendon | Rutland County Natural Resources Conservation District | Cold River Floodplain Restoration and Corridor Easement (Ruane Property) – Implementation | NR | $75,100 | Otter Creek-Litter Otter Creek-Lewis Creek |
| Rutland | Poultney | Poultney Village | Poultney River/York Street, Poultney Stormwater Treatment – Implementation | SW | $420,000 | Southern Lake Champlain |
| Rutland | Rutland City | Rutland County Natural Resources Conservation District | Moon Brook/Easterly Avenue, Rutland City Stormwater Treatment – Final Design | SW | $20,000 | Otter Creek-Litter Otter Creek-Lewis Creek |
| Rutland, Windsor | Watershed-wide | Stone Environmental | Ottauquechee-Black Rivers Illicit/Unauthorized Discharge Detection and Elimination | SW | $69,940 | Ottauquechee-Black |
| Washington | Barre City | Barre City | Gunners Brook Floodplain Restoration – Implementation | NR | $100,000 | Winooski |
| Washington | Barre City | Barre City | City of Barre Vacuum Sweeper Equipment | Roads | $260,750 | Winooski |
| Washington | Barre City | Barre City | City of Barre Vactor Equipment | Roads | $340,620 | Winooski |
| Washington | Barre City | Barre City | Edgewood Brook/Park-Winter Meadow Neighborhood, Barre City Stormwater Treatment – Implementation | SW | $36,978 | Winooski |

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Washington | Calais | Vermont Land Trust | Pekin Brook River Corridor Easement (Armstrong Farm) – Implementation | NR | $23,800 | Winooski |
| Washington | Duxbury | Friends of The Mad River | Lozelle Brook/Harwood Union Middle and High School, Duxbury Stormwater Treatment – Implementation | SW | $29,040 | Winooski |
| Washington | Fayston, Waitsfield, Warren | Friends of The Mad River | Mad River/Fayston and Warren Elementary Schools Stormwater Treatment – Preliminary Design | SW | $18,685 | Winooski |
| Washington | Montpelier | Montpelier | Stevens Branch Winooski River/Route 302 and Berlin Street, Montpelier Stormwater Treatment – Final Design | SW | $42,000 | Winooski |
| Washington | Moretown | Central Vermont Regional Planning Commission | Mad River Corridor Plan – Project Identification | NR | $27,878 | Winooski |
| Washington | Northfield | Central Vermont Regional Planning Commission | Dog River/Union and Water Street, Northfield Stormwater Treatment – Implementation | SW | $173,785 | Winooski |
| Washington | Northfield | Friends of The Winooski River | Dog River Floodplain Restoration – Implementation | NR | $242,039 | Winooski |
| Washington | Northfield | Northfield | Northfield Hydroseeder Equipment | Roads | $6,628 | Winooski |
| Washington | Warren | Warren | Mad River/Fuller Hill Road, Warren Stormwater Treatment – Preliminary Design | SW | $9,600 | Winooski |
| Washington | Waterbury | Vermont River Conservancy | Thatcher Brook River Corridor Easement Design | NR | $5,750 | Winooski |
| Washington | Waterbury | Vermont River Conservancy | Thatcher Brook River Corridor Easement (Roscioli Property) – Implementation | NR | $45,800 | Winooski |
| Washington | Watershed-wide | Central Vermont Regional Planning Commission | Mad River and Kingsbury Branch Stormwater Master Plan – Project Identification | SW | $140,530 | Winooski |
| Windham | Brattleboro | Vermont River Conservancy | Whetstone Brook Floodplain Restoration and River Corridor Easement – Implementation | NR | $84,400 | Deerfield-Connecticut Direct |
| Windham | Grafton | Vermont River Conservancy | Saxtons River Tributary Corridor Easement Design (Howe, Willie, and Stiles Brooks) | NR | $2,000 | West-Williams-Saxtons |

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Windham | Grafton | Vermont River Conservancy | Saxtons River Corridor Easement (Kissel Property) – Implementation | NR | $21,000 | West-Williams-Saxtons |
| Windham | Guilford | Connecticut River Conservancy | Green River Corridor Easement/Floodplain Restoration – Final Design | NR | $8,140 | Deerfield-Connecticut Direct |
| Windham | Guilford | Vermont River Conservancy | Green River Corridor Easement Design | NR | $2,000 | Deerfield-Connecticut Direct |
| Windham | Guilford | Windham Regional Commission | Green River Corridor Easement, Floodplain Berm Removal, and Buffer Restoration – Implementation | NR | $32,000 | Deerfield-Connecticut Direct |
| Windham | Jamaica | Connecticut River Conservancy | Winhall River Riparian Buffer Restoration/Planting – Implementation | NR | $3,000 | West-Williams-Saxtons |
| Windsor | Andover | Southern Windsor County Regional Planning Commission | Trout Brook/Andover Branch River Corridor and Floodplain Restoration – Implementation | NR | $26,520 | West-Williams-Saxtons |
| Windsor | Chester | Vermont River Conservancy | Williams River Corridor Easement Design | NR | $6,300 | West-Williams-Saxtons |
| Windsor | Springfield | Ottauquechee Natural Resources Conservation District | Black River/Springfield Transfer Station Stormwater Treatment – Final Design | SW | $30,230 | Ottauquechee-Black |
| Windsor | Springfield | Springfield | Springfield Vactor Truck Equipment | Roads | $375,000 | Ottauquechee-Black |
| Windsor | Stockbridge | White River Partnership | Middle White River Corridor Easement (Hull Property) – Implementation | NR | $35,671 | White |
| Windsor | Stockbridge | White River Partnership | Middle White River Corridor Easement (Freund/Finn Property) – Implementation | NR | $70,391 | White |
| Windsor | West Windsor | Southern Windsor County Regional Planning Commission | Mill Brook Dam Removal at West Windsor Firehouse – Implementation | NR | $19,040 | Ottauquechee-Black |
| Windsor | Woodstock | Vermont Department of Forests, Parks and Recreation | Curtis Hollow Brook/Coolidge State Forest Road Stream Culvert Removal – Implementation | Roads | $4,060 | Ottauquechee-Black |
| Lake Champlain Basin | Lake Champlain Basin | Vermont Rural Water Association | Municipal Wastewater Treatment Facility Technical Assistance to Optimize for Nutrient Treatment | WW | $103,000 | Lake Champlain Basin Regional |
| Statewide | Statewide | Stone Environmental | Development of Methodologies for Identifying Subsurface Tile Drains on Agricultural Lands | Ag | $9,926 | Statewide |

| COUNTY | TOWN | PARTNER | SUMMARY TITLE | SECTOR | AMOUNT | WATERSHED |
|---|---|---|---|---|---|---|
| Statewide | Statewide | Vermont Department of Forests, Parks and Recreation | Acceptable Management Practices for Water Quality on Logging Jobs Manual Design and Editing | NR | $20,000 | Statewide |
| Statewide | Statewide | Vermont Department of Forests, Parks and Recreation | Vermont State Parks Lake Shoreland Erosion Control – Implementation | NR | $71,472 | Statewide |
| Statewide | Statewide | Vermont Youth Conservation Corps | Clean Water Projects Planning and Implementation Work Crew (Vermont Youth Conservation Corps) | Roads | $189,399 | Statewide |
| Statewide | Statewide | Watershed Consulting Associates, LLC | Statewide Illicit/Unauthorized Discharge Detection and Elimination | SW | $69,835 | Statewide |

# Appendix C. Clean Water Initiative: Major Statutory and Lake Champlain Phosphorus TMDL Phase I Plan Deliverables

*** The light blue-shaded tasks are milestones specified in the Lake Champlain TMDLs Accountability Framework – the guide containing required tasks for monitoring progress in the restoration of Lake Champlain*

## *On-Going* Clean Water Initiative Deliverables

| AGENCY | KEY TASK | DEADLINE | UPDATE | RECURRING? |
|---|---|---|---|---|
| ANR/DEC, AAFM | Report to Legislature on the execution of the Phase I Implementation Plan for the Lake Champlain TMDL | Act 64: 1/15/2017 | -Completed & integrated into the Clean Water Initiative Annual Investment Report (12/30/2016);<br>-Integrating update in FY2017 Report (Deadline: 1/15/2018) | 1/15/2017, and every four years thereafter |
| ANR/DEC, AAFM | ANR and AAFM shall each develop three performance measures relating to new Memorandum of Understanding (MOU) | Act 64: 7/1/2016 | -Legislative Report with performance measures under development;<br>-New Target Date: 1/15/2018 | No |
| AAFM, ANR/DEC | Report to Legislature on meeting agricultural nonpoint source pollution MOU performance measures | Act 64: 1/15/2017 | -Legislative Report with performance measures under development;<br>-New Target Date: 1/15/2018 | 1/15/2017 and annually thereafter |
| ANR/DEC | Issue Municipal Roads General Permit | Champlain TMDL deadline: 12/30/2017 | -Under development;<br>-New Target Completion Date: 1/31/2018 | No |
| ANR/DEC | Update existing regulated municipal MS4 permits to include Phosphorus Control Plan requirements that are consistent with the TMDLs' targets | Champlain TMDL deadline: 12/30/2017 | -Under development;<br>-Stakeholder process held in 2017;<br>-New Target Completion Date: 3/31/2018 | No |
| ANR/DEC | Develop Clean Water Fund budget | June, 2018 | -FY18 appropriated;<br>-FY19 budget proposed as part of state budget process;<br>-Next step: Legislative budget approval and appropriations process<br>-Target Date: 7/1/2018 | Annually |
| ANR/DEC | Develop Stormwater Management Practices Handbook for sub-jurisdictional activities | Act 64: 1/1/2016 | -Completed web-based materials and hard copy;<br>-Target Date to publish handbook with updated photos: 7/1/2018 | No |

| AGENCY | KEY TASK | DEADLINE | UPDATE | RECURRING? |
|---|---|---|---|---|
| ANR/DEC, AAFM | Document methodologies used to estimate pollutant load reductions | No deadline | -Under development;<br>-New Target Date: 7/1/2018 | No |
| ANR/FPR | Revise by rule the Acceptable Management Practices for Maintaining Water Quality on Logging Jobs<br>(Act 64, Sec. 49) | Champlain TMDL deadline: 12/30/2016 | -Initial update completed and in effect on 10/22/2016;<br>-Undergoing second rule-making for small modifications;<br>-New Target Completion Date: 7/1/2018;<br>-Following rule-making, Target Completion Date for publishing AMP guide: 8/31/2017 | No |
| ANR/DEC | Adopt rules to manage stormwater runoff, including technical standards and BMPs | 12/31/2017 | -Draft under development;<br>-Stakeholder process begun in 2017;<br>-New Target Date: 2018 | No |
| ANR/DEC | Issue Stormwater general permit for impervious surfaces equal to or greater than three acres | Champlain TMDL deadline: 12/30/2017 | -Under development;<br>-Draft legislation to extend deadline to 12/30/2018 | No |
| AAFM | Target funding for agricultural BMP and Nutrient Management Plan implementation for Missisquoi Bay, St. Albans Bay & South Lake | Champlain TMDL deadline to begin work: 12/30/2017 | - Inspections, Revised Secretary's Decision (RSD) and federal priorities have led to increase in conservation practice enrollment through cost-share programs | On-going |
| AAFM | Complete education, outreach & compliance activities with farms in the Missisquoi Bay watershed per Section II,6 of Secretary of AAFM 2/3/2016 decision | Champlain TMDL Deadline: 12/30/2017 | -AAFM is working with CLF to ensure the effort is aligned with the RSD | On-going per RSD |
| AAFM | Commence notification of affected farms about the Assessment and Plan process, per Section II,6 of Secretary of AAFM 2/3/2016 decision | Champlain TMDL Deadline: 12/30/2017 | -AAFM sent letters out to all farms in Franklin County to let them know about the RSD;<br>-Included RSD in nearly all presentations in the County (RAP, custom manure applicator, tile drainage, etc.) | No |

| AGENCY | KEY TASK | DEADLINE | UPDATE | RECURRING? |
|---|---|---|---|---|
| ANR/DEC, AAFM, VTrans, ACCD, Administration | Establish long-term revenue source to support water quality improvement via the Clean Water Fund | Champlain TMDL deadline: 12/30/2017 | -H518 (2017) extended the CWF funding source (surcharge on property transfer) to 7/1/2027;<br>-Act 84 (2017) included increase in capital funds for clean water through FY2019;<br>-Legislative Report by State Treasurer on clean water funding options completed (1/15/2017);<br>-Legislative Report of the Working Group on WQ Funding completed (11/15/2017);<br>-Legislation required to establish additional revenue sources | On-going |
| AAFM | Revise RAPs to include requirements to reduce nutrient pollution from tile drains and other priority actions (Act 64, Sec. 4) | Act 64: 1/15/2018 | - AAFM to pre-file the rule to meet the 1/15/2018 deadline | No |
| ANR/DEC | Prepare and maintain management plan to assure that the State is meeting water quality standards and include a schedule for updating basin plans | Schedule:<br>2015: 2 Plans<br>2016: 2 Plans<br>2017: 2 Plans<br>2018: 3 Plans<br>2019: 3 Plans<br>2020: 2 Plans | -Completed tactical basin plans scheduled for 2015, 2016 (Lamoille & Missisquoi) & 2017 (North and South Lake Champlain (LC) Plans);<br>-South LC Plan includes Poultney-Mettowee and Lower Champlain basins | Schedule for issuance of tactical basin plans in Lake TMDL Phase 1 Plan |

## *COMPLETED* Clean Water Initiative Deliverables

| AGENCY | KEY TASK | DEADLINE | UPDATE | RECURRING? |
|---|---|---|---|---|
| ANR/DEC, AAFM, VTrans, ACCD, Administration | Establish a Clean Water Fund (CWF) | Act 64: 06/16/2015 established Clean Water Fund | -Established Fund in 2015 | On-going |
| AAFM, ANR/DEC | Submit interim progress report to legislature on impacts from tile drainage | Act 64: 1/15/2016 | -Report completed | No |
| ANR/DEC | Report on lowering the impervious surface regulatory permitting threshold from one acre to 1/2 acre | Act 64: 1/15/2016 | -Report completed | No |
| ANR/DEC | Report to Legislature on Basin Planning Progress | Act 64: 1/15/2016 | -Report completed | 1/15/2016 and annually thereafter |
| ANR/DEC | Report to Legislature on land application of septage and sludge | Act 64: 1/15/2016 | -Report completed | No |
| ANR/FPR | Report to legislature on recommendation on how to implement forestry AMPs as mandatory practices, how to enforce AMPs, whether maple syrup production should be enrolled in UVA as managed forestland | Act 64: 1/15/2016 | -Report completed | No |
| ANR/DEC | Report on activities and progress of water quality ecosystem restoration programs | Act 64: 2/1/2016 | -Report completed | 2/1/2016 and annually thereafter |
| ANR/DEC | Develop TMDL implementation tracking system at ANR/DEC with ability to estimate phosphorus load reductions achieved by TMDL implementation activities | Act 64: 6/1/2016 | -Tracking System completed | No |
| AAFM | As part of the Small Farm Certification Program (CSFO), farms are to certify for compliance with RAPs | Act 64: 7/1/2017 | --CSFO program has been created;<br>-More than 150 farms have certified;<br>-Deadline for farm to certify is 1/31/2018 | 7/1/2017 and annually thereafter |

| AGENCY | KEY TASK | DEADLINE | UPDATE | RECURRING? |
|---|---|---|---|---|
| ANR/DEC, AAFM | Update Water Quality Standards Anti-Degradation Implementation Rule | Act 64: 7/1/2016 | -VT Water Quality Standards rule completed and approved on 11/17/2016;<br>-VT operating under 2010 VT ANR Interim Anti-Degradation Implementation Procedure | No |
| ANR/DEC, AAFM, VTrans | Develop databases to consistently track TMDL implementation activities achieved through regulatory and funding programs across agencies, and link databases with ANR/DEC TMDL implementation tracking system | Champlain TMDL deadline: 12/30/2016 | -Databases completed | No |
| ANR/DEC | Update Combined Sewer Overflow (CSO) Rule | Champlain TMDL deadline: 12/30/2016 | -Rule completed, 2016 | No |
| ANR/DEC, AAFM, VTrans, ANR/FPR | Update Phase 1 Plan to reflect final Lake Champlain Phosphorus TMDL and how basin plans will be used for TMDL implementation and hold 30-day public comment period | Act 64: Three months following release of final TMDL; Deadline: 9/15/2016 | -Completed, 9/15/2016 | No |
| AAFM | As part of revisions to Required Agricultural Practices (RAP; formerly "Accepted agricultural practices or AAP), adopt by rule requirements for training classes or programs for farmers | Champlain TMDL deadline: 12/30/2016 | -RAPs completed;<br>-Effective date: 12/05/2016 | No |
| AAFM | As part of RAP revisions, adopt by rule a custom applicator certification program for operating in VT (Act 64, Sec. 16) | Champlain TMDL deadline: 12/30/2016 | -RAPs completed; effective date: 12/05/2016;<br>-Certification trainings held;<br>-Certification due annually | No |
| AAFM | Adopt small farm certification program (CSFO) | Champlain TMDL deadline: 12/30/2016 | -RAPs completed; effective date: 12/05/2016;<br>-CSFO self-certification due on 1/31/2018 | No |
| AAFM | Revise AAPs to improve water quality in the state and implement the small farm certification program | Champlain TMDL deadline: 12/30/2016 | -RAPs completed;<br>-Effective date: 12/05/2016 | No |
| AAFM | Develop a matrix and small farm template for nutrient management planning | Champlain TMDL deadline: 12/30/2016 | -RAPs completed;<br>-Effective date: 12/05/2016 | No |
| AAFM | Establish livestock exclusion standards to prevent erosion and water quality impacts (Act 64, Sec. 4) | Champlain TMDL deadline: 12/30/2016 | -RAPs completed;<br>-Effective date: 12/05/2016 | No |

| AGENCY | KEY TASK | DEADLINE | UPDATE | RECURRING? |
|---|---|---|---|---|
| AAFM | Establish a training program and schedule for all farmers to complete training | Champlain TMDL deadline: 12/30/2016 | -RAPs completed;<br>-Effective date: 12/05/2016 | No |
| ANR/DEC | Issue TS4 Permit for VTrans State roads and VTrans non-road developed lands | Champlain TMDL deadline: 12/30/2016 | -Completed;<br>-Effective date: 12/28/2016 | No |
| ANR/DEC, Office of the State Treasurer | Report to the Legislature on Financing of Statewide Clean Water Improvement (in partnership with Office of State Treasurer, Dept. of Taxes, AAFM, VTrans, ACCD) | Act 64: 1/15/2017 | -Held 23 stakeholder and public meetings;<br>-Completed and released on 1/15/2017 | No |
| ANR/DEC, AAFM | Develop ANR/AAFM Memorandum of Understanding (MOU) regarding the concentrated animal feeding operation (CAFO) program and relationship with state large, medium and small farm operations (LFO, MFO and SFO, respectively), enforcement and implementation | Act 64: 7/1/2016 | -Integrated three MOUs (CAFO, enforcement, nonpoint source pollution) into one MOU;<br>-MOU completed on 3/17/2017 | No |
| ANR/DEC, AAFM | Develop ANR/DEC and AAFM MOU relating to AAFMS's request to ANR to take enforcement action to enforce 6 V.S.A. Ch. 215. | Act 64: 7/1/2016 | -Integrated three MOUs (CAFO, enforcement, nonpoint source pollution) into one MOU;<br>-MOU completed on 3/17/2017 | No |
| ANR/DEC, AAFM | Revise ANR/DEC/AAFM MOU for the agricultural nonpoint source program | Champlain TMDL deadline: 12/30/2016 | -Integrated three MOUs (CAFO, enforcement, nonpoint source pollution) into one MOU;<br>-MOU completed on 3/17/2017 | No |
| ANR/DEC | Update Vermont Stormwater Management Manual | Champlain TMDL deadline: 12/30/2016 | -Completed;<br>-Manual became effective on 7/1/2017 | No |
| AAFM, ANR/DEC | Submit report to legislature on current scientific research and recommendations to amend RAPs to reduce nutrient contributions from tile drainage | Act 64: 1/15/2017 (Champlain TMDL deadline: 12/30/2017) | -Report completed on 1/31/2017 | No |

**Key**

AAFM: Agency of Agriculture, Food and Markets
ACCD: Agency of Commerce and Community Development
ANR: Agency of Natural Resources
BMP: Best Management Practices used to reduce pollution loading into surface waters
CAFO: Concentrated animal feeding operation
CLF: Conservation Law Foundation
DEC: Department of Environmental Conservation at ANR
FPR: Forests, Parks and Recreation Department at ANR
LFO: Large Farm Operations Program at AAFM
MFO: Medium Farm Operations Program at AAFM
MOU: Memorandum of Understanding
RAPs: Formerly Accepted Agricultural Practices; now referred to as Required Agricultural Practices
RSD: Revised Secretary's Decision, the AAFM Secretary's decision re: CLF Settlement for Best Management Practice (BMP) implementation in the Missisquoi Bay watershed
SMO: Small Farm Operations Program at AAFM
TMDL: Total Maximum Daily Loads
TS4: Transportation Separate Storm Sewer System General Permit, Issued by ANR/DEC
VTrans: Vermont Agency of Transportation

# APPENDIX F. VTRANS CLEAN WATER INITIATIVES & STORMWATER INVESTMENTS

Provided by VTrans for January 2018 Legislative Session

Specific to Water Quality Initiatives and Investments Targeting Regulatory Compliance for VTrans' Highways and Developed Lands

## Why does stormwater matter?

- Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or impervious surfaces and does not infiltrate into the ground.
- Impervious surfaces and concentrated drainage conveyances increase the frequency, volume, and flow rate of stormwater runoff and pollutants, causing cumulative impacts throughout a watershed.
- Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, or wetland. Unmitigated, this may result in environmental and economic impacts to downstream waters.

*Photo: Stormwater runoff from impervious surfaces*

## How do roads impact stormwater?

- Impervious roadway surfaces can quickly convey polluted stormwater runoff to nearby waterways.
- VTrans is responsible for stormwater collection, conveyance, and treatment along its highways and at other transportation facilities (airports, maintenance yards, park & rides, welcome centers, gravel pits).
- Linear Transportation stormwater management differs from city, town, retail, and commercial entities:
  - Highways stretch for many miles, crossing multiple waterways, watersheds, and jurisdictions.
  - Transportation storm conveyance systems are linear and often discharge stormwater and associated pollutants that originate outside of the transportation right-of-way.

*Photo: Road stormwater collection*

## What is Vermont's Clean Water Act?

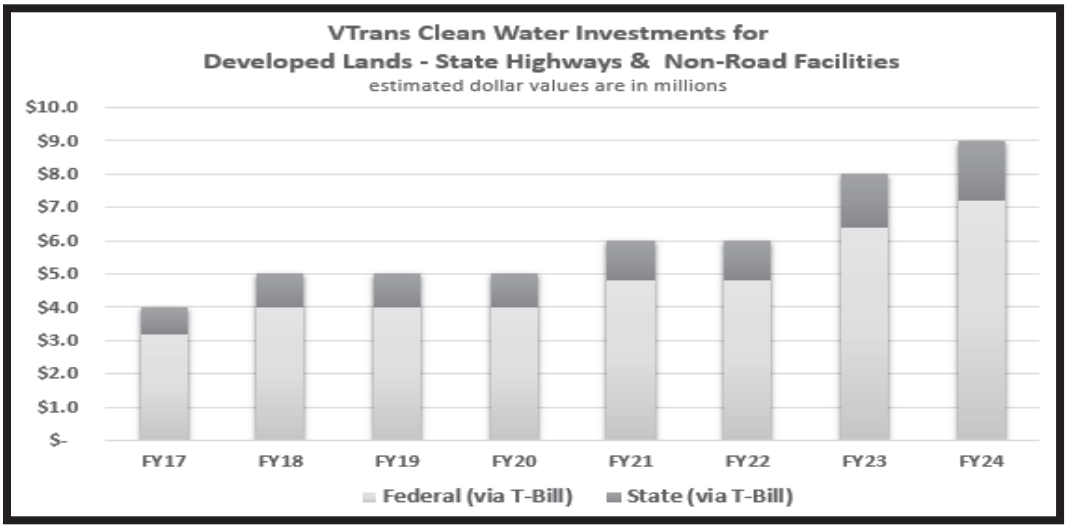
- Act 64 of 2015 – referred to as Vermont's Clean Water Act – laid the foundation for the protection and restoration of Vermont's waters by adopting a cross-sector "all in" approach, with a broad suite of programs and regulations addressing: agricultural practices, stormwater runoff from roads and non-road developed lands, and natural infrastructure (river corridors, wetlands and forest management).
- In addition, The U.S. Environmental Protection Agency, in June 2016, established Total Maximum Daily Loads (TMDLs) and reduction targets for phosphorus in the 12 lake segments of Lake Champlain Basin.

*Photo: Algal Bloom*

## How is VTrans investing in clean water?

- VTrans has a role to play under Vermont's Clean Water Act and under pre-Act 64 regulations addressing stormwater from its highways and non-road developed lands. *Refer to back page for Clean Water Programs and Regulations VTrans must comply with.*
- VTrans' Clean Water Initiatives and Stormwater Regulatory Compliance Investments for the State Highway System and VTrans non-road developed lands are anticipated to be covered by the Transportation Bill and Federal Funds where eligible. *See estimated costs below through SFY24 which include Project Development, Construction, O&M and FTE.*

*Photo: St. Albans I-89 Median Stormwater Retrofit*



# VTRANS' STORMWATER REGULATORY REQUIREMENTS

| PERMIT PROGRAMS | COVERAGE AND APPLICABILITY | COMPLIANCE ACTIVITIES |
|---|---|---|
| **TS4 GP**<br>**Transportation Separate Storm Sewer System General Permit** | • Permit effective on 11/29/2017<br>• Regulates stormwater discharges from the Statewide VTrans TS4 (including road and non-road developed lands)<br>• Specific to the unique linear nature of VTrans' infrastructure<br>• Allows several stormwater programs to be rolled into one comprehensive regulatory program (*4 programs listed below*) | • VTrans applied for TS4 coverage in early December 2017<br>• ANR authorization anticipated in early 2018<br>• Requires development of a Stormwater Management Plan addressing all of the requirements set forth in the TS4 GP<br>• Requires, at a minimum, compliance with all of the regulatory standards of those programs rolled into the TS4 GP |
| **TS4 GP ENCOMPASSES:** | | |
| MS4 –> Municipal Separate Storm Sewer System | • Spread across 10 stormwater impaired watersheds<br>• Includes VTrans highways and non-road developed lands in 12 MS4 communities including: Burlington, Colchester, Essex, Essex Junction, Milton, Rutland Town, Shelburne, South Burlington, St. Albans City and Town, Williston, Winooski | • Public Education & Participation, Training & Education<br>• Compliance with State Stormwater Regulations and TMDLs<br>• Installation of Stormwater Treatment Practices<br>• Asset Management & Illegal Connection & Run-on Control<br>• Spill Prevention and Stormwater Pollution Source Control |
| TMDL –> Total Maximum Daily Load | • Establishes reduction targets for specific pollutants (e.g. stormwater flow, phosphorus, E. coli, etc.) in order to attain water quality standards<br>• Applies to watersheds with identified impairments for which a TMDL has been issued by ANR and approved by EPA | • Flow Restoration Plans (FRP) in 10 stormwater impaired watersheds<br>• Phosphorus Control Plans (PCP) in the Lake Champlain Basin<br>• Construct stormwater treatment practices targeting pollutants of concern in VTrans ROW and on non-road developed lands. Currently VTrans has identified through FRPs 58 stormwater retrofit practices and has installed 4 practices. Development of PCPs has been initiated |
| MSGP –> Multi-Sector Industrial Stormwater | • Covers discharges of stormwater from industrial facilities which conduct activities and use materials that have the potential to impact the quality of Vermont's waters<br>• Regulated VTrans facilities including 9 State Airports and 3 State Gravel Pits | • Facilities are required to examine potential sources of pollution, implement measures to reduce the risk of stormwater contamination, and test stormwater discharges for sources of pollution<br>• VTrans develops and maintains Stormwater Pollution Prevention Plans (SWPPPs) at each facility that include training and education, stormwater management, asset management, erosion control, spill prevention, and stormwater pollution source control |
| State OSW –> Operational Stormwater Discharges | • Coverage under the general permit is required for discharges of regulated stormwater runoff from the construction, expansion, and redevelopment of impervious surfaces pursuant to the permit threshold triggers established in Vermont Statutes | • Construct and maintain permanent stormwater management and treatment practices for projects that trigger jurisdiction<br>• In 2017 VTrans had 24 projects in design/permitting and 13 projects installing stormwater treatment practices<br>• As of 2017 VTrans in managing compliance on 72 projects constructed over many years with stormwater permits and treatment practices requiring ongoing operation, maintenance, inspection and reporting |
| **State CSW Construction Stormwater Discharges** *(not included under TS4)* | • Regulates discharge of stormwater runoff from construction activities | • Construct temporary stormwater management and treatment practices designed to control erosion and prevent sediment transport<br>• In the 2017 construction season, 37 of the 80 projects under construction had CSW coverage, requiring 100 compliance visits |

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