VERMONT CLEAN WATER INITIATIVE
2018 INVESTMENT REPORT

VERMONT CLEAN WATER INITIATIVE

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 2018 INVESTMENT REPORT

Summary of the Vermont Clean Water Initiative
Describing State Fiscal Year (SFY) 2016-2018 State Investments, Actions, and Outcomes

Submitted by the Vermont Agency of Administration
January 15, 2019

Relevant Statutory Reporting Requirements:	**Fulfilled by:**
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 state fiscal year	Vermont Clean Water Initiative Investment Report
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	Vermont Clean Water Initiative Investment Report
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 Initiative 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 Initiative 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 Initiative Investment Report, Appendix E
Act 181 (2018), Section 2, codified at 10 V.S.A. § 1264 (k)(1-3) Report on installation of stormwater treatment practices through operational stormwater permits, including: (1) permitted new development is achieving at least a 70 percent average phosphorus load reduction; (2) estimated total phosphorus load reduction from new development, redevelopment, and retrofit of impervious surface permitted; and (3) number and percentage of projects that implemented Tier 1, 2, or 3 stormwater treatment practices	Vermont Clean Water Initiative Investment Report, Appendix B
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 Initiative Investment Report, Appendix F

[1] Act 64 or the "Vermont Clean Water Act;" 2015 Vt. Act 64, as amended by 2017 Act 85 § E.700 & E.700.1 and by 2018 Act 168 §§ 1-4.

ACKNOWLEDGEMENTS

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**

VERMONT CLEAN WATER INITIATIVE AGENCIES

Agency of Administration - aoa.vermont.gov
Agency of Agriculture, Food and Markets - agriculture.vermont.gov
Agency of Commerce and Community Development - accd.vermont.gov
Agency of Natural Resources - anr.vermont.gov
Agency of Transportation - vtrans.vermont.gov

COVER PHOTOS

Stormwater treatment in Rutland City, see Figure 22

Municipal road workshop, see Figure 12

Agency of Agriculture staff assist farmers installing conservation practices, see Figure 14

Portable skidder bridge in action, see Figure 16

Dam removal on Passumpsic River, see Figure 29

Forested riparian buffer restoration in Franklin, see Figure 27

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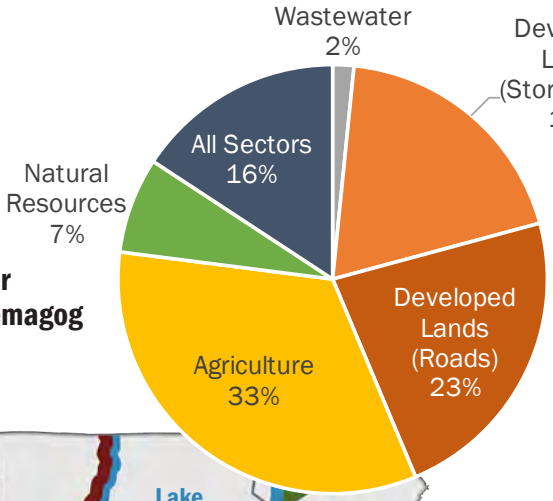
State Investments in Clean Water

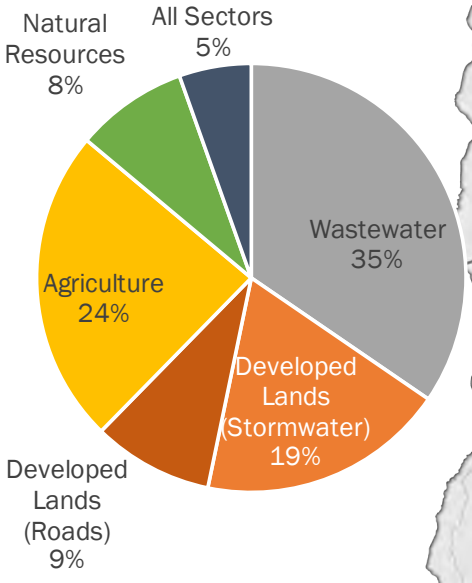
State funding awarded in SFY 2016-2018, by major basin.

260%

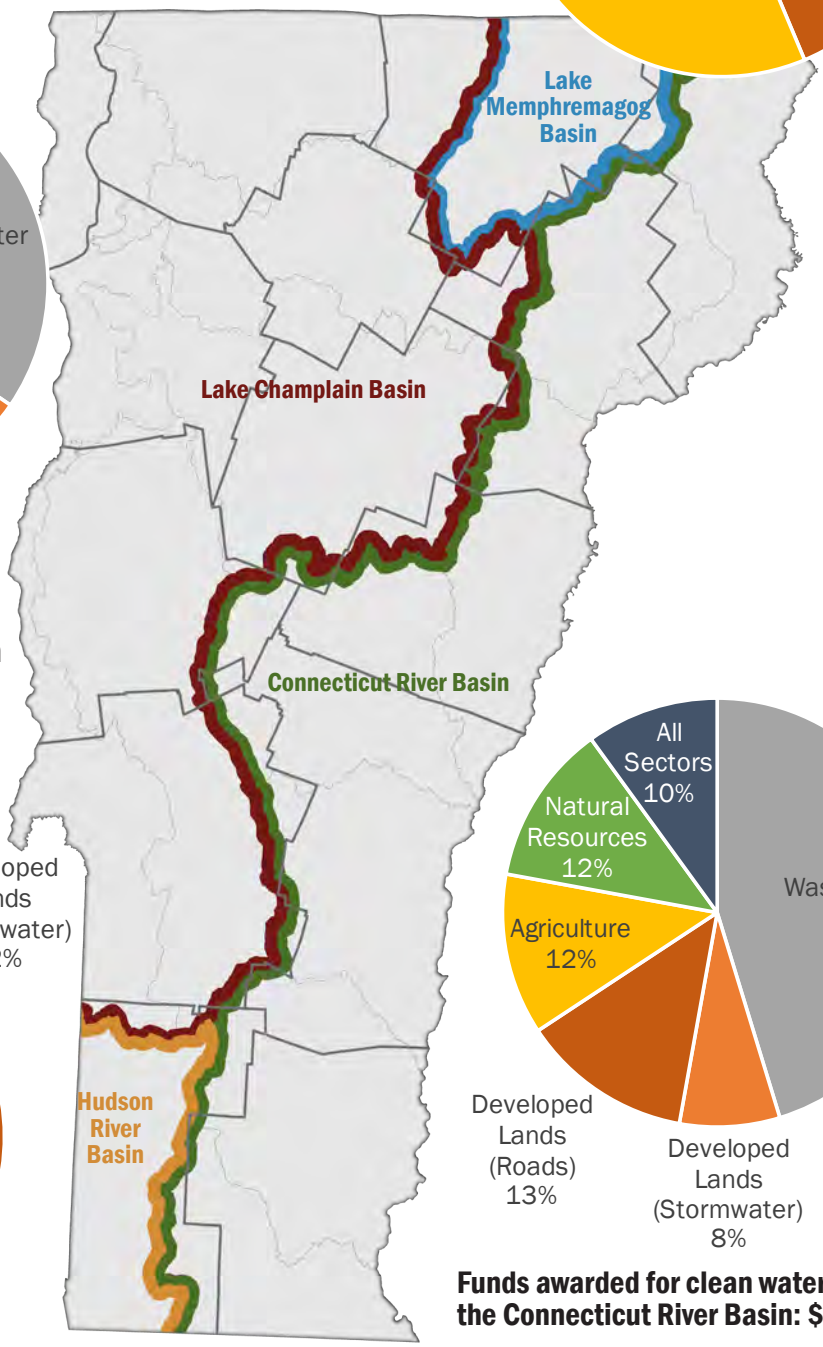
Increase in State of Vermont investments in clean water projects since SFY 2016

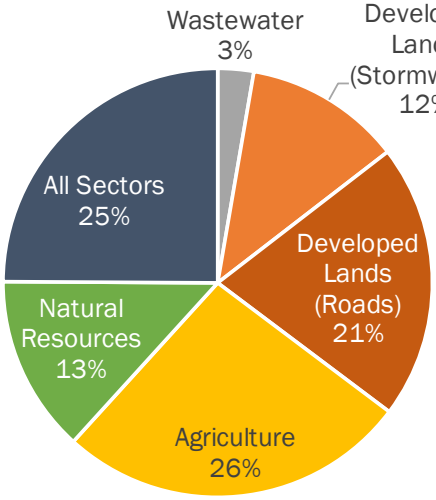


Funds awarded for clean water projects in the Lake Memphremagog Basin: $2,661,522

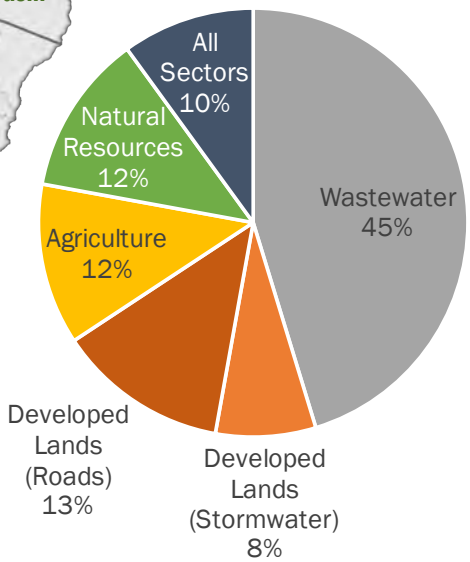


Funds awarded for clean water projects in the Lake Champlain Basin: $66,232,457





Funds awarded for clean water projects in the Hudson River Basin: $1,620,651



Funds awarded for clean water projects in the Connecticut River Basin: $28,780,176

State-Funded Clean Water Project Results

Results of projects completed in SFY 2016–2018, by sector.

AGRICULTURE

AGRICULTURE PROJECT RESULTS	2016	2017	2018	TOTAL
Acres of agricultural land treated by conservation practices	5,466	3,261	7,244	15,971
Acres of land treated by forested buffers	258	200	208	666
Acres of pasture with livestock excluded from surface waters	258	117	97	472
Number of barnyard and production area practices installed	57	97	85	239
Acres of water quality protections within newly conserved agricultural lands	New in 2017	116	208	324
Estimated acres of agricultural land treated through innovative equipment	New in 2017	1,729	2,000	3,729

NATURAL RESOURCES

NATURAL RESOURCES PROJECT RESULTS	2016	2017	2018	TOTAL
Acres of forested riparian buffer restored through buffer planting	85	32	50	167
Acres of river corridor conserved through easements	141	208	213	562
Acres of floodplain restored	–	2	5	7
Stream miles reconnected for stream equilibrium/aquatic organism passage	35	100	108	243
Acres of wetland restored	–	131	40	171
Acres of forest conserved with special water quality protection	58	172	590	820
Number of stream crossings improved	–	–	15	15

DEVELOPED LANDS

ROADS

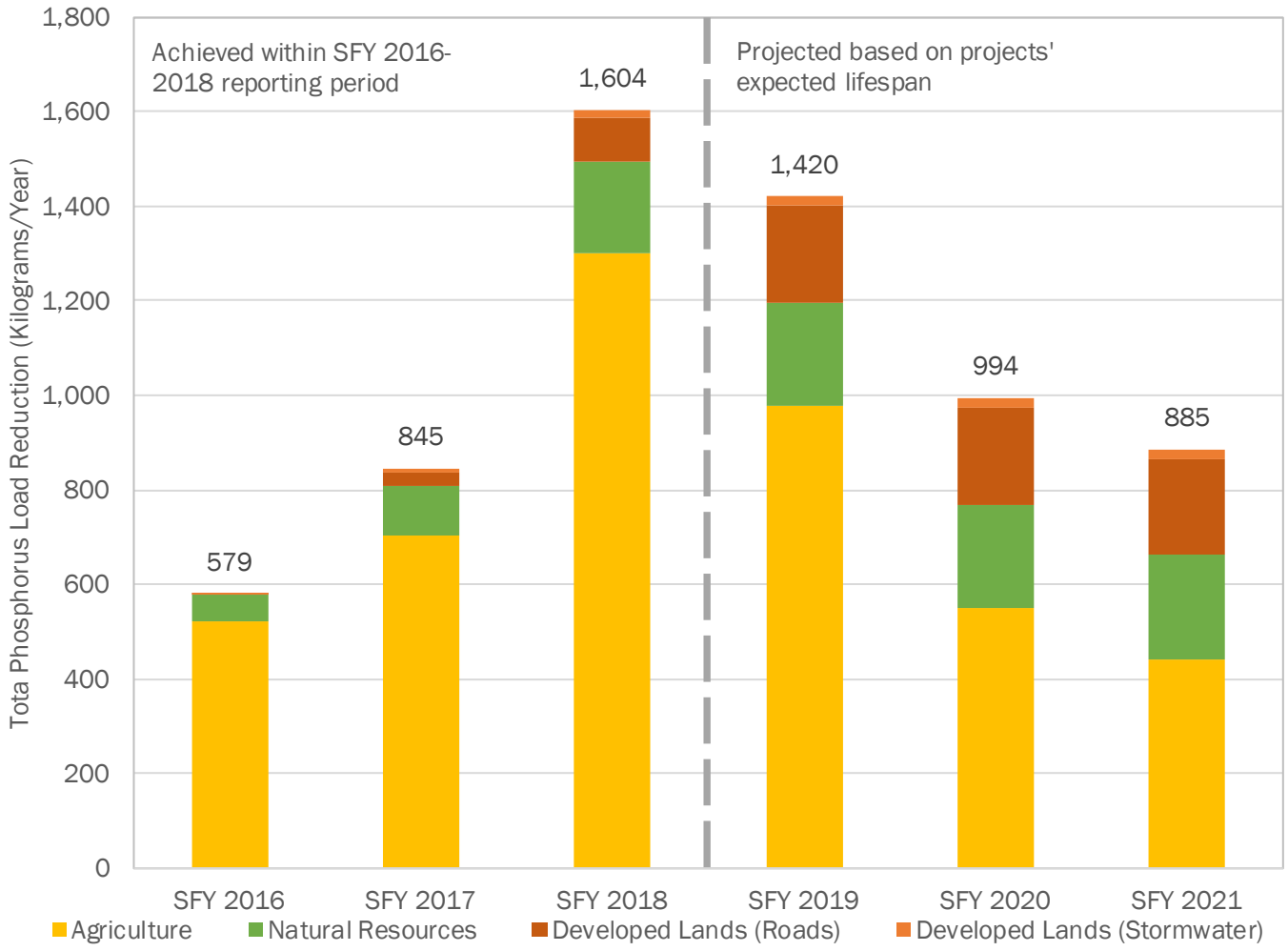
DEVELOPED LANDS AND ROADS PROJECT RESULTS	2016	2017	2018	TOTAL
Acres of impervious surface treated	0.2	86	28	114
Miles of municipal road drainage and erosion control improvements	1	13	63	77
Number of municipal road drainage and stream culverts replaced	New in 2017	108	110	218
Cubic yards of municipal Class 4 road gully erosion remediated	New in 2018	New in 2018	260	260
Acres stabilized through use of hydroseeder/mulcher equipment per year	New in 2018	New in 2018	12	12

WASTEWATER

WASTEWATER PROJECT RESULTS	2016	2017	2018	TOTAL
Number of combined sewer overflow abatements completed	4	1	–	5
Number of sewer extensions completed	–	2	–	2
Number of wastewater collection systems refurbished	–	2	2	4
Number of wastewater treatment facility refurbished	–	–	1	1
Number of wastewater treatment facility upgrades completed	1	–	–	1

State-Funded Clean Water Project Results

Annual avereage estimated total phosphorus load reduction (kilograms per year) achieved by state-funded clean water projects implemented/ constructed in SFY 2016–2018 reporting period, by sector, along with projected load reductions based on projects' expected lifespan (SFY 2019–2021).



Introduction

The Vermont Clean Water Initiative 2018 Investment Report covers State Fiscal Year (SFY) 2016-2018 (July 1, 2015 – June 30, 2018) 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. The purpose of the report is to summarize the State of Vermont's investments in clean water projects and demonstrate how these investments are making a difference for clean water statewide through the following accountability measures:

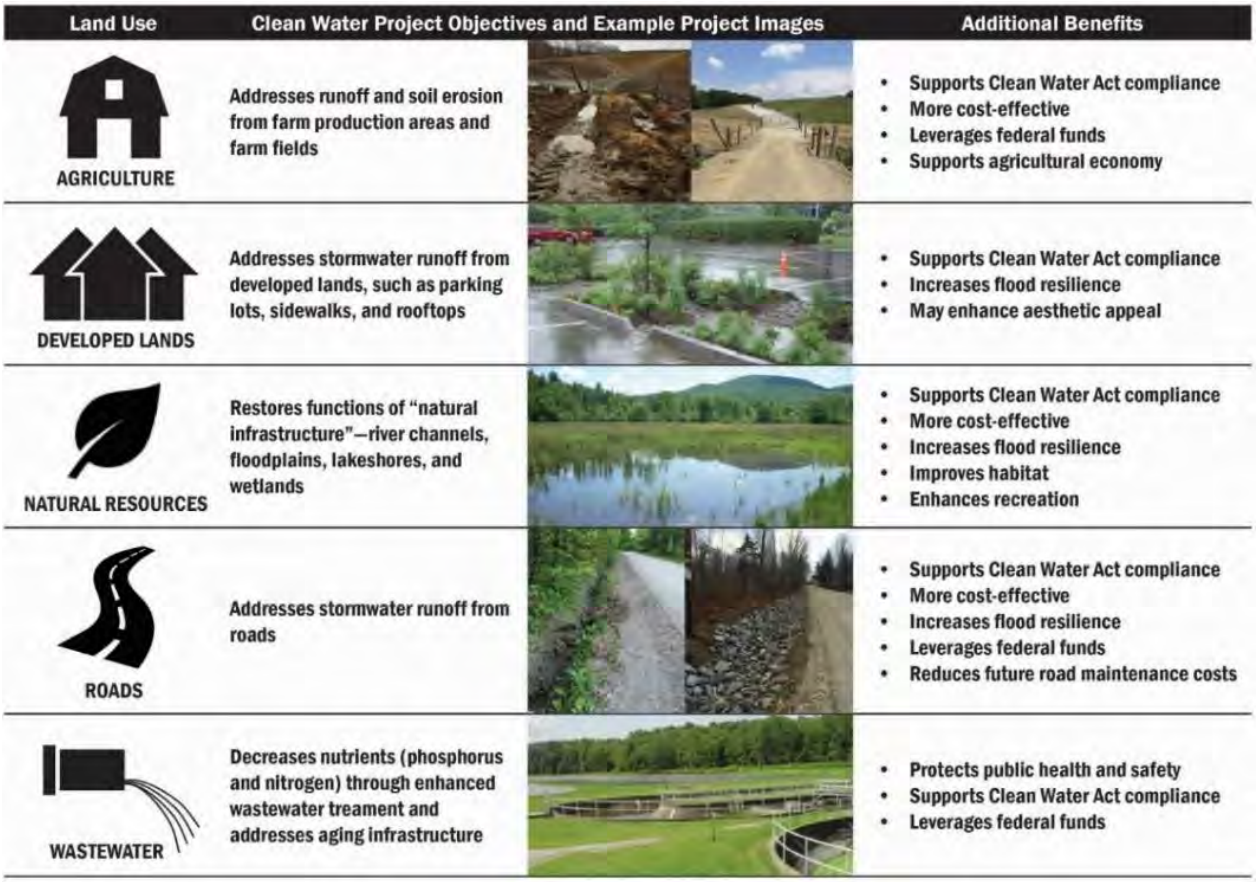
Investment measures of how State of Vermont invests in clean water projects from planning to design and implementation

Project output measures that quantify the results of state-funded clean water projects

Education measures on outreach and technical assistance to support, identify, and develop clean water projects

Pollutant reduction measures of nutrient pollution reductions achieved through state-funded clean water projects

Figure 1. Clean water project objectives and additional benefits



Clean Water Projects

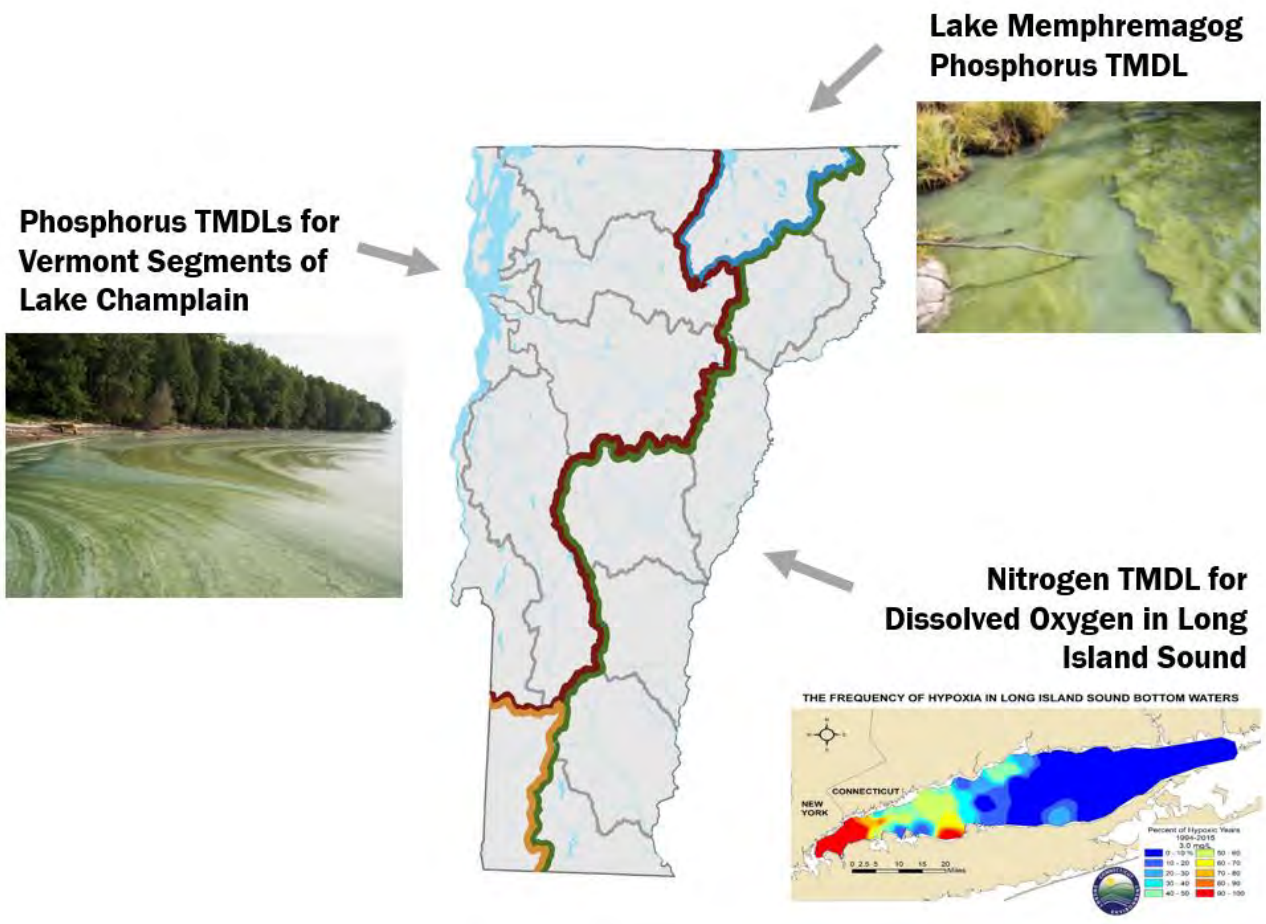
Clean water projects target nutrient and sediment pollution from across the landscape, described in

Figure 1. Nutrient and sediment pollution reductions are required by clean water restoration plans, known as Total Maximum Daily Loads (TMDLs), and are driven by the Vermont Clean Water Act and the Combined Sewer Overflow (CSO) Rule.

Clean Water Restoration Plans (i.e., Total Maximum Daily Loads, or TMDLs)

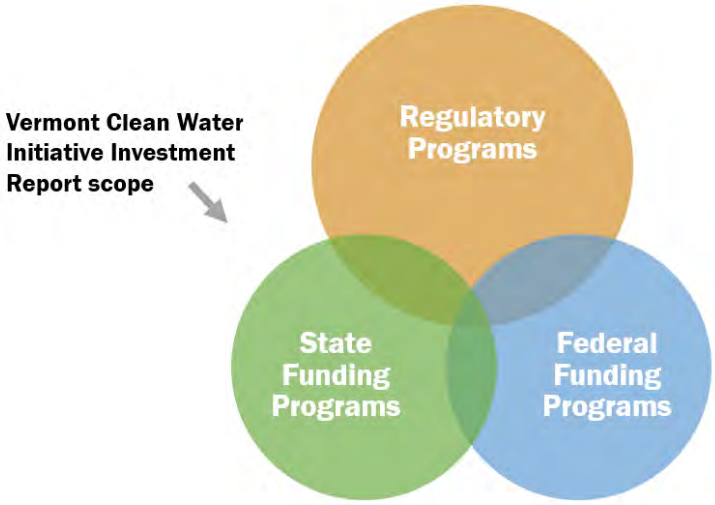
Most of Vermont's water quality problems are caused by nonpoint sources of pollution. Nonpoint source pollution includes nutrient and sediment pollution transported from the landscape to waterways by rain-runoff and snowmelt. Clean water restoration plans, or TMDLs, target nonpoint source pollutant reductions in addition to end-of-pipe reductions. Most of the State of Vermont is covered by large TMDLs that require nutrient pollutant reductions (i.e., phosphorus and nitrogen), shown in Figure 2. Lake Champlain and Lake Memphremagog target phosphorus pollutant reductions to address cyanobacteria blooms (i.e., blue-green algae) and the Long Island Sound TMDL targets nitrogen pollutant reductions to address low dissolved oxygen in the Sound.

Figure 2. Vermont's large TMDLs that require nutrient pollutant reductions



This Investment Report focuses on state-funded clean water restoration activities only. However, work is ongoing to implement these TMDLs in Vermont beyond the State of Vermont's funding programs. Clean water projects are also supported by federal funding programs and are required by wastewater, stormwater, and agricultural regulatory programs (see Figure 3). Funding and regulatory programs are important drivers of clean water projects. The state is tracking the results of these programs and will report on the results in future publications.

Figure 3. Investment Report scope compared to clean water restoration tracking scope (i.e., TMDL progress)



Summary of Investment Report Scope

Included in this Report

- State agencies' investments in clean water projects through state grants, contracts, and loans awarded SFY 2016-2018 (see Table 1 for list of funding programs by agency).
- Education provided through outreach and technical assistance by state agency staff and external partners under a state grant or contract in SFY 2016-2018.
- Results of clean water projects, funded by state agencies, completed SFY 2016-2018, including project output measures and nutrient pollutant reductions.[2]

Outside the Scope of this Report

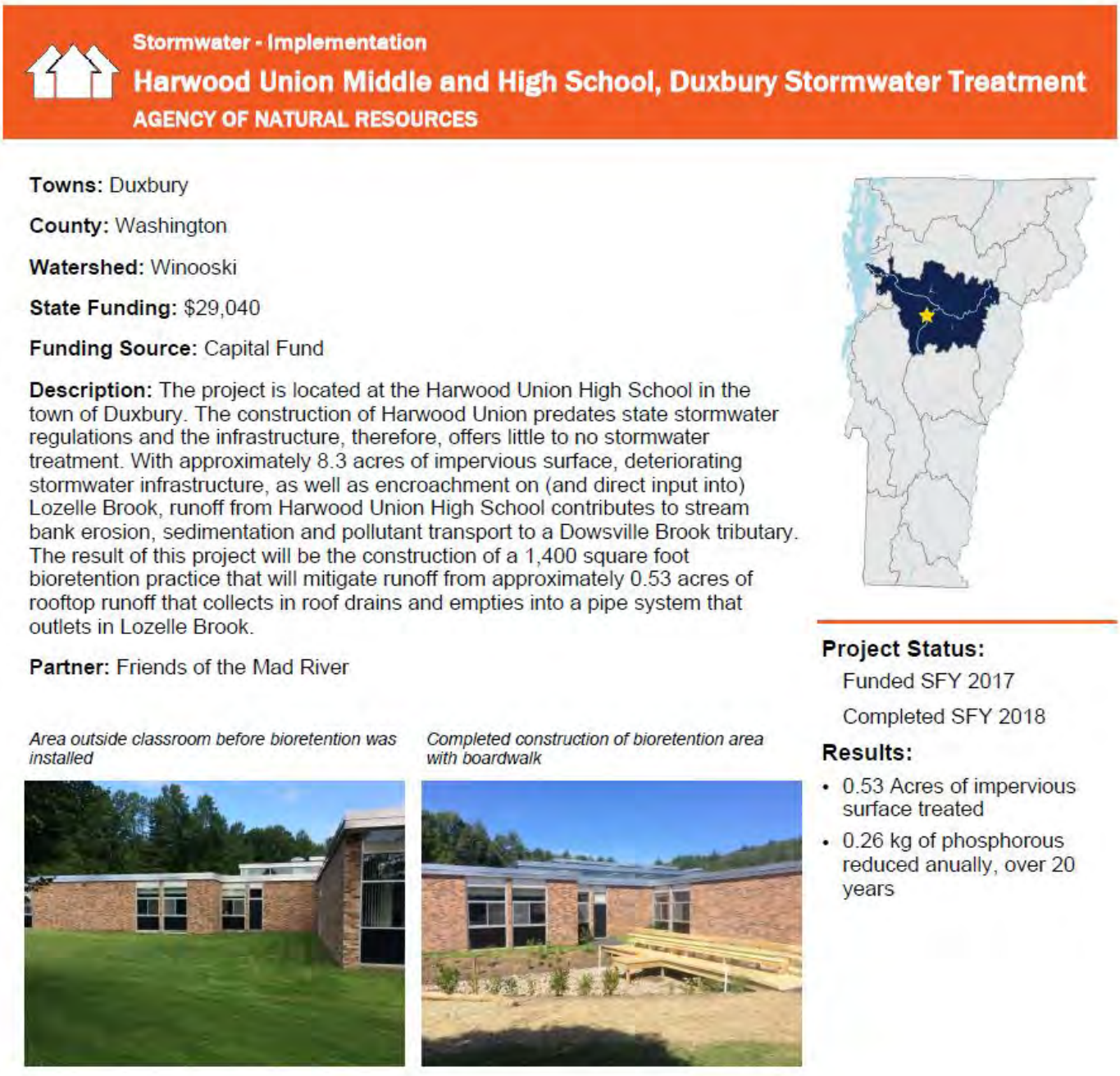
- Outreach and technical assistance provided by external partners without a state grant or contract.
- Federal agencies' direct investments in clean water projects, and the results of those projects, unless projects are also funded by a state grant or financed by a state loan.
- Municipal and private 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.

[2] Work completed in the reporting period of SFY 2016-2018 includes funding agreements closed out (all deliverables completed/approved and final payments made) between July 1, 2015 and June 30, 2018.

Learn More: Clean Water Projects Dashboard

The Clean Water Projects Dashboard complements this Investment Report by allowing interested parties to search for and learn more about individual state-funded clean water projects. Visit the Dashboard to access individual clean water project reports, such as the report pictured in Figure 4, at: https://dec.vermont.gov/watershed/cwi/projects.

Figure 4. Sample clean water project report from the new Clean Water Projects Dashboard



Stormwater - Implementation

Harwood Union Middle and High School, Duxbury Stormwater Treatment

AGENCY OF NATURAL RESOURCES

Towns: Duxbury

County: Washington

Watershed: Winooski

State Funding: $29,040

Funding Source: Capital Fund

Description: The project is located at the Harwood Union High School in the town of Duxbury. The construction of Harwood Union predates state stormwater regulations and the infrastructure, therefore, offers little to no stormwater treatment. With approximately 8.3 acres of impervious surface, deteriorating stormwater infrastructure, as well as encroachment on (and direct input into) Lozelle Brook, runoff from Harwood Union High School contributes to stream bank erosion, sedimentation and pollutant transport to a Dowsville Brook tributary. The result of this project will be the construction of a 1,400 square foot bioretention practice that will mitigate runoff from approximately 0.53 acres of rooftop runoff that collects in roof drains and empties into a pipe system that outlets in Lozelle Brook.

Partner: Friends of the Mad River

Area outside classroom before bioretention was installed

Completed construction of bioretention area with boardwalk

Project Status:

Funded SFY 2017

Completed SFY 2018

Results:

- 0.53 Acres of impervious surface treated
- 0.26 kg of phosphorous reduced anually, over 20 years

Vermont's Clean Water Investments

How is the State of Vermont investing in clean water?

Restoring Vermont's clean water requires investments at the state, federal, municipal, and private-level. The State of Vermont's clean water 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 polluted runoff from unregulated sources. Figure 5 through Figure 10 summarize State of Vermont's clean water investments made SFY 2016-2018 through the funding programs shown in Table 1.[3]

Table 1. State of Vermont funding programs reported by agency[4]

Agency	Funding Programs
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 Commerce and Community Development (ACCD)	Vermont Center for Geographic Information (VCGI)
Agency of Natural Resources (ANR)	Clean Water State Revolving Fund (CWSRF) Loans Ecosystem Restoration Grants and Contracts Fish and Wildlife Department Watershed Grants Municipal Pollution Control Grants Municipal Roads Grants-in-Aid
Agency of Transportation (VTrans)	Better Roads Program Municipal Highway Stormwater Mitigation Program Municipal Mitigation Assistance Program Transportation Alternatives Program (TAP)
Vermont Housing and Conservation Board (VHCB)[5]	Conservation Grants Farmland Protection Grants Water Quality Grants

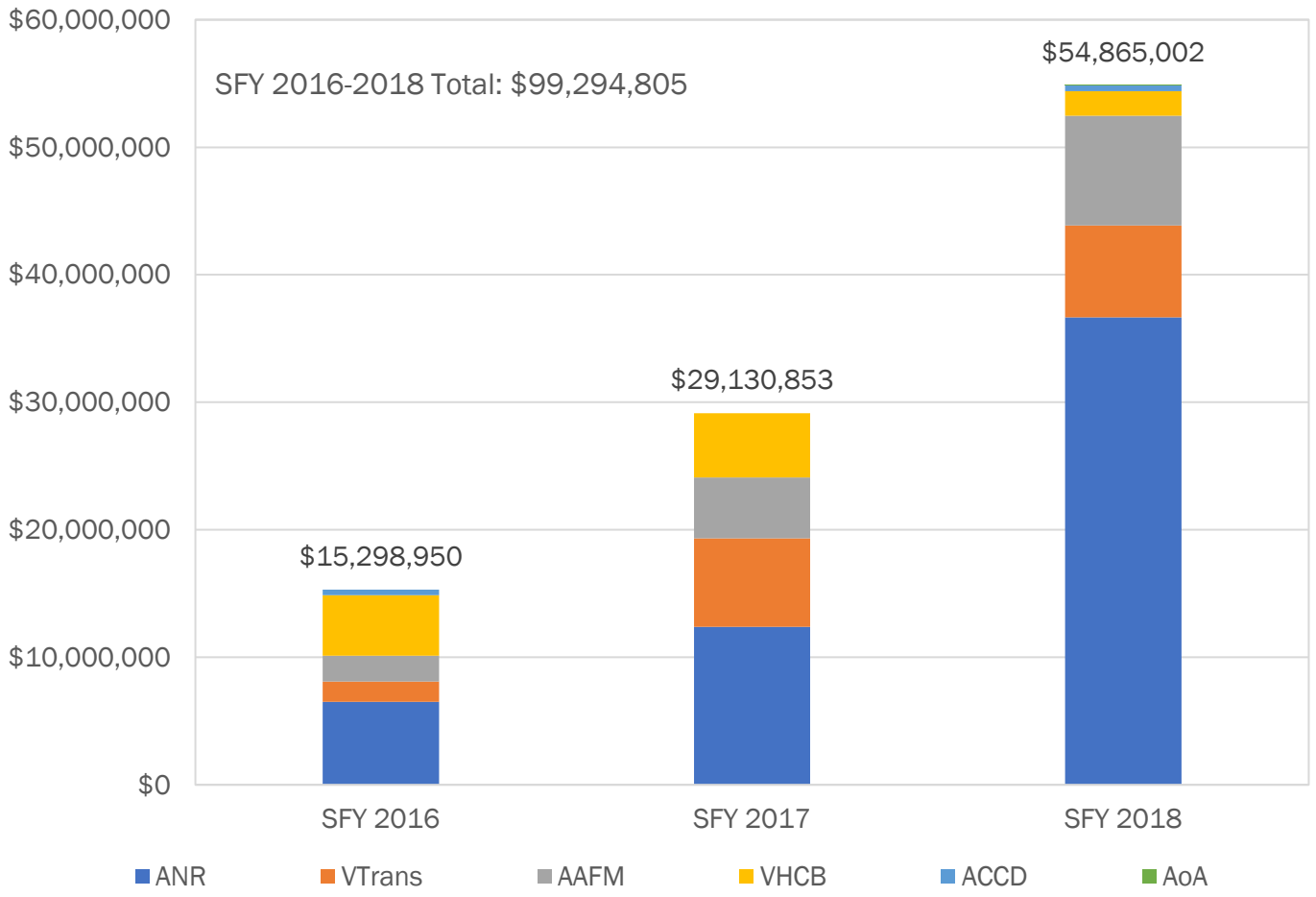
[3] The Legislature transferred clean water reporting from the Clean Water Fund Board to the Secretary of Administration during the 2017 Legislative session (2017 Act 85 § 6.77.1). All departments are working with the Secretary's Office to develop a standardized financial reporting structure to improve accuracy, transparency and a comprehensive view of the state's investment in clean water initiatives.

[4] 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 exclude federal funds awarded to projects directly by federal agencies.

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

Investments by State Fiscal Year and Agency

Figure 5. Total dollars awarded to clean water projects by agency and state fiscal year, SFY 2016-2018



EXPLANATION OF FIGURE

The State of Vermont's investments in clean water projects have increased by 260 percent since SFY 2016. The increased investment is driven by:

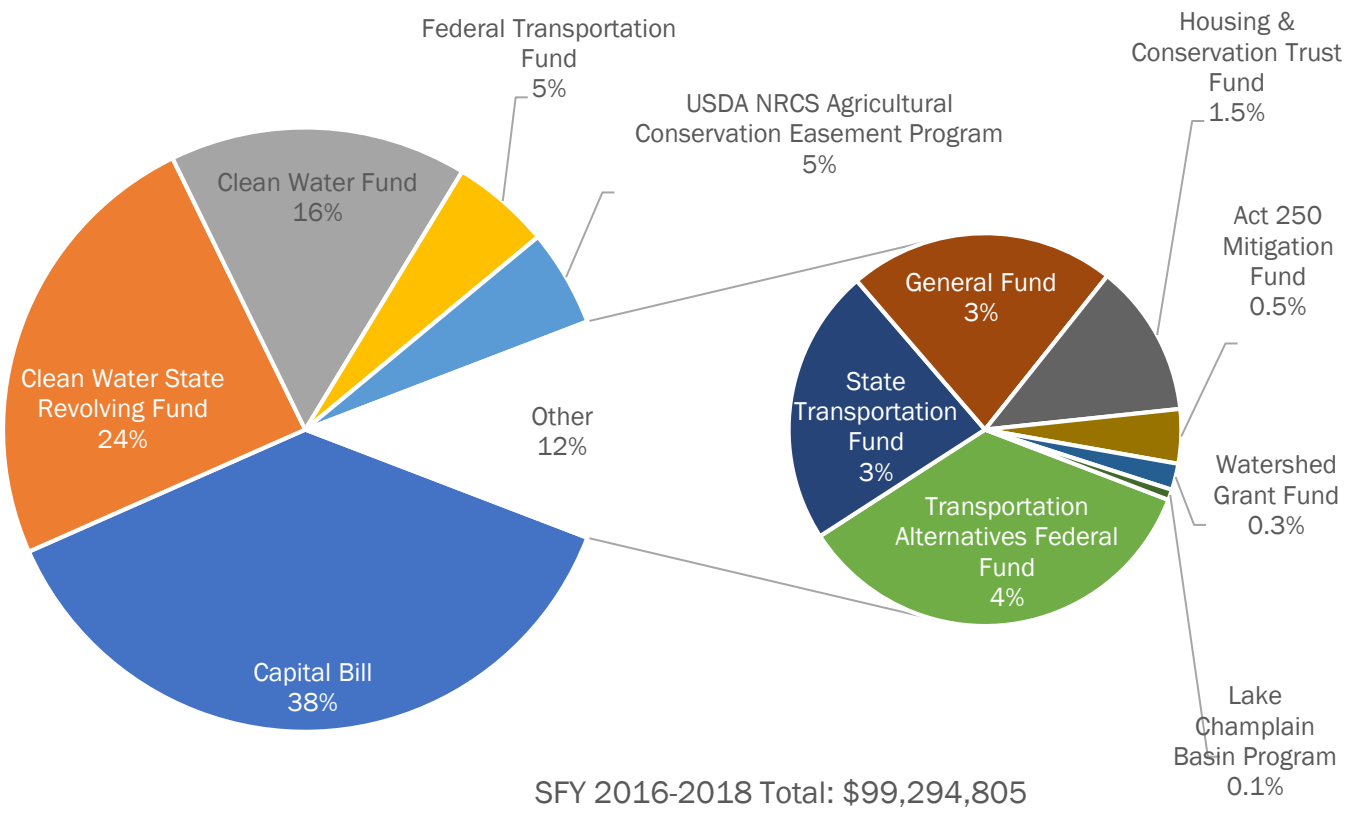
1. Increased funding availability;
2. New and expanded regulations that require treatment of polluted runoff from impervious surfaces and agricultural lands, as well as enhanced treatment of nutrient pollution from wastewater treatment facilities; and
3. Increased investments in outreach, technical assistance, planning, and partner capacity that drive completion of voluntary/non-regulatory projects, such as natural resources restoration and treatment of unregulated impervious surfaces.

State agencies coordinate to track investments in projects and to quantify the results of completed projects in improving water quality, as well as other environmental and socioeconomic benefits described in

Figure 1.

Investments by Funding Source

Figure 6. Proportion of dollars awarded by funding or financing source, SFY 2016-2018[6]



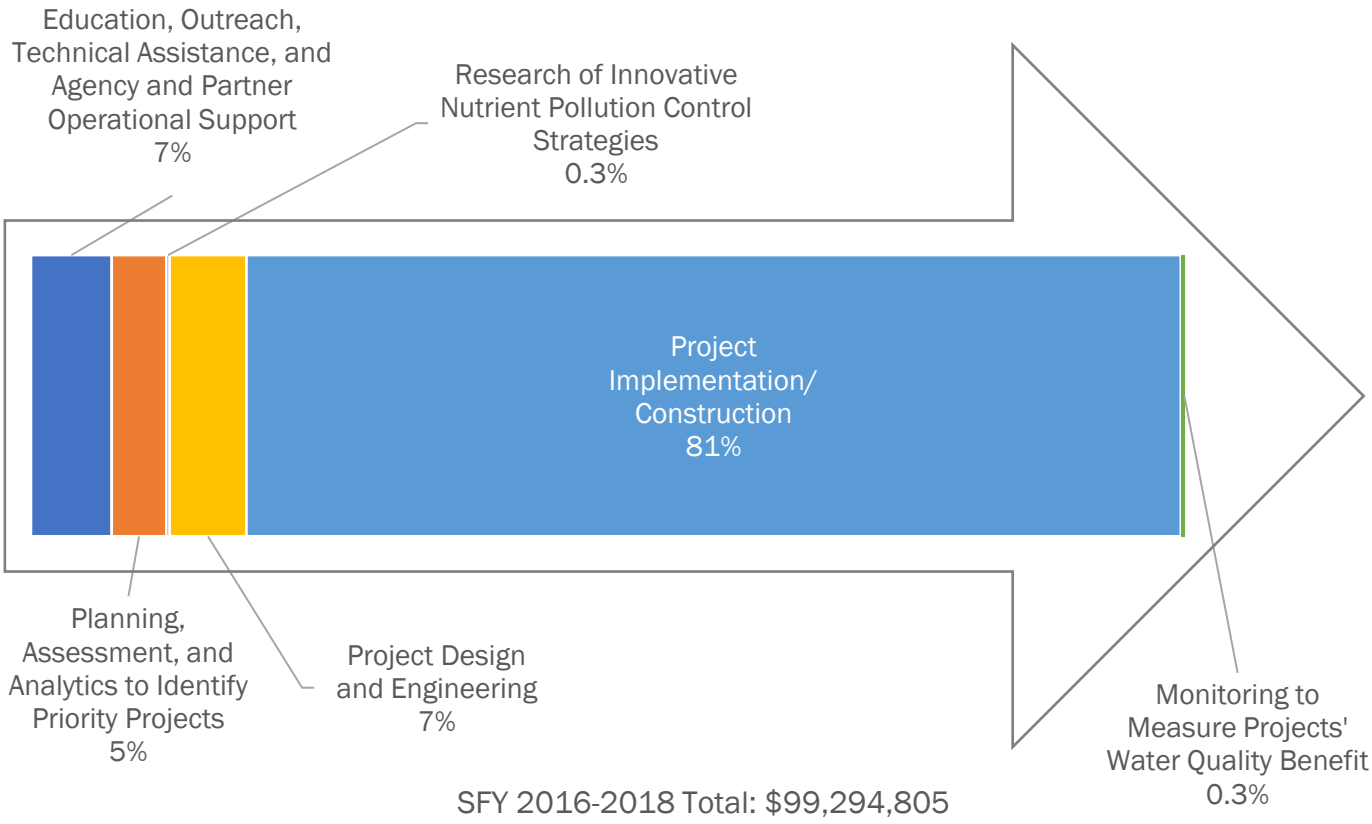
EXPLANATION OF FIGURE

State agencies' clean water investments are supported by a variety of funding sources. This Figure shows the percent of total dollars awarded by state agencies to projects by funding source from SFY 2016 to 2018. The variety of funding sources are necessary to support all aspects of clean water projects, from outreach and project development to construction.

[6] Investments reported include state and federal dollars awarded to projects by state agencies, but exclude federal funds awarded to projects directly by federal agencies. Federal funding sources included in this report: Clean Water State Revolving Fund, Federal Transportation Fund, Federal Transportation Alternatives Fund, USDA NRCS Agricultural Conservation Easement Fund, and Lake Champlain Basin Program.

Investments by Project Step

Figure 7. Clean water project development process and proportion of dollars awarded by project step, SFY 2016-2018

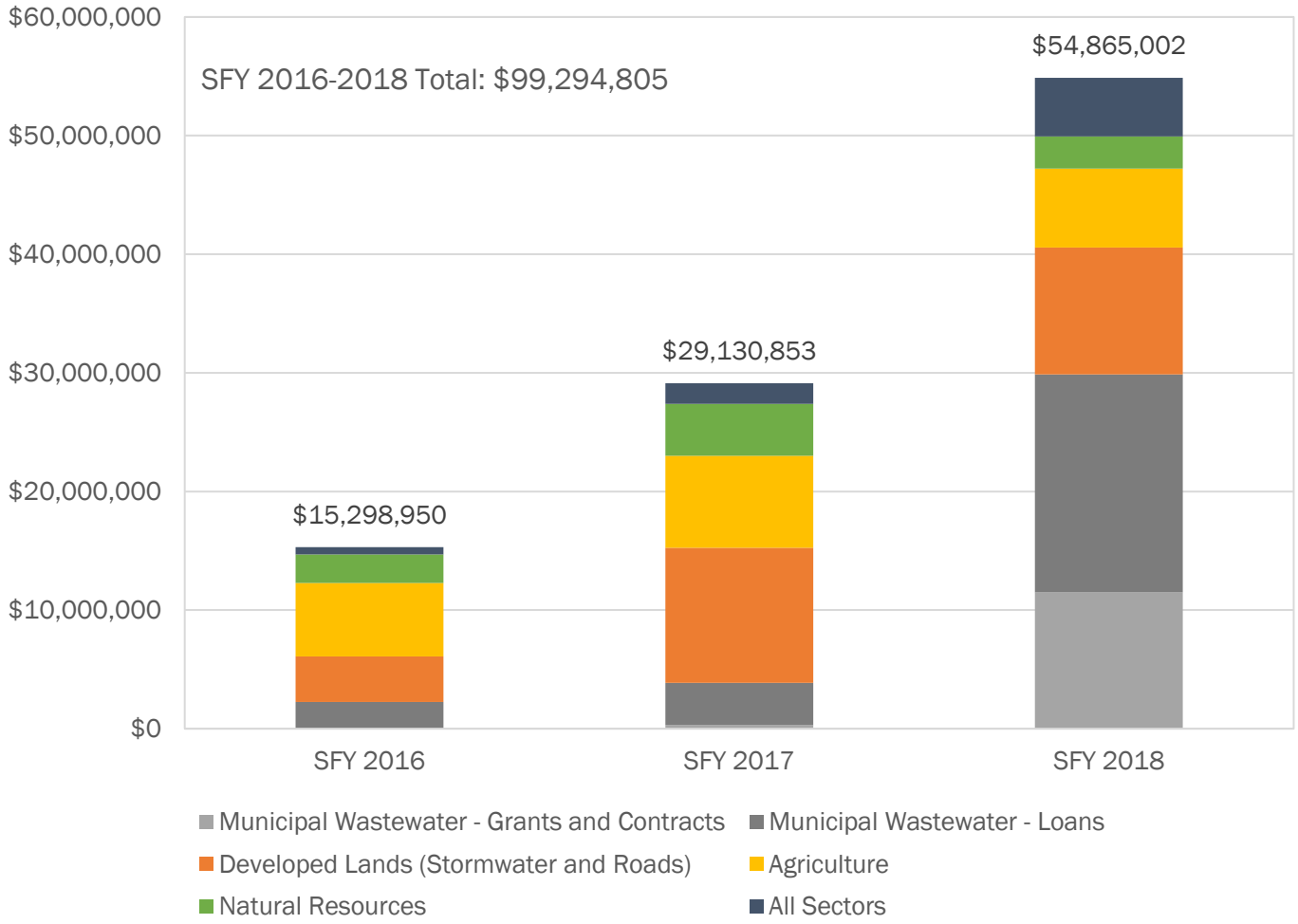


EXPLANATION OF FIGURE

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. While the state invests in all project steps, the majority of clean water investments are used to construct or implement clean water projects that reduce nutrient and sediment pollution.

Investments by State Fiscal Year and Land Use Sector

Figure 8. Total dollars awarded to clean water projects by land use sector and state fiscal year, SFY 2016-2018

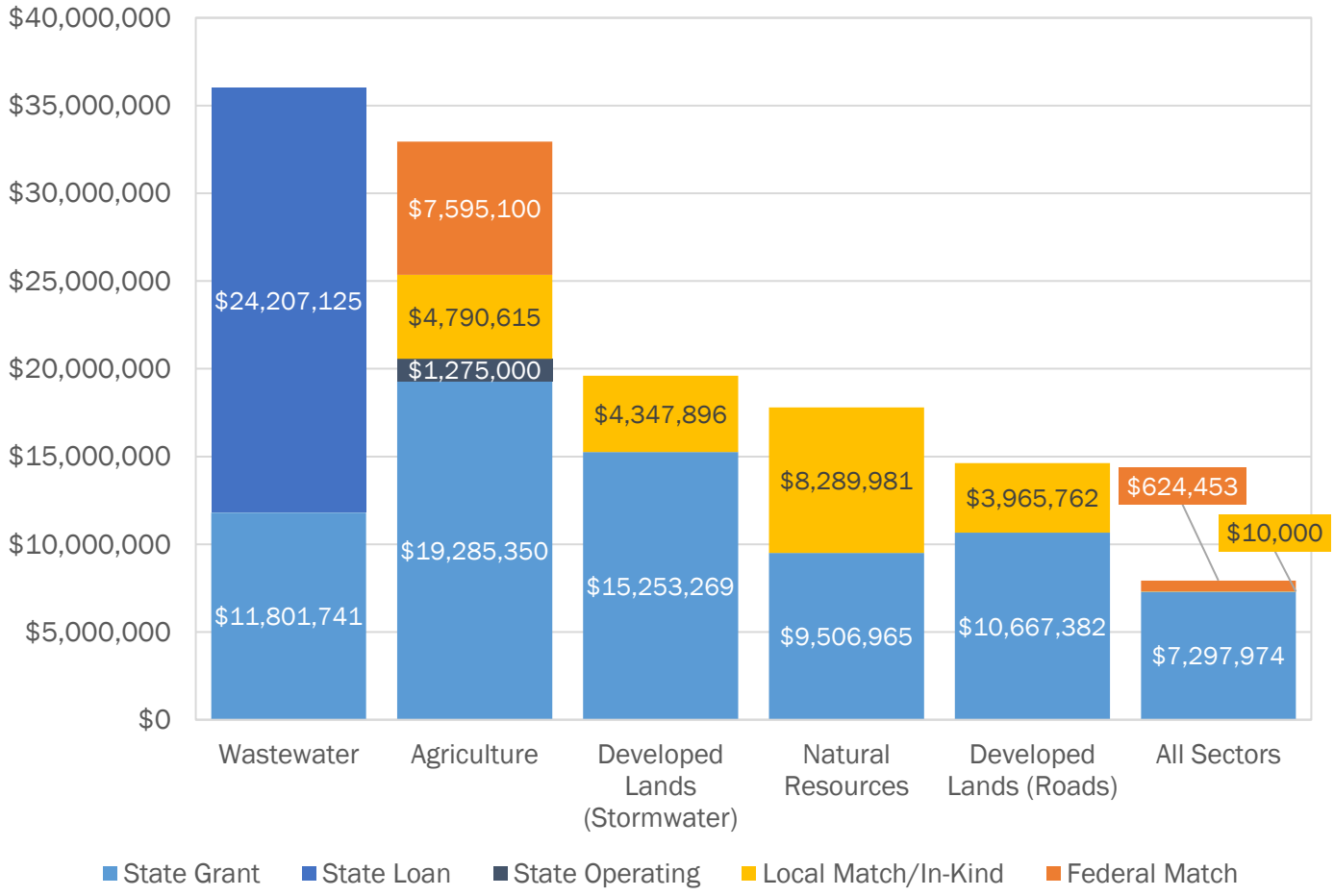


EXPLANATION OF FIGURE

Reaching Vermont's clean water goals requires an "all-in" approach. Since the state began tracking clean water investments across agencies in SFY 2016, investments have increased to support costs of compliance with clean water regulation for agriculture, stormwater, and wastewater. Notably, in SFY 2018 investments in municipal wastewater infrastructure increased nearly seven-fold to meet municipal demand to improve the performance of municipal infrastructure and to abate combined sewer overflows, or CSOs. The State of Vermont continues to incentivize non-regulatory/discretionary projects, such as natural resources restoration, however, demand for funding of these projects may vary year-to-year depending on landowner willingness to participate. This highlights the need to continue investing in partner capacity and outreach to increase participation in voluntary/discretionary projects.

Match or In-Kind Funds Leveraged by Land Use Sector

Figure 9. Local match/in-kind and federal match contributing to state-funded clean water projects by land use sector, SFY 2016-2018



EXPLANATION OF FIGURE

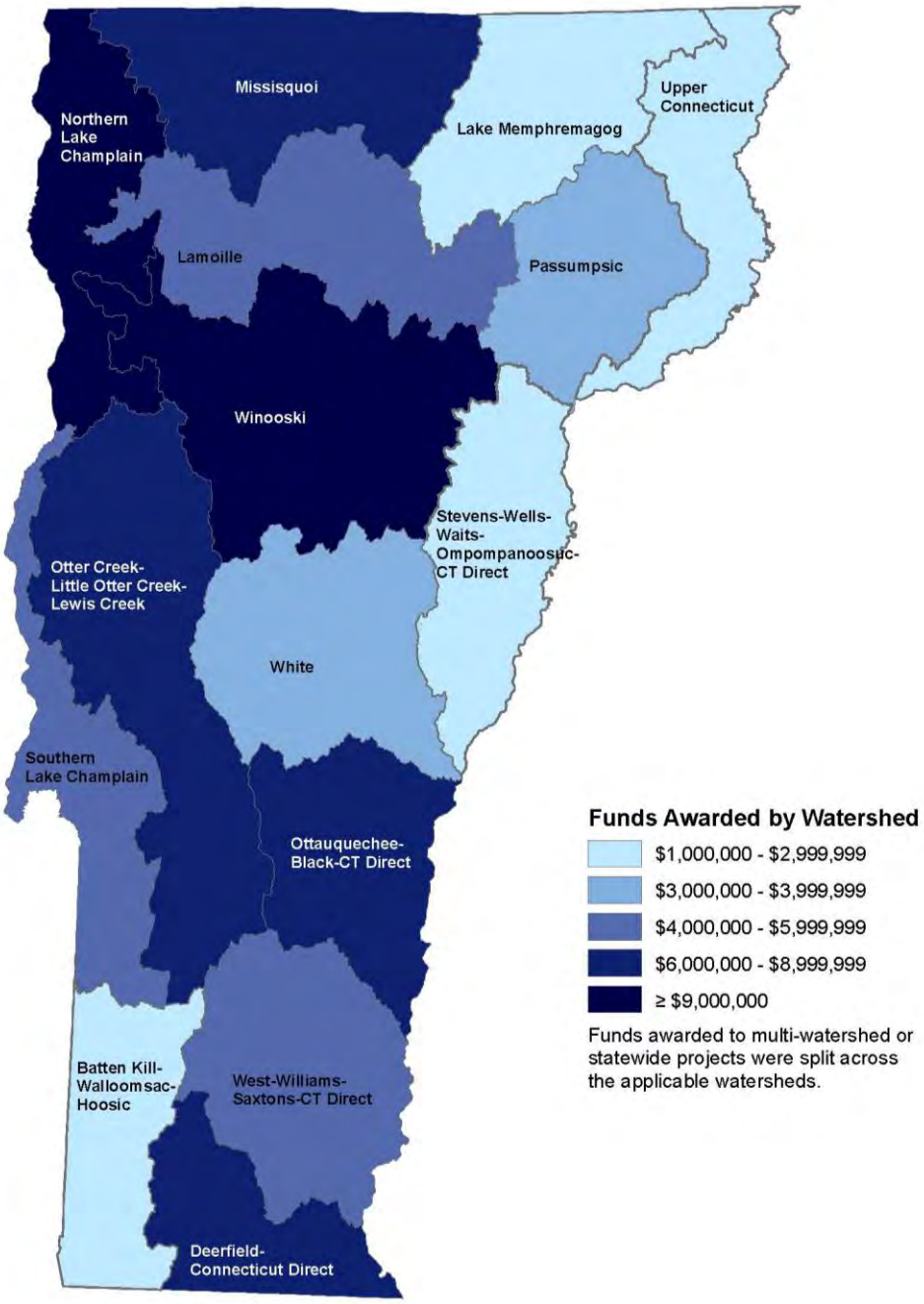
State-funded clean water projects leverage local and federal contributions to cover project costs and to further clean water efforts in Vermont. Leveraged funds reported here only include match and in-kind associated with clean water projects funded by state agencies. Clean water projects funded by federal agencies or other organizations are beyond the scope of this report.

State-funded clean water projects have leveraged substantial investments since SFY 2016:

Total State Grants:	$73,812,680
Total State Loans:	$24,207,125
Total State Operating:	$1,275,000
Total Local Match/In-Kind:	$21,404,254
Total Federal Match:	$8,219,553

Investments by Watershed Region

Figure 10. Map of dollars awarded to clean water projects by watershed, SFY 2016-2018



EXPLANATION OF FIGURE

Each region of the state has local clean water priorities to address. Each of Vermont's 15 major river basins benefits from state investments in clean water projects. Most basins experienced an investment between $2 million and $8 million since SFY 2016. The Northern Lake Champlain and Winooski River basin are outliers with investments at $18.2 and $21.7 million respectively. Significant investments in these basins are largely driven by municipal wastewater treatment and CSO abatement requirements, as well as municipal stormwater treatment requirements for Vermont's most populous municipalities.

Vermont's Clean Water Education

How is the State of Vermont educating stakeholders to improve clean water?

Reducing nutrient and sediment pollution sources fundamentally means changing or adjusting our land uses and employing sound land use management practices, which requires education. The State of Vermont is delivering clean water education through outreach (i.e., workshops, trainings, and public/stakeholder meetings) and technical assistance (i.e., targeted, one-on-one interactions). Clean water education aims to:

- Increase public awareness and engagement in establishing and implementing clean water priorities;
- Increase landowner acceptance of new and changing policies and willingness to adopt best management practices;
- Support stakeholders in preparing to meet new regulatory requirements in the most cost-effective manner;
- Support stakeholders in planning and securing resources to implement clean water projects; and
- Increase adoption and effectiveness of best management practices to improve water quality.

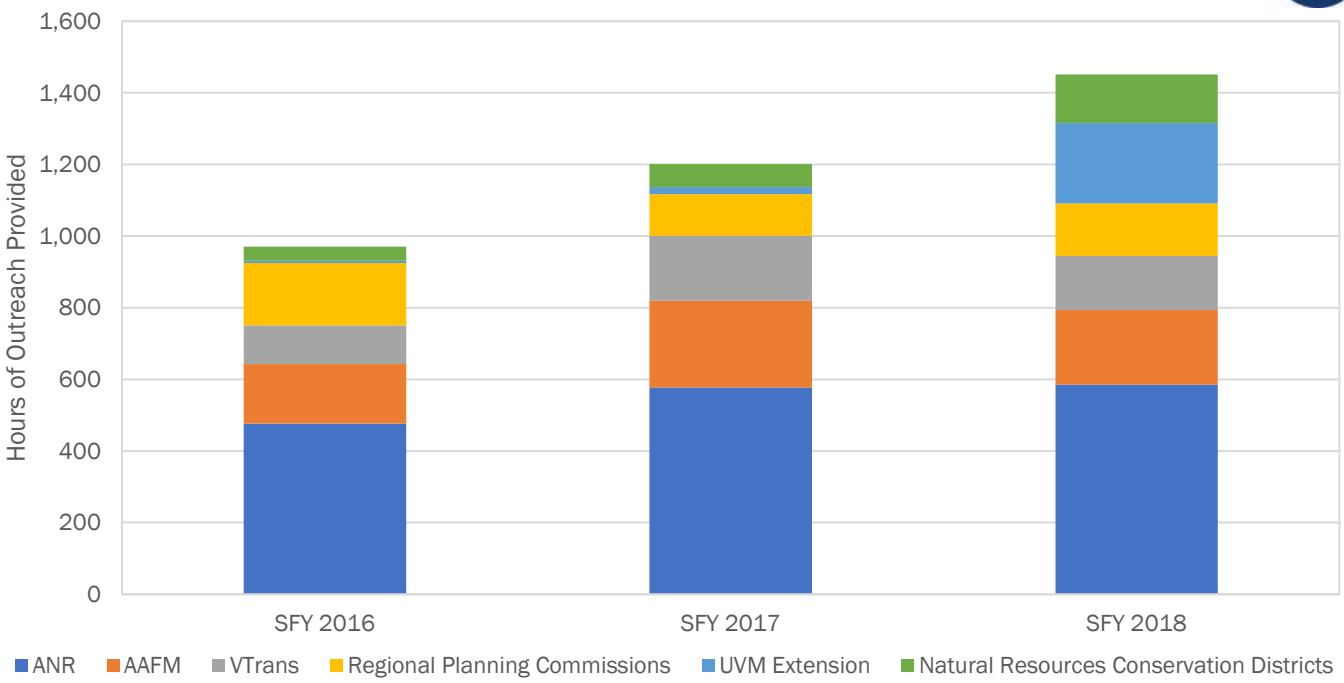
Educational efforts support all sectors in planning and securing resources to implement clean water projects. Table 2 summarizes the primary or target audience per land use sector. Clean water education measures, summarized in this report, show the extent of outreach and technical assistance conducted by state agencies and partners with state financial support.

Table 2. Summary of primary or target audiences per land use sector (listed in alphabetical order)

Land Use Sector	Primary or Target Audiences
	Businesses, farmers, natural resources conservation districts, nongovernmental organizations (e.g., watershed groups), public
	Businesses, municipalities, natural resources conservation districts, nongovernmental organizations (e.g., watershed groups), public, regional planning commissions, residential landowners
	Loggers and foresters, nongovernmental organizations (e.g., watershed groups), natural resources conservation districts, other governmental organizations, public, residential landowners
	Municipalities, other governmental organizations, public, regional planning commissions, residential landowners
	Businesses, municipalities, public, residential landowners

Outreach by Agency

Figure 11. Total hours of education provided to participants of outreach events (i.e., workshops, trainings, and public/stakeholder meetings) by outreaching organization, SFY 2016-2018



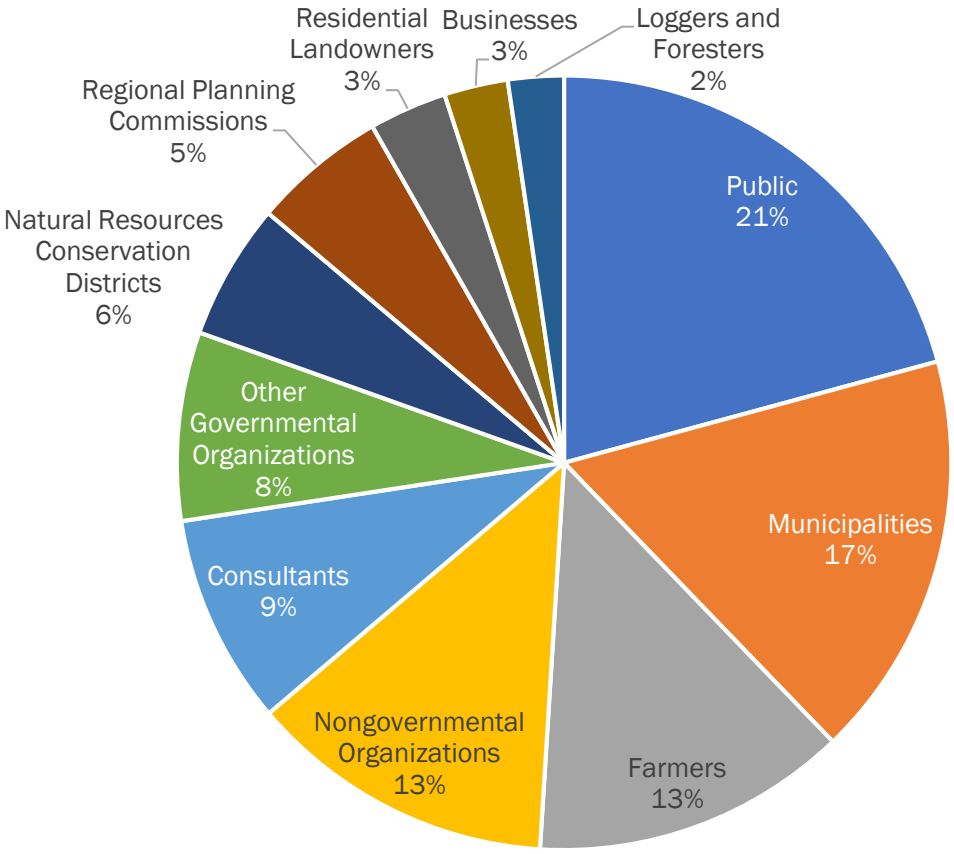
EXPLANATION OF FIGURE

State clean water outreach efforts increased from SFY 2016 (when outreach data collection began) to SFY 2018. In total, 1,254 outreach events have been reported, reaching 33,575 attendees, with 3,141 hours of education provided. For presentation purpose, figure excludes outreaching organizations reported as other and, or with ≤ 70 hours of education provided in SFY 2018.

Figure 12. Left: Field training by VTrans staff for municipal road managers on best practices for road erosion remediation in Lamoille County; Right: AAFM staff providing outreach on soil health and water quality

Outreach by Target Audience

Figure 13. Target audiences reached through the state's clean water outreach efforts (i.e., workshops, trainings, and public/stakeholder meetings), SFY 2016-2018



EXPLANATION OF FIGURE

This figure demonstrates how the state's outreach efforts target different sector-based audiences by the number of attendees. 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 to secure funds to implement priority clean water projects. It is also important to keep the public engaged for broader support of the state's clean water efforts.

Technical Assistance Targeting Agricultural Audiences

The State of Vermont aims to support farmers in addressing agricultural sources of nutrient pollution. AAFM conducts regulatory farm visits to ensure compliance with Required Agricultural Practices (RAPs) and Medium Farm Operation (MFO) and Large Farm Operation (LFO) Rules, as well as non-regulatory farm visits to support the implementation of conservation practices on farms. AAFM also provides financial assistance to enhance local partner capacity (e.g., natural resources conservation districts) to help farmers install conservation practices.

Land Use Sector	Primary or Target Audiences
AGRICULTURE	Businesses, farmers, natural resources conservation districts, nongovernmental organizations (e.g., watershed groups), public

Table 3. State of Vermont technical assistance and capacity building to support clean water improvements on agricultural lands, SFY 2016-2018

Technical Assistance Measures	2016	2017	2018	Total
Number of water quality compliance farm visits conducted by AAFM to ensure compliance with RAPs and MFO and LFO Rules	186	352	675	1,213
Number of technical assistance visits conducted by AAFM to support implementation of conservation practices	594	348	592	1,534
Number of custom manure applicators certified (5-year certification)	New in 2018	New in 2018	83	83
Number of additional farmer clients served by partners per year	New in 2018	New in 2018	120	120
Number of new or expanded partner-provided agricultural services	New in 2018	New in 2018	20	20
Number of nutrient management planning and manure spreading record keeping books distributed	New in 2018	New in 2018	300	300

Figure 14. Left: AAFM staff helping farmers plan pasture improvement practices and livestock exclusion from surface water; Right: University of Vermont Extension staff educating farmers on water quality best practices

Technical Assistance Targeting Developed Lands and Wastewater Audiences

The State of Vermont aims to support municipalities in addressing stormwater and wastewater sources of nutrient pollution. Much of this work is driven by wastewater discharge permits, municipal stormwater permits, and the Municipal Roads General Permit. The state's educational programs help municipalities prepare to meet new regulatory requirements in the most cost-effective manner and secure resources to increase adoption and implementation of clean water projects.

Land Use Sector	Primary or Target Audiences
DEVELOPED LANDS	Businesses, municipalities, natural resources conservation districts, nongovernmental organizations (e.g., watershed groups), public, regional planning commissions, residential landowners
ROADS	Municipalities, other governmental organizations, public, regional planning commissions, residential landowners
WASTEWATER	Businesses, municipalities, public, residential landowners

Table 4. State of Vermont technical assistance targeting stormwater, roads, and wastewater treatment improvements, SFY 2016-2018

Technical Assistance Measures	2016	2017	2018	Total
Number of developed lands, roads, and wastewater projects reviewed by ANR Watershed Management Division staff	922	1,052	1,161	3,135
Approximate hours of technical assistance provided by DEC's Facilities and Engineering Division on municipal stormwater and wastewater projects	New in 2017	5,300	6,400	11,700
Hours of water quality municipal technical assistance provided by VTrans staff	New in 2017	1,483	1,489	2,972

Figure 15. Left: ANR staff assist Montpelier City surveying stormwater and sewer infrastructure to detect illicit/unauthorized discharges; Right: South Burlington City guides tour of its stormwater treatment infrastructure

Technical Assistance Targeting Natural Resources Restoration Audiences

Natural resources restoration work is voluntary and not driven by regulation. Successful natural resource restoration and protection projects require landowner commitment. Education targeting the public and landowners increases likelihood of natural resource restoration projects moving forward. Nongovernmental organizations (e.g., watershed groups) and natural resources conservation districts conduct outreach to landowners and help secure funds to complete projects. Educational activities help: (a) identify and prioritize opportunities for natural resource restoration, (b) gain landowner commitment to projects, and (c) inform the public on the value and cobenefits of natural resource restoration to increase adoption of projects.

Land Use Sector	Primary or Target Audiences
NATURAL RESOURCES	Loggers and foresters, nongovernmental organizations (e.g., watershed groups), natural resources conservation districts, other governmental organizations, public, residential landowners

Table 5. State of Vermont technical assistance to support natural resource restoration, SFY 2016-2018

Technical Assistance Measures	2016	2017	2018	Total
Number of projects reviewed to restore and protect natural resources by ANR Watershed Management Division staff	2,965	3,973	5,921	12,859
Number of logging operation site visits to provide Acceptable Management Practices (AMP) technical assistance[7]	11	12	No Data[6]	23
Acres of forest lands covered by Use Value Appraisal (UVA) site inspections[6]	189,733	211,150	No Data[6]	400,883
Number of communities receiving Urban and Community Forestry Program technical assistance	94	78	78	250

Figure 16. Left: Portable skidder bridge building workshop hosted by Vermont Association of Conservation Districts with ANR funding; Right: Portable skidder bridges avoid erosion at stream crossings along logging roads

[7] Data are reported by calendar year rather than state fiscal year. Given the timeline of this report, calendar year 2018 data are not yet available. FPR annual statewide summary reports are available at: http://fpr.vermont.gov/forest/vermonts_forests/amps.

Results of Vermont's Clean Water Investments

What difference are the State of Vermont's investments making to improve clean water?

Results of state-funded clean water projects completed SFY 2016-2018 are summarized in the following sections by land use sector. Clean water investments and results are also summarized by watershed region in Appendix A.

Agriculture

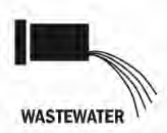
Installation or application of conservation practices that reduce sources of nutrient and sediment pollution from farm production areas and farm fields.

Developed Lands (Stormwater)

Installation of stormwater practices that treat polluted stormwater runoff from developed lands, such as parking lots, sidewalks, and rooftops.

Developed Lands (Roads)

Installation of stormwater and roadside erosion control practices that prevent erosion and treat road-related sources of nutrient and sediment pollution.



Wastewater

Improvements to municipal wastewater infrastructure that decrease nutrient pollution (e.g., phosphorus and nitrogen) from municipal wastewater systems through treatment upgrades, combined sewer overflow (CSO) abatement, and refurbishment of aging infrastructure.

Natural Resource Restoration

Restoration of "natural infrastructure" functions that prevent and abate nutrient and sediment pollution. Natural infrastructure includes floodplains, river channels, lakeshores, wetlands, and forest lands.

Results of Agricultural Pollution Prevention Projects

Agricultural pollution prevention projects involve the installation or application of conservation practices that reduce sources of nutrient and sediment pollution from farm production areas and farm fields.

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 (RAPs), as well as Medium Farm Operation (MFO) and Large Farm Operation (LFO) Rules
- Improved flood resiliency and flood hazard mitigation
- Supports agricultural working lands
- Improved habitat function

The following sections summarize the results of state-funded agricultural pollution prevention projects based on quantified project outputs (e.g., acres of agricultural lands treated) and estimated pollutant reductions (e.g., kilograms of total phosphorus reduced annually).

Agricultural Project Outputs

Table 6. Outputs of state-funded agricultural pollution prevention projects implemented, SFY 2016-2018

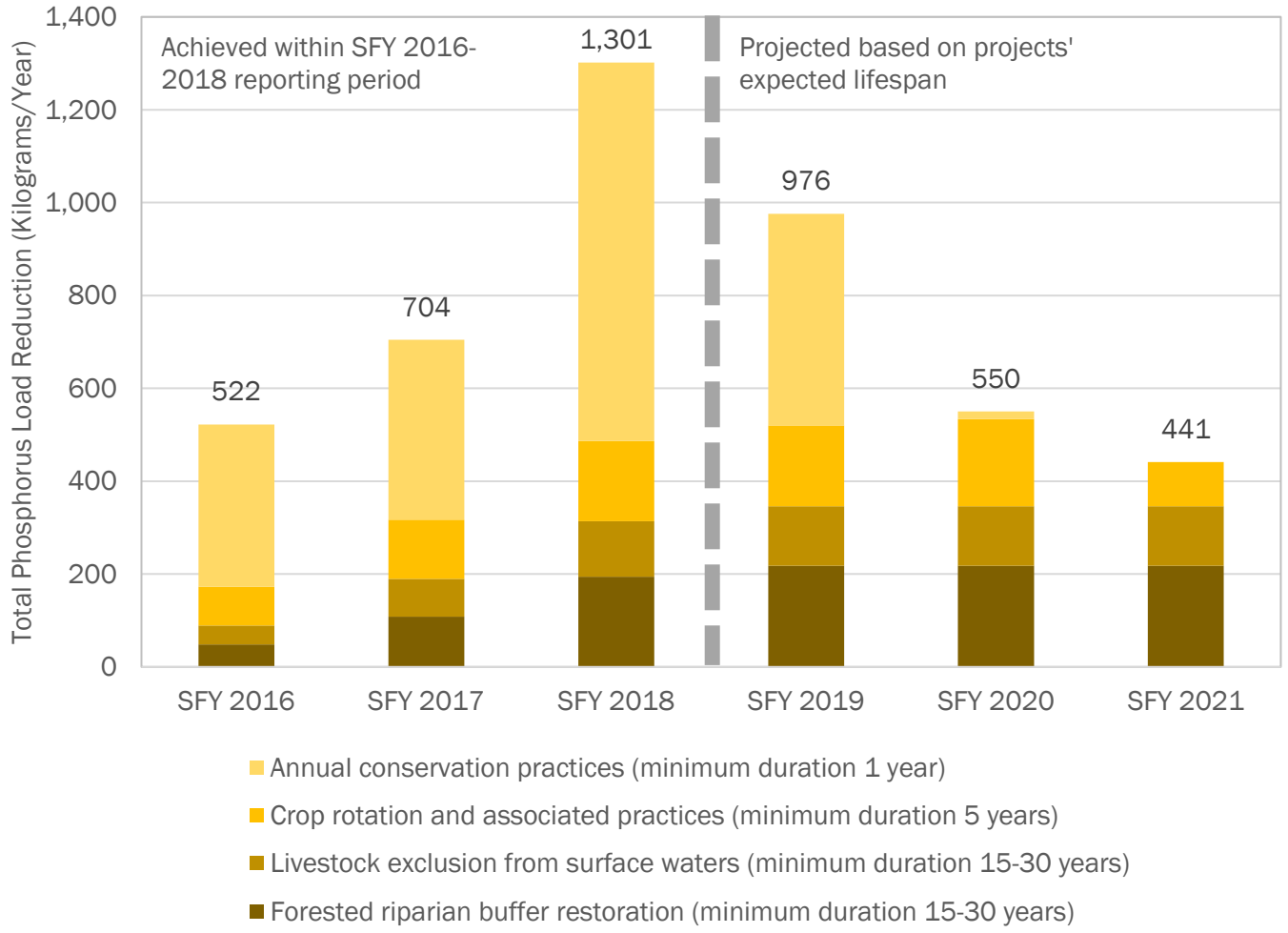
Project Output Measures	2016	2017	2018	Total
Acres of agricultural lands treated by conservation practices	5,466	3,261	7,244	15,971
Acres of agricultural lands treated by forested buffers	258	200	208	666
Acres of pasture with livestock excluded from surface waters	258	117	97	472
Number of barnyard/production area conservation practices installed	57	97	85	239
Acres of water quality protections within newly conserved agricultural lands	New in 2017	116	208	324
Acres of agricultural land treated by innovative equipment (annual estimate)	New in 2017	1,729	2,000	3,729

EXPLANATION OF TABLE

Acres of agricultural lands treated by conservation practices more than doubled from 2017 to 2018. Twenty-six square miles of agricultural lands have been treated by state-funded conservation practices since SFY 2016.

Agricultural Project Pollutant Reductions

Figure 17. Annual average estimated total phosphorus load reduction (kilograms per year) achieved by state-funded agricultural pollution prevention projects implemented SFY 2016-2018



EXPLANATION OF FIGURE

Phosphorus pollutant reductions achieved by agricultural projects nearly doubled from SFY 2017 to SFY 2018. Projected pollutant reductions, based on projects' anticipated lifespan (noted in legend), are shown to the right of the dashed line. Practices must be maintained for pollutant reductions to continue in future years. See Appendix C for summary of methods used to estimate pollutant reductions. Phosphorus reductions can only be estimated for practices installed in the Lake Champlain and Memphremagog basins at this time.

Agricultural Pollution Prevention Project Examples

Figure 18. Before (left) and after (right) installation of heavy use area protection and clean water diversion project on a small farm in Swanton, VT. Project completed with funding from the AAFM Best Management Practice (BMP) Program. Before photo courtesy of the United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS).

Figure 19. Implementation of cover cropping after corn harvest with a no-till grain drill acquired by a group of small farms in Craftsbury with funding from the AAFM Capital Equipment Assistance Program (CEAP). Photo courtesy of Orleans County Natural Resources Conservation District.

Figure 20. Construction of waste storage facility on a small farm operation in Tunbridge. Project completed with funding from the AAFM Best Management Practice (BMP) Program and the USDA NRCS Environmental Quality Incentive Program (EQIP).

Results of Developed Lands (Stormwater, Roads) Projects

Developed lands projects decrease nutrient (e.g., phosphorus and nitrogen) and sediment pollution through: (a) installation of structures that treat polluted stormwater runoff from developed lands, such as roads, parking lots, sidewalks, and rooftops, as well as (b) installation of road erosion remediation practices that prevent road/roadside erosion.

Developed lands projects (stormwater and roads) 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
- Improved flood resiliency and flood hazard mitigation for public health and safety

The following sections summarize the results of state-funded developed lands projects based on quantified project outputs (e.g., acres of impervious surface treated) and estimated pollutant reductions (e.g., kilograms of total phosphorus reduced annually).

Developed Lands and Road Project Outputs

Table 7. Outputs of state-funded stormwater treatment and road erosion remediation project development (i.e., planning and design) work completed, SFY 2016-2018

Project Development Measures	2016	2017	2018	Total
Square miles assessed through Stormwater Master Plans	20	201	320	541
Number of projects identified through Stormwater Master Plans	52	120	163	335
Number of illicit/unauthorized discharges confirmed	40	9	1	50
Hydrologically connected municipal road miles inventoried	New in 2017	123	463	586
Hydrologically connected municipal road miles identified that require water quality improvements	New in 2017	55	223	278
Number of preliminary (30%) stormwater and road project designs completed	19	13	52	84
Number of final (100%) stormwater and road project designs completed	9	23	13	45

Table 8. Outputs of state-funded stormwater treatment and road erosion remediation projects implemented/constructed, SFY 2016-2018

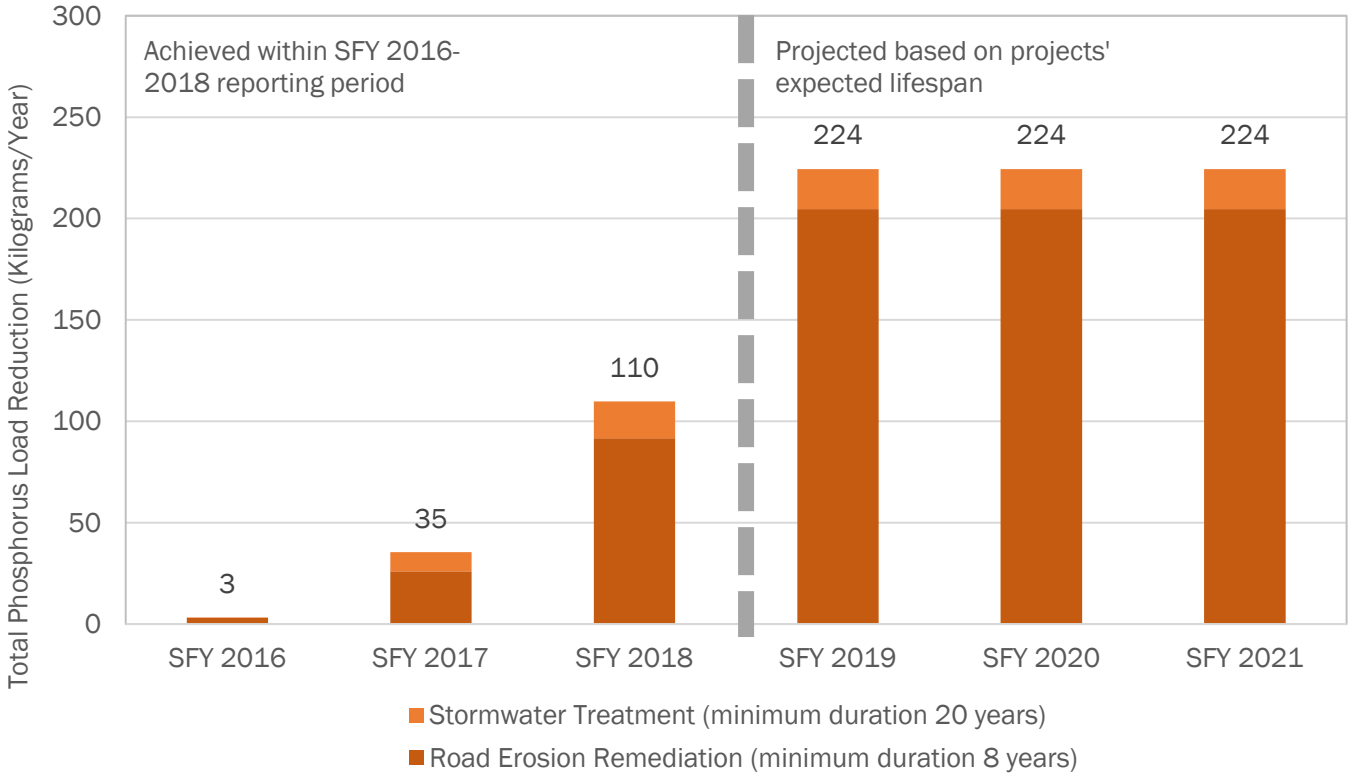
Project Output Measures	2016	2017	2018	Total
Acres of impervious surface treated by stormwater treatment practices	0.2	86	28	114
Miles of municipal road drainage and erosion control improvements	1	13	63	77
Number of municipal road drainage and stream culverts replaced	New in 2017	108	110	218
Cubic yards of municipal Class 4 road gully erosion remediated	New in 2018	New in 2018	260	260
Acres stabilized through use of hydroseeder/mulcher equipment per year	New in 2018	New in 2018	12	12

EXPLANATION OF TABLES

Miles of state-funded municipal road drainage and erosion control improvements increased nearly five-fold from SFY 2017 to 2018. The increase is, in part, due to the NEW Municipal Roads Grants-in-Aid Program where 179 municipalities enrolled through regional planning commissions and brought 44 road miles into full compliance with the Municipal Roads General Permit.

Developed Lands and Road Project Pollutant Reductions

Figure 21. Annual average estimated total phosphorus load reduction (kilograms per year) achieved by state-funded stormwater treatment and road erosion remediation projects implemented/constructed, SFY 2016-2018



EXPLANATION OF FIGURE

New phosphorus pollutant reductions achieved by road erosion remediation in SFY 2018 represents a 254% increase from SFY 2017. Phosphorus pollutant reductions achieved by stormwater treatment practices more than doubled from SFY 2017 to SFY 2018. Projected pollutant reductions, based on projects' anticipated lifespan (noted in legend), are shown to the right of the dashed line. Practices must be maintained for pollutant reductions to continue in future years. See Appendix C for summary of methods used to estimate pollutant reductions. Phosphorus reductions can only be estimated for practices installed in the Lake Champlain and Lake Memphremagog basins at this time.

Developed Lands and Road Project Examples

Figure 22. Stormwater treatment practice installed by Rutland County Natural Resources Conservation District at Giorgetti Park in the City of Rutland (planting completed by Vermont Youth Conservation Corps)

Figure 23. Stormwater treatment practice installed by Friends of the Mad River at Harwood Union Middle and High School; structure serves additional purpose as outdoor classroom to educate students on green stormwater infrastructure

Figure 24. Before (left) and after (right) installation of road erosion remediation along Long Hill Road, Concord by the Town of Concord in partnership with Northeastern Vermont Development Association through the Municipal Roads Grants-in-Aid Program

Results of Wastewater Treatment Projects

Wastewater treatment projects decrease nutrient pollution (e.g., phosphorus and nitrogen) from municipal wastewater systems through treatment upgrades, combined sewer overflow (CSO) abatement, and refurbishment of aging infrastructure.

Wastewater treatment 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
- Protects public health and safety
- Improved flood resiliency and flood hazard mitigation

The following sections summarize the results of state-funded wastewater treatment projects based on quantified project outputs (e.g., number of upgrades completed). Pollutant reductions from wastewater treatment facilities will be summarized in future TMDL progress reports. Wastewater treatment facilities measure changes in pollutants of concern as part of wastewater discharge permit requirements.

Wastewater Treatment Project Outputs

Table 9. Outputs of state-funded/financed wastewater treatment project development (i.e., planning and design) work completed, SFY 2016-2018

Project Development Measures	2016	2017	2018	Total
Number of preliminary (30%) designs completed	--	5	4	9
Number of final (100%) designs completed	4	3	8	15
Number of municipal wastewater asset management plans completed	--	3	3	6

Table 10. Outputs of state-funded/financed wastewater treatment projects constructed, SFY 2016-2018

Project Output Measures	2016	2017	2018	Total
Number of combined sewer overflow abatements completed	4	1	--	5
Number of sewer extensions completed	--	2	--	2
Number of wastewater collection systems refurbished	--	2	2	4
Number of wastewater treatment facility refurbished	--	--	1	1
Number of wastewater treatment facility upgrades completed	1	--	--	1

EXPLANATION OF TABLES

State grants and low interest loans capitalized through the Vermont and U.S. Environmental Protection Agency (EPA) Clean Water State Revolving Fund (CWSRF) finance municipal wastewater improvements. The tables above describe the number and type of municipal wastewater improvement projects completed.

Wastewater Treatment Project Pollutant Reductions

Wastewater treatment facilities treat phosphorus and nitrogen from the communities they serve. Facility operators monitor for pollutants of concern, depending on the discharge permit requirements, and report these data to the State of Vermont through Discharge Monthly Reports. Facilities in the Lake Champlain and Lake Memphremagog basins monitor for total phosphorus and facilities in the Connecticut River basin (drains to Long Island Sound) monitor for nitrogen. Due to the complexity of these treatment systems, it is difficult to connect the results of wastewater improvement projects, summarized in this section, to changes in pollutants discharging from the facility to surface waters. Treatment of phosphorus by wastewater treatment facilities in the Lake Champlain basin will be reported in future publications on Lake Champlain TMDL progress.

Wastewater Treatment Project Examples

Notable projects completed in SFY 2016-2018 include:

- Upgrade of the Waterbury municipal Wastewater Treatment Facility for phosphorus, which reduced the total phosphorus discharge from the plant by 58 percent.
- Disconnection of 50 acres of developed land from Rutland's combined sewer system and separation of 400 feet of storm and wastewater sewer pipes in Springfield to abate CSOs.
- Construction of a new sewage collection system to treat wastewater from the Village of Brownsville at the Town of Windsor Wastewater Treatment Facility, 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 (see Figure 25).

Figure 25. Construction of sewer replacement under Vermont Route 2A in Williston completed by Town of Williston with financing from the Vermont and EPA Clean Water State Revolving Fund (CWSRF)

Results of Natural Resource Restoration Projects

Natural resource restoration projects involve the restoration and protection of "natural infrastructure" functions that prevent and abate nutrient and sediment pollution. Natural infrastructure includes floodplains, river channels, lakeshores, wetlands, and forest lands.

Projects that restore and protect natural infrastructure 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
- Supports outdoor recreation opportunities and economy
- Improved habitat function

Natural Resource Restoration Project Outputs

Table 11. Outputs of state-funded natural resource restoration project development (i.e., planning and design) work completed, SFY 2016-2018

Project Development Measures	2016	2017	2018	Total
Stream miles assessed by Stream Geomorphic Assessment, River Corridor Plan	113	29	8	150
Number of natural resource restoration projects identified	125	17	52	194
Acres of river corridor scoped for easements	17	14	--	31
Number of preliminary (30%) designs completed	10	--	--	10
Number of final (100%) designs completed	9	6	17	32

Table 12. Outputs of state-funded natural resource restoration projects implemented, SFY 2016-2018

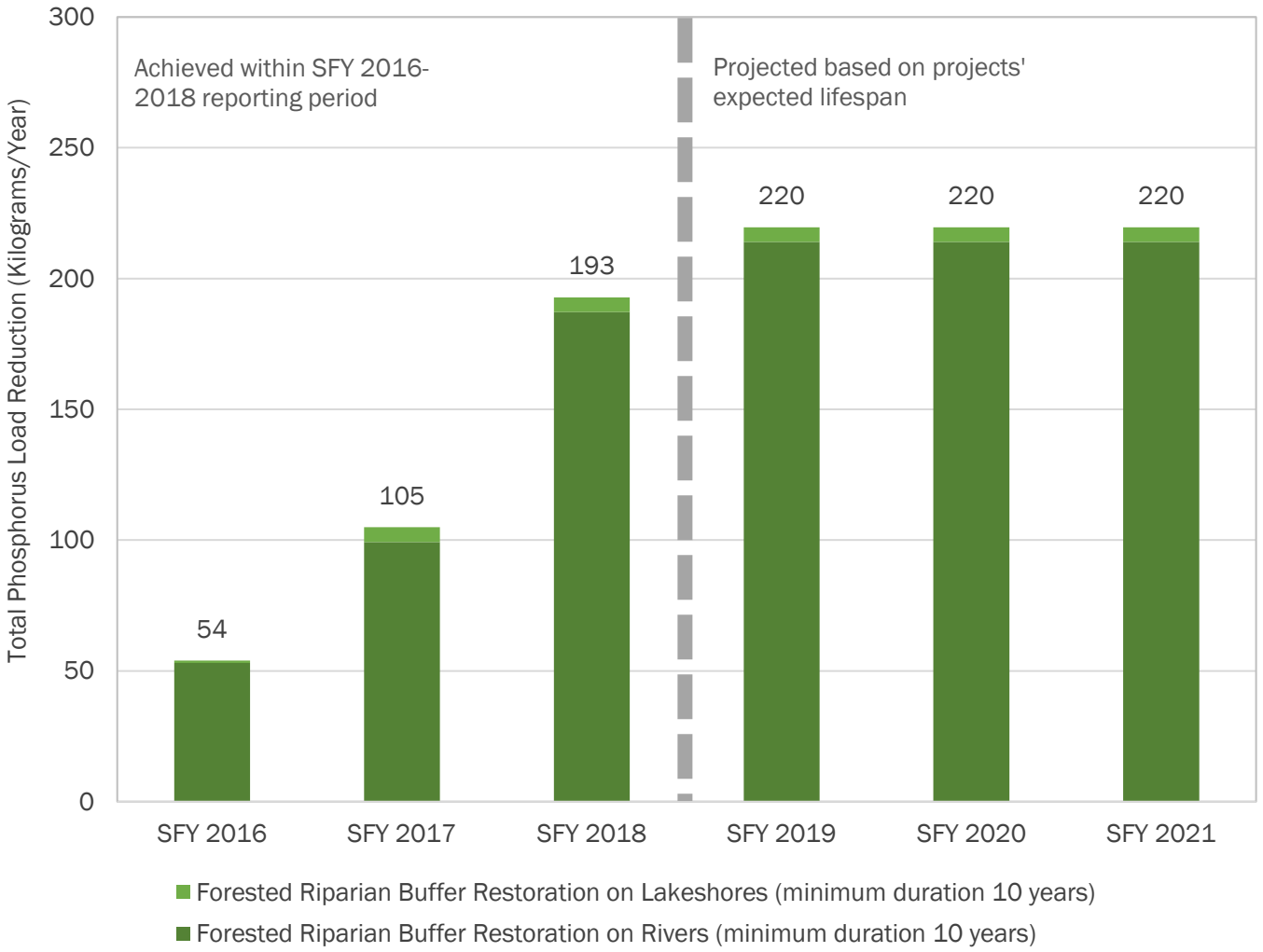
Project Output Measures	2016	2017	2018	Total
Acres of forested riparian buffer restored through buffer planting	85	32	50	167
Acres of river corridor conserved and restored through easements	141	208	213	562
Acres of floodplain restored	--	2	5	7
Stream miles reconnected for stream equilibrium/aquatic organism passage	35	100	108	243
Acres of wetland restored	--	131	40	171
Acres of forestland conserved with special water quality protection	58	172	590	820
Number of stream crossings improved	--	--	15	15

EXPLANATION OF TABLES

Acres of river corridor conserved through river corridor easements has increased by 421 miles since SFY 2016. 243 stream miles have been reconnected through dam removal and stream culvert upgrades (the State of Vermont is 159 miles long for context).

Natural Resource Restoration Pollutant Reductions

Figure 26. Annual average estimated total phosphorus load reduction (kilograms per year) achieved by state-funded forested riparian buffer restoration projects completed SFY 2016-2018



EXPLANATION OF FIGURE

Pollutant reductions achieved by forested riparian buffer restoration have nearly doubled each year since SFY 2016. Projected pollutant reductions, based on projects' anticipated lifespan (noted in legend), are shown to the right of the dashed line. Practices must be maintained for pollutant reductions to continue in future years. See Appendix C for summary of methods used to estimate pollutant reductions. Phosphorus reductions can only be estimated for practices installed in the Lake Champlain and Lake Memphremagog basins at this time.

Natural Resource Restoration Project Examples

Figure 27. Eco AmeriCorps members helping Vermont Department of Forests, Parks and Recreation restore forested-woody vegetation along Marsh Brook at Lake Carmi State Park in Franklin

Figure 28. Before (left) and after (right) remediation of gully with bio-engineering near Crooked Creek in Colchester, completed by Fitzgerald Environmental Associates with ANR funding

Figure 29. Before (left) and after (right) removal of dam on the Passumpsic River in East Burke, completed by Connecticut River Conservancy with ANR funding

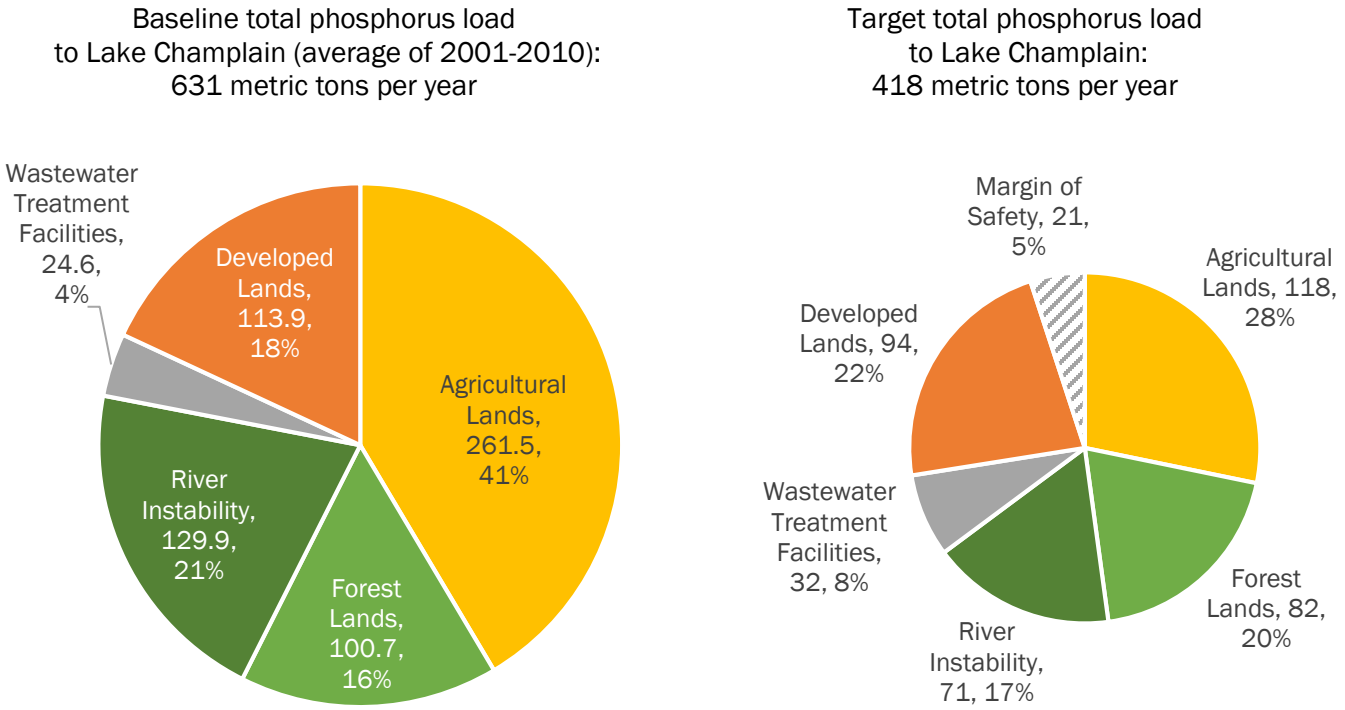
Clean Water Restoration Progress

The State of Vermont is measuring its progress meeting nutrient pollutant reduction targets identified in clean water restoration plans known as Total Maximum Daily Loads, or TMDLs. The following summarizes annual average estimated total phosphorus load reductions achieved by state-funded projects implemented/constructed SFY 2016-2018. In future publications, these results will be combined with results of federally-funded projects and projects completed to comply with water quality regulation for wastewater, stormwater, and agriculture to provide a more complete progress report on TMDL progress. See Appendix C for a summary of methods used to measure nutrient pollutant reductions.

Lake Champlain TMDL Progress

Phosphorus Total Maximum Daily Loads for Vermont Segments of Lake Champlain[8] (i.e., Lake Champlain TMDL) identifies phosphorus pollutant reductions that must be achieved for all segments of Lake Champlain to comply with State of Vermont water quality standards (baseline and target phosphorus loads shown in Figure 30). Clean water projects implemented in the Lake Champlain basin contribute to progress meeting Lake Champlain TMDL phosphorus reduction targets (see Figure 31).

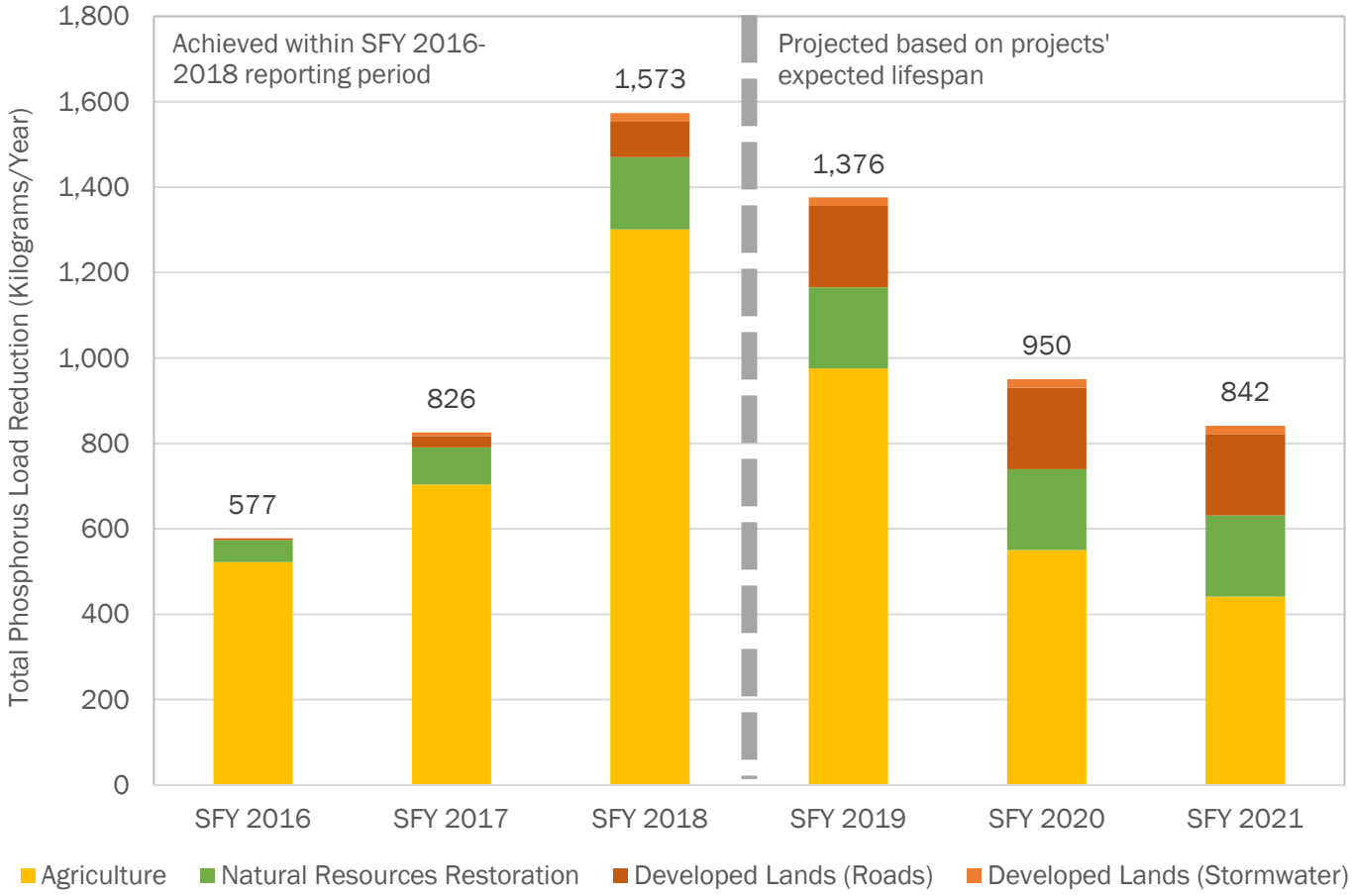
Figure 30. Lake Champlain TMDL baseline (left) and target (right) total phosphorus load (requires a total reduction of 213 metric tons per year)[9]



[8] Phosphorus Total Maximum Daily Loads for Vermont Segments of Lake Champlain available at: https://dec.vermont.gov/watershed/cwi/restoring/champlain.

[9] The baseline for wastewater treatment facilities shows baseline discharge levels; the target for wastewater treatment facilities shows maximum permittable discharge levels.

Figure 31. Annual average estimated total phosphorus load reduction (kilograms per year) achieved by state-funded clean water projects that support implementation of the Lake Champlain TMDL, completed SFY 2016-2018



EXPLANATION OF FIGURE

The Lake Champlain TMDL implementation timeframe is 2017-2038. Although phosphorus reductions estimated from state-funded projects nearly doubled from SFY 2017 to 2018 at 1.57 metric tons, this only represents a fraction of the 213 metric ton reduction required over the twenty-year TMDL implementation timeframe. There are three fundamental reasons for this modest result:

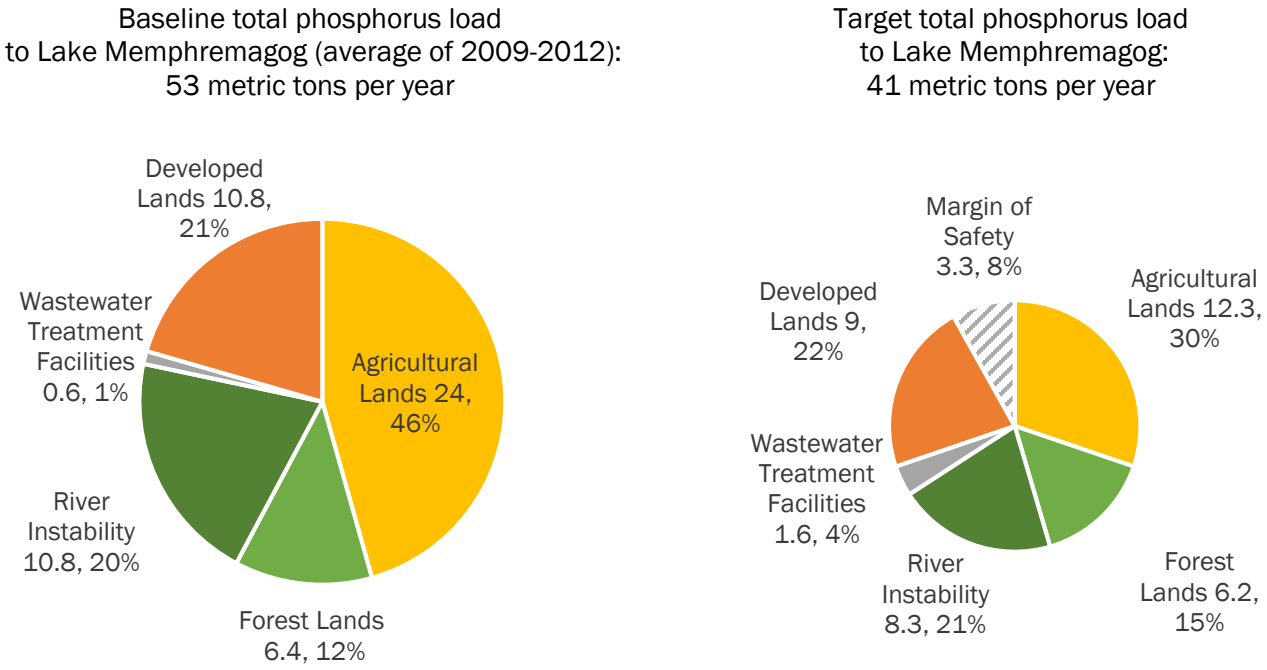
1. Phosphorus reductions reported represent state-funded clean water projects only. Future publications on TMDL progress will include phosphorus reductions associated with regulatory programs and federal funding programs.
2. The State of Vermont is expanding its ability to quantify phosphorus reductions for all project types, however, some gaps still exist, described in Appendix C.
3. The Lake Champlain TMDL and its implementation plan anticipated a modest ramping up of phosphorus reduction activities. The first two to three years were dedicated to establishing programs and funding strategies across all sectors to drive phosphorus reduction activities in future years.

Projected pollutant reductions based on projects' anticipated lifespan are shown to the right of the dashed line. Practices must be maintained for pollutant reductions to continue in future years. See Appendix C for summary of methods used to estimate pollutant reductions.

Lake Memphremagog TMDL Progress

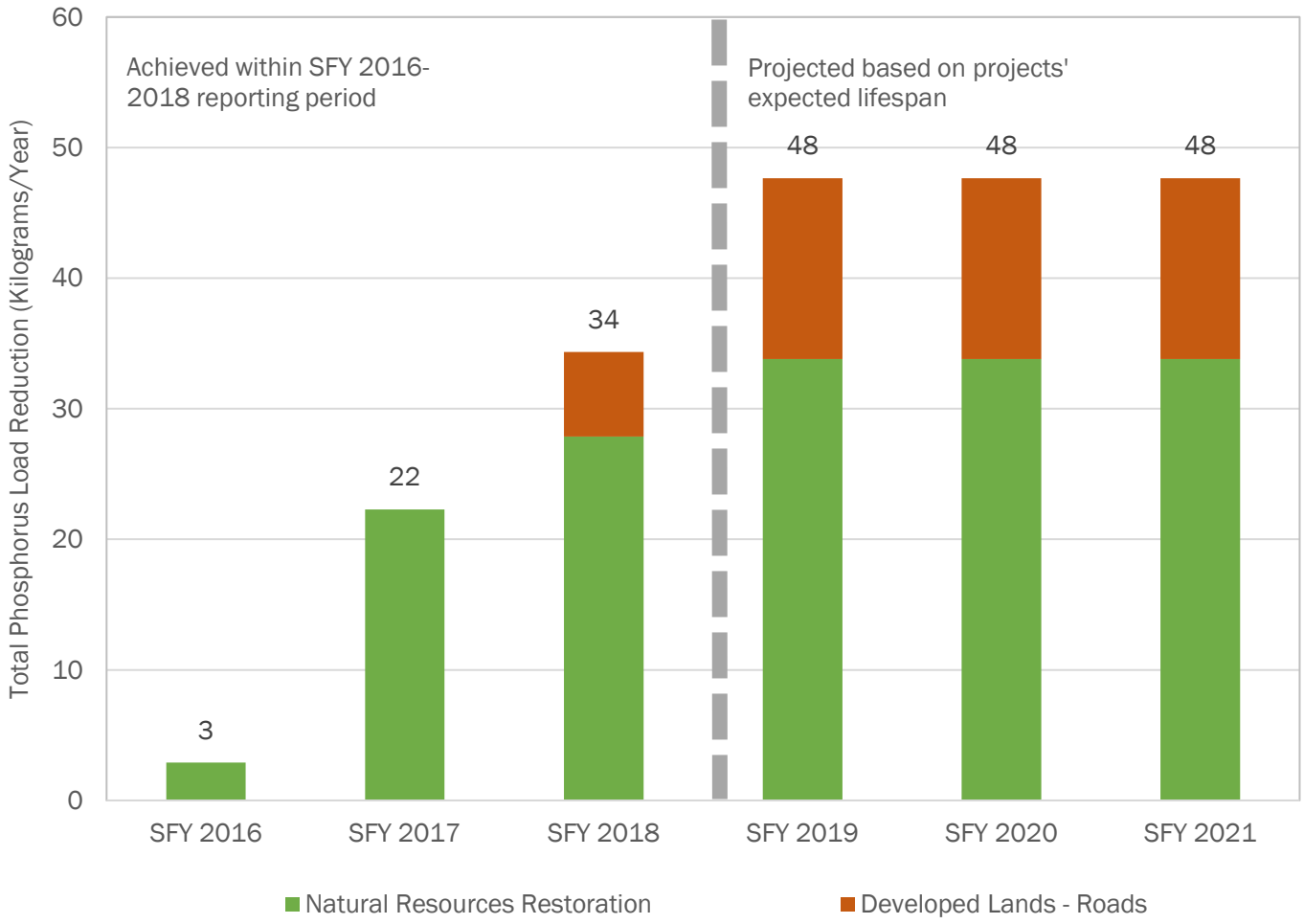
Lake Memphremagog Phosphorus Total Maximum Daily Load[10] (i.e., Lake Memphremagog TMDL) identifies phosphorus pollutant reductions that must be achieved for Lake Memphremagog to comply with State of Vermont water quality standards (baseline and target phosphorus loads shown in Figure 32). Clean water projects implemented in the Lake Memphremagog basin contribute to progress meeting Lake Memphremagog TMDL phosphorus reduction targets (see Figure 33).

Figure 32. Lake Memphremagog TMDL baseline (left) and target (right) total phosphorus load (requires a total reduction of 12 metric tons per year)



[10] Lake Memphremagog Phosphorus Total Maximum Daily Load available at: https://dec.vermont.gov/watershed/map/basin-planning/basin17.

Figure 33. Annual average estimated total phosphorus load reduction (kilograms per year) achieved by state-funded clean water projects that support implementation of the Lake Memphremagog TMDL, completed SFY 2016-2018



EXPLANATION OF FIGURE

Pollutant reductions from road erosion remediation began ramping up in the Lake Memphremagog basin in SFY 2018 through the Municipal Roads Grants-in-Aid program and the VTrans Better Roads grant program. Pollutant reductions reported here only represents a subset of ongoing work to implement the Lake Memphremagog TMDL. Additional reductions are being achieved through regulatory programs and federal funding programs. Projected pollutant reductions based on projects' anticipated lifespan are shown to the right of the dashed line. Practices must be maintained for pollutant reductions to continue in future years. See Appendix C for summary of methods used to estimate pollutant reductions.

Appendices

A. Summary of Vermont Water Quality Priorities and Projects by Watershed

B. Results of Operational Stormwater Permits

C. Summary of Methods used to Quantify Pollutant Reductions

D. Report of the Working Group on Water Quality funding under 2017 Act 73

Available at: https://anr.vermont.gov/sites/anr/files/specialtopics/Act73WorkingGroup/2017-11-15-FINAL-act-73-water-quality-funding-report.pdf

E. Summary of Federal Law, Policy, and Funding related to Clean Water in Vermont

Available at: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2018-08-31%20Vermont%20Federal%20Clean%20Water%20Funding%20Report.pdf

F. Ecosystem Restoration Grant Program Projects

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 2016-2018;
2. Summary of project results completed by sector in SFY 2016-2018, including phosphorus load reductions; and
3. Table of projects that were awarded funds in SFY 2018.

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

Agencies

AoA	Agency of Administration
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	Developed lands road erosion remediation
SW	Developed lands stormwater treatment
WW	Wastewater treatment

Funding Source

Capital	Vermont Capital Fund
CWF	Vermont Clean Water Fund
CWSRF	Clean Water State Revolving Fund
FTF	Federal Transportation Fund
General	General Fund
VTTF	Vermont Transportation Fund
WGF	Watershed Grant Fund
TAP	Federal Highway Administration Transportation Alternatives Fund
Other	May include: Act 250 Mitigation Fund, Housing and Conservation Trust Fund, Lake Champlain Basin Program Funds, and U.S. Department of Agriculture Natural Resources Conservation Service Agricultural Conservation Easement Program

[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/cleanWaterDashboard/WPDSearch.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

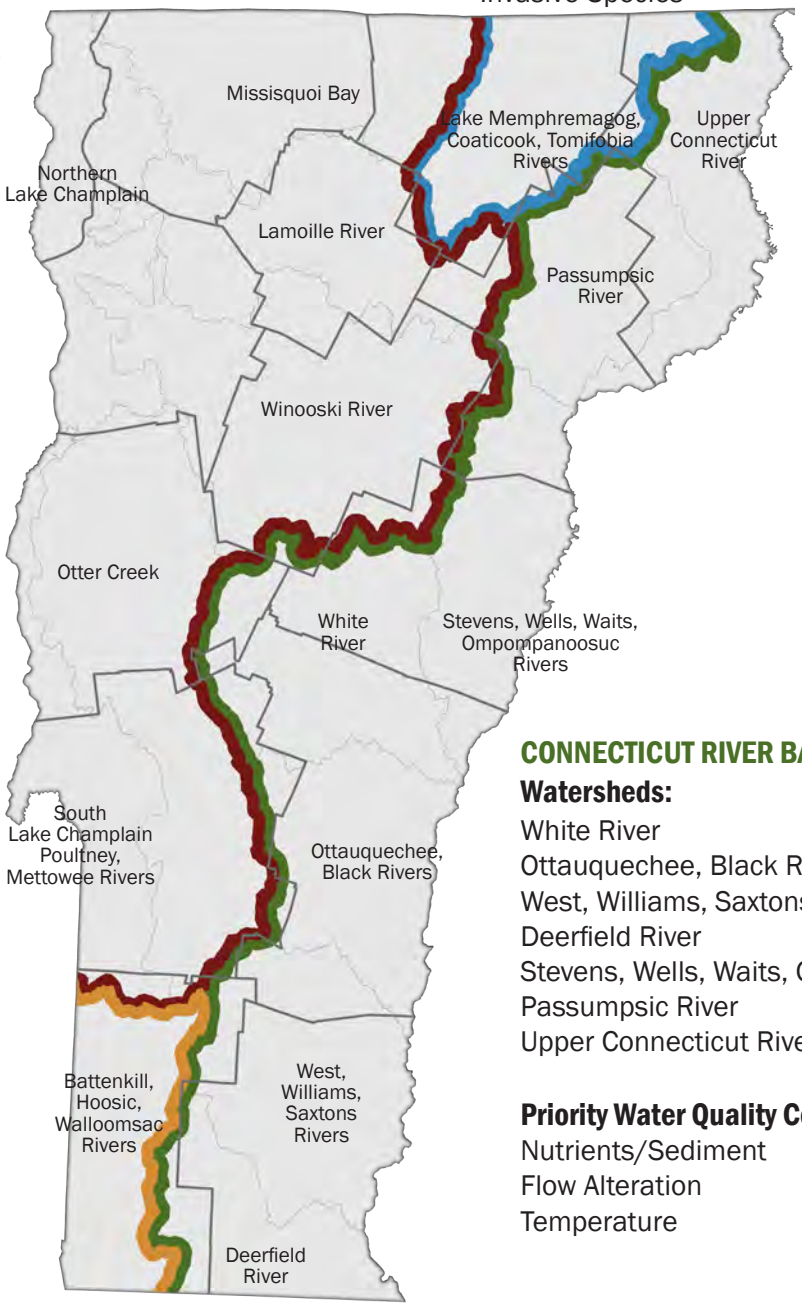
Watersheds:
Northern Lake Champlain
Missisquoi Bay
Winooski River
South Lake Champlain, Poultney, Mettowee Rivers
Otter Creek
Lamoille River

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



HUDSON RIVER BASIN

Watersheds:
Battenkill, Hoosic, Walloomsac Rivers

Priority Water Quality Concerns:
Nutrients/Sediment
Habitat
Temperature

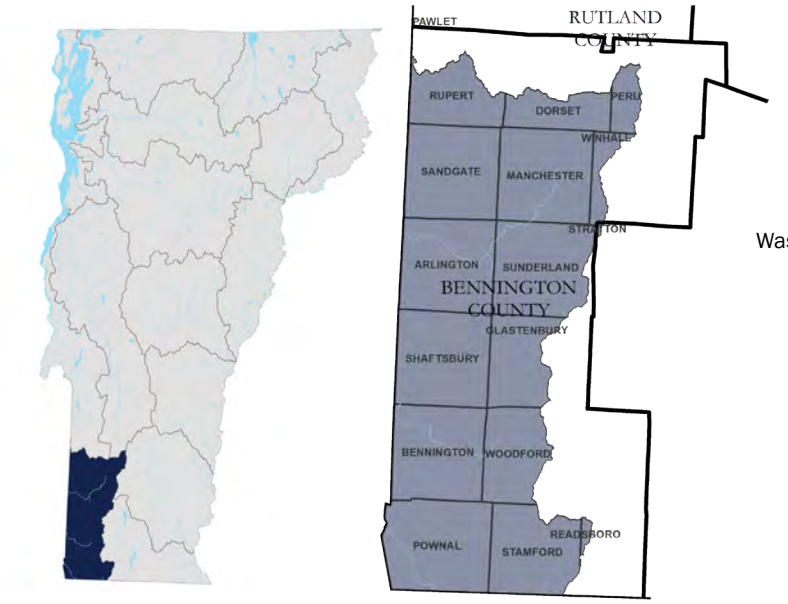
CONNECTICUT RIVER BASIN

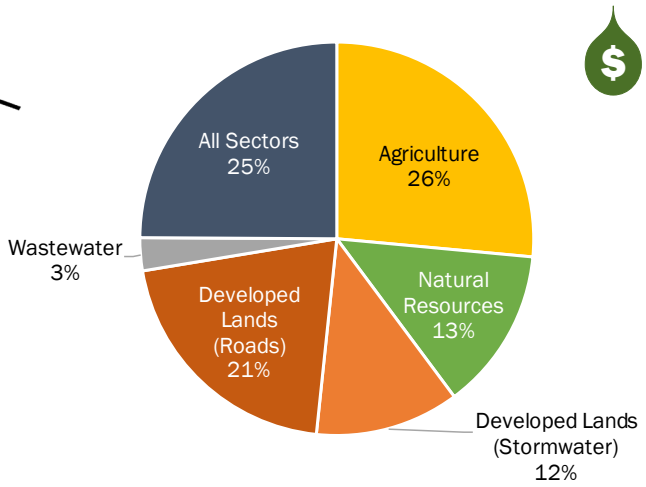
Watersheds:
White River
Ottauquechee, Black Rivers
West, Williams, Saxtons, Connecticut Rivers
Deerfield River
Stevens, Wells, Waits, Ompompanoosuc Rivers
Passumpsic River
Upper Connecticut River

Priority Water Quality Concerns:
Nutrients/Sediment
Flow Alteration
Temperature

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, SFY 2016-2018, by sector
Total: $1,620,651

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Hudson River watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	155
Acres of land treated by forested buffers	–
Acres of pasture with livestock excluded from surface waters	–
Number of barnyard and production area practices installed	–
Acres of water quality protections within newly conserved agricultural lands	3
Estimated acres of agricultural land treated through innovative equipment	–

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	2
Acres of river corridor conserved through easements	–
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	3
Number of municipal road drainage and stream culverts replaced	11
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	12

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of wastewater treatment facilities refurbished	–
Number of wastewater collection systems refurbished	–

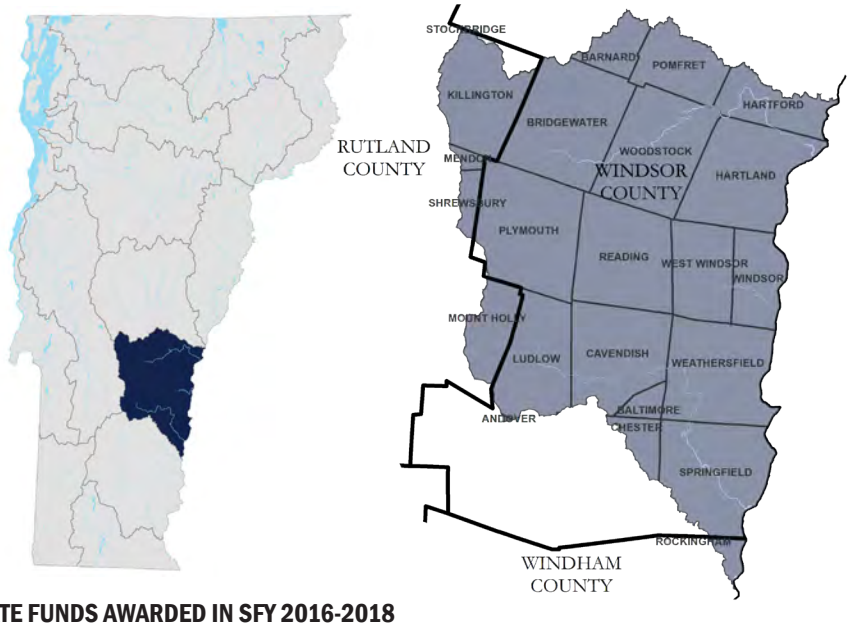
Battenkill, Walloomsac, Hoosic (Hudson) Rivers Watershed Projects

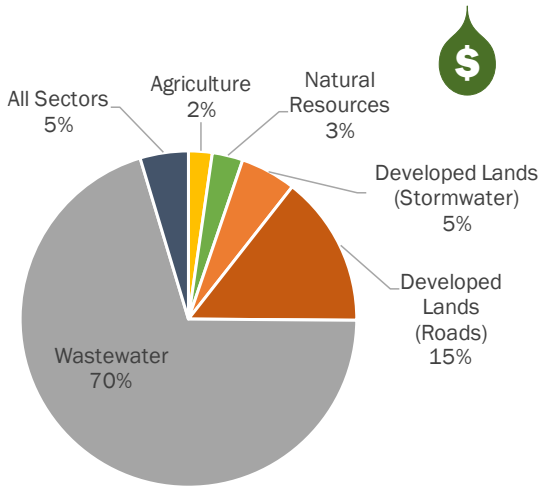
Clean water projects funded by state agencies in SFY 2018 in the Hudson River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Bennington County Conservation District	Agricultural Conservation Practices Technical Assistance	All	General	$6,000
Bennington	AAFM	Pine Hill View Farm	Cover Crop - Broadcast	Ag	General	$6,200
Manchester	ANR	Bennington County Regional Commission	Lye Brook Berm Removal Alternatives Analysis	NR	CWF	$15,000
Pownal	ANR	Bennington County Conservation District	Pownal Hay Mulcher	Roads	CWF	$5,080
Pownal	ANR	Bennington County Regional Commission	Tubbs Brook Culvert Replacement	NR	WGF	$10,000
Shaftsbury	ANR	Bennington County Conservation District	Shaftsbury Hay Mulcher	Roads	CWF	$5,080
Shaftsbury	ANR	Bennington County Regional Commission	Shaftsbury Stormwater Master Planning	SW	Capital	$21,761

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, SFY 2016-2018, by sector
Total: $7,290,432

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Black, Ottauquechee Rivers watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	–
Acres of land treated by forested buffers	–
Acres of pasture with livestock excluded from surface waters	–
Number of barnyard and production area practices installed	–
Acres of water quality protections within newly conserved agricultural lands	–
Estimated acres of agricultural land treated through innovative equipment	–

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	3
Acres of river corridor conserved through easements	47
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	58
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	4
Number of municipal road drainage and stream culverts replaced	7
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	3
Number of sewer extensions completed	2
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

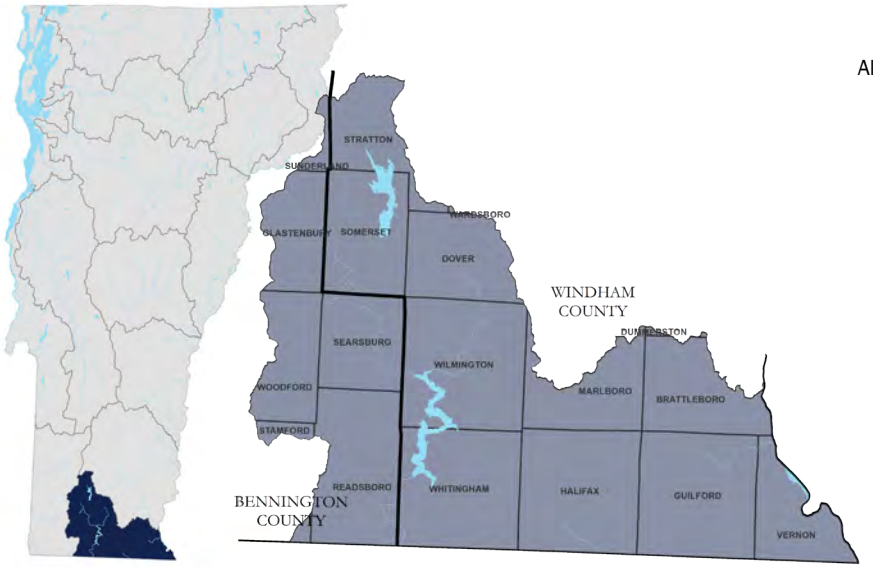
Black, Ottauquechee Rivers Watershed Projects

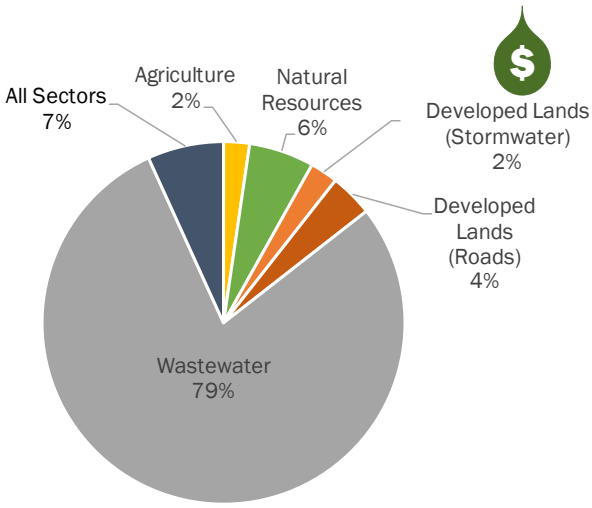
Clean water projects funded by state agencies in SFY 2018 in the Black, Ottauquechee Rivers watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Ottauquechee Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	General	$6,000
Bridgewater	ANR	Bridgewater	Bridgewater – Wastewater Collection System Refurbishment – Preliminary Design	WW	CWSRF	$2,500
Bridgewater	ANR	Bridgewater	Bridgewater – Wastewater Treatment Facility Refurbishment – Preliminary Design	WW	CWSRF	$2,500
Cavendish	ANR	Cavendish	Cavendish – Wastewater Treatment Facility Refurbishment – Final Design	WW	CWSRF	$28,600
Cavendish	ANR	Vermont Department of Forests Parks and Recreation	Proctor-Piper State Forest Culvert to Bridge Replacement	NR	CWF	$42,260
Shrewsbury	ANR	Vermont Department of Forests Parks and Recreation	Coolidge State Forest - forest highway crossing upgrade	NR	Capital	$7,625
Springfield	ANR	Black River Action Team	River Dipper Program	All	WGF	$1,650
Springfield	ANR	Ottauquechee Natural Resources Conservation District	Springfield Transfer Station Infiltration-Detention Basin Implementation	SW	Capital	$141,032
Springfield	ANR	Southern Windsor County Regional Planning Commission	Springfield Lincoln Street Stormwater Infrastructure	SW	Capital	$7,771
Springfield	ANR	Springfield	Springfield – Collection System – Combined Sewer Overflow Abatement – Construction	WW	Capital	$46,545
Springfield	ANR	Springfield	Springfield – Collection System – Combined Sewer Overflow Abatement – Construction	WW	Capital	$91,974
Springfield	ANR	Springfield	Springfield – Collection System – Combined Sewer Overflow Abatement – Construction	WW	CWSRF	$177,100
Springfield	ANR	Springfield	Springfield – Collection System – Combined Sewer Overflow Abatement – Construction	WW	CWSRF	$1,572,823
Springfield	ANR	Springfield	Springfield – Collection System – Combined Sewer Overflow Abatement – Construction	WW	Capital	$416,375
West Windsor	ANR	Southern Windsor County Regional Planning Commission	West Windsor Dam Removal	NR	WGF	$10,000
West Windsor	ANR	West Windsor	West Windsor – Wastewater Collection System Sewer Extension – Construction	WW	Capital	$388,619
Woodstock	VTrans	Woodstock	Purchase of high-efficiency vactor truck	Roads	FTF	$216,800

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

Deerfield River Watershed Summary





State funding awarded in the Deerfield River watershed, SFY 2016-2018, by sector
Total: $6,169,628

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Deerfield River watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	–
Acres of land treated by forested buffers	–
Acres of pasture with livestock excluded from surface waters	–
Number of barnyard and production area practices installed	–
Acres of water quality protections within newly conserved agricultural lands	–
Estimated acres of agricultural land treated through innovative equipment	–

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	2
Acres of river corridor conserved through easements	–
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	2
Number of municipal road drainage and stream culverts replaced	2
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

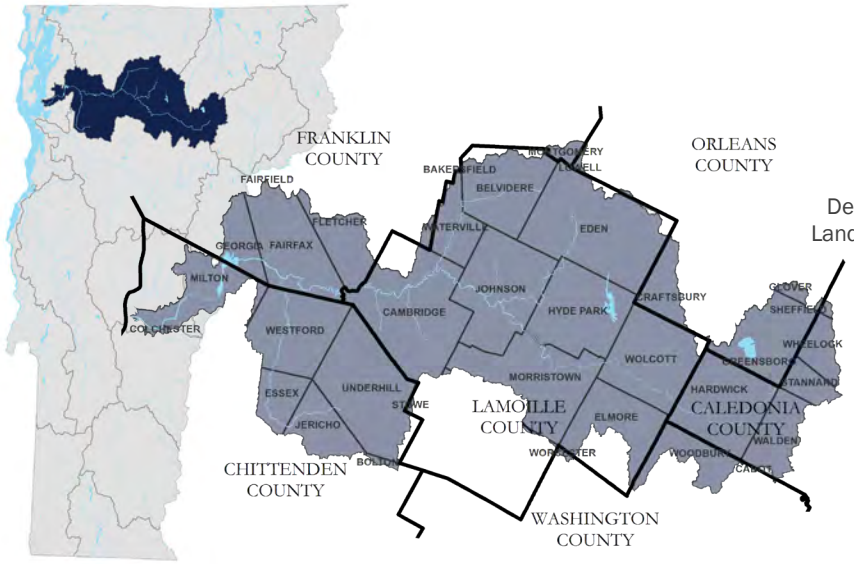
Deerfield River Watershed Projects

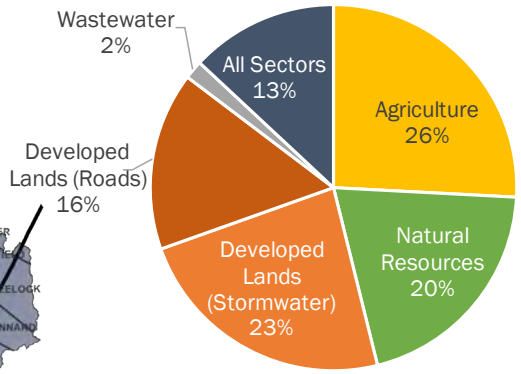
Clean water projects funded by state agencies in SFY 2018 in the Deerfield River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Brattleboro	ANR	Windham County Natural Resources Conservation District	Deerfield and Saxtons: Cross-Watershed Stream Table Outreach Program	All	WGF	$5,000
Dover	ANR	North Branch Fire District #1	North Branch Fire District #1 – Wastewater Treatment Facility Refurbishment – Construction	WW	CWSRF	$4,419,902
Guilford	ANR	Connecticut River Conservancy	Green River Corridor Restoration Implementation	NR	Capital	$2,165
Guilford, Halifax	ANR	Connecticut River Conservancy	Deerfield Watershed Project Identification	NR	CWF	$5,737
Marlboro	ANR	Windham County Natural Resources Conservation District	Marlboro Auto Shop Floodplain Restoration	NR	CWF	$5,392
Wilmington	ANR	Connecticut River Conservancy	Planning for Stormwater Reduction in Deerfield Watershed	SW	WGF	$3,500

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, SFY 2016-2018, by sector
Total: $4,118,564

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Lamoille River watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**85.8**
Acres of agricultural land treated by conservation practices	458
Acres of land treated by forested buffers	114
Acres of pasture with livestock excluded from surface waters	36
Number of barnyard and production area practices installed	43
Acres of water quality protections within newly conserved agricultural lands	42
Estimated acres of agricultural land treated through innovative equipment	153

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**3.5**
Acres of forested riparian buffer restored through buffer planting	3
Acres of river corridor conserved through easements	91
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	30
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**4.4**
Acres of impervious surface treated	14

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**13.9**
Miles of municipal road drainage and erosion control improvements	5
Number of municipal road drainage and stream culverts replaced	9
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

Lamoille River Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Lamoille River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Lamoille County Conservation District	Agricultural Conservation Practices Technical Assistance	All	General	$6,000
Cambridge	VHCB	Quarry Hill Farm	Gillilan - Quarry Hill Farm - FY18 WQ and Dairy Grant	Ag	Capital	$16,750
Cambridge	AAFM	Boissoneault, Jason	Cover Crop - Drill	Ag	General	$5,000
Cambridge	ANR	Cambridge Town	Cambridge Elementary Stormwater Project	SW	Capital	$18,589
Cambridge	AAFM	Riverbend Farm LLC, Boissoneault	Livestock Exclusion	Ag	Capital	$858
Cambridge	AAFM	Riverbend Farm LLC, Boissoneault	Riparian Forest Buffer	Ag	Capital	$27,623
Cambridge	AAFM	Riverbend Farm LLC, Boissoneault	Riparian Forest Buffer	Ag	Capital	$858
Eden	ANR	Lamoille County Conservation District	Lake Eden Watershed Assessment	NR	CWF	$28,605
Fairfax	AAFM	Blake Family Farm	Heavy Use Area Protection	Ag	Capital	$32,400
Fairfax	AAFM	Blake Family Farm	Waste Transfer	Ag	Capital	$34,011
Fairfax	AAFM	Blake, Joshua	Aeration Tillage	Ag	General	$1,176
Fairfax	AAFM	Blake, Joshua	Alternative Manure Incorporation	Ag	General	$2,450
Fairfax	AAFM	Copper Hill Farm LLC	Cover Crop - Broadcast	Ag	General	$10,000
Fairfax	ANR	Northwest Regional Planning Commission	Fairfax Stormwater Master Plan	SW	CWF	$19,655
Fairfax	AAFM	River Berry Farm	Cover Crop - Drill	Ag	General	$1,700
Greensboro	ANR	Greensboro Town	Greensboro Green Stormwater Infrastructure Project	SW	Capital	$16,000
Hardwick	ANR	Caledonia County Natural Resources Conservation District	Buffalo Storage Unit-Route 14 Drainage Channel Restoration	SW	CWF	$18,132
Hardwick	ANR	Caledonia County Natural Resources Conservation District	Hazen Union School Stormwater Retrofit - Hardwick	SW	Capital	$50,964
Hyde Park	VTrans	Hyde Park	Design and construction of retrofit to exsiting drainage system along Johnson St. Ext. and W Main St.	SW	FTF	$435,825
Jericho	ANR	Jericho Town	2017 Jericho SWMP - Town Parcel Infiltration Basin	SW	Capital	$56,635
Johnson	ANR	Vermont Department of Forests Parks and Recreation	French Hill Block Culvert Removals and Forest Road AMPs	NR	CWF	$7,135

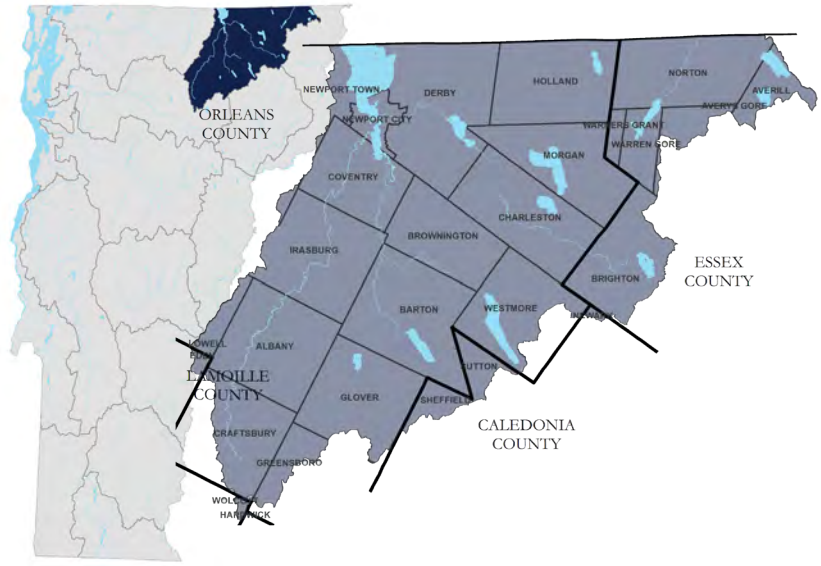
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

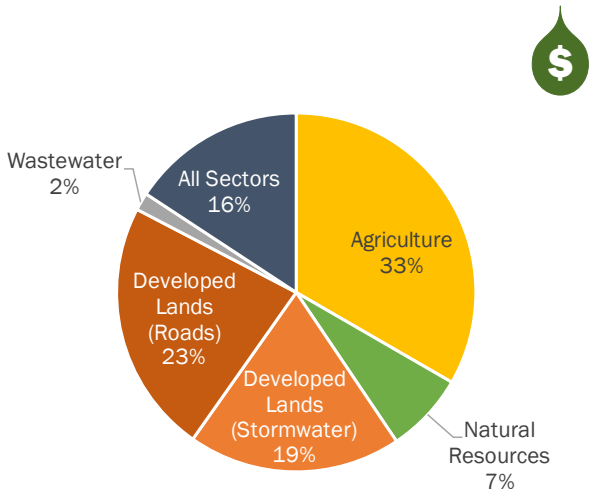
Lamoille River Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Lamoille River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Johnson	ANR	Vermont Department of Forests Parks and Recreation	Waterman Brook Culvert to Bridge Project - Johnson	NR	Capital	$26,540
Milton	ANR	Chittenden County Regional Planning Commission	Milton Stormwater Planning and Implementation	SW	CWF	$24,881
Westford	AAFM	Pouliot, Donald	Cover Crop - Drill	Ag	General	$7,405
Wolcott	ANR	Vermont Fish and Wildlife Department	Wild Branch Wetland Restoration - Wolcott	NR	Capital	$23,750

Lake Memphremagog Watershed Summary





State funding awarded in the Lake Memphremagog watershed, SFY 2016-2018, by sector
Total: $2,661,522

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Lake Memphremagog watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	2,405
Acres of land treated by forested buffers	–
Acres of pasture with livestock excluded from surface waters	–
Number of barnyard and production area practices installed	13
Acres of water quality protections within newly conserved agricultural lands	–
Estimated acres of agricultural land treated through innovative equipment	–

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**24.2**
Acres of forested riparian buffer restored through buffer planting	21
Acres of river corridor conserved through easements	–
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	29
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**6.6**
Miles of municipal road drainage and erosion control improvements	6
Number of municipal road drainage and stream culverts replaced	22
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

Lake Memphremagog Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Lake Memphremagog watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	ANR	Memphremagog Watershed Association	Lake Wise and Shoreland Erosion Control Training	All	CWF	$5,288
Watershed-wide	AAFM	Orleans County Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	General	$6,000
Watershed-wide	AAFM	Orleans County Natural Resources Conservation District	Moisture Probe	Ag	Capital	$720
Watershed-wide	AAFM	Orleans County Natural Resources Conservation District	Portable Scales	Ag	Capital	$8,280
Albany	ANR	NorthWoods Stewardship Center	Irons Property Buffer Planting on the Black River - Albany	NR	Capital	$4,298
Albany	ANR	NorthWoods Stewardship Center	Mongeon Property Black River Buffer Planting - Albany	NR	Capital	$1,231
Averill	ANR	Trout Unlimited	Little Averill Pond Culvert Replacement	Roads	WGF	$10,000
Brownington	AAFM	Moulton, Adam	Waste Storage Structure	Ag	Capital	$75,000
Brownington, Derby, Morgan	ANR	Derby Town	Derby, Morgan and Brownington shared Hydroseeder program	Roads	CWF	$24,390
Charleston	ANR	Charleston Town	Town of Charleston Shoulder Retriever/Reclaimer	Roads	CWF	$2,900
Charleston	AAFM	Gratton Hill Farm	Aeration Tillage	Ag	General	$2,291
Charleston	ANR	Town of Charleston	Echo Lake Ecosystem School Education and Milfoil Prevention Project	All	WGF	$5,000
Coventry	ANR	NorthWoods Stewardship Center	VT Fish and Wildlife Buffer Planting on the Barton River - Coventry	NR	Capital	$2,252
Craftsbury	VHCB	Jones Farm	Jones-Jones Farm-FY18 WQ Grant	Ag	Capital	$39,469
Craftsbury	AAFM	Stronghold Farm	No Till Grain Drill	Ag	Capital	$15,300
Derby	VHCB	Maple Grove Farm	Birch - Maple Grove Farm - FY18 WQ Grant	Ag	Capital	$40,000
Derby	AAFM	Champney, Brian	Cover Crop - Broadcast	Ag	General	$2,800
Derby	AAFM	Grand View Farm	Conservation Tillage	Ag	General	$974
Derby	AAFM	Grand View Farm	Cover Crop - Broadcast	Ag	General	$4,280
Derby	AAFM	Grand View Farm	Cross-Slope Tillage	Ag	General	$812
Glover	AAFM	Sweet Rowen Farmstead LLC	Effluent Pump	Ag	Capital	$2,320
Glover	AAFM	Sweet Rowen Farmstead LLC	Electrical Supplies	Ag	Capital	$2,340
Glover	AAFM	Sweet Rowen Farmstead LLC	Irrigation Line	Ag	Capital	$4,140
Glover	AAFM	Sweet Rowen Farmstead LLC	Mobile Pod Irrigation	Ag	Capital	$2,000

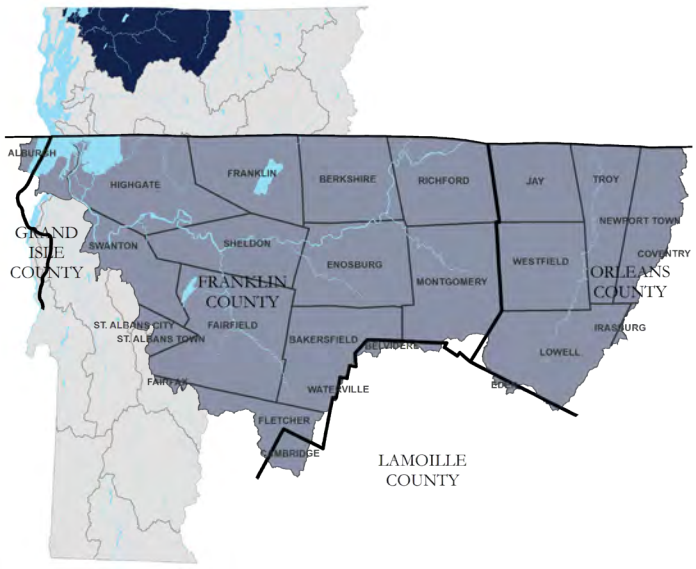
Note: Multi-watershed and statewide projects are listed in separate tables at the end of this appendix.

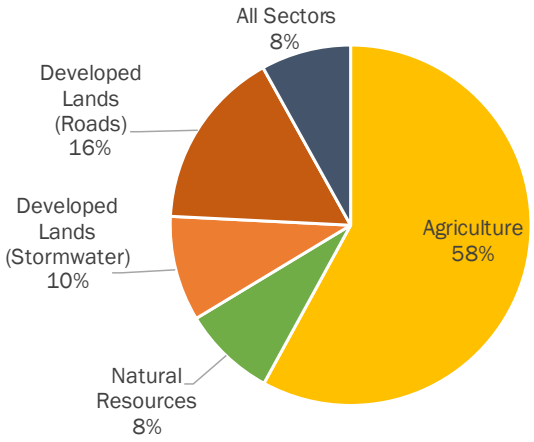
Lake Memphremagog Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Lake Memphremagog watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Greensboro	AAFM	Maplehurst Farm	Aeration Tillage	Ag	General	$2,102
Greensboro	AAFM	Maplehurst Farm	Cover Crop - Drill	Ag	General	$7,155
Greensboro	AAFM	The Gebbie's Maplehurst Farm	Correction for Underpayment	Ag	Capital	$1,950
Greensboro	AAFM	The Gebbie's Maplehurst Farm	Diversion	Ag	Capital	$33,150
Holland	AAFM	Gray Farms	Diversion	Ag	Capital	$40,760
Holland	AAFM	Gray Farms	Heavy use area protection	Ag	Capital	$34,240
Irasburg	AAFM	Lawson, Douglas	Aeration Tillage	Ag	General	$702
Irasburg	AAFM	Robillard Flats Farm	Aeration Tillage	Ag	General	$6,491
Irasburg	AAFM	Wild Cud Farms	Waste Transfer	Ag	Capital	$2,424
Newport City	ANR	Memphremagog Watershed Association	Newport City Main street pull off - Underground chambers Final Design	SW	CWF	$21,455
Newport City	AAFM	Orleans County Natural Resources Conservation District	Education and Outreach	All	General	$1,000
Newport City	AAFM	Orleans County Natural Resources Conservation District	Education and Outreach	All	General	$1,000
Newport City	AAFM	Orleans County Natural Resources Conservation District	Education and Outreach	All	General	$1,000
Newport Town	AAFM	Mystiq Heights LLC	Pond Sealing or Lining - Concrete	Ag	Capital	$75,000
Newport Town	ANR	NorthWoods Stewardship Center	Chop Property Buffer Planting on Memphremagog Direct Tributary - Newport	NR	Capital	$4,042

Missisquoi Bay Watershed Summary





State funding awarded in the Missisquoi Bay watershed, SFY 2016-2018, by sector
Total: $8,162,429

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Missisquoi Bay watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**519.1**
Acres of agricultural land treated by conservation practices	3,765
Acres of land treated by forested buffers	182
Acres of pasture with livestock excluded from surface waters	144
Number of barnyard and production area practices installed	64
Acres of water quality protections within newly conserved agricultural lands	39
Estimated acres of agricultural land treated through innovative equipment	730

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**13**
Acres of forested riparian buffer restored through buffer planting	12
Acres of river corridor conserved through easements	89
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**3.4**
Acres of impervious surface treated	20

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**11.7**
Miles of municipal road drainage and erosion control improvements	6
Number of municipal road drainage and stream culverts replaced	18
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

Missisquoi Bay Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Missisquoi Bay watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Farmers Watershed Alliance	Grassed Waterway & Filter Strip Program	Ag	CWF	$50,000
Watershed-wide	AAFM	Franklin Watershed Committee	Pike River Watershed: Dispelling the Myths; Education and Outreach	Other	Other	$30,000
Watershed-wide	AAFM	Missisquoi River Basin Association	Partners for Clean Water: Education and Outreach Programs, Technical Assistance and Organizational Development	Other	CWF	$20,000
Barnard	AAFM	Kiss the Cow Farm	Access Road	Ag	Capital	$5,000
Barnard	AAFM	Kiss the Cow Farm	Heavy Use Area Protection	Ag	Capital	$10,000
Barnard	AAFM	Kiss the Cow Farm	Waste Facility Closure	Ag	Capital	$5,000
Barnard	AAFM	Kiss the Cow Farm	Waste Storage Structure	Ag	Capital	$75,000
Barnard	AAFM	Kiss the Cow Farm	Waste Transfer	Ag	Capital	$5,000
Berkshire	ANR	Missisquoi River Basin Association	Cultivating Watershed Stewards in the Missisquoi Basin	Other	Other	$2,440
Enosburgh	AAFM	Aires Hill Farm	Conservation Tillage	Ag	Other	$900
Enosburgh	AAFM	Aires Hill Farm	Cover Crop - Broadcast	Ag	Other	$4,876
Enosburgh	AAFM	B & T Black Creek Farm Ltd	Alternative Manure Incorporation	Ag	Other	$4,638
Enosburgh	AAFM	B&T Black Creek Farms LTD	No-Till Planter Retrofit	Ag	Capital	$8,989
Enosburgh	AAFM	Bittersweet Valley Farm	Alternative Manure Incorporation	Ag	Other	$750
Enosburgh	VHCB	Dalestead Farm & Maple	Hull-Dalestead Farm & Maple-FY18 WQ Grant	Ag	Capital	$40,000
Enosburgh	AAFM	Dalestead Farm & Maple LLC	Waste Storage Structure	Ag	Capital	$100,000
Enosburgh	AAFM	Kane's Scenic River Farms LLC	Alternative Manure Incorporation	Ag	Other	$6,250
Enosburgh	AAFM	Kane's Scenic River Farms LLC	Cover Crop - Drill	Ag	Other	$5,570
Enosburgh	AAFM	Lussier, Daniel & Susan	Alternative Manure Incorporation	Ag	Other	$875
Enosburgh	AAFM	Lussier, Daniel & Susan	Conservation Tillage	Ag	Other	$420
Enosburgh	AAFM	Lussier, Daniel & Susan	Cover Crop - Broadcast	Ag	Other	$1,400
Enosburgh	AAFM	Parent, Pierre	Cover Crop - Broadcast	Ag	Other	$3,708
Enosburgh	AAFM	Pothier, Ben & Rita	Animal Trails and Walkways	Ag	Capital	$6,000
Enosburgh	AAFM	Pothier, Ben & Rita	Diversion	Ag	Capital	$6,000
Enosburgh	AAFM	Pothier, Ben & Rita	Heavy Use Area Protection	Ag	Capital	$35,000
Enosburgh	AAFM	Pothier, Ben & Rita	Waste Treatment - Silage	Ag	Capital	$6,000
Enosburgh	AAFM	Schreindorfer, Brendan	Alternative Manure Incorporation	Ag	Other	$1,413
Enosburgh	AAFM	Stebbins III, George	Cover Crop - Broadcast	Ag	Other	$2,528
Enosburgh	AAFM	Stebbinshire Farms, Inc.	Cover Crop - Broadcast	Ag	Other	$5,000
Fairfield	AAFM	Callan, James	Alternative Manure Incorporation	Ag	Other	$1,023
Fairfield	AAFM	H.J. & A. Howrigan & Sons, Inc.	Cover Crop - Broadcast	Ag	Other	$1,800
Fairfield	AAFM	H.J. & A. Howrigan & Sons, Inc.	Cover Crop - Broadcast	Ag	Other	$2,828
Fairfield	AAFM	H.J. & A. Howrigan & Sons, Inc.	Cover Crop - Drill	Ag	Other	$5,085

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 2018 in the Missisquoi Bay watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Fairfield	AAFM	H.J. & A. Howrigan & Sons, Inc.	Cover Crop - Drill	Ag	Other	$1,425
Fairfield	AAFM	H.J. & A. Howrigan & Sons, Inc.	Cover Crop - Drill	Ag	Other	$1,300
Fairfield	AAFM	H.J. Howrigan & Sons, Inc.	Diversion	Ag	Capital	$8,467
Fairfield	AAFM	Magnan Brothers Dairy, Inc.	Alternative Manure Incorporation	Ag	Other	$5,000
Fairfield	AAFM	Magnan Brothers Dairy, Inc.	Waste Storage Structure	Ag	Capital	$30,000
Fairfield	AAFM	Magnan Brothers Dairy, Inc.	Waste Transfer	Ag	Capital	$22,500
Fairfield	AAFM	Magnan Brothers Dairy, Inc.	Waste Transfer	Ag	Capital	$22,500
Fairfield	AAFM	Menard Center Farm	Correction for Underpayment	Ag	Capital	$3,037
Fairfield	AAFM	Menard Center Farm	Heavy Use Area Protection	Ag	Capital	$71,621
Fairfield	AAFM	Rainville, Michael & Carol	Closure of Waste Impoundments	Ag	Capital	$22,441
Fairfield	AAFM	Ridgeview Farm, Inc.	Alternative Manure Incorporation	Ag	Other	$350
Fairfield	AAFM	Ridgeview Farm, Inc.	Cover Crop - Drill	Ag	Other	$4,250
Fairfield	AAFM	Stone, Kelly	Alternative Manure Incorporation	Ag	Other	$1,325
Fairfield	AAFM	Stony Pond Farm	heavy Use Area Protection	Ag	Capital	$49,077
Fairfield	AAFM	Stony Pond Farm	heavy Use Area Protection	Ag	Capital	$17,846
Fairfield	AAFM	Stygles, William & Karen	Animal Trails and Walkways	Ag	Capital	$428
Fairfield	AAFM	Stygles, William & Karen	Diversion	Ag	Capital	$1,796
Fairfield	AAFM	Stygles, William & Karen	Heavy Use Area Protection	Ag	Capital	$26,233
Fairfield	AAFM	Stygles, William & Karen	Roof Runoff Management	Ag	Capital	$1,527
Fairfield	AAFM	Stygles, William & Karen	Stream Crossing	Ag	Capital	$878
Franklin	VHCB	Bouchard Family Dairy	Bouchard-Bouchard Family Dairy-FY18 WQ Grant	Ag	Capital	$40,000
Franklin	AAFM	Bouchard Family Dairy LLC	Flow Meter	Ag	Capital	$7,400
Franklin	AAFM	Bourdeau, Jacob	Cover Crop - Broadcast	Ag	Other	$10,232
Franklin	AAFM	Dodd Farms Partnership	Cover Crop - Broadcast	Ag	Other	$5,160
Franklin	ANR	Franklin Watershed Committee	"Effective communication materials for Pike River watershed water quality documents "	Other	Other	$5,000
Franklin	ANR	Friends of Northern Lake Champlain	Bouchard Farm Ditch Improvement Project-Rock River	NR	Capital	$47,913
Franklin	VHCB	Green Dream Farm	Wagner-Green Dream Farm - FY18 WQ Grant	Ag	Capital	$40,000
Franklin	AAFM	Kittell, Peter	Waste Facility Closure	Ag	CWF	$39,010
Franklin	ANR	Reservoir Environmental Management Inc.	Lake Carmi Aeration Design- Step 2	NR	CWF	$47,021
Franklin	ANR	Reservoir Environmental Management Inc.	Lake Carmi Aeration- Step 1	NR	CWF	$7,250
Franklin	ANR	The Nature Conservancy	Marsh Brook Restoration	NR	Capital	$25,446
Franklin	VHCB	Vermont Land Trust	Michael & Denna Benjamin Agricultural Easement with Riparian Protection	Ag	Capital, Other, Other	$319,000
Highgate	ANR	Friends of Northern Lake Champlain	Two-Tiered Ditch P-Loss Monitoring at Bouchard Farm	Ag	Other	$3,500

Missisquoi Bay Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Missisquoi Bay watershed.

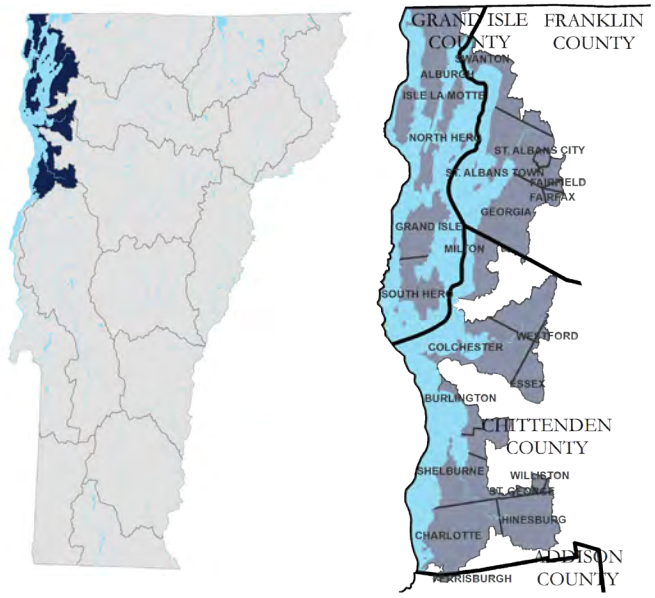
TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Highgate	AAFM	Green Mountain Dairy Farm LLC	Cover Crop - Drill	Ag	Other	$3,875
Highgate	VTrans	Highgate	Design and construction of slope stabilization along Machia Rd.	Roads	FTF	$734,800
Highgate	AAFM	Rainville, Louis	Assiststed Steers	Ag	Capital	$4,676
Highgate	AAFM	Rainville, Louis	GPS Display	Ag	Capital	$6,479
Highgate	AAFM	Rainville, Louis	Rover Bundle Base Station	Ag	Capital	$12,854
Highgate	VHCB	Vermont Land Trust	S&B Bessette Dairy, LLC Agricultural Easement with Riparian Protection	Ag	Capital, Other	$354,000
Irasburg	AAFM	Burkewitz, Dana	Livestock Exclusion	Ag	Capital	$925
Irasburg	AAFM	Burkewitz, Dana	Riparian Forest Buffer	Ag	Capital	$925
Irasburg	AAFM	Burkewitz, Dana	Riparian Forest Buffer	Ag	Capital	$1,772
Newport Town	AAFM	Marquis Organic Dairy	Aeration Tillage	Ag	Other	$2,099
Newport Town	AAFM	Marquis, Marc	Livestock Exclusion	Ag	Capital	$463
Newport Town	AAFM	Marquis, Marc	Riparian Forest Buffer	Ag	Capital	$463
Newport Town	AAFM	Rivers, Jamie	Aeration Tillage	Ag	Other	$1,646
Richford	AAFM	Brouillette Farms, Inc.	Cover Crop - Broadcast	Ag	Other	$5,000
Richford	AAFM	Farm #1	Waste Storage Structure	Ag	Capital	$50,000
Richford	AAFM	Farm #1	Waste Storage Structure	Ag	Capital	$50,000
Richford	AAFM	L.F. Hurtubise & Sons Inc.	Cover Crop - Drill	Ag	Other	$8,845
Richford	AAFM	Lermontov, Olga	Livestock Exclusion	Ag	Capital	$38
Richford	AAFM	Lermontov, Olga	Riparian Forest Buffer	Ag	Capital	$38
Richford	AAFM	Lermontov, Olga	Riparian Forest Buffer	Ag	Capital	$7,049
Richford	ANR	Northwest Regional Planning Commission	Richford Stormwater Master Plan	SW	CWF	$19,665
Richford	AAFM	Pleasant Valley Farms	Cover Crop - Broadcast	Ag	Other	$15,232
Richford	AAFM	Stockman, Dean	Livestock Exclusion	Ag	Capital	$60
Richford	AAFM	Stockman, Dean	Riparian Forest Buffer	Ag	Capital	$5,734
Richford	AAFM	Stockman, Dean	Riparian Forest Buffer	Ag	Capital	$60
Sheldon	AAFM	Green Mountain Dairy	Waste Storage Structure	Ag	Capital	$75,000
Sheldon	AAFM	Howrigan, Patrick	Cover Crop - Drill	Ag	Other	$4,615
Sheldon	AAFM	Sheldon Creek Farms	Heavy Use Area Protection	Ag	Capital	$55,000
Sheldon	AAFM	Sheldon Creek Farms	Waste Storage Structure	Ag	Capital	$5,000
Sheldon	AAFM	Stebbins, Timothy & Tammy	Diversion	Ag	Capital	$5,000
Sheldon	AAFM	Stebbins, Timothy & Tammy	Stream Crossing	Ag	Capital	$2,500
Sheldon	AAFM	Windy Hill Farm	Heavy Use Area Protection	Ag	Capital	$3,992
Sheldon	AAFM	Windy Hill Farm	Waste Storage Structure	Ag	Capital	$72,368
Sheldon	AAFM	Windy Hill Farm	Waste Transfer	Ag	Capital	$4,585
Sheldon	AAFM	Windy Hill Farm	Waste Transfer	Ag	Capital	$3,130

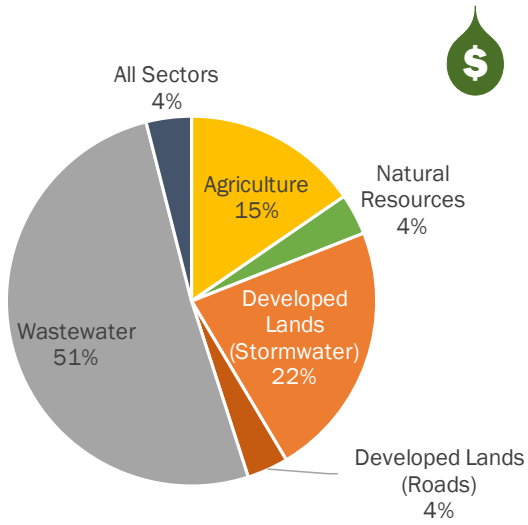
Missisquoi Bay Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Missisquoi Bay watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
St. Albans Town	AAFM	Manning Dairy LLC	Cover Crop - Drill	Ag	Other	$7,190
Swanton	AAFM	Friends of Northern Lake Champlain	Education and Outreach	Other	Other	$1,000
Swanton	AAFM	Friends of Northern Lake Champlain	Education and Outreach	Other	Other	$1,000
Troy	VHCB	J and L Dairy	Rivers - J and L Dairy - FY18 WQ Grant	Ag	Capital	$40,000
Westfield	VHCB	Breezy Valley Farm	Burkewitz - Breezy Valley Farm - FY18 WQ Grant	Ag	Capital	$34,375
Westfield	AAFM	Breezy Valley Farm	Heavy Use Area Protection	Ag	Capital	$47,622
Westfield	AAFM	Butterworks Farm LLC	No-Till Grain Drill	Ag	Capital	$39,393
Westfield	AAFM	Missisquoi Valley Farm LLC	Aeration Tillage	Ag	Other	$1,200
Westfield	AAFM	Missisquoi Valley Farm LLC	Heavy use area protection	Ag	Capital	$91,046
Westfield	AAFM	Missisquoi Valley Farm LLC	Waste Transfer	Ag	Capital	$2,526
Westfield	VHCB	O'Donnell Farm	O'Donnell-O'Donnell Farm-FY18 WQ Grant	Ag	Capital	$14,040
Westfield	AAFM	O'Donnell, Patrick & Karen	Access Road	Ag	Capital	$10,576
Westfield	AAFM	O'Donnell, Patrick & Karen	Waste Storage Structure	Ag	Capital	$33,854
Westfield	AAFM	O'Donnell, Patrick & Karen	Waste Storage Structure	Ag	Capital	$44,344
Westfield	AAFM	O'Donnell, Patrick & Karen	Waste Transfer	Ag	Capital	$10,662

Northern Lake Champlain Watershed Summary





State funding awarded in the Northern Lake Champlain watershed, SFY 2016-2018, by sector
Total: $18,219,111

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Northern Lake Champlain watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**52.2**
Acres of agricultural land treated by conservation practices	1,966
Acres of land treated by forested buffers	81
Acres of pasture with livestock excluded from surface waters	81
Number of barnyard and production area practices installed	30
Acres of water quality protections within newly conserved agricultural lands	42
Estimated acres of agricultural land treated through innovative equipment	1,653

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**13.2**
Acres of forested riparian buffer restored through buffer planting	9
Acres of river corridor conserved through easements	–
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	1
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**0.3**
Acres of impervious surface treated	0.2

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**1.4**
Miles of municipal road drainage and erosion control improvements	2
Number of municipal road drainage and stream culverts replaced	2
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

Northern Lake Champlain Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Northern Lake Champlain watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Farmers Watershed Alliance	Farmers Helping Farmers; Education and Outreach and Organizational Development for Water Quality in Northern Lake Champlain	Other	CWF	$63,783
Watershed-wide	AAFM	Grand Isle County Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	Other	Other	$6,000
Burlington	VTrans	Burlington	Construction of various SW management practices along Main St.	SW	FTF	$475,000
Charlotte	ANR	Charlotte	LaPlatte River Riparian Restoration	NR	Other	$2,750
Charlotte	ANR	Town of Charlotte	Ahead of the Storm - Flood Resilience and Stormwater Mitigation	SW	Other	$2,500
Colchester	VTrans	Colchester	Construction of several BMPs in the Moorings Stream Watershed.	SW	TAP	$295,200
Colchester	VTrans	Colchester	Phosphorous Control Plan (scoping)	SW	FTF	$40,000
Colchester	ANR	Vermont Natural Resources Council	Dam removal study Indian Brook	NR	CWF	$35,000
Fairfield	AAFM	Magnan Bros Maquam Shore Dairy LLC	Alternative Manure Incorporation	Ag	Other	$4,450
Hinesburg	ANR	Lewis Creek Association	Town Garage Beecher Hill Brook-floodplain restoration	NR	Capital	$43,398
Milton	AAFM	Meadowbrook Acres Farm	Cover Crop - Broadcast	Ag	Other	$6,268
Milton	VTrans	Milton	Vacuum Flusher / Pipeline Truck	Roads	TAP	$300,000
Shelburne	ANR	Lewis Creek Association	Lower McCabe Brook stormwater projects	SW	Capital	$29,150
Shelburne	ANR	Shelburne	Shelburne – Wastewater Collection System Refurbishment – Construction	WW	CWSRF	$1,699,353
Shelburne	ANR	Shelburne Town	Shelburne Stormwater Utility	SW	CWF	$25,000
South Burlington	VTrans	South Burlington	Construction of a sub-surface stormwater infiltration & detention system	SW	TAP	$242,000
South Burlington	VTrans	South Burlington	Design and construction of expansion of Bartlett Brook SW treatment system off US 7	SW	Capital, FTF	$375,720
South Burlington	VTrans	South Burlington	Expansion of an existing stormwater pond along Kennedy Drive	SW	TAP	$300,000
South Burlington	VTrans	South Burlington	Scoping for replacement of pre-existing culvert on Kimball Ave./Marshall Ave	NR	FTF	$66,240
South Burlington	ANR	South Burlington City	Iby Street Gravel Wetlands	SW	Capital	$83,497
South Burlington	ANR	South Burlington City	Pinnacle at Spear Pond 2 Retrofit	SW	CWF	$109,612
South Burlington	AAFM	Sunset Lake Farm #2, LLC	Conservation Tillage	Ag	Other	$4,176
South Hero	AAFM	Islandacres Farm LLC	Waste Transfer	Ag	Capital	$6,315

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 2018 in the Northern Lake Champlain watershed.

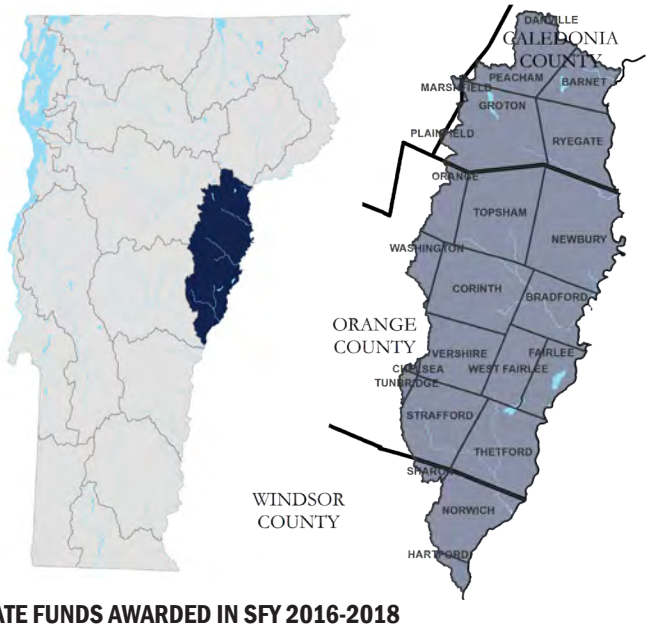
TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
St. Albans City	ANR	St. Albans City	St. Albans City – Wastewater Treatment Facility Refurbishment – Construction	WW	CWSRF	$1,133,621
St. Albans City	ANR	St. Albans City	St. Albans City – Wastewater Treatment Facility Upgrade – Construction	WW	CWSRF	$4,213,648
St. Albans Town	VHCB	Bedrock Farm	Sweet- Bedrock Farm-FY18 WQ Grant	Ag	Capital	$25,000
St. Albans Town	AAFM	Bedrock Farm	Additional Conservation Practices	Ag	Capital	$5,695
St. Albans Town	AAFM	Bedrock Farm	Heavy Use Area Protection	Ag	Capital	$11,849
St. Albans Town	AAFM	Bedrock Farm	Heavy Use Area Protection	Ag	Capital	$21,484
St. Albans Town	AAFM	Bedrock Farm	Obstruction Removal	Ag	Capital	$2,910
St. Albans Town	AAFM	Bedrock Farm	Roof Runoff Management	Ag	Capital	$3,218
St. Albans Town	AAFM	Bedrock Farm	Roof Runoff Management	Ag	Capital	$5,767
St. Albans Town	AAFM	Bedrock Farm	Waste Storage Structure	Ag	Capital	$19,583
St. Albans Town	AAFM	Bedrock Farm	Waste Storage Structure (Partial Payment #1)	Ag	Capital	$27,500
St. Albans Town	AAFM	Bedrock Farm	Waste Storage Structure (Partial Payment #2)	Ag	Capital	$22,931
St. Albans Town	AAFM	Bedrock Farm	Waste Transfer	Ag	Capital	$5,061
St. Albans Town	AAFM	Bedrock Farm	Waste Transfer	Ag	Capital	$9,000
St. Albans Town	AAFM	Boissoneault, Jeff	Cover Crop - Drill	Ag	Other	$5,000
St. Albans Town	AAFM	Boissoneault, Jeffrey	Alternative Manure Incorporation	Ag	Other	$5,000
St. Albans Town	AAFM	Holyoke Farm	Waste Storage Structure	Ag	Capital	$16,441
St. Albans Town	AAFM	Holyoke Farm	Waste Transfer	Ag	Capital	$2,564
St. Albans Town	AAFM	Montagne, David	Closure of Waste Impoundments	Ag	Capital	$4,298
St. Albans Town	AAFM	Montagne, David	Closure of Waste Impoundments (Partial Payment #1)	Ag	Capital	$10,913
St. Albans Town	AAFM	Montagne, David	Closure of Waste Impoundments (Partial Payment #2)	Ag	Capital	$9,790
St. Albans Town	AAFM	Scott Magnan's Custom Service	Alternative Manure Incorporation	Ag	Other	$1,465
St. Albans Town	AAFM	Scott Magnan's Custom Service	Conservation Tillage	Ag	Other	$1,590

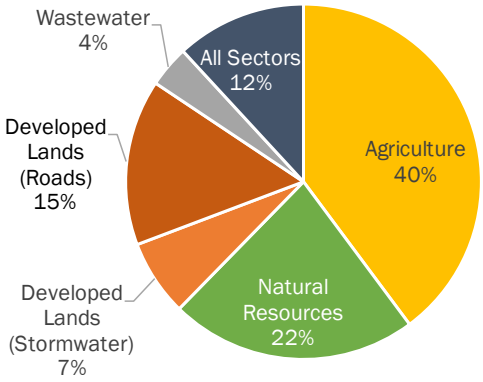
Northern Lake Champlain Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Northern Lake Champlain watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
St. Albans Town	AAFM	Scott Magnan's Custom Service	Crop Rotation	Ag	Other	$732
St. Albans Town	AAFM	Scott Magnan's Custom Service	Education and Outreach	Other	Other	$1,000
St. Albans Town	AAFM	Scott Magnan's Custom Service	Nurse Crop	Ag	Other	$209
St. Albans Town	ANR	St. Albans City	St. Albans Town – Wastewater Treatment Facility Upgrade – Construction	WW	Capital	$1,314,301
St. Albans Town	ANR	St. Albans Town	Northwest Medical Center (NMC)-Main Pond (Hill Farm Estates)	SW	Capital	$29,900
St. Albans Town	ANR	St. Albans Town	Northwestern Medical Center -South Pond A Retrofit	SW	Capital	$12,800
St. Albans Town	ANR	St. Albans Town	Northwestern Medical Center -South Pond B retrofit	SW	Capital	$3,050
St. Albans Town	ANR	St. Albans Town	Rugg Brook Stormwater Detention Pond near Tanglewood Estates	SW	Capital	$34,000
St. Albans Town	ANR	The Nature Conservancy	Hathaway Point Agricultural Stormwater System/ Montagne Conservation Easement Project	SW	Capital	$22,565
Swanton	VHCB	Longway Farms	Longway - Longway Farms - FY18 WQ Grant	Ag	Capital	$40,000
Swanton	AAFM	Longway Farms LLC	6" Flow Meter	Ag	Capital	$9,442
Swanton	AAFM	Longway Farms LLC	GPS Auto Trac Steering	Ag	Capital	$15,003
Swanton	AAFM	Longway Farms LLC	No-Till Corn PLanter	Ag	Capital	$10,000
Swanton	AAFM	Machia, Dustin	Krohne Flow Meter with cables and converter	Ag	Capital	$9,500
Swanton	AAFM	Montagne, David	Crop Rotation	Ag	Other	$1,400
Swanton	AAFM	Sanders, Jeffrey	Autosteer	Ag	Capital	$7,200
Swanton	AAFM	Sanders, Jeffrey	Rotary harrow	Ag	Capital	$27,000
Swanton	AAFM	Sanders, Jeffrey	Seeder	Ag	Capital	$11,700

Ompompanoosuc, Stevens, Waits, Wells Rivers Watershed Summary





State funding awarded in the Ompompanoosuc, Stevens, Waits, Wells Rivers watershed, SFY 2016-2018, by sector
Total: $2,726,294

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Ompompanoosuc, Stevens, Waits, Wells Rivers watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	685
Acres of land treated by forested buffers	108
Acres of pasture with livestock excluded from surface waters	62
Number of barnyard and production area practices installed	10
Acres of water quality protections within newly conserved agricultural lands	27
Estimated acres of agricultural land treated through innovative equipment	266

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	16
Acres of river corridor conserved through easements	119
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	28
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	4
Number of municipal road drainage and stream culverts replaced	5
Cubic yards of municipal Class 4 road gully erosion remediated	104
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	1
Number of wastewater treatment facility refurbished	1
Number of wastewater treatment facility upgrades completed	–

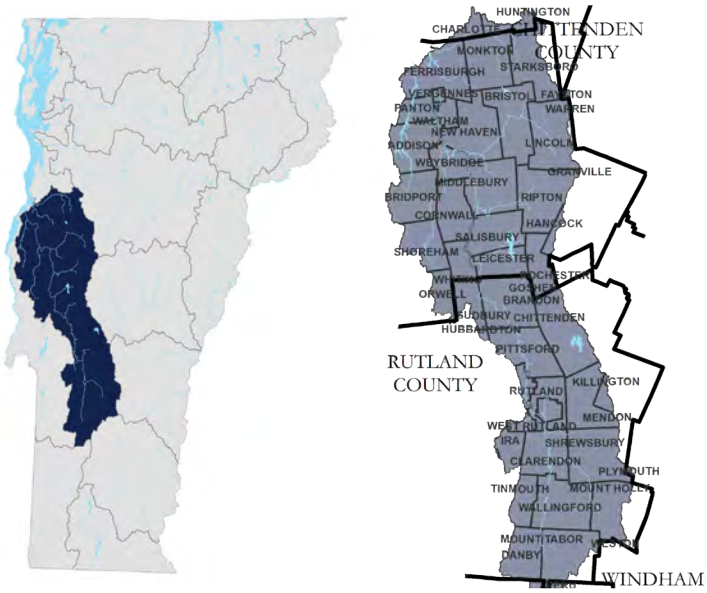
Ompompanoosuc, Stevens, Waits, Wells Rivers Watershed Projects

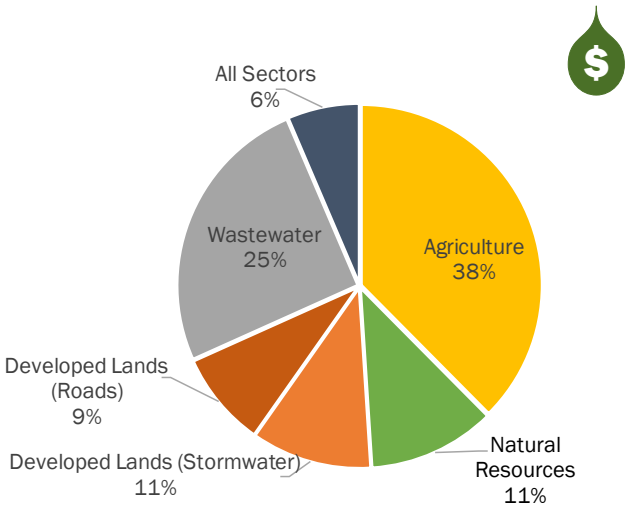
Clean water projects funded by state agencies in SFY 2018 in the Ompompanoosuc, Stevens, Waits, Wells Rivers watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Barnet	ANR	Connecticut River Conservancy	Harveys Lake Dam Removal and Lake Outlet Structure	NR	CWF	$31,978
Fairlee	AAFM	Hodge, Herbert or Beverly	Waste Treatment - Milk House Waste	Ag	Capital	$16,629
Fairlee	AAFM	Hodge, Herbert or Beverly	Waste Treatment - Milk House Waste (Partial Paymen	Ag	Capital	$5,920
Fairlee	AAFM	Newmont Farm LLC	Solid/Liquid Waste Separation Facility	Ag	Capital	$68,199
Hartford	ANR	White River Natural Resources Conservation District	E.coli Education and Outreach	All	WGF	$1,526
Newbury	AAFM	Ekolott Farm	No-Till Planter	Ag	Capital	$9,950
Newbury	AAFM	Ekolott Farm	Truck Scales	Ag	Capital	$24,750
Newbury	AAFM	Full Circle Farm	Waste Treatment - Milk House Waste	Ag	Capital	$1,906
Norwich	ANR	Connecticut River Conservancy	Norwich Reservoir Dam Removal	NR	Capital	$287,545
Orange	ANR	Vermont Department of Forests Parks and Recreation	Butterfield Loop Forest Road Stormwater Improvements	NR	Capital	$34,020
Ryegate	ANR	Ryegate	Ryegate – Wastewater Collection System Refurbishment – Construction	WW	CWSRF	$52,595
Ryegate	ANR	Ryegate	Ryegate – Wastewater Collection System Refurbishment – Final Design	WW	CWSRF	$16,671
Ryegate	ANR	Ryegate	Ryegate – Wastewater Treatment Facility Refurbishment – Construction	WW	Capital	$25,681
Ryegate	AAFM	Wayside Meadow Livestock LLC	Access Road	Ag	Capital	$7,300
Ryegate	AAFM	Wayside Meadow Livestock LLC	Additional Conservation Practices	Ag	Capital	$67,176
Ryegate	AAFM	Wayside Meadow Livestock LLC	Heavy Use Area Protection	Ag	Capital	$12,026
Ryegate	AAFM	Wayside Meadow Livestock LLC	Heavy Use Area Protection	Ag	Capital	$27,030
Ryegate	AAFM	Wayside Meadow Livestock LLC	Roof Runoff Management	Ag	Capital	$2,000
Ryegate	AAFM	Wayside Meadow Livestock LLC	Roof Runoff Management	Ag	Capital	$2,076
Ryegate	AAFM	Wayside Meadow Livestock LLC	Waste Storage Structure	Ag	Capital	$62,392
Vershire	AAFM	Shire Beef LLC	Heavy Use Area Protection	Ag	Capital	$30,000

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, SFY 2016-2018, by sector
Total: $8,976,930

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Otter Creek watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**216**
Acres of agricultural land treated by conservation practices	2,817
Acres of land treated by forested buffers	23
Acres of pasture with livestock excluded from surface waters	23
Number of barnyard and production area practices installed	16
Acres of water quality protections within newly conserved agricultural lands	33
Estimated acres of agricultural land treated through innovative equipment	153

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**37.1**
Acres of forested riparian buffer restored through buffer planting	11
Acres of river corridor conserved through easements	–
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	131
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**2.5**
Acres of impervious surface treated	12

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**13.9**
Miles of municipal road drainage and erosion control improvements	7
Number of municipal road drainage and stream culverts replaced	14
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	1
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

Otter Creek Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Otter Creek watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Otter Creek Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	Other	Other	$6,000
Addison	AAFM	Gosliga Farm, Inc.	Pop-Up Fertilizer Applicator	Ag	Capital	$9,000
Addison	VHCB	Harrison's Homegrown	Harrison-Harrison's Homegrown-FY18 WQ Grant	Ag	Capital	$25,000
Addison	AAFM	No-Mon-Ne Farms Associates	Cover Crop - Drill	Ag	Other	$1,510
Brandon	ANR	Brandon	Brandon – Wastewater Collection System Refurbishment – Preliminary Design	WW	CWSRF	$9,650
Brandon	VTrans	Brandon	Design and construction of bio-swales along Park St.	SW	FTF	$308,800
Bridport	AAFM	Audet's Cow Power LLC	DAF	Ag	Capital	$200,000
Bridport	AAFM	Audet's Cow Power LLC	DAF (Partial Payment #1)	Ag	Capital	$100,000
Bridport	VTrans	Bridport	Design and construction of concrete box culvert on Basin Harbor Rd.	NR	FTF	$343,248
Bridport	AAFM	Plouffe, Paul	Baler	Ag	Capital	$36,540
Bridport	AAFM	Plouffe, Paul	In-line wrapper	Ag	Capital	$26,100
Bridport	AAFM	Sunderland Farm, Inc.	Heavy Use Area Protection	Ag	Capital	$32,590
Bridport	AAFM	Sunderland Farm, Inc.	Waste Storage Structure	Ag	Capital	$37,410
Bridport	VHCB	Vermont Land Trust	Pope (LeMay) Agricultural Easement with Wetlands Protection/Forest Zone	Ag	Capital, Other, Other	$344,000
Bristol	VHCB	Four Hills Farm	Hill - Four Hills Farm - FY18 WQ Grant	Ag	Capital	$20,000
Bristol	ANR	Bristol Town	Bristol Stormwater Master Plan	SW	CWF	$24,637
Clarendon	AAFM	Grembowicz Farm	Conservation Tillage	Ag	Other	$7,147
Clarendon	ANR	Rutland County Natural Resources Conservation District	Cold River Berm Removal	NR	Capital	$36,400
Cornwall	VHCB	Meeting Place Pastures	Cesario - Meeting Place Pastures - FY18 WQ Grant	Ag	Capital	$20,450
Cornwall	AAFM	Cesario, Cheryl	Livestock Exclusion	Ag	Capital	$717
Cornwall	AAFM	Cesario, Cheryl	Riparian Forest Buffer	Ag	Capital	$717
Cornwall	VHCB	Standard Milk	Mellish-Standard Milk-FY18 WQ Grant	Ag	Capital	$35,000
Cornwall	AAFM	Standard Milk, LLC	Access Road	Ag	Capital	$4,489
Cornwall	AAFM	Standard Milk, LLC	Heavy Use Area Protection	Ag	Capital	$3,071

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 2018 in the Otter Creek watershed.

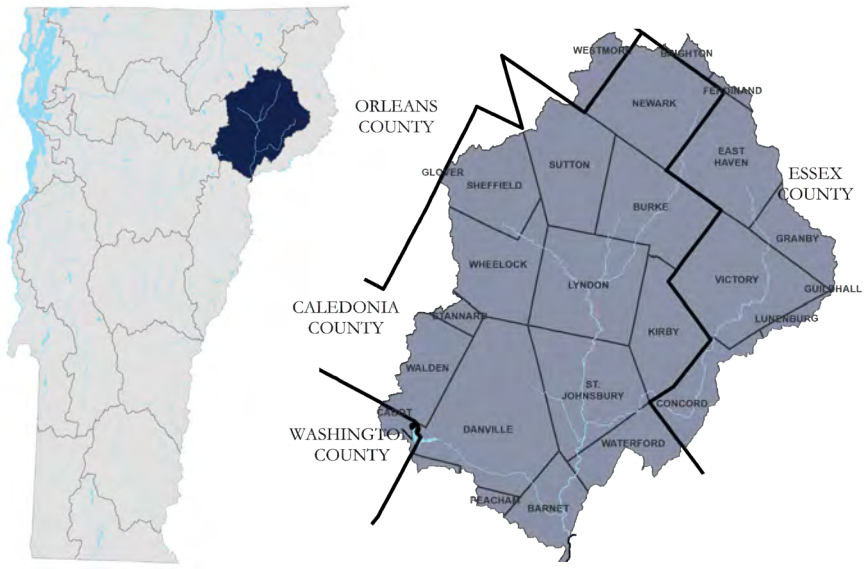
TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Cornwall	AAFM	Standard Milk, LLC	Heavy Use Area Protection	Ag	Capital	$27,550
Cornwall	AAFM	Standard Milk, LLC	Heavy Use Area Protection	Ag	Capital	$28,350
Cornwall	AAFM	Standard Milk, LLC	Lined Waterway	Ag	Capital	$1,890
Cornwall	AAFM	Standard Milk, LLC	Waste Storage Structure	Ag	Capital	$37,073
Cornwall	AAFM	Standard Milk, LLC	Waste Transfer	Ag	Capital	$17,577
Danby	AAFM	Dorset Peak Jerseys	Heavy Use Area Protection	Ag	Capital	$20,000
Danby	VHCB	Dorset Peak Jerseys	Smith-Dorset Peak Jerseys-FY18 WQ Grant	Ag	Capital	$40,000
Danby	AAFM	Dorset Peak Jerseys	Waste Storage Structure	Ag	Capital	$57,000
Danby	AAFM	Dorset Peak Jerseys	Waste Storage Structure	Ag	Capital	$5,400
Danby	AAFM	Dorset Peak Jerseys	Waste Transfer	Ag	Capital	$6,800
Danby	AAFM	Dorset Peak Jerseys	Waste Treatment - Milk House Waste	Ag	Capital	$800
Danby	AAFM	Dorset Peak Jerseys Ltd Co	No-Till Drill	Ag	Capital	$25,830
Hinesburg	AAFM	Full Belly Farm	Cover Crop - Drill	Ag	Other	$1,250
Mendon, Rutland City, Rutland Town	ANR	Rutland County Natural Resources Conservation District	Moon Brook Stormwater Master Plan	SW	CWF	$42,500
Panton	AAFM	Nolan Family Farm LLC	Alternative Manure Incorporation	Ag	Other	$4,258
Pittsford	VTrans	Pittsford	Design and construction of salt shed	SW	FTF	$173,317
Pittsford	ANR	Pittsford	Pittsford – Wastewater Collection System Refurbishment – Preliminary Design	WW	CWSRF	$7,600
Pittsford	ANR	Pittsford	Pittsford – Wastewater Treatment Facility Refurbishment – Preliminary Design	WW	CWSRF	$7,600
Proctor	ANR	Proctor	Proctor – Wastewater Collection System Refurbishment – Construction	WW	CWSRF	$637,483
Rutland Town	ANR	Rutland Town	Hitzel Terrace Outlet Retrofit	SW	Capital	$9,115
Rutland Town	ANR	Rutland Town	Rutland Town – Collection System – Combined Sewer Overflow Abatement – Construction	WW	Capital	$1,286,342
Shoreham	AAFM	North Wind Acres	Additional Conservation Practices	Ag	Capital	$12,535
Shoreham	AAFM	North Wind Acres	Heavy Use Area Protection	Ag	Capital	$9,478
Shoreham	AAFM	North Wind Acres	Roof Runoff Management	Ag	Capital	$2,861

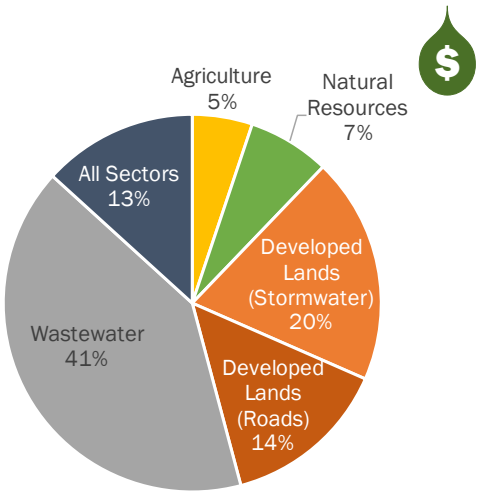
Otter Creek Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Otter Creek watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Shoreham	AAFM	North Wind Acres	Waste Storage Structure	Ag	Capital	$50,126
Shoreham	VTrans	Shoreham	Design and construction of concrete box culvert on Buttolph Rd.	NR	FTF	$292,044
Starksboro	AAFM	Kelly, Mitchell	Cover Crop - Broadcast	Ag	Other	$1,720
Vergennes	VHCB	Chalker Farm	Kayhart-Chalker Farm-FY18 WQ Grant	Ag	Capital	$11,828
Vergennes	AAFM	Crazy Acres Farm	Cover Crop - Broadcast	Ag	Other	$1,228
Vergennes	AAFM	Crazy Acres Farm	Cover Crop - Drill	Ag	Other	$3,730
Vergennes	AAFM	Hatch Farm, Inc.	Alternative Manure Incorporation	Ag	Other	$2,425
Wallingford	ANR	Rutland County Natural Resources Conservation District	Homer Stone Berm Removal	NR	CWF	$11,600
Wallingford	ANR	Rutland County Natural Resources Conservation District	Wallingford Stormwater Master Plan	SW	CWF	$19,250
Weybridge	AAFM	DeBisschop Farm	Cover Crop - Broadcast	Ag	Other	$1,476
Weybridge	AAFM	DeBisschop Farm	Cover Crop - Drill	Ag	Other	$1,700
Weybridge	AAFM	Kettle Top Farm	Guidance System	Ag	Capital	$1,886
Whiting	AAFM	Acer Jersey Farm	Diversion	Ag	Capital	$6,120
Whiting	AAFM	Michael & Lawrence Quesnel LLC	GPS monitor, reciever, software, cables	Ag	Capital	$12,335
Whiting	AAFM	Michael & Lawrence Quesnel LLC	No Till Corn Planter	Ag	Capital	$9,514

Passumpsic River Watershed Summary





State funding awarded in the Passumpsic River watershed, SFY 2016-2018, by sector
Total: $3,369,543

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Passumpsic River watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	–
Acres of land treated by forested buffers	30
Acres of pasture with livestock excluded from surface waters	30
Number of barnyard and production area practices installed	1
Acres of water quality protections within newly conserved agricultural lands	–
Estimated acres of agricultural land treated through innovative equipment	–

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	2
Acres of river corridor conserved through easements	–
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	99
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	41

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	5
Number of municipal road drainage and stream culverts replaced	36
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	1
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

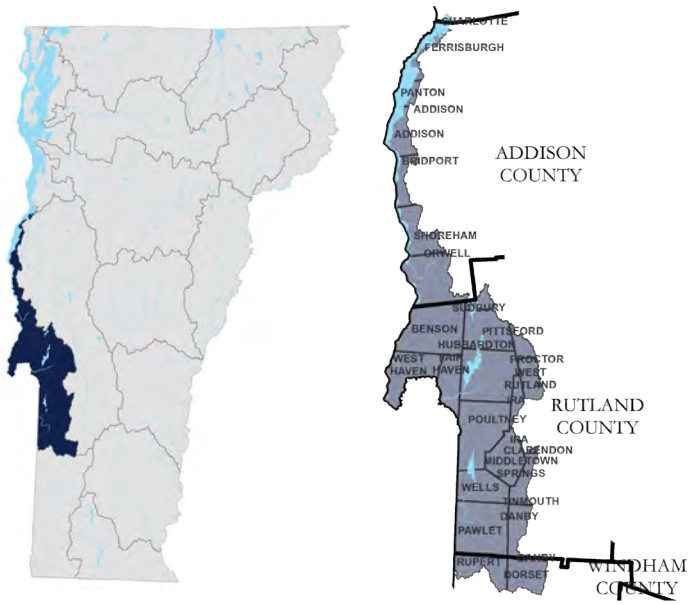
Passumpsic River Watershed Projects

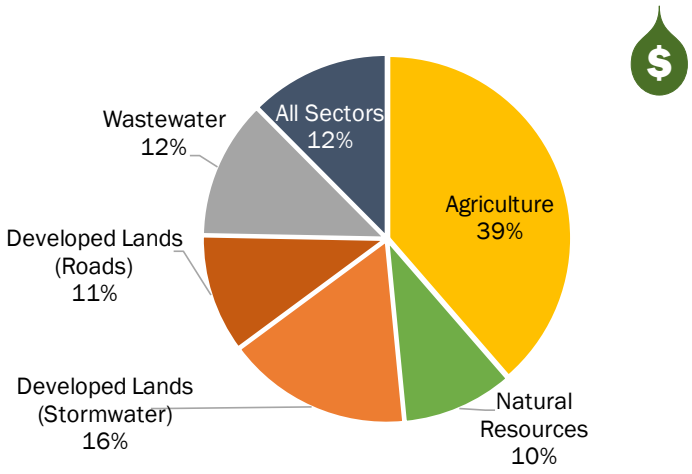
Clean water projects funded by state agencies in SFY 2018 in the Passumpsic River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Burke, Victory	ANR	Vermont Department of Forests Parks and Recreation	Darling State Forest Fire Road Close out	Roads	Capital	$27,950
Concord	ANR	Essex County Natural Resources Conservation District	Concord Stormwater Master Plan	SW	CWF	$14,000
Lyndon	ANR	Caledonia County Natural Resources Conservation District	Lyndon State College Gravel Wetland Final Design	SW	Capital	$10,680
Lyndon	ANR	Caledonia County Natural Resources Conservation District	Lyndonville High Street Stormwater Retrofit	SW	Capital	$9,885
Lyndon	ANR	Caledonia County Natural Resources Conservation District	South Prospect Street Gully Stabilization- Lyndon	SW	CWF	$8,500
Lyndon	ANR	Town of Lyndon	Conversion of former Lyndon Town Garage site to public greenspace	NR	WGF	$3,500
St. Johnsbury	ANR	Caledonia County Natural Resources Conservation District	Pearl Street Parking Lots Stormwater Retrofit	SW	Capital	$17,020
St. Johnsbury	ANR	St. Johnsbury	Saint Johnsbury – Collection System – Combined Sewer Overflow Abatement – Preliminary Design	WW	CWSRF	$123,600
St. Johnsbury	ANR	St. Johnsbury	St. Johnsbury – Collection System – Combined Sewer Overflow Abatement – Construction	WW	Capital	$1,254,567
Sutton	ANR	NorthWoods Stewardship Center	Dolloff Pond Access Area Closure and Restoration Project	NR	CWF	$6,535

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, SFY 2016-2018, by sector
Total: $5,019,022

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

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

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**214.6**
Acres of agricultural land treated by conservation practices	1,852
Acres of land treated by forested buffers	–
Acres of pasture with livestock excluded from surface waters	–
Number of barnyard and production area practices installed	25
Acres of water quality protections within newly conserved agricultural lands	34
Estimated acres of agricultural land treated through innovative equipment	353

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**34**
Acres of forested riparian buffer restored through buffer planting	4
Acres of river corridor conserved through easements	–
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	4
Acres of wetland restored	40
Acres of forest conserved with special water quality protection	202
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**16.7**
Miles of municipal road drainage and erosion control improvements	6
Number of municipal road drainage and stream culverts replaced	27
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

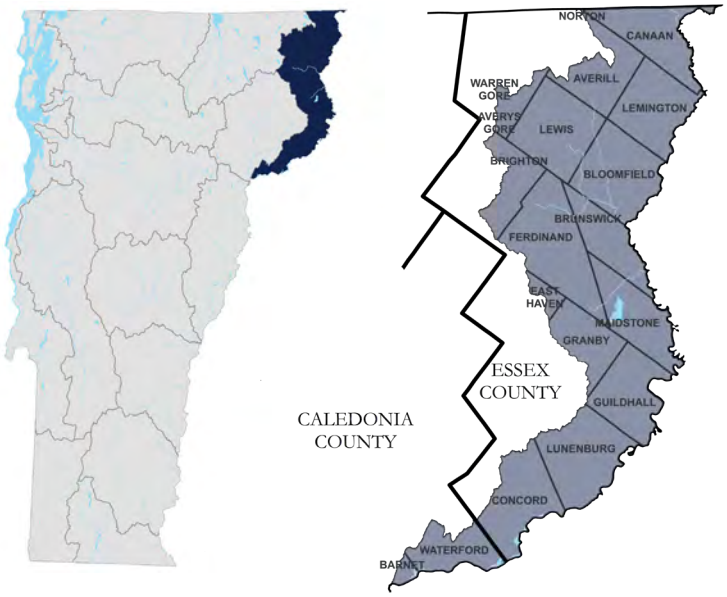
South Lake Champlain, Poultney, Mettowee Rivers Watershed Projects

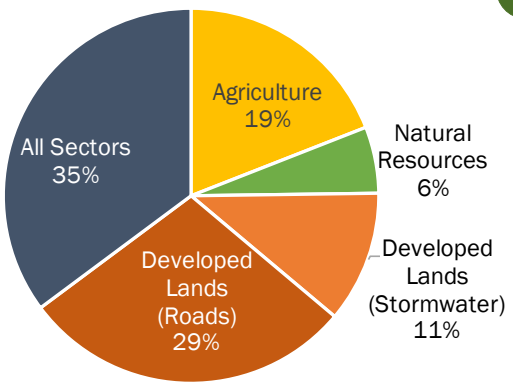
Clean water projects funded by state agencies in SFY 2018 in the South Lake Champlain, Poultney, Mettowee Rivers watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Poultney Mettowee Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	General	$6,000
Addison	AAFM	Kayhart Brothers LLC	Waste Storage Structure	Ag	Capital	$102,000
Addison	AAFM	Kayhart Brothers LLC	Waste Storage Structure	Ag	Capital	$10,000
Addison	AAFM	Kayhart Brothers LLC	Waste Transfer	Ag	Capital	$13,000
Bridport	AAFM	Iriquoi Acres NWA LLC	No-Till Planter	Ag	Capital	$10,000
Castleton	ANR	Castleton	Castleton – Wastewater Collection System Refurbishment – Construction	WW	CWSRF	$522,200
Fair Haven	AAFM	Charron Farm, Inc.	Access Road	Ag	Capital	$1,700
Fair Haven	AAFM	Charron Farm, Inc.	Heavy Use Area Protection	Ag	Capital	$20,383
Fair Haven	ANR	Fair Haven	Fair Haven – Wastewater Collection System Refurbishment – Preliminary Design	WW	CWSRF	$19,400
Fair Haven	ANR	Fair Haven	Fair Haven – Wastewater Treatment Facility Refurbishment – Preliminary Design	WW	CWSRF	$34,600
Fair Haven	AAFM	Sheldon Farm, Inc.	Cover Crop - Broadcast	Ag	General	$5,536
Orwell	AAFM	Russell, Mark & Sarah	Cover Crop - Broadcast	Ag	General	$440
Orwell	AAFM	Swallowdale Farm	Alternative Manure Incorporation	Ag	General	$875
Orwell	AAFM	Swallowdale Farm	Cover Crop - Drill	Ag	General	$1,500
Orwell	AAFM	Swallowdale Farm	Nurse Crop	Ag	General	$110
Pawlet	VHCB	Woodlawn Holsteins	Leach - Woodlawn Holsteins - FY18 WQ Grant	Ag	Capital	$25,000
Pawlet	VHCB	Deer Flats Farm	Hulett-Deer Flats Farm-FY18 WQ Grant	Ag	Capital	$40,000
Pawlet	VHCB	Wayward Goose Farm	Brooks-Wayward Goose Farm-FY18 WQ Grant	Ag	Capital	$40,000
Pawlet	AAFM	Woodlawn Holsteins LLC	No Till Corn Planter	Ag	Capital	$9,900
Poultney	ANR	Poultney-Mettowee Natural Resources Conservation District	Lewis Brook Riparian Buffer Restoration at Saltis Farm- Poultney VT	NR	CWF	$13,889
Poultney, Wells	ANR	Poultney-Mettowee Natural Resources Conservation District	Lake Saint Catherine Watershed Stormwater and Lakewise Master Planning	SW	CWF	$27,753
Rutland Town	ANR	Roche	Roche Wetland Conservation Incentive Payment	NR	Capital	$18,396
Shoreham	AAFM	Woodnotch Farms, Inc.	Alternative Manure Incorporation	Ag	General	$606
Shoreham	AAFM	Woodnotch Farms, Inc.	Crop Rotation	Ag	General	$3,941
Shoreham	AAFM	Woodnotch Farms, Inc.	Nurse Crop	Ag	General	$1,126
West Haven	VHCB	Vermont Land Trust	Wilson/Hertzberg-Tolchin Agricultural Easement with Forest Zone	Ag	Capital, Other	$264,000

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

Upper Connecticut River Watershed Summary





State funding awarded in the Upper Connecticut River watershed, SFY 2016-2018, by sector
Total: $1,242,592

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Upper Connecticut River watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	–
Acres of land treated by forested buffers	–
Acres of pasture with livestock excluded from surface waters	–
Number of barnyard and production area practices installed	–
Acres of water quality protections within newly conserved agricultural lands	6
Estimated acres of agricultural land treated through innovative equipment	–

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	1
Acres of river corridor conserved through easements	80
Acres of floodplain restored	4
Stream miles reconnected for stream equilibrium/aquatic organism passage	–
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	–
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	3
Number of municipal road drainage and stream culverts replaced	17
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

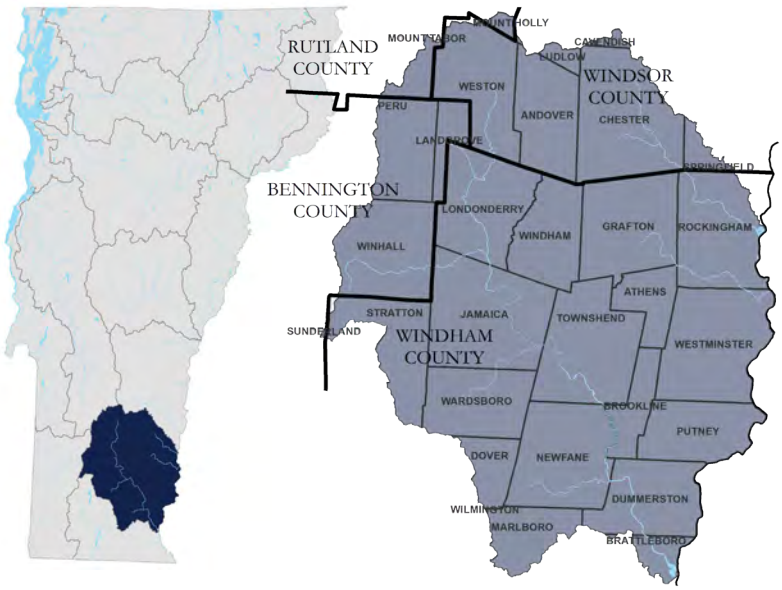
Upper Connecticut River Watershed Projects

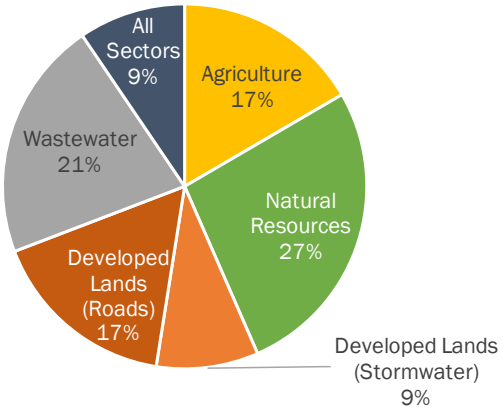
Clean water projects funded by state agencies in SFY 2018 in the Upper Connecticut River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Lewis	ANR	Vermont Fish and Wildlife Department	Nulhegan Watershed Strategic Wood Addition - Beaver Brook, Brown Brook, Black Branch	NR	CWF	$10,000

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, SFY 2016-2018, by sector
Total: $4,267,393

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the West, Williams, Saxtons, Connecticut Rivers watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	–
Acres of land treated by forested buffers	–
Acres of pasture with livestock excluded from surface waters	–
Number of barnyard and production area practices installed	4
Acres of water quality protections within newly conserved agricultural lands	–
Estimated acres of agricultural land treated through innovative equipment	–

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	5
Acres of river corridor conserved through easements	14
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	4
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	21
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	6
Number of municipal road drainage and stream culverts replaced	2
Cubic yards of municipal Class 4 road gully erosion remediated	44
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	1
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

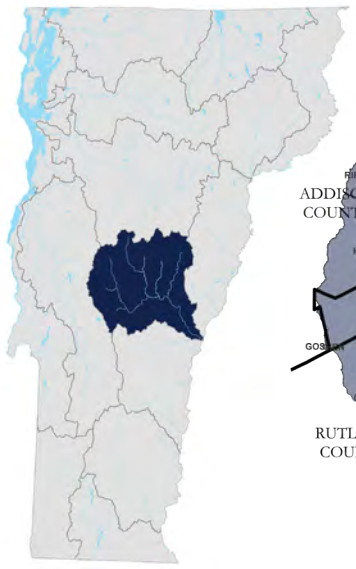
West, Williams, Saxtons, Connecticut Rivers Watershed Projects

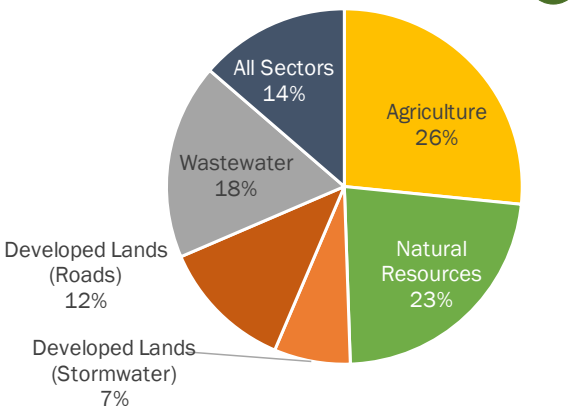
Clean water projects funded by state agencies in SFY 2018 in the West, Williams, Saxtons, Connecticut Rivers watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Athens	ANR	Vermont Department of Forests Parks and Recreation	Turner Hill WMA Road & Crossing Closeout	NR	Capital	$29,652
Brookline	VTrans	Brookline	Design and construction of salt shed	SW	FTF	$188,000
Multiple	ANR	Stone Environmental	IDDE - Basin 11- 2018	SW	CWF	$52,785
Grafton, Rockingham	ANR	Windham County Natural Resources Conservation District	Saxtons River buffer plantings	NR	CWF	$2,872
Newfane	VTrans	Newfane	Replacement of a steel culvert with a concrete box culvert.	NR	TAP	$160,000
Newfane	ANR	Windham Regional Commission	Adams Brook Stream Bank and Floodplain Restoration Implementation	NR	Capital	$73,056
Rockingham	ANR	Bellows Falls Village Corporation	Bellows Falls Village Corporation – Wastewater Collection System Refurbishment – Construction	WW	CWSRF	$377,500
Rockingham	VTrans	Rockingham	Purchase of high-efficiency vactor truck	Roads	FTF	$300,000

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, SFY 2016-2018, by sector
Total: $3,714,295

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the White River watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of agricultural land treated by conservation practices	222
Acres of land treated by forested buffers	32
Acres of pasture with livestock excluded from surface waters	27
Number of barnyard and production area practices installed	16
Acres of water quality protections within newly conserved agricultural lands	21
Estimated acres of agricultural land treated through innovative equipment	266

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of forested riparian buffer restored through buffer planting	21
Acres of river corridor conserved through easements	72
Acres of floodplain restored	–
Stream miles reconnected for stream equilibrium/aquatic organism passage	98
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	460
Number of stream crossings improved	1

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Acres of impervious surface treated	–

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Miles of municipal road drainage and erosion control improvements	6
Number of municipal road drainage and stream culverts replaced	27
Cubic yards of municipal Class 4 road gully erosion remediated	–
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	–
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	–

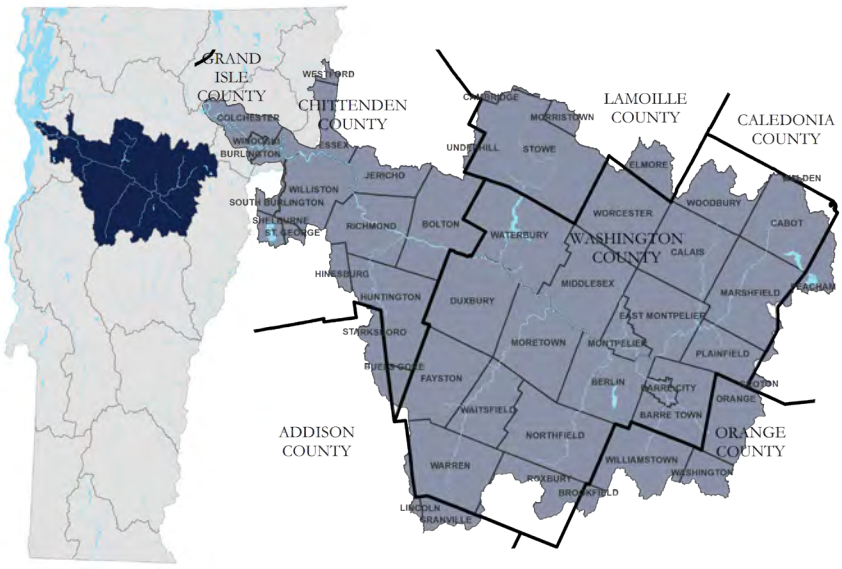
White River Watershed Projects

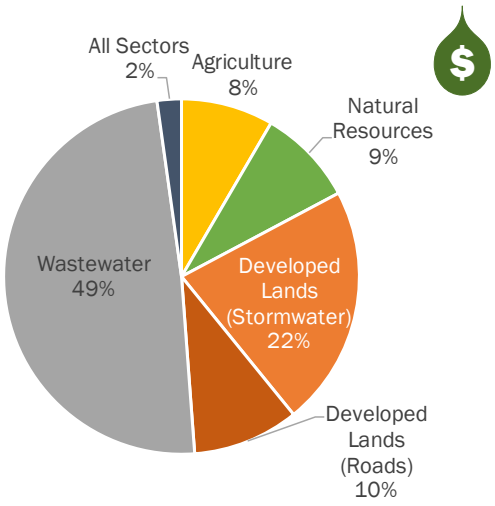
Clean water projects funded by state agencies in SFY 2018 in the White River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	White River Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	General	$6,000
Barnard	AAFM	Kiss the Cow Farm	Diversion	Ag	Capital	$3,060
Barnard	AAFM	Kiss the Cow Farm	Waste Treatment - Milk House Waste	Ag	Capital	$729
Bethel	ANR	Vermont Fish and Wildlife Department	Route 107 - FWD Floodplain Restoration - Bethel	NR	Capital	$20,000
Bethel	ANR	White River Partnership	Bethel RCE Outreach - Third Branch White River	NR	CWF	$20,394
Brookfield	VHCB	Poulin & Daughters Family Farm	Poulin-Poulin & Daughters Family Farm-FY18 WQ Grant	Ag	Capital	$5,250
Brookfield	AAFM	Sprague Ranch LLC	Corn Planter	Ag	Capital	$10,000
Chelsea	AAFM	VT Heritage Farm	Use Exclusion	Ag	Capital	$6,000
Chelsea	AAFM	VT Heritage Farm	Watering Facility	Ag	Capital	$1,000
Hancock	ANR	White River Partnership	Hancock River Corridor Plan Project-Identification	NR	CWF	$2,794
Hancock	ANR	White River Partnership	Killooleet Dam Removal and In-Stream Restoration Design	NR	Capital	$62,131
Randolph	AAFM	Ayers Brook Goat Dairy LLC	Waste Storage Structure	Ag	Capital	$62,360
Randolph	VHCB	Poulin & Daughters Family Farm	Poulin-Poulin & Daughters Family Farm-FY18 WQ Grant	Ag	Capital	$5,250
Randolph	AAFM	Townsend Farms	Waste Storage Structure	Ag	Capital	$100,095
Randolph	AAFM	Townsend Farms	Waste Storage Structure (Part #2)	Ag	Capital	$99,905
Randolph	AAFM	Vermont Technical College	Water Quality Outreach; Education and Outreach at Vermont's Technical Center	All	CWF	$43,000
Rochester	AAFM	North Hollow Farm LLC	Diversion	Ag	Capital	$3,000
Rochester	ANR	Rochester	Rochester – Wastewater Treatment Facility Refurbishment – Construction	WW	CWSRF	$473,932
Rochester	ANR	White River Partnership	Rochester Stormwater Master Plan - Basin 9	SW	CWF	$20,449
Royalton	AAFM	Calderwood Goat Dairy	Pond Sealing or Lining - (Partial Payment)	Ag	Capital	$10,493
Royalton	AAFM	Calderwood Goat Dairy	Pond Sealing or Lining - Flexible Membrane	Ag	Capital	$24,507
Royalton	ANR	White River Partnership	Upper and Lower Eaton Dam Removal Design	NR	Capital	$29,062
Tunbridge	ANR	White River Partnership	Tunbridge River Corridor Plan Project-Identification	NR	CWF	$2,794

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

Winooski River Watershed Summary





State funding awarded in the Winooski River watershed, SFY 2016-2018, by sector
Total: $21,736,401

STATE FUNDS AWARDED IN SFY 2016-2018

RESULTS OF PROJECTS COMPLETED, SFY 2016-2018

Results of projects completed, SFY 2016-2018, by sector, in the Winooski River watershed.

AGRICULTURE PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**213.8**
Acres of agricultural land treated by conservation practices	1,647
Acres of land treated by forested buffers	96
Acres of pasture with livestock excluded from surface waters	69
Number of barnyard and production area practices installed	17
Acres of water quality protections within newly conserved agricultural lands	77
Estimated acres of agricultural land treated through innovative equipment	153

NATURAL RESOURCES PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**72.5**
Acres of forested riparian buffer restored through buffer planting	55
Acres of river corridor conserved through easements	51
Acres of floodplain restored	3
Stream miles reconnected for stream equilibrium/aquatic organism passage	9
Acres of wetland restored	–
Acres of forest conserved with special water quality protection	20
Number of stream crossings improved	2

DEVELOPED LANDS STORMWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**7.6**
Acres of impervious surface treated	27

DEVELOPED LANDS ROAD PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**22.8**
Miles of municipal road drainage and erosion control improvements	11
Number of municipal road drainage and stream culverts replaced	21
Cubic yards of municipal Class 4 road gully erosion remediated	112
Acres stabilized through use of hydroseeder/mulcher equipment per year	–

WASTEWATER PROJECT RESULTS	
Kilograms of total phosphorus reduced annually	**–**
Number of combined sewer overflow abatements completed	–
Number of sewer extensions completed	–
Number of wastewater collection systems refurbished	2
Number of wastewater treatment facility refurbished	–
Number of wastewater treatment facility upgrades completed	1

Winooski River Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Winooski River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Watershed-wide	AAFM	Winooski Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	General	$6,000
Barre Town	ANR	Barre Town	Town of Barre Hydroseeder	Roads	CWF	$6,073
Barre Town	ANR	Friends of the Winooski River	Barre Town Garage Bioretention	SW	Capital	$6,978
Barre Town	ANR	Friends of the Winooski River	Barre Town School Infiltration Swale and Basin	SW	Capital	$7,207
Barre Town	ANR	Friends of the Winooski River	Barre Town School Parking Lot Bioretention	SW	Capital	$6,520
Bolton	ANR	Friends of the Winooski River	Lafreniere Field Camel's Hump State Park Riparian Planting	NR	Capital	$4,946
Bolton	ANR	Vermont Department of Forests Parks and Recreation	Bombardier Forest Road- Preston Brook logging road remediation	NR	Capital	$60,170
Cabot	AAFM	Cabot Smith Farm	Crop Rotation	Ag	General	$175
Cabot	AAFM	Cabot Smith Farm	Cross-Slope Tillage	Ag	General	$400
Cabot	AAFM	Cabot Smith Farm	Strip Cropping	Ag	General	$875
Calais, Moretown, Waitsfield, Woodbury, Worcester	ANR	Central Vermont Regional Planning Commission	Municipal Class 4 Road Erosion Remediation and Demonstration	Roads	CWF, Other	$113,000
Colchester	AAFM	Cottonwood Stables LLC	Conservation Tillage	Ag	General	$545
Colchester	AAFM	Cottonwood Stables LLC	Cover Crop - Broadcast	Ag	General	$1,936
Colchester	AAFM	Cottonwood Stables LLC	GPS Unit	Ag	Capital	$3,800
Colchester	AAFM	Robert & Normand Thibault Farm	Flow Meter	Ag	Capital	$13,400
Elmore, Worcester	ANR	Vermont River Conservancy	North Branch Cascades Stormwater Mitigation and Pedestrian Trail	NR	WGF	$9,625
Elmore, Worcester	ANR	Vermont River Conservancy	Stormwater Management along North Branch Cascades Trail Corridor	Roads	Capital	$38,580
Essex	VTrans	Essex	Retrofit of 3 cul-de-sacs with infiltration systems and stabilized outfalls.	SW	TAP	$271,139
Essex	VTrans	Essex Jct	Phosphorous Control Plan (scoping)	SW	FTF	$40,000
Essex	VTrans	Essex Junction	Vacuum Flusher / Pipeline Truck	Roads	TAP	$283,000
Essex	VTrans	Essex Town	Design and construction of retrofit of two SW detention ponds at LDS Church off Essex Way	SW	Capital, FTF	$1,076,948
Fayston	ANR	Fayston Town	Chase Brook Stormwater Master Plan	SW	CWF	$14,500
Huntington	AAFM	Taft's Milk and Maple Farm	Cover Crop - Broadcast	Ag	General	$2,808
Huntington	AAFM	Taft's Milk and Maple Farm	Cover Crop - Drill	Ag	General	$4,015

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 2018 in the Winooski River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Middlesex	ANR	Winooski Natural Resources Conservation District	Shady Rill Recreation Area Floodplain Restoration	NR	Capital	$10,580
Middlesex	ANR	Winooski Natural Resources Conservation District	Shady Rill Road Stormwater Design	SW	CWF	$10,420
Montpelier	ANR	Friends of the Winooski River	Hubbard Park Road System and Frog Pond Final Designs	Roads	Capital	$13,629
Montpelier	ANR	Montpelier	Montpelier – Wastewater Collection System Refurbishment – Construction	WW	CWSRF	$1,813,475
Moretown	VTrans	Moretown	Design and construction for replacment of existing drainage system along VT100B	SW	FTF	$204,524
Northfield	ANR	Friends of the Winooski River	Camp Wihakowi Dam Removal Final Design	NR	Capital	$24,042
Plainfield	ANR	Friends of the Winooski River	Recreation Road gullies study	NR	CWF	$20,268
Richmond	AAFM	Conants' Riverside Farms LLC	Cover Crop - Drill	Ag	General	$17,045
Richmond	ANR	Vermont Department of Forests Parks and Recreation	Preston Brook Floodplain Restoration Design- Berm Removal	NR	CWF	$8,563
Roxbury	AAFM	Harvest Mountain Farm	Waste Transfer	Ag	Capital	$2,000
Roxbury	AAFM	Harvest Mountain Farm	Waste Treatment - Milk House Waste	Ag	Capital	$10,000
South Burlington	AAFM	Ethan Allen Farm	Cover Crop - Broadcast	Ag	General	$3,768
South Burlington	AAFM	Ethan Allen Farm	GPS and automatic shutoff	Ag	Capital	$19,100
South Burlington	ANR	South Burlington	South Burlington – Wastewater Collection System Refurbishment – Final Design	WW	CWSRF	$306,720
Stowe	ANR	Lamoille County Conservation District	Little River Agricultural Site Riparian Tree Planting	NR	CWF	$27,510
Stowe	AAFM	Ricketson, Ken	Use Exclusion	Ag	Capital	$5,589
Stowe	ANR	Stowe Town	Town of Stowe Grader-Mounted Rollers	Roads	CWF	$19,045
Waitsfield	ANR	Waitsfield	Waitsfield – Wastewater Treatment Facility – Decentralized – Construction	WW	CWSRF	$502,228
Warren	AAFM	DeFreest Farm Partnership	No-Till Drill	Ag	Capital	$40,000
Warren	ANR	Warren Town	Fuller Hill Road, Warren Stormwater Treatment Implementation	SW	CWF	$93,000
Warren	ANR	Warren Town	Warren School Campus Stormwater Management	SW	Capital	$5,864
Warren	ANR	Warren Town	Warren School Campus Stormwater Management - Raingarden	SW	Capital	$6,500
Warren	ANR	Warren Town	Warren School Campus Stormwater Management - Subsurface Chambers	SW	Capital	$22,051
Washington	VHCB	Lambert Farm	Lambert-Lambert Farm-FY18 WQ Grant	Ag	Capital	$10,000

Winooski River Watershed Projects

Clean water projects funded by state agencies in SFY 2018 in the Winooski River watershed.

TOWN	AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
Waterbury	ANR	Vermont Department of Forests Parks and Recreation	Cotton Brook Culvert Upgrades	SW	Capital	$130,800
Waterbury	ANR	Vermont Department of Forests Parks and Recreation	Waterbury State Park Shoreline Bioengineering Restoration	NR	CWF	$18,275
Waterbury	ANR	Waterbury	Waterbury – Wastewater Treatment Facility Upgrade – Construction	WW	Capital	$6,426,145
Waterbury	ANR	Winooski Natural Resources Conservation District	Thatcher Brook Elementary School Stormwater Management	SW	CWF	$9,038
Williston	VTrans	Williston	Stormwater utility incentive payments	SW	CWF	$25,000
Williston	ANR	Williston Town	Brennan Woods Pond Retrofit	SW	Capital	$44,476
Williston	ANR	Williston Town	Meadowridge Stormwater Improvements	SW	Capital	$236,448
Williston	ANR	Williston Town	Meadowrun-Forest Run Pond Upgrade	SW	Capital	$54,625
Williston	ANR	Williston Town	South Ridge Pond Upgrades- Williston	SW	Capital	$66,125
Williston	ANR	Williston Town	Williston Stormwater Treatment at Golf Links South Pond Upgrade	SW	Capital	$40,076
Williston	ANR	Williston Town	Williston Stormwater Treatment at Indian Ridge	SW	Capital	$58,688
Williston	ANR	Williston Town	Williston Stormwater Treatment at Tafts Farm	SW	Capital	$36,188
Winooski	ANR	Winooski	Winooski – Wastewater Collection System Refurbishment – Preliminary Design	WW	CWSRF	$213,276
Winooski	ANR	Winooski	Winooski – Wastewater Treatment Facility Refurbishment – Preliminary Design	WW	CWSRF	$12,800

Multi-Watershed Projects

Clean water projects funded by state agencies in SFY 2018 the Connecticut River basin.

AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
ANR	Ottauquechee Natural Resources Conservation District	Mill Brook Water Quality Analysis	All	Other	$965
ANR	Vermont Youth Conservation Corps	VYCC Class 4 Roads MRGP Compliance	Roads	CWF	$31,131
AAFM	Connecticut River Watershed Farmers Alliance, Inc.	No-Till Grain Drill	Ag	Capital	$29,100
AAFM	Lambert Farm	Haybar w/ Flow Meter	Ag	Capital	$22,500
AAFM	Lambert Farm	Injectors w/ Flow Meter	Ag	Capital	$45,600
ANR	Ascutney Mountain Audubon Society	Herrick's Cove Wildlife Festival	All	Other	$4,100
ANR	Brattleboro	Brattleboro – Wastewater Treatment Facility Refurbishment – Construction	WW	Capital	$241,193
AAFM	Windham County Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	Other	$6,000
AAFM	Caledonia County Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	Other	$6,000

Clean water projects funded by state agencies in SFY 2018 the Lake Champlain basin.

AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
AAFM	Champlain Valley Farm Coalition, Inc.	Champlain Valley Farmer Coalition: Outreach to Improve Water Quality; Outreach and Education, Technical Assistance and Organizational Development	All	CWF	$242,360
AAFM	Matthew's Trucking LLC	Tank Injector	Ag	Capital	$24,100
AAFM	University of Vermont	Broadcast Top-Dresser	Ag	Capital	$5,936
ANR	Vermont Department of Forests Parks and Recreation	Green Street Vermont Guide and Bylaw Review	All	CWF	$55,000
ANR	Vermont Rural Water Association	Municipal Wastewater Treatment Facility Technical Assistance to Optimize for Nutrient Treatment	All	CWF	$103,000
AAFM	Franklin County Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	Other	$6,000
AAFM	Franklin County Natural Resources Conservation District	Tile Drain Sampling & Analysis Services	All	CWF	$49,999
ANR	Vermont Land Trust	River Corridor Easements- 2017- Vermont Land Trust	NR	Capital	$360,048
ANR	Chittenden County Regional Planning Commission	Clean Streets Phosphorus Reduction Project	SW	CWF	$122,671
ANR	Lewis Creek Association	"Stormwater Mitigation and Flood Resilience for Thorp Brook and the Big Oak Lane Neighborhood"	SW	Other	$10,000
VTrans	Burlington	Stormwater utility incentive payments	SW	CWF	$25,000
VTrans	Colchester	Stormwater utility incentive payments	SW	CWF	$25,000
VTrans	South Burlington	Stormwater utility incentive payments	SW	CWF	$25,000
AAFM	Rutland County Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	Other	$6,000

Statewide Watershed Projects

Statewide clean water projects funded by state agencies in SFY 2018.

AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
AoA	Agency of Administration	Purchase of clean water project signs and posts to identify clean water projects funded by the state (legislative requirement)	All	CWF	$7,300
ANR	Caledonia County Natural Resources Conservation District	Multi-Sector Clean Water Block Grant - 02	SW	Capital	$500,000
ANR	Green Mountain Club	Southern Backcountry Caretaker Program	All	Other	$5,000
AAFM	Natural Resources Conservation Council	Agricultural Conservation Practices Technical Assistance (Capacity and Oversight)	All	Other	$28,000
AAFM	Natural Resources Conservation Council	State Natural Resources Conservation Districts Small Farm Assistance Program: Education and Outreach, Technical Assistance, and Organizational Development	All	CWF	$1,338,975
ANR	Southern Windsor County Regional Planning Commission	Multi-Sector Clean Water Block Grant- 01	SW	Capital	$1,500,000
ANR	The Orianne Society	Halting and reversing Wood Turtle population decline in Vermont	NR	Other	$3,500
ANR	The Winooski Natural Resources Conservation District	Boosting the technical capacity of Conservation Commissions to engage in water quality protection and river corridor planning	All	Other	$2,000
AAFM	University of Vermont	Comprehensive Extension Programming to Improve Water Quality in Vermont: Education and Outreach, Technical Assistance and Research and Development	All	Other	$1,301,785
AAFM	University of Vermont	Education and Outreach	All	Other	$5,000
AAFM	University of Vermont	Pasture & Surface Water Fencing Program	Ag	CWF	$149,824
AAFM	University of Vermont	Tile Drain Sampling & Analysis Services	All	CWF	$25,000
AAFM	University of Vermont	Tile Drain Sampling & Analysis Services	All	CWF	$25,000
AAFM	Vermont Agency of Agriculture, Food and Markets	Operational Support	Ag	CWF	$375,000
ANR	Vermont Agency of Transportation	Tier 3 River and Road Activities Outreach - VTrans	All	CWF	$8,000
ANR	Vermont Agricultural and Environmental Laboratory	2018 Citizen Science Volunteer Monitoring Water Quality Sampling LaRosa Laboratory Analysis	All	CWF	$100,000
AAFM	Vermont Association of Conservation Districts	Conservation Planning for Nutrient Reduction in Vermont's Surface Waters; Education and outreach, Technical Assistance and Organizational Development	All	CWF	$600,000
AAFM	Vermont Association of Conservation Districts	Grassed Waterway & Filter Strip Program	Ag	CWF	$100,000
ANR	Vermont Center for Ecosystem Studies	Vermont Vernal Pool Monitoring Program	NR	Other	$3,500
ANR	Vermont Center for Geographic Information	Statewide Impervious Surface Mapping	All	CWF	$100,000
ANR	Vermont Department of Forests Parks and Recreation	Water Quality Assistance Program- FPR Skidder Bridges	NR	Capital	$50,000
AAFM	Vermont Grass Farmers Association	Strengthening Vermont's Network of Grass-based Farmers to Protect Soil and Water; Education and Outreach, Technical Assistance and Organizational Development.	All	CWF	$32,970

Statewide Watershed Projects

Statewide clean water projects funded by state agencies in SFY 2018.

AGENCY	PARTNER	SUMMARY TITLE	SECTOR	FUNDING SOURCE	AMOUNT
ANR	Vermont Natural Resources Council	Outreach Efforts for Dam Removal in the Lake Champlain Basin	All	Other	$3,000
ANR	Vermont River Conservancy	Natural Resources Protection and Restoration Training	All	CWF	$25,828
ANR	Vermont River Conservancy	Stormwater Management Training for Watershed Groups	All	CWF	$39,544
ACCD	Vermont Center for Geographic Information	LiDAR Mapping of the State of Vermont, Next Phase to Support Agriculture, Stormwater, River, and Forest Road Mapping	All	CWF	$460,000
ANR	Watershed Consulting	IDDE - Smaller Towns- 2018	SW	Capital	$33,355
ANR	Vermont River Conservancy	River Corridor Easements- 2017- Vermont River Conservancy	NR	Capital	$159,461
AAFM	Essex County Natural Resources Conservation District	Agricultural Conservation Practices Technical Assistance	All	Other	$6,000
ANR	NorthWoods Stewardship Center	Northwoods Work Crew 2018	All	CWF	$98,470

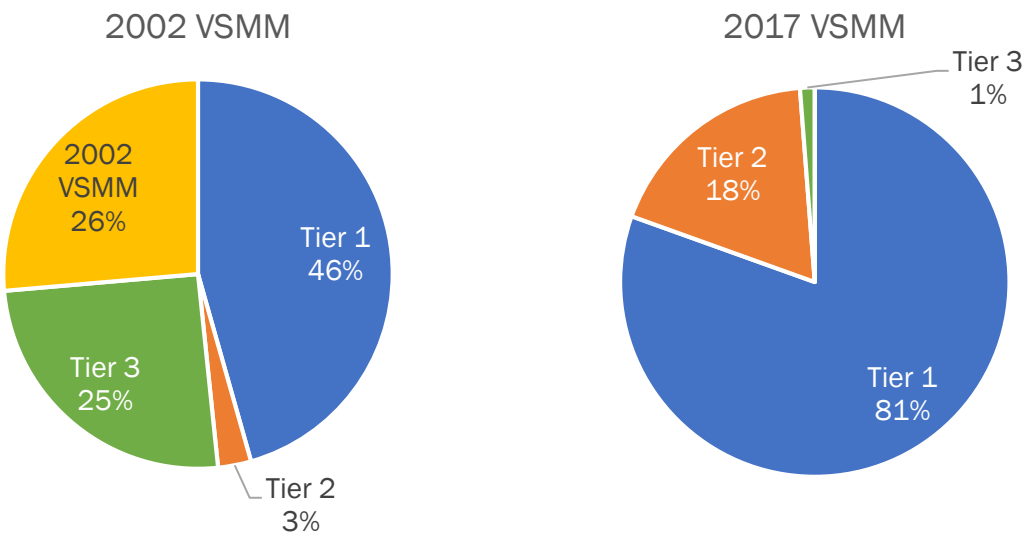
Appendix B. Summary of Phosphorus Reductions Achieved Through Stormwater Operational Permits

Scope of Data	
Data include:	Stormwater permit data includes new or amended operational stormwater permits issued in State Fiscal Year (SFY) 2018. Permits authorize new, redeveloped, and existing impervious surfaces meeting regulatory thresholds. DEC tracks permit issuance; actual construction of impervious and change in phosphorus load lag behind authorization under the permit. The updated 2017 Vermont Stormwater Management Manual (VSMM) went into effect on July 1, 2017 which replaced the 2002 VSMM. SFY 18 data includes permits authorized under both the 2002 and 2017 Manuals.
Data do not include:	Phosphorus load data from outside the Lake Champlain and Memphremagog basins.
Future improvements:	More precise tracking of the drainage area and size of each practice is needed to improve the accuracy of the reductions. Permitted retrofit projects should be flagged if funded by a grant program.

Stormwater Treatment Practice Types SFY 2018 (Statewide, New Permits)				
Performance Tier	Definition and Examples	Average Phosphorus Removal	# of Practices Permitted under the 2002 VSMM	# of Practices Permitted under the 2017 VSMM
Tier 1 Practices	Infiltrating practices, impervious disconnection	> 80%	83	66
Tier 2 Practices	Gravel Wetlands and bioretention w/ underdrains	60-80%	5	15
Tier 3 Practices	Wet ponds, filters and dry swales not designed to infiltrate	50-60%	46	1
2002 VSMM Practices	Grass lined channels, non-structural credits	< 50%	48	0
Total Number of Practices Permitted			182	82
Average Phosphorus Removal of Permitted Practices[1]			48%	72%

[1] Phosphorus removal efficiencies were assigned to each practice assuming that it was sized to meet the water quality volume. See Appendix C for removal efficiencies.

Figure 1: Number of stormwater treatment practices by tier for new operational stormwater permits issued under the 2002 and 2017 VSMM in SFY 2018



Impervious Surfaces Permitted in SFY 2018 (Statewide)			
Performance Measure	Lake Champlain	Lake Memphremagog	Other Drainage Areas
New Impervious (acres)	127.9	10.2	28.1
Redeveloped Impervious (acres)	20.6	3.2	9.5
Existing Impervious (acres)	19.6	1.5	20.7
Total Impervious (acres)	168.1	14.9	58.3
Percent of Permitted Impervious in Vermont	70%	6%	24%

Phosphorus Loads and Reductions SFY 2018 (Lake Champlain and Memphremagog Basins)		
Change in Phosphorus Load	Lake Champlain	Lake Memphremagog
Increase in Phosphorus from Operational Permits, prior to treatment[2] (kg/yr)	103.3	42.6
Phosphorus Reduced by Treatment Practices (kg/yr)	101.6	30.0
Net Phosphorus of Operational Permits (kg/yr)	2.2[3]	12.6

[2] Permitted impervious and phosphorus load calculations include both new and amended permit authorizations. For amended permits, only the increased impervious acres and phosphorus load relative to the previous permit are summarized here. Phosphorus increase from new development assumed that the permitted area was forested prior to development.
[3] The low increase in phosphorus within the Lake Champlain Basin is partly due to treatment of existing impervious in the stormwater impaired waters as part of Flow Restoration Plans.

Appendix C. Summary of Methods to Measure Nutrient Pollutant Reductions

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 1 summarizes the State of Vermont's current ability to quantify nutrient load reductions by basin and project type.

Tables 2-4 contain project types for which the State of Vermont currently quantifies nutrient load reductions. The table defines project categories and minimum standards that must be met for pollutant reductions to apply, minimum data needed to quantify pollutant reductions, and the average annual pollutant reduction assigned to the project type (i.e., efficiency).

Table 1. Summary of Vermont's ability in SFY 2018 to account for nutrient pollution reductions by project type, basin, and nutrient of concern

Key
Currently have ability to account for nutrient pollution reduction
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
River and floodplain restoration	Phosphorus	Phosphorus	Nitrogen
Riparian buffer restoration	Phosphorus	Phosphorus	Nitrogen
Lakeshore restoration	Phosphorus	Phosphorus	Nitrogen
Wetland restoration	Phosphorus	Phosphorus	Nitrogen
Forest erosion control	Phosphorus	Phosphorus	Nitrogen
Stormwater treatment practices	Phosphorus	Phosphorus	Nitrogen
Road erosion control practices	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).

Table 2. Agricultural clean water project types, definitions, minimum standards and data required to quantify pollutant reductions, and average annual total phosphorus load reduction efficiency (if available).

Project Type	Definition and Minimum Standards to Quantify Pollutant Reductions	Data Required to Quantify Pollutant Reductions	Total Phosphorus Load Reduction Efficiency (%)[1]
Barnyard/ Production Area Management[2]	Exclusion of clean water runoff from the production area and management of the remaining runoff in a way that minimizes its pollution. Production area includes barnyards, heavy-use areas, waste storage, feed storage, and access roads. Production areas must divert clean water runoff and manage the remaining runoff in a way that minimizes pollution. This involves complete containment and/or control and management of all wastes, including covered barnyards and/or diversion of runoff/silage waste to manure storage facilities. To be assessed via AAFM inspections.	Vermont water quality/premise ID Compliance status Date of inspection Size operation of premise HUC12 watershed location Production area acres (optional)	80%
Livestock Exclusion	Exclusion of livestock from surface waters by installing fence or other barrier. May include acceptable alternatives such as structures providing limited access for watering or fencing to limit access for livestock stream crossing.	Acres of pasture excluded HUC12 watershed location Field HSG type (optional) Field average slope (optional)	55%
Forested Riparian Buffer	Areas of woody vegetation (shrubs and trees) located adjacent to surface waters that filter out pollutants from runoff. Minimum 25-foot width, no manure application, no gully erosion or channelized flow.	Field land use Buffer acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	40% plus reduction from converting cropland to forest
Filter Strip Riparian Buffer	Areas of grasses or hay located adjacent to surface waters that filter out pollutants from runoff. Minimum 25-foot width, no manure application, no gully erosion or channelized flow.	Field land use Buffer acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	40% plus reduction from converting cropland to grass/hay
Forested Ditch Buffer	Areas of woody vegetation (shrubs and trees) located adjacent to drainage ditches that filter out pollutants from runoff. Minimum 10-foot width, no manure application, no gully erosion or channelized flow.	Field land use Buffer acres HUC12 watershed location	24% plus reduction from converting cropland to forest

[1] Represents annual average total phosphorus load reduction based on project types expected performance.

[2] The State of Vermont established methods to quantify pollutant reductions associated with barnyard/production area management practices, however, insufficient data were available to do so at the time of writing this report. AAFM will assess compliance status of barnyard/production areas through inspections. Nutrient pollutant reductions will be quantified for sites in full compliance with farm operational permits and Required Agricultural Practices and will be reported in future publications on Lake Champlain TMDL progress.

Project Type	Definition and Minimum Standards to Quantify Pollutant Reductions	Data Required to Quantify Pollutant Reductions	Total Phosphorus Load Reduction Efficiency (%)[1]
		Field HSG type (optional) Field average slope (optional)	
Filter Strip Ditch Buffer	Areas of grasses or hay located adjacent to drainage ditches that filter out pollutants from runoff. Minimum 10-foot width, no manure application, no gully erosion or channelized flow.	Field land use Buffer acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	24% plus reduction from converting cropland to grass/hay
Conservation Crop Rotation, Change in Crop Rotation, Strip Cropping	Land that is managed to change crop types cyclically over time with the intention of reducing soil erosion and/or improving long-term soil health and quality, typically between an annual crop (e.g., corn, soybeans) and a perennial crop (e.g., hay). May involve change from continuous cropland to crop rotation or extending duration of perennial crop in existing crop rotation.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	Average 25% (depends on land use, soil, and slope)
Conservation Tillage, Reduced Till, No Till	Any tillage and planting system that leaves a minimum of 30% of the soil surface covered with plant residue after the tillage or planting operation (e.g., reduced till, no-till). For silage corn, this could involve required application of a cover crop or use of zip-till, zone-till or minimum tillage equipment.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	Average 27.5% (depends on land use, soil, and slope)
Cover Crop, Nurse Crop	Establishing a seasonal cover on annual cropland for soil erosion reduction and conservation purposes. Seasonal cover consists of a crop of winter rye or other herbaceous plants seeded at a minimum rate of 100 lbs/ac or at the highest recommended rate to provide effective soil coverage. When categorized as nurse crop, accounted for as cover crop, but typically used to begin crop rotation and often accounted for as a system with crop rotation.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	Average 28% (depends on land use, soil, and slope)
Forage and Biomass	Conversion of cropland to hay. Typical duration 5 years.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	Reduction from converting cropland to hay
Crop to Hay	Permanent conversion of cropland to hay.	Field land use Practice acres HUC12 watershed location	Reduction from converting cropland to hay

Project Type	Definition and Minimum Standards to Quantify Pollutant Reductions	Data Required to Quantify Pollutant Reductions	Total Phosphorus Load Reduction Efficiency (%)[1]
		Field HSG type (optional) Field average slope (optional)	
Grassed Waterways	Stabilizing areas prone to field gully erosion by establishing grass-lined swales.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	Need to define acres treated. To be reviewed.
Hay Field Riparian Buffer	Area of grasses or hay located adjacent to surface waters that filter out pollutants from hay field runoff. Minimum 25-foot width, no manure application, no gully erosion or channelized flow. Effectively a manure spreading setback on a hay field, but categorized as a buffer, as this practice would be considered a filter strip riparian buffer if field land use is converted to cropland.	Field land use Buffer acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	To be reviewed
Reduced Phosphorus Manure, Nutrient Management Plan Implementation	A 20% reduction of the total phosphorus content applied to fields, through either manure or fertilizer. This can be accomplished by reducing the amount of manure/fertilizer applied or by altering livestock feed formulation or treating manure prior to application.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	To be reviewed
Manure Injection	Applying liquid manure below the soil surface.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	To be reviewed
Manure Spreading Setback	Area of field adjacent to riparian or ditch buffer where manure is not spread for purposes of enhancing performance of the riparian or ditch buffer and reducing total phosphorus content applied to fields.	Field land use Practice acres HUC12 watershed location Field HSG type (optional) Field average slope (optional)	To be reviewed

Table 3. Stormwater treatment clean water project types (including road erosion controls), definitions, minimum standards and data required to quantify pollutant reductions, and average annual total phosphorus load reduction efficiency (if available)[3]

Project Type	Definition and Minimum Standards to Quantify Pollutant Reductions	Data Required to Quantify Pollutant Reductions	Total Phosphorus Load Reduction Efficiency (%)[4]
Infiltration trench	Provides storage of runoff using the void spaces within the soil, sand, gravel mixture within the trench for infiltration into the surrounding soils.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume Infiltration rate	Average 90% (depends on storage volume and infiltration rate)
Subsurface Infiltration	Provides storage of runoff using the combination of storage structures and void spaces within the washed stone within the system for infiltration into the surrounding soils.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume Infiltration rate	Average 90% (depends on storage volume and infiltration rate)
Surface Infiltration	Provides storage of runoff through surface ponding (e.g., basin or swale) for subsequent infiltration into the underlying soils.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume Infiltration rate	Average 93% (depends on storage volume and infiltration rate)
Rain Garden, Bioretention (no underdrains)	Provides storage of runoff through surface ponding and possibly void spaces within the soil, sand, washed stone mixture that is used to filter runoff prior to infiltration into underlying soils.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume Infiltration rate	Average 93% (depends on storage volume and infiltration rate)
Rain Garden, Bioretention (with underdrain)	Provides storage of runoff by filtering through an engineered soil media. The storage capacity includes void spaces in the filter media and temporary ponding at the surface. After runoff passes through the filter media it discharges through an under-drain pipe.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume	Average 68% (depends on storage volume)

[3] See DEC's Stormwater Treatment Practice Calculator (https://anrweb.vt.gov/DEC/CleanWaterDashboard/STPCalculator.aspx) to calculate phosphorus pollutant reductions associated with stormwater treatment practices in the Lake Champlain and Lake Memphremagog basins. Includes instructions for calculating storage volume by practice type.

[4] Represents annual average total phosphorus load reduction based on project types' expected performance.

Project Type	Definition and Minimum Standards to Quantify Pollutant Reductions	Data Required to Quantify Pollutant Reductions	Total Phosphorus Load Reduction Efficiency (%)[4]
Gravel Wetland	Provides surface storage of runoff in a wetland cell that is routed to an underlying saturated gravel internal storage reservoir (ISR). Outflow is controlled by an orifice that has its invert elevation equal to the top of the ISR layer and provides retention of at least 24 hours.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume	Average 61% (depends on storage volume)
Porous Pavement (with infiltration)	Provides filtering of runoff through a filter course and temporary storage of runoff within the void spaces of a subsurface gravel reservoir prior to infiltration into subsoils.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume Infiltration rate	Average 90% (depends on storage volume and infiltration rate)
Porous Pavement (with impermeable underlining or underdrain)	Provides filtering of runoff through a filter course and temporary storage of runoff within the void spaces prior to discharge by way of an underdrain.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume Filter course depth	Average 70% (depends on storage volume and filter course depth)
Sand Filter (with underdrain)	Provides filtering of runoff through a sand filter course and temporary storage of runoff through surface ponding and within void spaces of the sand and washed stone layers prior to discharge by way of an underdrain.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume	Average 68% (depends on storage volume)
Wet Pond	Provides treatment of runoff through routing through permanent pool.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume	Average 53% (depends on storage volume)
Extended Dry Detention Basin	Provides temporary detention storage for the design storage volume to drain in 24 hours through multiple outlet controls.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume	Average 12% (depends on storage volume)
Grass Conveyance Swale	Conveys runoff through an open channel vegetated with grass. Primary removal mechanism is infiltration.	Latitude, longitude Developed impervious acres treated Developed pervious acres treated Storage volume	Average 19% (depends on storage volume)

Project Type	Definition and Minimum Standards to Quantify Pollutant Reductions	Data Required to Quantify Pollutant Reductions	Total Phosphorus Load Reduction Efficiency (%)[4]
Road Erosion Remediation on Gravel and Paved Open Drainage (Uncurbed) Roads	Installation of a suite of practices to correct road related erosion problems for gravel and paved roads and road drainage culverts. Practices may include drainage ditch installation and upgrades, turnouts, removal of high road shoulders, and stabilization of drainage culverts.	Road segment ID Road type (paved, unpaved) Hydrologic connectivity Project length Municipal Roads General Permit compliance status before and after implementation	Not → partially compliant: 40% Partially → fully compliant: 40% Not → fully compliant 80%
Road Erosion Remediation on Class 4 Roads	Correction of gully erosion on Class 4 road surface and shoulder.	Road segment ID Hydrologic connectivity Project length Volume of gully erosion Municipal Roads General Permit compliance status before and after implementation	Not → fully compliant 40%
Catch Basin Outlet Stabilization on Paved, Curbed Roads	Correction of erosion at catch basin outlet by stabilizing flow path from outlet to surface waters.	Catch basin outlet ID Volume of erosion Municipal Roads General Permit compliance status before and after implementation	Under development

Table 4. Natural resources restoration clean water project types (including road erosion controls), definitions, minimum standards and data required to quantify pollutant reductions, and average annual total phosphorus load reduction efficiency (if available).

Project Type	Definition and Minimum Standards to Quantify Pollutant Reductions	Data Required to Quantify Pollutant Reductions	Total Phosphorus Load Reduction Efficiency (%)[5]
Forested Riparian Buffer Restoration (Non-Agricultural)	Restoration of riparian buffer along rivers and lakeshores. Buffers consist of native woody vegetation (trees and shrubs) with a minimum of 300 stems per acre and a minimum width of 35-feet.	Latitude, longitude buffer endpoints Buffer acres Buffer length Buffer average width	50%
River Channel and Floodplain Restoration	Restoration of river channel and or floodplain to its least erosive condition (i.e., equilibrium condition). Restoration work includes removing/retrofitting river corridor and floodplain encroachments and instream structures, dam removal, and establishing river corridor easements.	Stream reach ID Project length Percent increase of annual flood volume that can access floodplain	Under development
Lakeshore Restoration	Implementation of lake shoreland habitat restoration projects and/or lakeshore nutrient/sediment pollution reduction practices at priority locations.	To be reviewed	To be reviewed
Wetland Restoration	Implementation of wetland and buffer area restoration and protection projects to promote water quality benefit, encourage flood resiliency, and provide habitat benefits.	To be reviewed	To be reviewed
Forest Erosion Control	Implementation of forest logging road, trail, and/or stream crossing Acceptable Management Practices (AMPs) project(s) to address erosion to control nutrient and sediment pollution at prioritized locations.	To be reviewed	To be reviewed

[5] Represents annual average total phosphorus load reduction based on project types expected performance.

Appendix F. Ecosystem Restoration Grant Program Projects

Table 1. Clean water projects funded through Vermont Department of Environmental Conservation's Ecosystem Restoration Grant Program in SFY 2018

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Addison	Bristol	Bristol Town	Bristol Stormwater Master Plan	SW	$24,637	Otter Creek
Addison	Hancock	White River Partnership	Hancock River Corridor Plan Project-Identification	NR	$2,794	White
Addison	Hancock	White River Partnership	Killooleet Dam Removal and In-Stream Restoration Design	NR	$62,131	White
Addison, Chittenden, Franklin, Grand Isle, Lamoille, Rutland, Washington	Multi-Town	Vermont Department of Forests Parks and Recreation	Green Street Vermont Guide and Bylaw Review	Other	$55,000	Lake Champlain Regional
Addison, Chittenden, Franklin, Grand Isle, Lamoille, Rutland, Washington	Multi-Town	Vermont Rural Water Association	Municipal Wastewater Treatment Facility Technical Assistance to Optimize for Nutrient Treatment	Other	$103,000	Lake Champlain Regional
Addison, Lamoille, Windham	Multi-Town	Vermont River Conservancy	River Corridor Easements- 2017-Vermont River Conservancy	NR	$159,461	Deerfield, Lamoille, White
Bennington	Pownal	Bennington County Conservation District	Pownal Hay Mulcher	Roads	$5,080	Batten Kill, Walloomsac and Hoosic
Bennington	Shaftsbury	Bennington County Conservation District	Shaftsbury Hay Mulcher	Roads	$5,080	Batten Kill, Walloomsac and Hoosic
Bennington	Manchester	Bennington County Regional Commission	Lye Brook Berm Removal Alternatives Analysis	NR	$15,000	Batten Kill, Walloomsac and Hoosic
Bennington	Shaftsbury	Bennington County Regional Commission	Shaftsbury Stormwater Master Planning	SW	$21,761	Batten Kill, Walloomsac and Hoosic
Bennington, Windham, Windsor	Multi-Town	Stone Environmental	IDDE - Basin 11- 2018	SW	$52,785	West, Williams and Saxtons
Caledonia	Hardwick	Caledonia County Natural Resources Conservation District	Buffalo Storage Unit-Route 14 Drainage Channel Restoration	SW	$18,132	Lamoille

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Caledonia	Hardwick	Caledonia County Natural Resources Conservation District	Hazen Union School Stormwater Retrofit - Hardwick	SW	$50,964	Lamoille
Caledonia	Lyndon	Caledonia County Natural Resources Conservation District	Lyndon State College Gravel Wetland Final Design	SW	$10,680	Passumpsic
Caledonia	Lyndon	Caledonia County Natural Resources Conservation District	Lyndonville High Street Stormwater Retrofit	SW	$9,885	Passumpsic
Caledonia	Lyndon	Caledonia County Natural Resources Conservation District	South Prospect Street Gully Stabilization- Lyndon	SW	$8,500	Passumpsic
Caledonia	St. Johnsbury	Caledonia County Natural Resources Conservation District	Pearl Street Parking Lots Stormwater Retrofit	SW	$17,020	Passumpsic
Caledonia	Barnet	Connecticut River Conservancy	Harveys Lake Dam Removal and Lake Outlet Structure	NR	$31,978	Stevens, Wells, Waits and Ompompanoosuc
Caledonia	Sutton	NorthWoods Stewardship Center	Dolloff Pond Access Area Closure and Restoration Project	NR	$6,535	Passumpsic
Caledonia, Essex	Burke, Victory	Vermont Department of Forests Parks and Recreation	Darling State Forest Fire Road Close out	Roads	$27,950	Passumpsic
Caledonia, Essex, Orange, Rutland, Windham, Windsor	Shrewsbury	Vermont Department of Forests Parks and Recreation	Coolidge State Forest - forest highway crossing upgrade	NR	$7,625	Black and Ottauquechee
Caledonia, Essex, Orange, Windham, Windsor	Guilford	Connecticut River Conservancy	Green River Corridor Restoration Implementation	NR	$2,165	Deerfield
Caledonia, Essex, Orange, Windham, Windsor	Guilford, Halifax	Connecticut River Conservancy	Deerfield Watershed Project Identification	NR	$5,737	Deerfield
Caledonia, Essex, Orange, Windham, Windsor	Springfield	Southern Windsor County Regional Planning Commission	Springfield Lincoln Street Stormwater Infrastructure	SW	$7,771	Black and Ottauquechee

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Caledonia, Essex, Orange, Windham, Windsor	Athens	Vermont Department of Forests Parks and Recreation	Turner Hill WMA Road & Crossing Closeout	NR	$29,652	West, Williams and Saxtons
Caledonia, Essex, Orange, Windham, Windsor	Cavendish	Vermont Department of Forests Parks and Recreation	Proctor-Piper State Forest Culvert to Bridge Replacement	NR	$42,260	Black and Ottauquechee
Caledonia, Essex, Orange, Windham, Windsor	Jamaica, Putney, Weathersfield	Vermont Youth Conservation Corps	VYCC Class 4 Roads MRGP Compliance	Roads	$31,131	Black and Ottauquechee, West, Williams and Saxtons
Caledonia, Essex, Orleans	Multi-Town	NorthWoods Stewardship Center	Northwoods Work Crew 2018	Other	$98,470	Memphremagog, Northern Connecticut, Passumpsic
Chittenden	Milton	Chittenden County Regional Planning Commission	Milton Stormwater Planning and Implementation	SW	$24,881	Lamoille
Chittenden	Bolton	Friends of the Winooski River	Lafreniere Field Camel's Hump State Park Riparian Planting	NR	$4,946	Winooski
Chittenden	Jericho	Jericho Town	2017 Jericho SWMP - Town Parcel Infiltration Basin	SW	$56,635	Lamoille
Chittenden	Hinesburg	Lewis Creek Association	Town Garage Beecher Hill Brook-floodplain restoration	NR	$43,398	North Champlain
Chittenden	Shelburne	Lewis Creek Association	Lower McCabe Brook stormwater projects	SW	$29,150	North Champlain
Chittenden	Shelburne	Shelburne Town	Shelburne Stormwater Utility	SW	$25,000	North Champlain
Chittenden	South Burlington	South Burlington City	Iby Street Gravel Wetlands	SW	$83,497	North Champlain
Chittenden	South Burlington	South Burlington City	Pinnacle at Spear Pond 2 Retrofit	SW	$109,612	North Champlain
Chittenden	Bolton	Vermont Department of Forests Parks and Recreation	Bombardier Forest Road- Preston Brook logging road remediation	NR	$60,170	Winooski
Chittenden	Richmond	Vermont Department of Forests Parks and Recreation	Preston Brook Floodplain Restoration Design- Berm Removal	NR	$8,563	Winooski

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Chittenden	Colchester	Vermont Natural Resources Council	Dam removal study Indian Brook	NR	$35,000	North Champlain
Chittenden	Williston	Williston Town	Brennan Woods Pond Retrofit	SW	$44,476	Winooski
Chittenden	Williston	Williston Town	Meadowridge Stormwater Improvements	SW	$236,448	Winooski
Chittenden	Williston	Williston Town	Meadowrun-Forest Run Pond Upgrade	SW	$54,625	Winooski
Chittenden	Williston	Williston Town	South Ridge Pond Upgrades- Williston	SW	$66,125	Winooski
Chittenden	Williston	Williston Town	Williston Stormwater Treatment at Golf Links South Pond Upgrade	SW	$40,076	Winooski
Chittenden	Williston	Williston Town	Williston Stormwater Treatment at Indian Ridge	SW	$58,688	Winooski
Chittenden	Williston	Williston Town	Williston Stormwater Treatment at Tafts Farm	SW	$36,188	Winooski
Chittenden, Franklin, Rutland, Washington	Multi-Town	Chittenden County Regional Planning Commission	Clean Streets Phosphorus Reduction Project	SW	$122,671	North Champlain, Otter Creek, Winooski
Essex	Concord	Essex County Natural Resources Conservation District	Concord Stormwater Master Plan	SW	$14,000	Passumpsic
Essex	Lewis	Vermont Fish and Wildlife Department	Nulhegan Watershed Strategic Wood Addition- Beaver Brook, Brown Brook, Black Branch	NR	$10,000	Northern Connecticut
Franklin	Franklin	Friends of Northern Lake Champlain	Bouchard Farm Ditch Improvement Project- Rock River	NR	$47,913	Missisquoi Bay
Franklin	Fairfax	Northwest Regional Planning Commission	Fairfax Stormwater Master Plan	SW	$19,655	Lamoille
Franklin	Richford	Northwest Regional Planning Commission	Richford Stormwater Master Plan	SW	$19,665	Missisquoi Bay
Franklin	Franklin	Reservoir Environmental Management Inc.	Lake Carmi Aeration Design- Step 2	NR	$47,021	Missisquoi Bay
Franklin	Franklin	Reservoir Environmental Management Inc.	Lake Carmi Aeration- Step 1	NR	$7,250	Missisquoi Bay
Franklin	St. Albans Town	St. Albans Town	Northwest Medical Center (NMC)-Main Pond (Hill Farm Estates)	SW	$29,900	North Champlain

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Franklin	St. Albans Town	St. Albans Town	Northwestern Medical Center -South Pond A Retrofit	SW	$12,800	North Champlain
Franklin	St. Albans Town	St. Albans Town	Northwestern Medical Center -South Pond B retrofit	SW	$3,050	North Champlain
Franklin	St. Albans Town	St. Albans Town	Rugg Brook Stormwater Detention Pond near Tanglewood Estates	SW	$34,000	North Champlain
Franklin	Franklin	The Nature Conservancy	Marsh Brook Restoration	NR	$25,446	Missisquoi Bay
Franklin	St. Albans Town	The Nature Conservancy	Hathaway Point Agricultural Stormwater System/ Montagne Conservation Easement Project	SW	$22,565	North Champlain
Franklin, Orleans, Washington	Richford, Troy, Waitsfield, Westfield	Vermont Land Trust	River Corridor Easements- 2017- Vermont Land Trust	NR	$360,048	Missisquoi Bay, Winooski
Lamoille	Cambridge	Cambridge Town	Cambridge Elementary Stormwater Project	SW	$18,589	Lamoille
Lamoille	Eden	Lamoille County Conservation District	Lake Eden Watershed Assessment	NR	$28,605	Lamoille
Lamoille	Stowe	Lamoille County Conservation District	Little River Agricultural Site Riparian Tree Planting	NR	$27,510	Winooski
Lamoille	Stowe	Stowe Town	Town of Stowe Grader-Mounted Rollers	Roads	$19,045	Winooski
Lamoille	Johnson	Vermont Department of Forests Parks and Recreation	French Hill Block Culvert Removals and Forest Road AMPs	NR	$7,135	Lamoille
Lamoille	Johnson	Vermont Department of Forests Parks and Recreation	Waterman Brook Culvert to Bridge Project - Johnson	NR	$26,540	Lamoille
Lamoille	Wolcott	Vermont Fish and Wildlife Department	Wild Branch Wetland Restoration - Wolcott	NR	$23,750	Lamoille
Lamoille, Washington	Elmore, Worcester	Vermont River Conservancy	Stormwater Management along North Branch Cascades Trail Corridor	Roads	$38,580	Winooski
Orange	Orange	Vermont Department of Forests Parks and Recreation	Butterfield Loop Forest Road Stormwater Improvements	NR	$34,020	Stevens, Wells, Waits and Ompompanoosuc
Orange	Tunbridge	White River Partnership	Tunbridge River Corridor Plan Project-Identification	NR	$2,794	White

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Orleans	Charleston	Charleston Town	Town of Charleston Shoulder Retriever/Reclaimer	Roads	$2,900	Memphremagog
Orleans	Brownington, Derby, Morgan	Derby Town	Derby, Morgan and Brownington shared Hydroseeder program	Roads	$24,390	Memphremagog
Orleans	Greensboro	Greensboro Town	Greensboro Green Stormwater Infrastructure Project	SW	$16,000	Lamoille
Orleans	Multi-Town	Memphremagog Watershed Association	Lake Wise and Shoreland Erosion Control Training	Other	$5,288	Memphremagog
Orleans	Newport City	Memphremagog Watershed Association	Newport City Main street pull off - Underground chambers Final Design	SW	$21,455	Memphremagog
Orleans	Albany	NorthWoods Stewardship Center	Irons Property Buffer Planting on the Black River - Albany	NR	$4,298	Memphremagog
Orleans	Albany	NorthWoods Stewardship Center	Mongeon Property Black River Buffer Planting - Albany	NR	$1,231	Memphremagog
Orleans	Coventry	NorthWoods Stewardship Center	VT Fish and Wildlife Buffer Planting on the Barton River - Coventry	NR	$2,252	Memphremagog
Orleans	Newport Town	NorthWoods Stewardship Center	Chop Property Buffer Planting on Memphremagog Direct Tributary - Newport	NR	$4,042	Memphremagog
Rutland	Poultney	Poultney-Mettowee Natural Resources Conservation District	Lewis Brook Riparian Buffer Restoration at Saltis Farm- Poultney VT	NR	$13,889	South Champlain
Rutland	Poultney, Wells	Poultney-Mettowee Natural Resources Conservation District	Lake Saint Catherine Watershed Stormwater and Lakewise Master Planning	SW	$27,753	South Champlain
Rutland	Rutland Town	Roche	Roche Wetland Conservation Incentive Payment	NR	$18,396	South Champlain
Rutland	Clarendon	Rutland County Natural Resources Conservation District	Cold River Berm Removal	NR	$36,400	Otter Creek
Rutland	Mendon, Rutland City, Rutland Town	Rutland County Natural Resources Conservation District	Moon Brook Stormwater Master Plan	SW	$42,500	Otter Creek

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Rutland	Wallingford	Rutland County Natural Resources Conservation District	Homer Stone Berm Removal	NR	$11,600	Otter Creek
Rutland	Wallingford	Rutland County Natural Resources Conservation District	Wallingford Stormwater Master Plan	SW	$19,250	Otter Creek
Rutland	Rutland Town	Rutland Town	Hitzel Terrace Outlet Retrofit	SW	$9,115	Otter Creek
Statewide	Statewide	Caledonia County Natural Resources Conservation District	Multi-Sector Clean Water Block Grant-02	SW	$500,000	Statewide
Statewide	Statewide	Southern Windsor County Regional Planning Commission	Multi-Sector Clean Water Block Grant-01	SW	$1,500,000	Statewide
Statewide	Statewide	Vermont Agency of Transportation	Tier 3 River and Road Activities Outreach- VTrans	Other	$8,000	Statewide
Statewide	Statewide	Vermont Agricultural and Environmental Laboratory	2018 Citizen Science Volunteer Monitoring Water Quality Sampling LaRosa Laboratory Analysis	Other	$100,000	Statewide
Statewide	Statewide	Vermont Center for Geographic Information	Statewide Impervious Surface Mapping	Other	$100,000	Statewide
Statewide	Statewide	Vermont Department of Forests Parks and Recreation	Water Quality Assistance Program- FPR Skidder Bridges	NR	$50,000	Statewide
Statewide	Statewide	Vermont River Conservancy	Natural Resources Protection and Restoration Training	Other	$25,828	Statewide
Statewide	Statewide	Vermont River Conservancy	Stormwater Management Training for Watershed Groups	Other	$39,544	Statewide
Statewide	Statewide	Watershed Consulting	IDDE - Smaller Towns- 2018	SW	$33,355	Statewide
Washington	Barre Town	Barre Town	Town of Barre Hydroseeder	Roads	$6,073	Winooski
Washington	Calais, Moretown, Waitsfield, Woodbury, Worcester	Central Vermont Regional Planning Commission	Municipal Class 4 Road Erosion Remediation and Demonstration	Roads	$113,000	Winooski
Washington	Fayston	Fayston Town	Chase Brook Stormwater Master Plan	SW	$14,500	Winooski

Counties	Towns	Partner	Summary Title	Sector	Amount	Watershed
Washington	Barre Town	Friends of the Winooski River	Barre Town Garage Bioretention	SW	$6,978	Winooski
Washington	Barre Town	Friends of the Winooski River	Barre Town School Infiltration Swale and Basin	SW	$7,207	Winooski
Washington	Barre Town	Friends of the Winooski River	Barre Town School Parking Lot Bioretention	SW	$6,520	Winooski
Washington	Montpelier	Friends of the Winooski River	Hubbard Park Road System and Frog Pond Final Designs	Roads	$13,629	Winooski
Washington	Northfield	Friends of the Winooski River	Camp Wihakowi Dam Removal Final Design	NR	$24,042	Winooski
Washington	Plainfield	Friends of the Winooski River	Recreation Road gullies study	NR	$20,268	Winooski
Washington	Waterbury	Vermont Department of Forests Parks and Recreation	Cotton Brook Culvert Upgrades	SW	$130,800	Winooski
Washington	Waterbury	Vermont Department of Forests Parks and Recreation	Waterbury State Park Shoreline Bioengineering Restoration	NR	$18,275	Winooski
Washington	Warren	Warren Town	Fuller Hill Road, Warren Stormwater Treatment Implementation	SW	$93,000	Winooski
Washington	Warren	Warren Town	Warren School Campus Stormwater Management	SW	$5,864	Winooski
Washington	Warren	Warren Town	Warren School Campus Stormwater Management - Raingarden	SW	$6,500	Winooski
Washington	Warren	Warren Town	Warren School Campus Stormwater Management - Subsurface Chambers	SW	$22,051	Winooski
Washington	Middlesex	Winooski Natural Resources Conservation District	Shady Rill Recreation Area Floodplain Restoration	NR	$10,580	Winooski
Washington	Middlesex	Winooski Natural Resources Conservation District	Shady Rill Road Stormwater Design	SW	$10,420	Winooski
Washington	Waterbury	Winooski Natural Resources Conservation District	Thatcher Brook Elementary School Stormwater Management	SW	$9,038	Winooski

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Windham	Grafton, Rockingham	Windham County Natural Resources Conservation District	Saxtons River buffer plantings	NR	$2,872	West, Williams and Saxtons
Windham	Marlboro	Windham County Natural Resources Conservation District	Marlboro Auto Shop Floodplain Restoration	NR	$5,392	Deerfield
Windham	Newfane	Windham Regional Commission	Adams Brook Stream Bank and Floodplain Restoration Implementation	NR	$73,056	West, Williams and Saxtons
Windsor	Norwich	Connecticut River Conservancy	Norwich Reservoir Dam Removal	NR	$287,545	Stevens, Wells, Waits and Ompompanoosuc
Windsor	Springfield	Ottauquechee Natural Resources Conservation District	Springfield Transfer Station Infiltration-Detention Basin Implementation	SW	$141,032	Black and Ottauquechee
Windsor	Bethel	Vermont Fish and Wildlife Department	Route 107 - FWD Floodplain Restoration - Bethel	NR	$20,000	White
Windsor	Bethel	White River Partnership	Bethel RCE Outreach - Third Branch White River	NR	$20,394	White
Windsor	Rochester	White River Partnership	Rochester Stormwater Master Plan - Basin 9	SW	$20,449	White
Windsor	Royalton	White River Partnership	Upper and Lower Eaton Dam Removal Design	NR	$29,062	White