Vermont Nonpoint Source Management Program
2017 Annual Report

A Report Submitted to the U.S. Environmental Protection Agency Region 1
on Progress Implementing the Vermont Nonpoint Source Management Program

June 15, 2018

Vermont Department of Environmental Conservation
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05602

Table of Contents

Introduction 3
Section 319-Funded Statewide Programs and Watershed Projects 5
Section 319 Funded Statewide Programs 5
Nonpoint Source Program Management/Administration 5
Continued Coordination with USDA-NRCS 7
Total Maximum Daily Load Development 9
Stormwater Management Priority Focus Areas 10
River and River Corridor Management 12
Lakes and Ponds Watershed and Shoreline Management 13
Agency of Agriculture, Food and Markets Nonpoint Source Programs 15
Completed Section 319 and Leveraged Watershed Projects 15
Completed Section 319 Projects 15
Completed Leveraged Watershed Projects 15
Ongoing Section 319 and Leveraged Watershed Projects 16
Section 319 Projects 16
Leveraged Watershed Projects 16
Summary of Water Quality Improvements 16
Appendices 18
Appendix A – Nonpoint Source Management Program Milestones 20
Appendix B – Section 319 Leveraged Watershed Projects and Status 30
Appendix C – Section 319 Leveraged Watershed Projects Completed in FFY 2017 and Results 34

Introduction

This *Vermont Nonpoint Source (NPS) Management Program 2017 Annual Report* addresses milestones and progress updates for the federal fiscal year (FFY) 2017 reporting period (October 2016-September 2017). During this reporting period, the State of Vermont has made substantial progress completing major milestones associated with the *Vermont NPS Management Program*[1], also driven by:

- The passage of the Vermont Clean Water Act (2015 Act 64): Vermont water pollution control statute, signed into law June 2015, strengthening statewide regulatory and financial support aimed at reducing water pollution with a focus on sediment and nutrient pollution (phosphorus and nitrogen).
- The approval of the *Phosphorus Total Maximum Daily Loads (TMDLs) for Vermont Segments of Lake Champlain:* A restoration plan developed by the U.S. Environmental Protection Agency (EPA) that evaluates current phosphorus pollution loading into Lake Champlain and establishes reduction targets to restore water quality.
- The completion of the *Lake Champlain TMDLs Phase 1 Implementation Plan:* The Framework of interagency programmatic milestones and actions required to implement the Lake Champlain TMDL.

Water quality issues and threats in the State of Vermont are caused primarily by nonpoint sources of water pollution. Nonpoint sources are diffuse precipitation and snowmelt-driven sources of water pollution. As a result, NPS Management Program activities are integrated in much of the water quality work completed by the Agency of Natural Resources' (ANR) Department of Environmental Conservation (DEC) Watershed Management Division (WSMD) and Department of Forests, Parks and Recreation (FPR); Agency of Agriculture, Food and Markets (AAFM); and Agency of Transportation (VTrans).

Noteworthy Vermont NPS Management Program accomplishments[2] during the reporting period include:

- Secured additional $48 million in the state budget above baseline spending over two years to support costs of clean water compliance in Vermont and began allocating capital funds through the Clean Water Fund Board public budget process.[3]

---

[1] The Vermont Nonpoint Source Management Program Plan finalized and approved August 2015: http://dec.vermont.gov/watershed/cwi/reports.

[2] Listed NPS accomplishments are not necessarily the result of efforts assisted in whole or in part by Section 319 funds.

[3] Additional $48 million in state budget represents state dollars except $10.8 million Federal Highway Administration funds, allocated by the VTrans and the State Legislature to support clean water work.

- Initiated NPS projects across Vermont that were assisted by nearly $23 million in clean water funding across the AAFM, ANR, VTrans, and Vermont Housing and Conservation Board.[4]
- Finalized Tactical Basin Plans for the Lamoille and Missisquoi river basins in December 2016.
- Reported recommendations for management of subsurface tile drainage on agricultural fields to the Legislature.
- Established an Environmental Stewardship Incentive Program to recognize farmers that go above and beyond required conservation practices for water quality.
- Updated the Vermont Water Quality Standards rule, pursuant to new legislation, to include a new tier that will allow for an upward reclassification of designated uses to a new, more protective class.
- Developed the Municipal Roads General Permit (MRGP) standards to minimize erosion and polluted runoff from roads statewide.
- Established the Municipal Roads Grants-in-Aid Program with participation from 75 percent of Vermont municipalities to bring whole road segments into compliance with MRGP standards.
- Continued Green Infrastructure Collaborative between DEC and Lake Champlain Sea Grant and conducted outreach to a variety of audiences on green stormwater infrastructure (GSI).
- Began implementation of Municipal Separate Storm Sewer System (MS4) flow restoration plans for stormwater impaired brooks.
- Developed a statewide River Corridor Base Map with 2,200 miles of field-based data in the ANR Stream Geomorphic Data Management System to inform permitting, planning, and project prioritization.
- Supported several lake communities in developing voluntary "Implementation Teams" to coordinate work among partners taking protective measures in lake watersheds, including Lake Bomoseen, Lake St. Catherine, and Lake Carmi.

Appendix A shows the entire suite of NPS-related goals, objectives, milestones, and respective completion year based on the Vermont NPS Management Program. A brief progress update is provided for those NPS milestones that were anticipated to be initiated or completed during 2017.

[4] Source: *Vermont Clean Water Initiative 2017 Investment Report* (http://dec.vermont.gov/watershed/cwi/cwf#report). $23 million represents dollars obligated/awarded to clean water projects in state fiscal year (SFY) 2017 through grants and contracts, or financed through loans, administered by the State of Vermont. Investments reported include state and federal dollars awarded to projects by state agencies, but excludes federal funds awarded to projects directly by federal agencies.

Section 319-Funded Statewide Programs and Watershed Projects

SECTION 319 FUNDED STATEWIDE PROGRAMS

DEC's FFY 2017 Section 319 federal funding award totaled approximately $1.18 million, of which approximately 84 percent was used to carry out DEC's specific NPS activities on a statewide basis. The six NPS-related programs within DEC's WSMD, which utilized 2017 Clean Water Act Section 319 funds, supports approximately 11 full time equivalents (FTE) as follows:

- NPS program management/administration and support (0.88 FTE)
- TMDL development (1 FTE)
- Stormwater management/control (0.8 FTE)
- River and river corridor management (improvement and protection) (5.6 FTE)
- Lake and pond watershed and shoreline management (1.65 FTE)
- Water quality planning and assessment (1.15 FTE)

Further information about these program activities and respective accomplishments during the reporting period are summarized below. The Section 319 award to Vermont DEC is included as part of Vermont's Performance Partnership Agreement (PPA) with EPA. DEC's annual report to EPA under the PPA provides more detailed information about additional water quality-related priorities and commitments under the PPA.

Nonpoint Source Program Management/Administration

Federal Funding – Clean Water Act Section 319

DEC continued implementation of the 2015-2019 Vermont NPS Management Program, approved by EPA Region 1 in August 2015, during the reporting period. DEC developed and gained EPA approval of the workplan associated with FFY 2017 Section 319 funding. Consistent with EPA program guidance, DEC continued using Section 319 funds to support personnel working under the NPS management program and leveraged $1.18 million in state-funded NPS projects, in addition to providing the required 40 percent non-federal match. DEC's $1.18 million in state-funded watershed projects, which leverage Section 319 funding, were reported in the EPA Grants Reporting and Tracking System (GRTS). DEC awarded $187,431 in Section 319 funds to the Vermont AAFM to support their work on the management of agricultural NPS pollution across Vermont.

Federal Funding – Clean Water Act Section 604(b)

DEC continues to manage water quality and NPS planning activities carried out by the 11 Regional

Planning Commissions (RPCs) with grant funds under federal Clean Water Act Section 604(b). For this reporting period, DEC received $100,000 Section 604(b) funds, of which $60,000 support DEC staff activities and $40,000 support RPC activities related to water quality planning, assessment, and listing. In 2017, DEC awarded another year of 604(b) funding to RPCs, incorporating support for DEC's work in protecting waterways through the identification of high priority projects from sector-based assessments that will be entered into DEC's Watershed Projects Database. Relevant assessment types include stormwater master plans, road erosion inventories to support stormwater planning for municipal roads, river corridor plans, illicit discharge detection and elimination reports, or other appropriate assessments including municipally-developed stormwater, green stormwater infrastructure, hazard mitigation, or other planning assessments with water quality relevance. Additionally, some RPCs may assist in the identification of priority surface waters for designation of Outstanding Resource Waters (ORW) or reclassification of surface waters to Class B1 or A1. This work will involve ongoing data/information collection, fact finding, and public outreach regarding potential rulemaking resulting in designation of specific waters as Outstanding Resource Waters, pursuant to the Vermont Water Quality Standards amendments and the Vermont Wetlands Rules. In addition to 604(b) funds, DEC awarded $330,000 in state funds to RPCs to support Tactical Basin Plan development and outreach in 2017.

State Clean Water Funding – Ecosystem Restoration Capital Funds and Clean Water Funds

The State of Vermont offers clean water funding across state agencies from a variety of sources, including Clean Water Fund (CWF), capital, transportation, and general fund dollars. Vermont's CWF was established in July 2015 under Act 64, known as the Vermont Clean Water Act. CWF dollars are allocated by the CWF Board, made up of secretaries of the Vermont Agencies of Administration; Agriculture, Food and Markets; Commerce and Community Development; Natural Resources; and Transportation, through an annual budget process with public participation opportunities. In addition, all state expenditures made across agencies in clean water are reported to the legislature in the *Vermont Clean Water Initiative Annual Investment Report* (http://dec.vermont.gov/watershed/cwi/cwf#report).

DEC Clean Water Initiative Program staff supported the CWF Board in completing the state fiscal year (SFY) 2018 CWF budget process, developing the *Vermont Clean Water Initiative 2017 Investment Report*, and continued allocating CWF dollars, along with other state dollars, to projects through the Program's Ecosystem Restoration Grants, as well as the new Municipal Roads Grants-in-Aid Program and multi-sector block grants.

DEC staff, working under Vermont's NPS Management Program, assisted in the review, selection, initiation, and completion of NPS projects funded under Ecosystem Restoration Grants. Staff also continued to work closely with Vermont Department of Fish and Wildlife and serve as co-administrator in the delivery of the 2017 Watershed Grants Program, a water quality, NPS, and aquatic habitat improvement program funded by the sale of Vermont conservation license plates.

Concurrently with Vermont's budgeting, granting, and reporting processes, ANR and DEC leadership facilitated a six-member Working Group on Water Quality Funding pursuant to Section 26 of Act 73 of 2017. The Working Group was chaired by the ANR Secretary and evaluated existing sources of funding and drafted recommendations to establish equitable and effective long-term funding methods to support clean water efforts in Vermont. The *Report of the Working Group on Water Quality Funding* was submitted to the Legislature on November 15, 2017 (http://anr.vermont.gov/about/special-topics/act-73-clean-water-funding). The report built on the Office of the State Treasurer's Clean Water Report by re-evaluating the costs of clean water compliance in SFY 2020-2024.

Nonpoint Source Projects

During the reporting period, DEC Staff were directly involved with many noteworthy NPS related projects and initiatives:

- Provided management and oversight to University of Vermont (UVM) Extension and Poultney-Mettowee Natural Resource Conservation District in the continued delivery of agronomy and conservation assistance work directed at farms in Vermont watersheds of the Lake Champlain basin.
- Provided support to UVM Extension, and local watershed groups in the Lake Carmi area, evaluating agricultural and land use opportunities for phosphorus reduction.
- Continued coordination with the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in priority subwatersheds, participating with assessment, data-sharing, and planning, as well as coordinating with outreach and implementation.
- Managed several grants with UVM Extension and Friends of Northern Lake Champlain to increase precision manure management, reduce fall tillage, increase cover crops, and pilot a two-tiered ditch installation in a farm field.
- Continued support and oversight of Green Infrastructure Collaborative between DEC and Lake Champlain Sea Grant. DEC and Lake Champlain Sea Grant co-fund and oversee a GSI Coordinator position that works on GSI education, technical assistance, and project evaluation, as well as coordinates the GSI Roundtable.
- Reviewed and selected proposals submitted to New Hampshire Charitable Foundation for the Upper Connecticut River Mitigation and Enhancement Fund, a grant program intended to improve river corridor and wetland habitat in the Upper Connecticut River watershed.

Continued Coordination with USDA-NRCS

DEC staff continued to participate as a member of NRCS State Technical Committee (STC) to direct cost-sharing assistance programs for Vermont landowners seeking to implement conservation practices. Staff

coordinate with NRCS and AAFM on nutrient management planning and to use resources efficiently.

USDA-NRCS National Water Quality Initiative

In FFY 2017, DEC staff continue to be fully engaged with NRCS under the National Water Quality Initiative (NWQI) program in Vermont. The NWQI focuses conservation funding on priority HUC-12 watersheds, as recommended by state water quality agencies, for addressing agricultural sources of NPS pollution. DEC coordinated with the Vermont Office of NRCS on NWQI watershed identification and selection and, when applicable, coordinates Section 319-funded activities occurring in NWQI watersheds. For designated NWQI watersheds, DEC ensures water quality monitoring data is made available to NRCS to help partner agencies assess water quality improvements in NWQI watersheds. As of FFY 2017, the Rock River watershed in Franklin County is the sole NWQI watershed in Vermont where cost-share dollars are targeted for conservation practice implementation.

Two additional HUC-12 watersheds were selected as NWQI pilot projects for new assessments in December 2016, including the East Creek in the South Lake Champlain basin and Hungerford Brook in the Missisquoi River basin. DEC staff coordinated with NRCS to start the assessment and planning process in 2017-2018.

USDA-NRCS Region Conservation Partnership Program Grants

DEC coordinates with partners on multiple NRCS Regional Conservation Partnership Program (RCPP) grants in the State of Vermont. DEC received the Lake Champlain RCPP grant in April 2015 focused on implementing agricultural and forestry conservation practices, as well as wetland protection projects. Accomplishments of the Lake Champlain RCPP to date are summarized as follows:

- $9.9 million was allocated to Vermont and $1 million to New York for on-farm conservation practices through the **NRCS Environmental Quality Incentive Program (EQIP**). Funding is available for development of farm conservation plans and agricultural and forestry water quality improvements. All forestry funds ($357,800) have been allocated in 31 contracts. An additional $150,000 has been added to this pool to address the ongoing interest in this program. $3.3 million of financial and technical EQIP funds were obligated to 29 farmers for agricultural conservation practices, including: production area and barnyard management, livestock exclusion fencing, nutrient management planning, and agronomic practices such as cover cropping.
- $4 million is allocated in Vermont to the **Agricultural Conservation Enhancement Program** for Agricultural Land Easements. $2.6 million of technical support and conservation easement funds have been obligated on 9 parcels of priority agricultural land.
- $1 million is allocated in Vermont to **Wetlands Reserve Easements (WRE)**. Through this program, landowners are compensated for retiring land from agriculture in perpetuity and

restoring wetland functions and values. As match, the State of Vermont is developing a wetlands payment calculator that will determine an incentive payment to accelerate landowner participation in high priority wetland, riparian, and floodplain restoration projects. The State of Vermont is providing cash payments to pilot this innovative approach. $422,449 of WRE funds have been obligated to three key wetland restoration projects. Each received the DEC wetland incentive payment. DEC committed $102,888 of additional payments to incentivize landowners of five high priority areas to protect critical wetlands. Of these projects, 2 have closed and received these payments. The remaining projects will close in the next fiscal year.

DEC has also coordinated with multiple partners in establishing and providing support for other RCPP grants in Vermont, summarized here:

- *The Memphremagog Long-term Water Quality Partnership RCPP Grant* ($674,000), led by the Orleans County Natural Resources Conservation District, target sub-watersheds where water quality sampling indicates significant contributions of phosphorus loading from agricultural lands to the phosphorus-impaired Lake Memphremagog and a nutrient-impaired stream within the Tomifobia River watershed. Partners will plan and implement key conservation practices on agricultural land to improve water quality. DEC provides full administrative support, as well as technical support.
- *The Nutrient Management Planning Training Program for Farmers and Conservation Practice Implementation Follow-Up RCPP Grant* ($800,000), led by the Vermont Association of Conservation Districts in Partnership with the fourteen Natural Resource Conservation Districts, UVM Extension, and Vermont NRCS. The project will assist small farm operators in the development of nutrient management plans to improve water quality by reducing phosphorus and the other nutrient loading from small livestock farm operations in the Lake Champlain basin and beyond.
- *Long Island Sound Watershed-Development of Whole-farm Management Certainty Program RCPP Grant* ($10 million), led by the Connecticut Council on Soil and Water Conservation, is addressing excess nutrients that have been identified as the primary cause of hypoxic conditions in Long Island Sound. The project will develop a comprehensive, whole-farm management certainty program for farmers and will utilize both working lands and easement programs to improve soil health and nutrient management.

Total Maximum Daily Load Development

DEC staff completed impaired waters remediation planning, TMDL planning and development, and continued 303(d) assessment activities during this reporting period.

TMDL development activities included:

- The Lake Memphremagog phosphorus TMDL was completed and approved by EPA and encompasses portions of both Vermont and Quebec and requires an overall phosphorus

reduction of 23 percent.

- Two TMDLs addressing nonpoint source temperature impairments in Moon and Mussey Brooks were drafted and released for public comment. These TMDLs modeled optimal solutions to remedy thermal inputs including increasing streamside buffers, shading, and on-stream pond manipulations.
- TMDL methodologies were initiated for a chloride TMDL in Sunnyside Brook. This methodology will be transferable to an emerging water quality problem identified in the state.
- NPS phosphorus TMDLs are under development for five small streams in the Missisquoi basin of Lake Champlain.

Activities related to the Long Island Sound Nitrogen TMDL include representing Vermont on EPA's Nitrogen Reduction Strategy Technical Work Group. This group reviews EPA and contractor work in the development of nitrogen thresholds and ultimately nitrogen allocations to the states.

Ongoing TMDL-related work included support for the development of Tactical Basin Plans that serve as Lake Champlain TMDLs Phase 2 Implementation Plans. This work involves developing five-year phosphorus reduction targets for each sector (e.g., agriculture, roads, etc.) necessary to meet each basin's TMDL reduction targets. Planning work during the reporting period was completed for Northern and Southern Lake Champlain direct drainage basins.

Considerable time was devoted to EPA's national TMDL/303(d) Program "Vision," including participation in multiple webinars and conference calls and the national TMDL workshop held by EPA in Shepherdstown, West Virginia.

Ongoing work continued related to alternative water quality remediation plans including remediation plans for habitat and water quality improvements at Jay Peak, Stowe, and Stratton mountain resorts. These efforts involve reviewing and commenting on annual reports on implementation progress, conducting site visits, and holding annual public meetings.

The 2018 303(d) assessment and listing process was initiated for the biannual listing cycle.

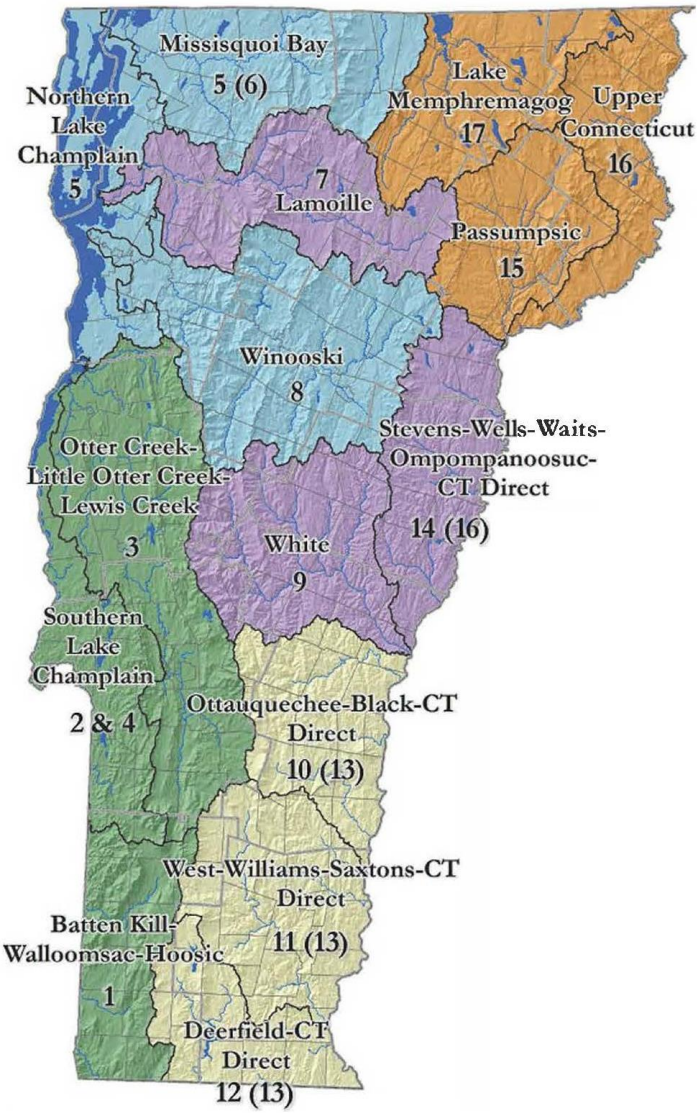
Stormwater Management Priority Focus Areas

Municipal Stormwater Mapping and Stormwater Permit Inspections

DEC staff provided final reports and stormwater infrastructure maps to 19 towns and 3 ski areas in the West, Williams, Saxtons River, Connecticut River Direct watersheds (see Figure 1, Basin 11, below) during this reporting period. Towns include: Chester, Dummerston, Grafton, Guilford, Jamaica, Londonderry-Magic Mountain, Marlboro, Newfane, Peru-Bromley, Putney, Reading, Rockingham, Stratton-Stratton Mountain, Townshend, Vernon, Wardsboro, West Brattleboro, Westminster, Weston, and Winhall.

Contacts were made, and field work was conducted with all towns in the Batten Kill-Walloomsac-Hoosic watersheds (see Figure 1, Basin 1, below). Towns include: Arlington, Dorset, Manchester, Pownal, Shaftsbury, Stamford, Sunderland, and Woodford. Bennington was previously done in 2015. Data were also collected for the towns of Alburgh, Berkshire, Bloomfield, Charleston, Corinth, Guildhall, Lincoln, North Montpelier, Roxbury, Sheffield, Sheldon, Smugglers Notch Ski Area, Strafford, Thetford, Topsham, Vershire, Waterbury Center, Waterville, Wheelock, and Woodbury. DEC staff inspected 104 stormwater permitted facilities in Basin 1 and other towns listed above and began preparation of findings for the Stormwater Program.

Figure 1. Tactical Basin Planning boundaries by watershed name and number.



Illicit Discharge Detection and Elimination

DEC staff participated in public notice of illicit discharges and oversaw five illicit discharge detection and elimination (IDDE) contracts during the reporting period. Contracts awarded or managed during this period involved IDDE work in the White River watershed (Basin 9), City of Montpelier (Basin 8), Ottauquechee-Black-Connecticut River watersheds (Basin 10), and statewide IDDE follow-up. Figure 1, above, shows watershed/basin boundaries by name and basin number. Eleven illicit discharges are under investigation in Barre City and several are scheduled to be eliminated. New illicit discharges have been found in Alburgh, Bennington, East Montpelier, Hyde Park, Montpelier, and Woodstock.

Grant Technical Assistance and Education

During the reporting period, the DEC staff participated in the Chittenden County Regional Stormwater Education Program steering committee meetings. Staff have collaborated with the U.S. Geological Survey (USGS) New England Water Science Center, the University of Vermont, 7 municipalities, and the Chittenden County Regional Planning Commission to conduct a two-year study on the effectiveness of street cleaning practices and cleaning strategies for improving phosphorus reduction. Staff met with numerous towns on stormwater retrofit projects and provided technical assistance on final designs. Staff are working on a Shelburne Bay gravel wetland project in collaboration with the Town of Shelburne. Staff provided technical and GIS assistance in development of the MRGP. Road segments with stormwater collection systems have been added to the MRGP hydrologically connected road segment database for almost the entire state.

Stormwater Master Planning

DEC staff provided technical assistance to the City of Burlington, towns of Fayston, Richmond, and Underhill, and the Friends of the Mad River, on five Stormwater Master Plan (SWMP) projects.

River and River Corridor Management

DEC Rivers Program field staff receive and respond to an average of 10 new requests per day from landowners, municipalities, and other state agencies for technical and regulatory assistance on river and floodplain projects. In FFY 2017, Rivers Program staff provided technical assistance on 3,634 projects, permitted 1,064 projects, and offered 260 hours of training. This level of interaction shows that adoption of new state river conservation policies and the establishment of the Vermont Rivers Program has increased awareness of the environmental damage and erosion hazards of river and floodplain encroachments.

The Section 319-funded river engineers and scientists play a critical role in providing technical and regulatory assistance based on sound river science. With science-based rules, technical assistance, and training, Vermont is protecting flows and managing streams toward their least erosive, equilibrium

condition. Resolving conflicts between human activities and development and river dynamics is resulting in the restoration of floodplain functions and the long-term reduction of nutrient and sediment pollution driven by erosion of stream banks.

The Rivers Program was in the process of completing revisions to the statewide River Corridor Base Map during this reporting period, with 2,200 miles of field-based data in the ANR Stream Geomorphic Data Management System. The new maps will be shared with all affected municipalities and adopted for use in Act 250 development reviews. ANR river corridor planning is also being melded with VTrans transportation corridor planning. A computer application is being developed to identify mitigation activities for road-river hazards related to flood inundation, fluvial erosion, and deposition. These efforts support the water quality, flood resiliency, and hazard mitigation cobenefits of improved natural stream stability and floodplain function.

Lakes and Ponds Watershed and Shoreline Management

The DEC's Lakes and Ponds Program focused work in 2017 on two strategic priorities identified in the Program's 2016-2018 Strategic Plan:

- Better integrate Lakes and Ponds Program priorities into the Tactical Basin Planning process.
- Empower lake leaders to participate in monitoring and managing their lakes.

An annual monitoring summit was integrated into the planning process for each summer field season to better integrate the Lakes and Ponds Program's monitoring efforts into the WSMD's Tactical Basin Planning process. Representatives from across the Division came together for a pilot summit in early June 2016 and official monitoring summits were held in February 2017 and 2018. Goals of each summit are to review water quality challenges in each of the three basins that are next in the pipeline for the assessment phase of Tactical Basin Planning, prioritize sites for monitoring during the coming field season, and coordinate monitoring efforts across the Lakes and Ponds, Monitoring, Assessment and Planning, Rivers, and Wetlands Programs.

The Lakes and Ponds Program also continued to grow its volunteer monitoring programs during 2017 and anticipates further growth in 2018. The Vermont Lay Monitoring program added 10 lakes in 2017, bringing the total inland lakes monitored to 75 with 12 additional stations on Lake Champlain. Twenty-seven waterbodies were covered by public access greeter programs in 2017. DEC staff provided technical assistance, sample identification, and general support to all active programs. Five formal greeter trainings were offered in locations statewide in the spring and early summer. Staff also provided aquatic nuisance species sample identification support to the Lake Champlain Boat Launch Steward Program. In 2017, 23,547 watercrafts were inspected in Vermont. During these inspections, greeters intercepted and removed 517 instances of aquatic invasive species, roughly 61 percent of recorded intercepts. Two new greeter programs are slated to begin operation in 2018.

Volunteer monitors and greeters often take leadership roles in their local lake associations and the statewide Federation of Vermont Lakes and Ponds (FOVLAP). Don Weaver, the current president of FOVLAP, began his work with Vermont lakes as a lay monitor and recognizes the potential of such citizen science initiatives to grow the number of lake leaders in Vermont. The Lakes and Ponds Program collaborates closely with FOVLAP in planning events to further empower lake leaders to participate in monitoring and managing their lakes. In 2016, lower attendance than usual at the annaul Lake Seminar, co-sponsored by DEC and FOVLAP, inspired the Lakes and Ponds Program to plan a series of webinars as an alternative source of training. The first webinar, describing the newly updated Vermont Inland Lake Score Card, was held in spring 2017. In 2018, the Program plans to hold a webinar on managing private roads to prevent sediment erosion.

Another important volunteer program is Vermont Lake Wise. The Shoreland Protection Act of 2014 prescribed protective measures for the 55% of Vermont shorelines not yet developed; however, it left restoration of previously developed shorelands voluntary. Replanting cleared areas and stabilizing eroding shorelines are critical actions for protecting water quality and improving shallow-water habitat. The Lake Wise Program provides technical assistance to shoreland property owners seeking to restore previously developed property. In 2017, many successful voluntary projects were implemented across the state. Below are three examples of projects completed with technical assistance from the Lakes and Ponds Program:

- Sand is not stable, especially in man-made beach areas. The Town Beach at Shadow Lake in Glover was washing into the lake, eroding the beach area and degrading water quality and shallow water habitat. Simply adding more sand to the beach was not a sustainable or ecological solution. To protect the beach and lake, upland stormwater treatments were installed, including plantings along the slope between the road and the recreational area, waterbars in the pathway to the beach, and two rain gardens to help absorb and infiltrate upland runoff.
- Ever since Champion International Paper sold off its land in 1998 around Maidstone Lake in the Northeast Kingdom, there has been a surge in private shoreland development. In 2017, several Maidstone shoreland owners participated in Lake Wise with assistance from the Essex County Natural Resources Conservation District and the Northwoods Stewardship Center. Shoreland best management practices (BMPs) installed included structural techniques, like waterbars in driveways to slow and dissipate the runoff and infiltration stairs to create stable permeable pathways. Several non-structural BMPs were also used, including native plantings that increased storm resiliency on properties while providing filtration, bank stability, and wildlife benefits.
- Brighton State Park on Island Pond received a permeable ADA compliant, meandering pathway through a shoreline stabilized with fiber coir rolls and encapsulated soil lifts held together with hundreds of newly planted native species. ANR engineers designed this beautiful ecological plan according to Department of Forests, Parks and Recreation needs and Lake Wise criteria.

Finally, to further empower lake leaders, the Lakes and Ponds Program supported several lake communities in developing voluntary "Implementation Teams" to coordinate work among partners taking protective measures in lake watersheds. Lake Bomoseen, Lake St. Catherine, and Lake Carmi communities each face unique challenges as they manage water quality and protect wildlife habitat. Lake Implementation teams bring together representatives from regional planning commissions, conservation districts, lake associations, watershed associations, state agencies, and other conservation groups with the Watershed Management Division's regional basin planners to review results of monitoring, identify important projects, provide input to Tactical Basin Plans, secure funding, and implement projects. The Lake Carmi Implementation Team, first established in 2015, not only serves the purpose of coordinating work in the watershed but also, as of 2017, has become a critical communication hub as work accelerates in the watershed and in the lake to prevent intense cyanobacteria blooms.

Agency of Agriculture, Food and Markets Nonpoint Source Programs

The remaining 16 percent of Vermont's 2017 Section 319 award was passed through by DEC to the Vermont Agency of Agriculture, Food and Markets (AAFM). AAFM used 2017 Section 319 funds to carry out portions of its agricultural NPS reduction program across the state. AAFM's agricultural NPS program, assisted by Section 319 funds, involves:

- Engineering technical assistance to landowners on BMP, conservation practice, and waste management recommendations and designs;
- Coordinating with NRCS in the review and certification of BMPs receiving federal and state cost-share funds; and
- Watershed planning and implementation assistance for agricultural NPS pollution.

Completed Section 319 and Leveraged Watershed Projects

COMPLETED SECTION 319 PROJECTS

No Section 319-funded projects were completed during this reporting period. DEC has not awarded Section 319 funds to watershed projects since 2011.

COMPLETED LEVERAGED WATERSHED PROJECTS

Vermont DEC retains and expends "Section 319 watershed funds" for NPS program purposes, and therefore is required to leverage Section 319 funds with state-funded NPS projects. Each year, DEC and EPA agree on specific state-funded NPS projects that qualify as Section 319 leveraging. In FFY 2017, 15 state-funded leveraged NPS projects were completed. The results of these projects are summarized in Appendix C of this report and are also reported in EPA's Section 319 Grants Reporting and Tracking

System (GRTS). Where feasible, DEC reports on the estimated NPS pollution reductions accomplished by completed projects. It is important to note that pollutant reductions reported are estimates. Actual pollutant reductions, typically measured through monitoring over time, are influenced by a range of factors such as BMP type, maintenance status, land use changes, and variations/extremes in weather (e.g., precipitation and runoff).

Appendix B of this report summarizes the status of all Section 319 leveraged watershed projects from FFY 2014 through FFY 2017. Additional details on all listed projects, completed or active, can be obtained by contacting the Vermont NPS Coordinator.

Ongoing Section 319 and Leveraged Watershed Projects

SECTION 319 PROJECTS

There are no active Section 319-funded NPS projects in Vermont. DEC has not awarded Section 319 funds to watershed projects since 2011.

LEVERAGED WATERSHED PROJECTS

Appendix B of this report lists NPS projects used for Section 319 leveraging purposes from FFY 2014 through FFY 2017. The status of projects (ongoing, completed, discontinued) are noted along with completion dates (where applicable). The 15 projects completed within FFY 2017 are described in Appendix C of this report.

Summary of Water Quality Improvements

DEC documented considerable success of multiple long-term remediation plans at high elevation ski area headwaters, including impaired waters near Stratton Mountain Resort, Stowe Mountain Resort, and Jay Peak Resort. As part of the 2018 listing cycle, DEC is proposing to delist three of these waters because after several BMP installations and remediation efforts, the waters now meet water quality standards. These include:

- Jay Branch and Tributary #9 to Jay Branch: These two segments are near Jay Peak Resort and were previously assessed as impaired due to sediment, impacting the aquatic biota. However, after several years of remediation activities, the past two years of biomonitoring show healthy waters that are compliant with the water quality standards.
- Big Spruce Brook: This segment, near Stowe Mountain Resort, has been delisted due to reduced sediment load impacting the aquatic biota. While the segment remains impaired due to iron discharges from groundwater, the sediment load no longer appears to be having a negative

impact. Several measures to control nonpoint sources of sediment have been implemented in the small watershed.

- Styles Brook: This impaired segment, near Stratton Mountain Resort, has shown considerable improvement in the aquatic biota in the last several years and is on the cusp of compliance with water quality standards. Multiple sediment control measures have been installed over the years and full compliance is expected in the near-term. Another stream associated with this ski area, Tributary #1 to Ball Mountain Brook, had been previously delisted in recent years as part of the same remediation planning efforts.

Also, as part of the 2018 listing cycle, another nonpoint source impaired water is scheduled for delisting:

- A one-mile reach of Little Otter Creek, previously assessed as impaired due to sediment and nutrients, now shows healthy aquatic biota and the water is now considered in compliance with the water quality standards. While it's difficult to point to a specific set of remediation measures causing this change in the agriculturally dominated watershed, it's likely that improved management over the years has led to this improvement.

DEC has documented the restoration of several NPS-impaired waterbodies in prior reporting periods. DEC helped to develop a New England region-leading number of NPS Success Stories that can be found on the EPA website: http://water.epa.gov/polwaste/nps/success319/.[5] When and where appropriate, DEC will continue to combine NPS implementation efforts with water quality monitoring to document waters where water quality has been improved or fully restored.

[5] NPS success stories within Vermont, describing where surface water quality has improved or been restored, include: Adams Brook, Chase and Slide Brooks, Crystal Brook, Dowsville Brook, Joiner Brook, South Bay of Lake Memphremagog, Ompompanoosuc River and Lords Brook, Rice Brook, Shelburne Beach, Stone Bridge Brook, Taft Brook, and Whetstone Brook.

Appendices

APPENDIX A – NONPOINT SOURCE MANAGEMENT PROGRAM MILESTONES

APPENDIX B – SECTION 319 LEVERAGED WATERSHED PROJECTS AND STATUS

APPENDIX C – SECTION 319 LEVERAGED WATERSHED PROJECTS COMPLETED IN FFY 2017 AND RESULTS

Acronyms

AAFM	Agency of Agriculture, Food and Markets
ANR	Agency of Natural Resources
BMP	Best Management Practice
CSO	Combined Sewer Overflow
CWF	Clean Water Fund
DEC	Department of Environmental Conservation
EPA	Environmental Protection Agency
FFY	Federal Fiscal Year
FOVLAP	Federation of Vermont Lakes and Ponds
FPR	Department of Forests, Parks and Recreation
FTE	Full Time Equivalent
GRTS	Grants Reporting and Tracking System
GSI	Green Stormwater Infrastructure
IDDE	Illicit Discharge Detection and Elimination
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
NSECC	Natural Shoreland Erosion Control Certification
PPA	Performance Partnership Agreement
RCPP	Regional Conservation Partnership Program
RPC	Regional Planning Commission
SWMP	Stormwater Master Plan
TMDL	Total Maximum Daily Load
USDA	U.S. Department of Agriculture
UVM	University of Vermont
VTrans	Agency of Transportation
WRE	Wetlands Reserve Easement
WSMD	Watershed Management Division

AGRICULTURE

Required Agricultural Practices

Objectives	Actions by Agency of Agriculture, Food and Markets (AAFM)	Milestones	Schedule (2015 - 2019)	Progress
Update Acceptable Agricultural Practices (AAP) rule to become known as Required Agricultural Practices (RAP)	Improve and standardize buffer width requirement along perennial streams. Create buffer width requirement along field ditches. Improve management of field gully erosion. Reduce specified soil losses to "T." Expand/improve restriction affecting livestock exclusion.	Initiate education to agricultural community regarding potential new regulations. Initiate rulemaking. Complete rulemaking. Begin enforcement of new regulations to be known as RAP. Increased livestock exclusion from surface waters throughout Vermont.	2014 2015 - 2016 2016 2016 (revised 2017) 2016 (revised 2017)	RAPs updated, effective December 5, 2016. RAP implementation began July 2017. Outreach and education to agricultural producers ongoing. In state fiscal year (SFY) 2017, AAFM reported 242 hours of education provided to 3,389 attendees, primarily targeting agricultural producers with a focus on implementing the RAPs. AAFM began enforcement of updated RAPs in 2017 and expanded its enforcement programs to regularly inspect certified small farm operations.
Begin small farm evaluation/inspection process	Inspect small farms within high priority watersheds.	100% of small dairies evaluated in Missisquoi River basin and St Albans Bay watershed. 100% small dairies evaluated in South Lake watershed. All small dairies evaluated in other watersheds of Lake Champlain drainage (2020). Evaluation of small farms in VT outside Lake Champlain basin.	2015 - 2016 2016 - 2019 2015 - 2019 2018 - 2019	May 2015-June 2016 AAFM completed small farm survey in Northern Lake Champlain basin. AAFM has visited all small farm dairies and is on track to completing full inspections per schedule.
Create small farm certification of compliance (COC) process	Using partner groups and different outreach media, achieve greater awareness by farmers and VT residents of AAP/RAP existence and associated requirements. Achieve higher levels of AAP/RAP compliance.	Determine threshold level for COC requirement. Develop online COC process. Conduct education and outreach process. Require submittal of certifications.	2016 2018 2016 - 2019 2017	COC threshold established with RAP rulemaking, effective December 5, 2016. COC education and outreach has been done on all small farm dairies. Certified small farms were required to certify by January 31, 2018.
Create livestock exclusion financial incentive program	Reduce direct and indirect discharges from livestock accessing surface waters. Provide financial assistance tied to early adopters.	Program developed with declining cost share levels.	2016	AAFM has contracted with University of Vermont (UVM) Extension to develop a livestock exclusion incentive program.

Agricultural Permitting

Objectives	Actions by AAFM unless noted otherwise	Milestones	Schedule (2015 - 2019)	Progress
Conduct inspections on all Large Farm Operations annually (AAFM)	Minimize large farm operation (LFO) NPS pollution. Ensure LFO permit terms and provisions are being attained.	100% LFOs inspected annually.	Ongoing	In 2017, AAFM made 130 visits to LFOs. Of these, 103 were regulatory in nature to assess and support compliance with the LFO individual permits. There are 27 LFO farms in total and an inspection can either be partial, covering a specific item known to be problematic on the farm, or a comprehensive review of the whole farm.
Conduct inspections of Medium Farm Operations (AAFM)	Minimize medium farm operation (MFO) NPS pollution Increase frequency of annual MFO inspections.	20% MFO inspected per year. At least 25% MFO inspected per year.	2015 - 2016 2018 - 2019	In 2017, AAFM made 238 visits to MFOs. Of these, 179 were regulatory in nature to assess and support compliance with the MFO general permit. There are 139 MFO farms in total and an inspection can either be partial, covering a specific item known to be problematic on the farm, or a comprehensive review of the whole farm.
Enhance MFO inspection protocols	Improve MFO inspection methods concerning number and scope of field-based inspections.	Modified inspection methods put into place and utilized.	2014	MFO inspection process was updated to include revised inspection forms. AAFM revised the MFO general permit and submitted it for public comment. A response summary is being developed and the general permit will be finalized shortly. AAFM established protocols for performing field compliance checks utilizing nutrient management plans (NMPs) and sending all inspection staff to National Certified Investigator and Inspector Training Basic program.
Carry out joint DEC and AAFM inspections	Institute measures or protocol to ensure consistency between DEC and AAFM during farm inspection process.	Ten joint inspections per year starting 2015. Trainings for staff twice per year starting 2015.	2015 - 2019 2015 - 2019	Vermont Department of Environmental Conservation (DEC) and/or U.S. Environmental Protection Agency (EPA) performed 8 MFO inspections and 1 LFO inspection jointly with AAFM. DEC and AAFM held a joint inspection training to increase shared knowledge of agency practices and regulatory oversight and conducted 36 joint inspections. DEC staff conducted 11 additional inspections.
Improve compliance reporting	Increase coordination. Monthly meetings between DEC-Watershed Management Division (WSMD),	Compliance findings shared among agencies.	2015 - 2019	In 2016, AAFM referred 15 investigations to ANR. Investigations are referred to ANR where potential exists for a direct discharge.

Objectives	Actions by AAFM unless noted otherwise	Milestones	Schedule (2015 - 2019)	Progress
	DEC-CED and AAFM to share current activities. Quarterly meetings to include VAG.			

Agricultural Nutrient Management

Objectives	Actions by AAFM unless noted otherwise	Milestones	Schedule (2015-2019)	Progress
Increase development and implementation of NMP	Promote nutrient management by all agricultural producers. Educate agricultural producers about nutrient management, nutrient management plans and following plan recommendations. Demonstrate NMP successes. Note: all actions above can be assisted by DEC, University of Vermont (UVM) Extension, Vermont Association of Conservation Districts (VACD)	Develop NMP matrix and SFO template. Expand offerings of small farm NMP development courses/workshops. Provide increased cost sharing for NMP development. Develop and deliver NMP training program for technical service providers and custom manure applicators. Require certification of custom manure applicators. Develop educational courses for farmers.	2016 2017 2018 2017 2016 2016 - 2018	UVM Extension and the Vermont Association of Conservation Districts (VACD) held NMP training classes for approximately 50 farmers between January-March 2017. Custom applicator trainings were held in approximately 5 locations in February-March 2017 and reached about 80 farmers and businesses. Custom manure applicators are now required to be certified. Education courses for farmers are ongoing with funding from AAFM Clean Water Funds.
Improve field practice implementation	Identify a network of NMP adopters and practitioners of different farm sizes/types in different watershed settings. Develop articles regarding development and beneficial use of NMP. Expand use of manure injection and cover cropping whether seeded through conventional or aerial means. Note: all actions above can be assisted by UVM Extension, VACD	Technical and financial assistance supporting AAP and best management practice (BMP) implementation on small farms with emphasis on key supporting practices. Continue and increase targeted NMP outreach and technical assistance. Continue and expand, if funding allows, technical assistance efforts under Agronomy and Conservation Assistance Program (ACAP). Support existing farmer-led groups. Create/establish additional farmer-led groups. Increase participation with Conservation Reserve Enhancement Program (CREP) via increased enrollment leading up to RAPs for livestock exclusion. Improved accounting of acres cover-cropped and manure injected. Article(s) describing NMP related successes.	2015 - 2019 2015 - 2019 2015 - 2019 2015 - 2019 2016 2015 - 2017 2017 - 2019	In 2017, AAFM performed 253 technical assistance visits on small farms, and an additional 95 technical assistance visits on medium and large farms and spent $3.8 million on BMPs on all farms. AAFM continued support of NMP development through a $0.15 million grant to support Land Treatment Planning staff at VACD. AAFM also provides matching funds for a Regional Conservation Partnership Program (RCPP) grant that helps farmers who wish to develop their own NMP through a course taught by UVM Extension. Funding for ACAP personnel is in place and continues through December 2018. AAFM continues to help farmer-led groups through education and outreach activities. Three groups are receiving grant funding to support their education and outreach activities that relate to nutrient and erosion reductions from farms. AAFM continues to support the CREP program. Natural Resources Conservation Service (NRCS) conducted trainings for staff to increase their outreach and technical support. AAFM provided funding for practices not able to be funded by NRCS through its BMP Program and Farm Agronomic Program. AAFM issued approximately $800,000 in State Clean Water Funds, as well as additional AAFM BMP funds to partners through a grant program targeted at phosphorus reduction strategies, increased outreach and education, and partner organizational capacity.
Improve tile drain effluent management	Assess tile drain management efforts underway elsewhere in northeast, USA and Canada. Develop guidance concerning tile install and managing tile effluent. Consider tile drain regulatory provisions to AAPs or farm permits. Develop tile drain install tracking procedures.	Bibliographic citations on tile drainage management (output from the Lake Champlain Basin Program, or LCBP). Interim and final reports for VT legislature on recommendations for management of tile drains. Report from USDA-CIG funded evaluation effort concerning tile outflow treatment media effectiveness. RAPs to include requirements for tile drain management.	2015 - 2016 2017 2017 - 2018 2018	LCBP-funded tile drainage literature review completed November 2016. VT ANR and AAFM submitted interim (February 2016) and final (January 2017) reports on recommendations for management of tile drains. The Agencies coordinated multiple meetings of a tile drain advisory group to inform the development of these reports. This group will continue to meet in 2017 to assist in implementation of the tile drain final report recommendations. UVM conducted a research project on a farm in Franklin County to evaluate the effectiveness of two media on filtering phosphorus from tile drain outflows. The media showed positive results, and the final report is pending.

Additional Agricultural Efforts/Measures in Priority Areas.

Objectives	Actions	Milestones	Schedule (2015 - 2019)	Progress
Achieve higher levels of land treatment implementation in	Develop protocols and programmatic areas of responsibility for delivering 3 RCPP efforts in an effective manner (AAFM, VACD).	Successful launching of two Lake Champlain related RCPP efforts focused on phosphorus. Assist with launch of Connecticut River related RCPP efforts focused on improving nitrogen management.	2015 2015	DEC's Lake Champlain RCPP and VACD's RCPP launched in 2015 and $667,286 were spent through RCPP under Environmental Quality Incentives Program (EQIP) contracts in FFY 2017.

Objectives	Actions	Milestones	Schedule (2015 - 2019)	Progress
Lake Champlain and CT River basins		Land treatment and NPS implementation progress documented annually by lead agency responsible for respective RCPP effort.	2016 - 2019	VACD and DEC continue to assist the Long Island Sound RCPP, launched in 2015, and Lake Memphremagog RCPP, launched in 2016.
Improve understanding of land treatment and water quality response in conjunction with NWQI (Rock River)	Carry out water quality monitoring efforts and interpret monitoring data (DEC). Acquire non-sensitive information from NRCS regarding land treatment implementation (DEC, AAFM). Develop and provide educational opportunities to inform landowners and interested stakeholders about progress (DEC, AAFM, NRCS).	National Water Quality Initiative (NWQI) progress reports submitted to EPA on annual or biannual basis. Mutually agreed upon process to document the nature and location of treatment. Content and schedule for NWQI educational forums.	2015 - 2019 2016 2017 - 2019	DEC provides annual progress reports on the Rock River NWQI watershed. NRCS designated Rock River as one of four strategic watersheds for EQIP cost sharing. East Creek and Hungerford Brook watersheds were selected as NWQI pilot projects for new assessments in December 2016. AAFM continues to coordinate with NRCS and partners to develop the Agricultural Partners' Database that will document efforts by all partners and increase implementation, coordination, and tracking.
Initiate environmental stewardship program (ESP)	Examine comparable ESP type programs / initiatives elsewhere (AAFM). Define and develop criteria and incentives for ESP (AAFM).	Agricultural certainty launched as pilot in chosen watershed area(s).	2016	A pilot of ESP was launched in spring 2017. ESP is a voluntary program that encourages and supports local agricultural producers to achieve environmental and agricultural excellence. Farms must meet high environmental standards regarding nutrient management, sediment and erosion control, soil health, greenhouse-gas emissions and carbon sequestration, and pasture health to be eligible. Farmers who meet ESP criteria will be awarded with a 5-year certification, an on-farm sign designating the farm as meeting high levels of environmental stewardship, and other potential recognition-based incentives. In 2018, 9 farmers, of diverse operations, will participate in a pilot of a Resource Stewardship Evaluation Tool (RSET) to evaluate level of stewardship and eligibility for ESP.

STORMWATER RUNOFF AND TRANSPORTATION NONPOINT SOURCE POLLUTION

Non-Regulated Stormwater Management

Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2019)	Progress
Increased use of stormwater master planning guidance by towns and other interested groups	Promote stormwater master planning (SWMP) guidance document. Develop stormwater management practices handbook for sub-jurisdictional activities.	5% of ERP applications for stormwater projects done in consultation with SWMP guidance. 35% of ERP applications for stormwater projects done in consultation with SWMP guidance. Stormwater management practices handbook for sub-jurisdictional activities produced. Stormwater related trainings provided referencing demonstration sites/projects.	2016 2019 2016 2015 - 2019	46 percent of Ecosystem Restoration Grant projects funded in 2017 focused on stormwater treatment, including 8 stormwater master plans, 2 illicit discharge detection and elimination, 11 stormwater designs, 15 stormwater implementation projects, and 7 stormwater/road equipment projects. Stormwater design/construction projects are prioritized and designed based on stormwater master plan guidance or other comparable plans (e.g., MS4 Flow Restoration Plans). In 2016, the Stormwater Management Practices Handbook for Sub-Jurisdictional Activities was completed. In 2018, hard copies of the handbook will be designed/printed. In 2017, DEC's Stormwater Program held trainings providing 85 hours of education to over 515 participants focused on new stormwater regulatory programs, including the Municipal Roads General Permit. In 2017, Lake Champlain Sea Grant's Green Stormwater Infrastructure (GSI) coordinator organized 12 trainings/workshops providing 20 hours of education to 190 participants focused on GSI techniques and demonstrations.
Green Stormwater Infrastructure techniques and philosophy become commonly known or accepted	Specified state agencies implement priority actions found in applicable state agency GSI action plans. Utilize findings or recommendations from GSI roundtable when beginning or expanding GSI initiatives. Coordinate efforts with Department of Forest, Parks and Recreation (FPR) regarding urban/rural forest canopy cover.	Annual agency plans/reports produced. Plan-defined GSI projects or initiatives undertaken by applicable state agencies. Final adopted VSMM made available for distribution.	2015 - 2019 2016 - 2019 2017	State agencies produced annual GSI progress reports (July 2015 and 2016) under Executive Order 06-12. Studies from elsewhere have confirmed that regular maintenance of GSI practices can have dramatic impact on their long-term ability to retain nutrients and pollutants but this type of infrastructure may be less likely to be regularly maintained than conventional, centralized, grey stormwater infrastructure. To understand status of maintenance of state-funded projects, in 2017, the GSI coordinator developed a tool to assess the condition of GSI projects using ArcGIS Collector software. Using this tool, GSI coordinator staff surveyed state-funded green infrastructure projects. The effort illuminated several important patterns about the maintenance and condition of GSI project sites based on surrounding land use, infrastructure type, soil type, and grantee. A report summarizing the findings and proposed improvements to the Clean Water Initiative Program (CWIP) granting process to improve outcomes was developed. The GSI

Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2019)	Progress
				coordinator also advised CWIP staff on methods and procedures to expand this assessment to other project types. The final adopted VSMM was issued and took effect July 2017.
Erosion and runoff reduced from Class 3 and Class 4 roadways	Promote availability of statewide maps defining erosion control priority Class 3+4 road segments. Distribute backroad erosion inventory methodology.	Statewide erosion priority map information at each town and regional planning commission (RPC). Priority road segment map information used by applicants seeking road erosion control grant funding. Road erosion control inventory methodology finalized. Methodology used in 50% of grant applications. Methodology used in 100% of grant applications.	2015 2016 2015 2017 2019	DEC and statewide partners have developed a municipal roads hydrologically-connected road segment GIS layer for all towns in the state. Agency of Transportation (VTrans) and DEC are prioritizing state clean water funding for projects on hydrologically-connected road segments. Applicants are using the hydrologically-connected road segment GIS layer on the ANR Atlas to identify where those road segments are located. DEC has developed draft Municipal Roads General Permit standards for different road types: paved roads with catch basins, paved roads with ditches, gravel roads, and class 4 roads. Road Erosion Inventories are using a DEC-provided template consistent with the Municipal Roads General Permit standards and involve field verification of hydrologically-connected road segments. DEC has developed a field GIS-based collector application for conducting inventories and managing associated data. DEC developed a database framework and portal to manage these data for project prioritization and reporting purposes. DEC rolled out a new Municipal Roads Grants-in-Aid program to disperse funds to municipalities via regional planning commissions based on the number of hydrologically connected municipal road miles, and municipalities will bring all road segments worked on into full compliance with the MRGP standards under this program.
Strategic planning pertaining to Vermont's new stormwater permit approach along with revisions to Vermont Stormwater Management Manual (VSMM)	VT NPS Program coordinator and staff will coordinate with Stormwater Program to identify and resolve any issues pertaining to Vermont's new permit approach for state and municipal roads, new and existing development (see description below, "Stormwater runoff from developed lands: conversion of NPS to point sources"). Incorporate LID/GSI concepts into completed revision to VSMM.	Joint program meetings to plan Vermont's new stormwater permit approach. Revised draft VSMM issued for public comment. Final adopted VSMM issued.	2016 2016 2017	In 2016 and 2017, VT NPS Program Coordinator and Stormwater Program staff met biweekly to coordinate on updates, implementation, funding, and tracking on developed lands permit programs and the Municipal Roads General Permit; the intended outcomes of these meetings are to coordinate funding programs with the roll out of new permit requirements and to develop stormwater permit program tracking and accounting standard operating procedures. The final adopted VSMM was issued and took effect July 2017. The updated Transportation Separate Storm Sewer System (TS4) permit took effect December 2016 and will require VTrans to develop and implement phosphorus control plans for state highways and VTrans owned/operated developed lands. The MS4 permit will be updated to also integrate the requirement to develop and implement phosphorus control plans in spring 2018. The Municipal Roads General Permit took effect January 2018 and municipalities must complete inventories by December 2020 and begin implementing in 2021. DEC and VTrans are incentivizing early adoption through grant programs. The developed lands general permit will be issued in 2018 and will require treatment of untreated/unpermitted sites with over 3 acres of impervious surface.

HYDROMODIFICATION (RIVER CHANNEL STABILITY)

Encroachments and Buffers

Encroachments and Buffers Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2019)	Progress
Establish state floodplain rules that set a standard of no adverse impact in floodplains and river corridors and address all developments exempt from municipal regulation.	Adopt Flood Hazard Area and River Corridor Protection Procedures to regulate Act 250 developments and establish map amendment and revision procedures and river corridor BMPs such as those concerning establishment and maintenance of riparian buffers. Establish MOUs with other state agencies to regulate developments within their purview to be consistent with the new state floodplain rule. In conjunction with Dams Task Force, remove old non-functional dams as opportunities arise.	Original procedures prepared and adopted (2014). Amendment/revision procedures finalized. MOUs drafted and in effect. Changes to dam removal inventory list.	2016 2016 2015 - 2016 2015 - 2019	VTrans and AAFM will not be developing MOUs to take over regulation. ANR will continue regulatory responsibilities for development in floodplains/river corridors. The Vermont Dam Task Force maintains listing of active and completed dam removals. Vermont Natural Resources Council is developing a prioritized list of dam removals using a set of ecological factors to produce a statewide ranking. The GIS portion of the analysis for the Lake Champlain basin was completed by The Nature Conservancy in late 2017. Analysis and mapping for the remainder of the state is slated for 2019.

Encroachments and Buffers Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2019)	Progress
Regulate municipally exempt activities and Act 250 developments to the higher standards established in Goal above and review all development proposals (under state and municipal jurisdiction) on floodplains.	Establish general permits and a regional Certified Floodplain Technician Program to also increase the regulatory and technical assistance capacity for floodplain protection. Program would also provide technical assistance to a greater number of communities each year to actively restore floodplains and riparian areas and secure the municipal adoption of enhanced model floodplain and river corridor protection bylaws that exceed the NFIP minimum requirements.	Create/ establish general permit. Initiation of certified technician program. Outreach provided to towns and RPCs regarding floodplain and river corridor protection methods. Create/modify spatially referenced catalog of river corridor conservation easements.	2015 2016 2015 - 2019 2016 - 2019	A General Permit was put into place during spring 2015. After a year of use, the General Permit was revised during spring 2016 and reissued in late 2016. Vermont and New York were awarded a grant from LCBP to develop floodplain protection outreach materials to include multi-media outreach products. This work has been completed and posted on the DEC's Flood Ready webpage. A spatially referenced catalog of river corridor conservation easements has been completed. Conserved corridor locations are available on the ANR Atlas.
Obtain LiDAR data where needed to modernize inundation and river corridor mapping statewide for streams and lakeshores.	Secure funding for LiDAR. Acquire data on statewide basis. Distribute data.	Create proposal for securing LiDAR data for eastern Vermont. Secure funding needed to acquire LiDAR imagery. LiDAR data used to develop DEM for eastern Vermont.	2015 2016 2017	Vermont proposed and secured funding to secure U.S. Geological Survey 3D Elevation Program (3DEP) funding. This next acquisition *3D Elevation LIDAR Acquisition for the Connecticut River Basin in Vermont* will complete statewide LiDAR coverage for Vermont to a Quality Level 2 (QL2) standard.
Implement statewide river corridor and floodplain mapping center to develop and maintain inundation, erosion hazard and riparian buffer maps per adopted Flood Hazard Area and River Corridor Protection Procedures.	Working with the Vermont Center for Geographic Information (VCGI), promote creation of Center as LiDAR data acquisition gains momentum and coverage.	Establishment of mapping Center. Update Center with new data as it becomes available.	2015 2015 - 2019	River corridor mapping center has been put in place, using Federal Emergency Management Agency (FEMA) Hazard Mitigation Funds. It will be essential to move this into base DEC functions for the center to survive long-term. Mapping center has produced a statewide river corridor base layer and is in the process of fine-tuning all river corridor information for which ANR has Phase 2 stream geomorphic data. Map revisions and data integration will be complete by the end of 2018.
Increase the role of land conservation in river corridor and floodplain protection and restoration (i.e., securing river corridor, channel management, and riparian buffer provisions in land conservation projects).	Target priority areas for conservation. Secure river corridor, channel management and or buffer provisions during new land conservation projects. Target previously conserved lands where corridor, channel or riparian provisions could be added. Develop riparian zone management policy and guidelines affecting riparian areas owned and managed by ANR. Strategic river corridor project identification.	Conservation targeting applied through river corridor planning process. Adopt ANR Riparian Zone Management policy and guidelines. Integrate field assessment data, river corridor plans and statewide river corridor mapping in support of town flood resiliency plans, road erosion assessments, basin plans and project identification in state, regional, local hazard mitigation plans.	2015 - 2019 2015 2015 - 2019	Ongoing. Conservation priorities are enumerated in Tactical Basin Plans and projects are consistently funded through that process. A riparian zone management policy and set of guidelines for State Lands has been adopted. A similar document for all development regulated by Act 250/Section 248 is complete and undergoing final policy analysis by senior ANR leadership. In both documents, the new policies recognize the importance of protecting a minimum of 50-foot-wide buffers on small perennial streams and aligning riparian zone protections with river corridor protections established in River Corridor and Floodplain Rules (2015) for larger streams. DEC secured a FEMA Hazard Mitigation Grant through VT Division of Emergency Management and Homeland Security (DEMHS) in fall 2015. ANR data integration into the statewide layer will be completed by 2018. The same grant was used to put in place a contract for Vermont Association of Planning and Development Agencies to pilot and develop RPC planning processes for culling local, regional and state plans for priority hazard mitigation projects and developing updated river corridor maps for inclusion in Local Hazard Mitigation and Flood Resiliency plans. These products were completed spring, 2018 and will be incorporated in the State Hazard Mitigation Plan

Encroachments and Buffers Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2019)	Progress
Establish/Enhance Flood Resilient Communities Program with funding and technical assistance incentives for municipalities to adopt regulations for floodplains, river corridors, and riparian buffers.	Track municipalities where enhanced river corridor and floodplain bylaws have been adopted. Provide increased state cost share recovery under the Vermont Emergency Relief and Assistance Fund (ERAF) to those municipalities with enhanced bylaws.	Municipal bylaw tracking system developed and in use. ERAF program in effect with an increase in towns taking advantage of 12.5% or 17.5% ERAF reimbursement incentives.	2015 - 2019 2015 - 2019	Municipal bylaw tracking system is available on the Flood Ready website and is maintained as part of the ERAF incentive program by the Agency of Commerce and Community Development, ANR, and DEMHS. ERAF rules were amended in 2015 to include the graduated incentives for municipalities to take emergency preparedness, hazard mitigation planning, and river corridor protection actions. ERAF incentives have resulted in an increase in activity by towns and RPCs to adopt restrictions and secure higher reimbursement rates.
Establish/Enhance a "Flood Ready" webpage to promote cross-agency, flood resiliency planning authorized by Act 16.	Offer peer-to-peer learning and community progress barometers in the Flood Resilient Communities Program. Increase municipal adoption of enhanced floodplain, river corridor, and riparian buffer protection bylaws and other mitigation measures to minimize flood risks and maximize floodplain function.	Creation of 'flood ready' webpage. River corridor/ERAF protection incentives tracked and promoted. Assistance offered by the State to increase adoption by municipalities.	2015 2015 - 2019 2015 - 2019	Flood Ready web page is online, fully functional and updated on a regular basis. Go to: http://floodready.vermont.gov/ See ERAF updates, above.

River Channel Modification

Channel modification objectives	Actions by DEC	Milestones	Schedule (2015-2019)	Progress
Provide technical and regulatory assistance for stream alterations, including emergency and next-flood protective measures to maximize equilibrium conditions.	Develop stream alteration rules and general permit regulating stream alterations and measures during emergency response.	Rules and general permit in place (2014). Enforcement of rules and general permit. Assessment of response actions following future emergencies.	2015 - 2019 2016 - 2019 2016 - 2019	Rules and general permit in place. In Spring 2017, the Stream Alteration Rule and General Permit were both revised to incorporate changes and FEMA has now sanctioned Vermont codes and standards for new and replacement bridges and culverts as eligible for federal cost share in the FEMA Public Assistance Program.
Establish agricultural streambank stabilization practices.	Work with AAFM and NRCS to establish practices consistent with ANR policies for minimizing fluvial erosion hazards as per revisions to 10 VSA section 1021.	Create stabilization practices work group to define and reach agreement on practices.	2015 - 2017	No progress to report. RAPs have been adopted and acceptable practices are to be defined in late 2017.
Establish and maintain a River Operations Center within an ANR Incident Command System (ICS).	Enable ICS to manage and authorize emergency measures in large scale flood disasters (i.e., when most modern-day channelization occurs). Center to include a network of river scientists, engineers, and habitat restoration specialists. Center to assist VTrans and municipalities as resident experts on larger disaster recovery sites.	Development of ICS for DEC-WSMD. Deputy river management engineers trained as part of ICS river operations. Coordination meetings with VTrans and VT Emergency Management.	2015 2016 2015 - 2019	ICS for WSMD has been outlined but there is much work to be done for this plan to be operational and for staff to have appropriate training. Rivers Program has developed municipal outreach materials on conducting emergency protective measures and gaining authorization for these practices, as per the Stream Alteration Rule. Staff time is devoted to getting this information to town officials. Ongoing. Ongoing.
In concert with DEC river scientists, capitalize on opportunities to implement projects involving the removal of river, river corridor,	Target restoration and protection funds to high priority critical source areas identified in tactical river basin water quality management plans or river corridor plans, recognizing that restoration measures will vary from avoidance-based to active interventions to restore stream equilibrium conditions, including riparian buffers,	Restoration and protection projects targeted and identified. Coordination of critical source, river corridor and river basin planning.	2015 - 2019 2015 - 2019	Rivers Program has re-assigned staff and increased capacity for identifying both restoration and protection projects. River scientists, floodplain managers, and river management engineers work with their respective watershed coordinators to prioritize these projects into Tactical Basin Plans to inform project funding. DEC Watershed Management Division has made significant progress aligning these processes. The best reporting of this work may be found in the *Lake Champlain Phase 1 TMDL Implementation Plan*; see Chapter 4, Sections F and I and Chapter 5, Section F.

Channel modification objectives	Actions by DEC	Milestones	Schedule (2015-2019)	Progress
and floodplain encroachments (e.g., floodplain fills, undersized stream crossings, flood-damaged structures, or dams).	depending on site characteristics, plan recommendations, and willing landowners.	Link encroachment removal efforts with climate readiness outreach activities.	2015 - 2019	Encroachment removal projects (both instream and river corridor/floodplain) in Vermont nearly all have the dual objectives of improving water quality and increasing flood resiliency. Climate change adaptation is a stated outcome for nearly all stream related hazard mitigation projects.
Adopt State Stream Alteration Rules and a General Permit establishing equilibrium and connectivity standards as well as standard practices for next-flood and emergency protective measures.	Develop and continually edit standard river management principles and practices (SRMPP) to maximize equilibrium conditions when managing conflicts between human activities and the dynamic nature of rivers, considering anticipated changes in climate. Achieve FEMA recognition of state adopted river management and stream crossing codes and standards for conducting emergency protective measures and promote the municipal adoption of these codes and standards (e.g., with the VTrans Road and Bridge Standards).	Publish SRMPP manual. Update SRMPP manual as new techniques are developed in the field. Achieve recognition of SRMPP by FEMA.	2014 2016 - 2019 2017	Completed. Ongoing. The SRMPP manual is in its 3rd edition. ANR has now received recognition from FEMA that its duly adopted bridge and culvert codes and standards qualify under the Public Assistance Program. This means that municipalities will be reimbursed by FEMA when they right-size a stream crossing damaged during a declared disaster. 93% of Vermont municipalities have now adopted Town Road and Bridge Standards consistent with State standards.
Develop and implement a 3-tiered outreach and training program by offering courses to VTrans Operations Technicians, municipal roads workers, contractors, and other river technicians.	Develop 3 tiers of information for river channel outreach and training. Deliver coordinated trainings to maximize attendance.	Tier 1 and 2 trainings developed (2014) and provided on ongoing basis. Develop Tier 3 trainings. Annual 3-tiered trainings made available.	2015 - 2019 2016 - 2017 2017 - 2019	Ongoing. The Tier 1 training is an online (self-guided course) and the Tier 2 is a 2-3-day training offered 3-6 times per year with class sizes ranging from 15-25 attendees. VTrans has put several hundred staffers through Tier 2 training and now the class is being attended by municipal road workers, consultants, and contractors. Development of Tier 3 training modules has been completed. ANR and VTrans have secured funding to hire a contractor to conduct the training modules during the 2018 calendar year.
Conduct outreach and train municipalities and contractors in the use of the SRMPP and authorizations under the new ANR Stream Alteration Rules and General Permit that contain equilibrium-based performance standards.	Assess logistical and practical aspects of delivering trainings and relationship(s) to 3-tiered approach above.	Integrate into Tier 2 trainings. Create separate training program for towns regarding how to conduct and authorize Emergency Protective Measures.	2015 - 2019 2016 - 2019	See descriptions of trainings, above.

FOREST MANAGEMENT

Acceptable Management Practices for Maintaining Water Quality on Logging Roads

AMP Objectives	Actions by FPR	Milestones	Schedule (2015 - 2019)	Progress
Update Acceptable Management Practices (AMPs) for Maintaining Water Quality on Logging Jobs in Vermont	Revise/update technical aspects of AMPs, especially to require compliance with standards set forth in DEC stream alteration general permit and rule affecting permanent stream crossing structures on perennial streams.	Improved/updated AMPs promulgated as rules.	2016	AMP rules revised and in effect October 2016. Following the adoption of the rule, the need was recognized for clarifications pertaining to permanent crossings on intermittent streams and some other minor details. The rule was reopened, has proceeded through public comment and is expected to be approved by July 2018.

AMP Objectives	Actions by FPR	Milestones	Schedule (2015 - 2019)	Progress
Reporting of AMP enforcement and compliance activities	Refine AMP reporting protocol.	Initiate annual AMP enforcement reporting under revised AMPs.	2017	This has been delayed by the reopening of the rule. The draft procedure has been developed and is currently under review by forestry staff. The procedure, once adopted, is expected to demonstrate the technical assistance provided to landowners throughout the state that often goes unreported.
Increase implementation of forestry related NRCS cost share practices in Lake Champlain basin through RCPP	Initiate effort in all watersheds draining to Lake Champlain to boost enrollment/adoption of priority forestry runoff practices. Target practice implementation efforts in priority watersheds of Missisquoi River and South Lake.	Agreement between NRCS and FPR regarding cost share arrangements. Quantify forest acres treated by practice by watershed.	2015 - 2016 2015 - 2019	MOA signed by VT Department of Fish and Wildlife (DFW) and Department of Forest, Parks and Recreation (FPR) in August 2015. MOA is revisited and renewed annually. Under this agreement, FPR collaborates with FWD in providing technical assistance to private forest landowners through the NRCS EQIP program. Under this agreement, FPR complies with all federal requirements as specified in the cooperative agreement 68-1644-14-05 between DFW and USDA NRCS. Quarterly reports are provided to NRCS to document statewide accomplishments. Quarterly reports are also provided to NRCS documenting accomplishments for the Lake Champlain Basin RCPP grant to reduce sediment and phosphorus inputs into the lake.

Forest Cover

Forest Cover Objectives	Actions by FPR	Milestones	Schedule (2015 - 2019)	Progress
Enhance urban forest canopy cover	Identify high priority communities for targeted technical and financial assistance to protect urban tree canopies and implement GSI practices. Update applicable technical resources. Deliver forest canopy cover outreach presentations to varying audiences. Assist high priority urban and rural towns conduct GI assessments. Develop GI and forest canopy implementation plans.	Data analyzed with map showing high priority urban and rural areas. *Landscape Guide for VT Roadways* and *Better Backroads Manual* updated to include GSI practices. 30 training events in different contexts (10 state/regional, 10 urban, 10 rural). 20 towns with completed GI inventories. Plans completed for 10 urban areas and 10 rural towns.	2015 2016 2017 2018 2019	Partners have convened and have begun to discuss information available and criteria to assist with identifying high-priority communities to provide technical assistance. Maps were produced in fall 2016. Two high-priority urban towns, Milton and Shelburne, received technical assistance in 2017 including bylaw and public specifications reviews, and photo interpretation of what GSI could look like in their community. Three additional community assessments are underway: Williston, Burlington, and Rutland. The rural roadside vegetation assessment protocol is developed through the engagement of two pilot communities, Calais and East Montpelier. Three additional community assessments are underway: Stowe, Tinmouth, and Charlotte. The new Vermont Green Streets Guide, incorporating GSI practices, will replace the Landscape Guide for Vermont Roadways. The Guide and supporting educational videos will be available by July 1, 2018, and a series of outreach strategies will be deployed to transfer the resources. Updates to the Vegetation Management Manual Along Rural Roads, and educational outreach are underway including four upcoming training events with the Vermont Local Roads Program

NONPOINT SOURCE PROGRAM PARTNERSHIPS AND FUNDING STRATEGIES

Partnerships and NPS funding objectives	Actions by DEC	Milestones	Schedule (2015 - 2019)	Progress
Restore competitive 319 pass through grants program	Determine amount and source of state funds needed to pass through 319 watershed funds (i.e., 50% of 319 award).	Annually evaluate the possibility of restoring a 319 pass-through program. Continue to use state funded projects (ERP) for '319 leveraging' if annual evaluation reveals a 319 pass-through program not feasible. Sufficient state funding provided for NPS personnel needs enabling DEC to award at least 50% of 319 award (i.e., watershed funds) as pass through grant funds for NPS projects.	2015 - 2019 2015 - 2019 TBD	DEC did not offer Section 319 pass through under FFY 2015-2017 workplans. DEC pursued "leveraging" under FFY 2015-2017 workplans.
Utilize to a higher degree US Army Corps' Watershed Environmental Assistance Program (WEAP) within Lake Champlain Basin	Define qualifying and eligible projects for WEAP. Identify and prioritize NPS projects for WEAP that address nutrient and/or sediment loading.	Ranked NPS-WEAP priority project listing. Process created for selecting one or more projects to undertake. At least 3 NPS projects initiated under WEAP.	2017 2018 2018 - 2019	The Lake Champlain Basin Program (LCBP) administers the WEAP in partnership with the U.S. Army Corps of Engineers. Project proposals are submitted to the LCBP and are prioritized based on the Lake Champlain Opportunities for Action, which identifies nonpoint sources of phosphorus pollution as a priority. The LCBP Executive Committee, including DEC, oversees prioritization of WEAP project proposals. NPS projects initiated under WEAP include:

Partnerships and NPS funding objectives	Actions by DEC	Milestones	Schedule (2015 - 2019)	Progress
				(1) Bartlett Brook stormwater management project in the City of South Burlington, which involved construction of drainage swales, bioretention, and infiltration trenches in September 2017 ($1.98 million project cost). (2) St. Albans Bay wetland restoration and phosphorus management project on Stevens Brook, which involved evaluation of alternatives to in-lake management for internal phosphorus loading and will result in a conceptual design and cost estimate for implementation ($0.5 million project cost). Additional nonpoint source projects are expected to be initiated in FFY 2018-2019.
Explore benefits and need of expanding CWSRF for NPS control	Assess the need (or value) of expanding CWSRF for certain NPS pollution sources beyond those currently authorized. Award CWSRF to certain qualifying NPS efforts.	At least 5 stormwater or LID projects awarded CWSRF dollars. Additional NPS pollution sources made eligible for CWSRF dollars under VT's Intended Use Plan.	2018 2019	The Vermont State Legislature passed a bill relating to the CWSRF (H.777) on May 9, 2018. The act will expand CWSRF eligibility to natural resources restoration projects. It also enacted a new sponsorship program to allow coupling of traditional wastewater and stormwater projects with GSI and/or natural resources restoration projects but providing loan forgiveness covering the GSI and/or natural resources project. This can be accomplished by making private entities eligible for CWSRF loans, but at a slightly higher administrative fee that municipalities. Additional GSI projects are expected to be funded via CWSRF because of the sponsorship program in 2018.
For NWQI, create annual information sharing process concerning agricultural NPS implementation and water quality monitoring results.	Work with NRCS and AAFM to develop reporting out process of watershed land treatment activities. Define water quality monitoring parameters of greatest interest, data analysis methods and report out frequency and methods.	Initiate NWQI annual reporting to EPA. Agreement reached between NRCS (VT), AAFM and DEC concerning process and metrics concerning land treatment and water quality reporting.	2015 2016	DEC reports annually to EPA on the Rock River NWQI. Coordination is ongoing to prioritize work, share data, and provide resources to support land treatment planning and nutrient management planning. DEC is an active participant in the Vermont NRCS subwatershed planning process. Four watersheds (St. Albans Bay, Rock River, Pike River/Lake Carmi, and McKenzie Brook) were part of a detailed assessment and planning exercise, and approximately $1.5 million were set aside for BMP implementation per watershed per year. Plans were completed in FFY 2017 and funds have been allocated through FFY 2020. Additional targeted watersheds will be added in FFY 2019.
Assist with allocation and funding decisions concerning VT Clean Water Fund	Participate with Clean Water Fund Board. Help guide decisions regarding allocation and distribution of funds. Define priority NPS efforts to receive Clean Water Funds.	Clean Water Funds directed to priority NPS restoration and protection projects.	2016 - 2019	Ongoing. Clean Water Fund Board has completed annual budget processes for SFY 2016-2019; SFY 2016-2018 Clean Water Fund dollars have been awarded to priority NPS and stormwater projects, and SFY 2019 Clean Water Fund dollars will be awarded beginning July 2018.

NPS PROGRAM ADMINISTRATION AND OVERSIGHT

Program administration/oversight Objectives	Actions by DEC	Milestones	Schedule (2015 - 2019)	Progress
Better define priority NPS threatened waters	Refine criteria and process to define priority NPS threatened waters.	NPS threatened waters throughout Vermont identified as part of NPS Management Program plan. Define criteria for priority NPS threatened waters and apply to candidate waters. Updated priority NPS threatened waters list.	2015 2016 2018	DEC's 2016 Water Quality Integrated Assessment Report identifies NPS stressed waters. DEC's 2018 Water Quality Integrated Assessment Report will define criteria for priority NPS threatened waters and include a list of priority NPS threatened waters.
Evaluate the possibility of higher level of GRTS use by grant recipients	In consultation with EPA Region 1, assess the merits and QA-related concerns behind GRTS data entry by grant recipients.	Meet with EPA to determine the feasibility and practicality of 3rd party GRTS data entry. Depending on outcome, plan next steps for potentially enabling data entry of mandated elements into GRTS by willing/capable NPS grant project partners.	2017 2018	DEC has enhanced grant reporting since 2015 to support DEC's tracking, accounting, and reporting requirements. Reporting mandates include data needed for DEC to quantify pollutant reductions associated with individual projects using the Watershed Projects Database and BMP Accounting and Tracking Tool (BATT). Transfer of data from the DEC tracking systems to GRTS has been streamlined as a result. Therefore, DEC feels third party data entry into GRTS is unnecessary and overly burdensome to grant recipients.
Partial or full restoration of NPS impaired waters	Through reliable water quality monitoring efforts, document NPS impaired situations where water quality is fully or partially restored. Prepare and submit to EPA Region 1 applicable NPS success stories consistent	At least two Vermont NPS success stories submitted and made part of EPA's NPS Success Stories web page.	2015 - 2019	No waters qualified during FFY 2017 therefore no success story submitted in 2016.

Program administration/oversight Objectives	Actions by DEC	Milestones	Schedule (2015 - 2019)	Progress
	with EPA requirements (under measure WQ-10).			
Continue to manage and implement NPS program to meet goals while working towards addressing Vermont's NPS water quality problems effectively and expeditiously	Employ appropriate programmatic and financial systems that ensure 319 dollars are used efficiently and consistent with fiscal and legal obligations. In keeping with Section 319(h)8 and 11, provide EPA with sufficient information/reports/data about VT 319 program to allow EPA to determine progress and whether meeting or exceeding all elements in EPA's Satisfactory Progress Determination (SPD) checklist.	Vermont NPS Program continues to receive SPDs on an annual basis in a timely fashion.	2015 - 2019	DEC effectively managed its NPS program during FFY 2017. SPD for 2017 program pending at time of annual report preparation.
Preparation and submittal of annual NPS program reports consistent with EPA guidance	Assemble pertinent material reporting on Vermont's progress meeting program milestones noted in NPS Management Program plan. When information is available, report estimated reductions in NPS pollutant loading and other improvements in water quality arising from program implementation. Provide draft annual program report to EPA for review. Submit annual report.	Draft and final annual NPS program reports.	2015 - 2019	2017 annual report prepared in May 2017.
Revised NPS Management Program plan	Track the status of actions, milestones and accomplishments found in current 2015–2019 NPS Management Program plan. Prepare revised and updated NPS Management Program plan for 2020-2024 period with submittal to EPA for review/approval prior to effective date.	EPA-approved Vermont NPS Management Program plan (2020-2024) in place by 10/1/2019.	2019	
Revised DEC strategic plan	Link results-based accountability (RBA) with planning effort.	RBA measure(s) defined for NPS program level. Measure(s) fed into DEC-WSMD plan. WSMD measure(s) linked to DEC plan.	2015 2016 2016 - 2017	DEC has developed an interagency tracking and accounting system for NPS and stormwater projects completed under funding and regulatory programs. Annual reporting has been developed incorporating RBA measures. NPS RBA measures are also being integrated in DEC-WSMD annual RBA reporting.
Within 250 feet of lakeshore lines, improved management of lakeshore development activities by property owners	Launch lakeshore development permit regulatory program (2014). Assess lakeshore development permit activities on selected candidate lakes 25 acres or larger.	Status ratings of lakeshore development on lakes 25 acres or larger showing how improved surface runoff control achieved.	2019	
Enhanced NPS management arising out of permit application decision processes	Achieve better levels of coordination between certain permit programs involving NPS pollution management.	Create strategies or outreach information for internal and contractor audiences to flag conditions in which the applicant and DEC permit writer need to be aware of other permits. Implement strategies/outreach delivered affecting river corridors, flood hazard areas, land disturbance 1 acre or more or within 250' of lakeshore.	2015 - 2017 2018	Ongoing by permit programs during 2016. Additionally, Ecosystem Restoration Grant applications require applicants to screen projects for permit requirements and natural resource conflicts. Members of permit programs participate in the application review process to flag any permit issues and to ensure Ecosystem Restoration Grants do not fund projects with adverse natural resource impacts.

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
2014	Vermont Agency of Agriculture, Food and Markets	Agricultural Technology to Monitor Nutrients (UVM)	$63,150	Completed	6/24/2014
2014	Lamoille County Conservation District	Lamoille LID - Phase I (Design) & Phase II (Construction)	$41,000	Completed	11/18/2014
2014	Rutland Natural Resources Conservation District	Tenney Brook Stormwater Master Plan	$34,000	Completed	12/17/2014
2014	Winooski Natural Resources Conservation District	Trees for Winooski Basin Streams	$33,960	Completed	12/29/2014
2014	Lewis Creek Association	Stormwater Treatment in the LaPlatte	$67,600	Completed	1/9/2015
2014	Poultney-Mettowee Natural Resources Conservation District	Poultney High School Stormwater Management	$41,710	Completed	2/4/2015
2014	Poultney-Mettowee Natural Resources Conservation District	Woodlawn Farm Agricultural Runoff Reduction	$42,765	Completed	2/4/2015
2014	Friends of Northern Lake Champlain	Enhanced Silage Leachate Treatment System	$10,000	Completed	3/13/2015
2014	Vermont Youth Conservation Corps	Water Quality Implementation Projects Work Crew	$75,403	Completed	4/24/2015
2014	Vermont Agency of Transportation	Better Backroads by Towns in St. Albans Bay Watershed	$60,000	Completed	5/27/2015
2014	Town of Poultney	York Street Stormwater Management Feasibility Analysis	$9,000	Completed	6/2/2015
2014	Northwest Regional Planning Commission	Franklin County Regional Hydroseeder Program	$38,675	Completed	6/5/2015
2014	Friends of the Winooski River	Winooski Watershed Targeted Riparian Restoration	$23,420	Completed	7/21/2015
2014	Friends of the Mad River	Fayston Road Erosion	$30,614	Completed	12/16/2015
2014	Vermont Association of Conservation Districts	Statewide Trees for Streams	$137,461	Completed	1/14/2016
2014	Central Vermont Regional Planning Commission	Waterbury Corridor Plan and Fluvial Erosion Hazards	$60,960	Completed	2/3/2016
2014	Lamoille County Planning Commission	Brewster River Stream Geomorphic Assessment and Corridor Plan	$24,240	Completed	2/24/2016
2014	Friends of the Winooski River	Upper Winooski Illicit Discharge Detection and Elimination (IDDE)	$59,400	Completed	3/7/2016
2014	Friends of Northern Lake Champlain	Missisquoi Basin Stormwater Project Identification and Implementation	$75,000	Completed	11/2/2016
2014	Missisquoi River Basin Association	Multi-Barrier Cluster Approach to Stewarding Farmland along the Missisquoi River	$15,000	Discontinued	1/14/2016

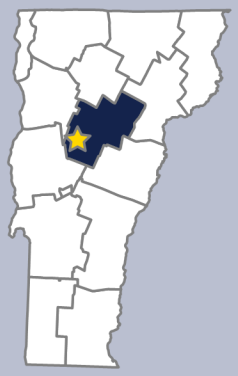
Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
2014	Franklin Watershed Committee	Multi-Barrier Cluster Approach to Stewarding Farmland Surrounding Lake Carmi	$15,000	Discontinued	1/27/2016
2014	Town of Hardwick	South Main Street Stormwater Treatment	$30,700	Completed	10/18/2017
2014	Vermont River Conservancy	Wild Branch Easements	$76,660	Completed	3/21/2017
2014	Vermont Agency of Agriculture, Food and Markets	Stewarding Farmland in Missisquoi and St. Albans Bay Basins	$68,000	Ongoing	
2015	Missisquoi River Basin Association	Northrop Road at Talcott Road (WB-3) Fairfield Ditch Project	$32,805	Completed	2/11/2015
2015	Vermont River Conservancy	Hurteau River Corridor Easement, Lamoille River	$48,220	Completed	4/24/2015
2015	Winooski Natural Resources Conservation District	Winooski Trees for Streams, Spring 2015	$23,625	Completed	8/5/2015
2015	Vermont River Conservancy	Selawsky River Corridor Easement: Wild Branch	$11,500	Completed	8/6/2015
2015	Vermont River Conservancy	Selawsky River Corridor Easement: Wild Branch - Phase 2	$26,540	Completed	10/9/2015
2015	Winooski Natural Resources Conservation District	Equine Manure Management and Composting	$13,000	Completed	11/3/2015
2015	Town of Fairfield	Shenang Road Erosion Controls	$30,000	Completed	1/6/2016
2015	City of Burlington	Installation of Pervious Stormwater Sidewalk	$11,890	Completed	1/14/2016
2015	Lake Iroquois Recreation District	Lake Iroquois Public Beach Area Ecological Landscape Design, Erosion Control and Stormwater Management	$49,661	Completed	3/7/2016
2015	Vermont Youth Conservation Corps	Implementation of Class IV Roads Erosion Control BMPs	$75,000	Completed	3/15/2016
2015	University of Vermont Extension	Implementing Precision Agriculture Technology to Improve Application and Minimize Nutrient Loss of Manure	$75,057	Completed	7/21/2016
2015	Village of Swanton	Marble Mill Park Underground Stormwater Treatment: Final Design and Implementation of Phase 1	$74,880	Completed	9/19/2016
2015	Lamoille County Conservation District	Hyde Park Stormwater Improvement Project	$75,000	Completed	11/9/2016
2015	Central Vermont Regional Planning Commission	Northfield Stormwater Site Construction	$59,842	Completed	11/21/2016
2015	Birds of Vermont Museum	Road Erosion Control and Stream Restoration Project	$15,000	Completed	5/3/2017

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
2015	Franklin Watershed Committee	Lake Wise Shoreland BMPs – Lake Carmi, Franklin County	$37,125	Completed	7/24/2017
2015	Lake Champlain Land Trust	The Upper La Platte River Floodplain and River Restoration Project	$15,750	Completed	3/14/2017
2015	Missisquoi River Basin Association	Missisquoi Watershed Trees for Streams	$45,000	Completed	1/19/2018
2015	Poultney-Mettowee Natural Resources Conservation District	Agricultural Water Quality BMP Implementation Project	$74,010	Completed	3/8/2017
2015	Rutland Natural Resources Conservation District	Stormwater Reduction in the East Creek Watershed	$75,000	Completed	9/27/2017
2015	Town of Cambridge	Cambridge Trail Bridge Replacement and Floodplain Restoration	$61,605	Completed	1/25/2018
2015	Vermont Association of Conservation Districts	Portable Skidder Bridge Rental Program	$75,000	Completed	7/11/2017
2015	Vermont Association of Conservation Districts	Statewide Trees for Streams	$67,500	Completed	7/11/2017
2015	Village of Jeffersonville	Jeffersonville Easement Acquisition	$4,677	Completed	1/25/2018
2015	Poultney-Mettowee Natural Resources Conservation District	Agricultural Runoff Mitigation Project on Beaver Brook Tributary	$75,000	Completed	4/30/2018
2016	Friends of the Winooski River	Hayes Road Sediment Control Project	$25,000	Completed	12/9/2015
2016	Vermont Land Trust	Kaiser Farm River Corridor Easement Purchase	$42,098	Completed	7/21/2016
2016	University of Vermont Extension	Developing Functional Nutrient Management Plans with GoCrop Software	$57,577	Completed	9/7/2016
2016	Winooski Natural Resources Conservation District	Trees for Streams 2016	$14,300	Completed	9/29/2016
2016	Town of Waitsfield	Waitsfield Town Office Stormwater Mitigation	$15,000	Completed	11/2/2016
2016	Vermont Land Trust	Rankin Farm River Corridor Easement	$40,349	Completed	12/28/2016
2016	Central Vermont Regional Planning Commission	Northfield Village Green Stormwater Site	$110,695	Completed	2/24/2017
2016	University of Vermont Extension	Precision Manure Management in the Jewett Brook Watershed	$75,000	Completed	4/24/2018
2016	City of Montpelier	One Taylor Street Stormwater Treatment	$230,000	Ongoing	
2016	City of Montpelier	Taylor Street Reconstruction Stormwater Treatment	$250,000	Ongoing	

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
2016	University of Vermont Extension/Farmers Watershed Alliance	Reduction of Fall Tillage in Jewett Brook/Stevens Brook Watersheds	$102,154	Ongoing	
2016	Vermont Association of Conservation Districts	Statewide Trees for Streams	$173,250	Ongoing	
2017	Winooski Natural Resources Conservation District	Trees for Streams Spring 2017	$18,050	Completed	9/25/2017
2017	Friends of the Mad River	Bioretention at Harwood Union Middle/High School	$29,040	Completed	2/19/2018
2017	Lamoille County Conservation District	Johnson State College Stormwater Improvements	$84,500	Discontinued	3/5/2018
2017	Village of Poultney	Poultney York Street Stormwater Treatment	$420,000	Ongoing	
2017	City of Barre	City of Barre Vacuum Sweeper	$260,750	Ongoing	
2017	City of Barre	City of Barre Vactor Truck	$14,043	Ongoing	
2017	City of Barre	Park-Winter Meadow Stormwater Reduction	$36,978	Ongoing	
2017	University of Vermont Extension	Enhancing the Water Quality Benefit of Cover Crops	$99,554	Ongoing	
2017	Lake Iroquois Association	Lake Iroquois Streambed Restoration and Erosion Control	$34,000	Ongoing	
2017	Town of Wolcott	Wolcott Town Garage and Fire Station Stormwater Management Improvements	$15,888	Ongoing	
2017	Central Vermont Regional Planning Commission	Northfield Water Street Stormwater Structure	$173,785	Ongoing	

Stormwater - Implementation

Constructing Green Stormwater Infrastructure at the Waitsfield Town Office



Project Status: Completed

Results:

- **0.2 kg/year phosphorus reduction**
- **0.3 acres of impervious area treated**
- **224 kg/year sediment reduction**

Town: Waitsfield

County: Washington

Watershed: Winooski

Funding Amount: $15,000

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

Description: The Town of Waitsfield is building a new town office at a 0.85 acre undeveloped site on Main Street in historic Waitsfield Village. The building, paved driveway and parking area, and concrete sidewalks will create approximately 13,555 square feet of new impermeable surfaces that will increase the volume of stormwater. The project includes construction of four rain gardens and a sitting garden to capture and treat the resulting stormwater. The project is fully designed and was put out to bid for construction but the low bid came in substantially higher than the funds available, which requires locating additional money or removing elements from the plan. Without the rain gardens, stormwater would be directed to an existing storm drain system that drains directly into the Mad River.

Partners: Waitsfield Town

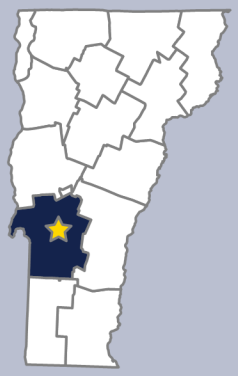
Waitsfield Town Office during rain garden construction.

Waitsfield Town Office after a rain garden was installed to treat stormwater runoff.

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

Stormwater - Implementation

Stormwater Reduction in the East Creek Watershed



Project Status: Completed

Results:

- **1.2 kg/year phosphorus reduction**
- **1.5 acres of impervious area treated**
- **454 kg/year sediment reduction**

Town: Rutland City

County: Rutland

Watershed: Otter Creek

Funding Amount: $75,000

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

Description: This project implements a vegetated bioswale and a bioretention pond for the purpose of stormwater reduction in the City of Rutland, which will serve to improve water quality by allowing nutrients and pollutants to settle out from stormwater runoff before it enters the East Creek. The practices implemented include, a green swale at Preville Avenue and Bioretention at Giorgetti Park. Both are located in the East Creek watershed and have been identified in the final Stormwater Master Plan for the Tenney Brook/East Creek as sites with existing stormwater problems with potential for stormwater retrofit.

Partners: Rutland County Natural Resources Conservation District

Bioretention basin installed near Giorgetti Park in the City of Rutland

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

Stormwater - Implementation

Hyde Park Stormwater Improvement Project

Project Status: Completed

Results:

- **1 100% designs completed**
- **3.5 kg/year phosphorus reduction**
- **4.4 acres of impervious area treated**
- **2,764 kg/year sediment reduction**

Town: Hyde Park

County: Lamoille

Watershed: Lamoille

Funding Amount: $75,000

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

Description: This project, located in the Town of Hyde Park, seeks to reduce nutrient and sediment loading and increase nutrient and sediment storage by targeting two major stressors; land erosion and nutrient loading, as outlined in the Vermont Surface Water Management Strategy. The project includes both the design and construction of the following stormwater management practices: stabilizing a headcut on a private Depot Street culvert, restoring an eroded gully on Depot Street, and constructing a bioretention area on Morey Road.

Partners: Lamoille County Conservation District

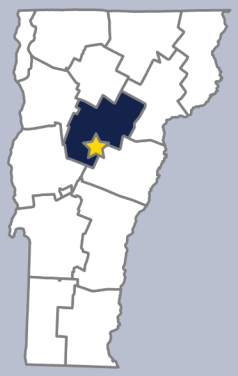
An eroded gully on Depot Street in Hyde Park before restoration.

The restored gully on Depot Street after constructing and post-planting.

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

Stormwater - Implementation

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



Project Status: Completed

Results:

- **2.8 kg/year phosphorus reduction**
- **2.9 acres of impervious area treated**
- **2,815 kg/year sediment reduction**

Town: Northfield

County: Washington

Watershed: Winooski

Funding Amount: $59,842

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

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

Partners: Central Vermont Regional Planning Commission

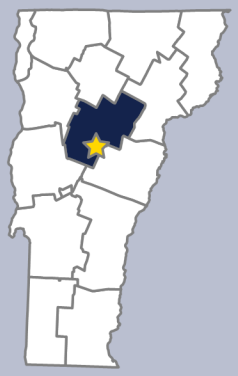
Before construction of rain garden and installation of grass swale in the parking lot of Kenyon's Hardware.

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

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

Stormwater - Implementation

Northfield Village Green Bioretention Installation



Project Status: **Completed**

Results:

- **2.8 kg/year phosphorus reduction**
- **5 acres of impervious area treated**
- **3,128 kg/year sediment reduction**

Town: Northfield

County: Washington

Watershed: Winooski

Funding Amount: $110,695

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

Description: This project was identified and designed as part of a previous grant to that sought to mitigate stormwater runoff within the Village of Northfield. The site that has been selected is located behind the Village Green in Northfield. This project constructs a large bioretention basin which captures and treats surface stormwater runoff from 14 acres of the downtown, including 5 acres of impervious surface.

Partners: Central Vermont Regional Planning Commission

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

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

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

Stormwater Master Planning

Missisquoi Basin Stormwater Master Planning and Priority Retrofit Project

Project Status: Completed

Results:

- **0.6 kg/year phosphorus reduction**
- **0.8 acres of impervious area treated**
- **6 100% designs completed**
- **96,000 acres covered by plan**
- **127 kg/year sediment reduction**

Town: Franklin, Alburg, St. Albans Town, Sheldon, Swanton, Enosburgh

County: Franklin, Grand Isle

Watershed: Missisquoi Bay

Funding Amount: $75,000

Funding Source: DEC Ecosystem Restoration Grant (Capital Fund, SFY 2014)

Description: This project serves to implement a priority planning process for stormwater pollution in Franklin, Alburgh, and St Albans Town. The grantee accomplished this by compiling existing information on stormwater problems, completing a problem area identification and evaluation process, designing solutions for problem areas in Swanton Village and Enosburg Town, and engineering a design solution for a complex area in Sheldon Springs. Results of the project included a completed a stormwater management plan, six completed stormwater designs and a Green Infrastructure infiltration system implemented in Swanton Village.

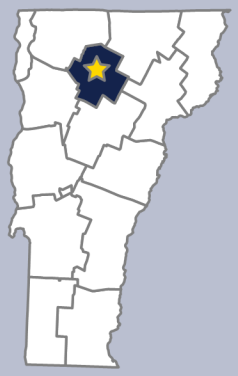
Partners: Friends of Northern Lake Champlain

Traffic calming-bioretention area, implemented in the Village of Swanton

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

River Corridor Easement - Implementation

Rankin Farm River Corridor Easement



Project Status: Completed

Results:

- **12.3 acres of corridor conserved**
- **2,578 linear feet of corridor conserved**

Town: Johnson

County: Lamoille

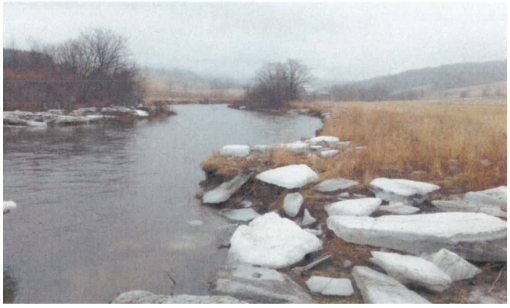
Watershed: Lamoille

Funding Amount: $39,513

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

Description: The Vermont Land Trust acquired a river corridor easement on 12.3 acres along the Gihon River in the town of Johnson. The easement acquires the channel management rights on 12.3 acres and establishes a 50-foot naturally vegetated buffer along the southern bank of the Gihon. In partnership and as match for this grant, the USDA Conservation Reserve Enhancement Program (CREP) program will be planting the portions of the buffer not currently in natural vegetation.

Partners: Vermont Land Trust



View of Gihon River and riparian corridor easement area. The easement will help to re-establish its natural slope and meander pattern and access to natural floodplains.

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

River Corridor Easement - Implementation

Wild Branch River Corridor Easements

Project Status: **Completed**

Results:

- **22.5 acres of corridor conserved**
- **4,100 linear feet of corridor conserved**

Town: Wolcott

County: Lamoille

Watershed: Lamoille

Funding Amount: $68,270

Funding Source: DEC Ecosystem Restoration Grant (Capital Fund, SFY 2014)

Description: The Wild Branch Easements, located on 2 properties along the Wild Branch in Wolcott, VT, will protect the river corridor and channel management rights along this area of the river. This section of the Wild Branch has very high sensitivity to channel adjustment and a high priority for conservation due to the value of the area for sediment attenuation and natural floodplain development. The corridor easement will conserve approximately 24 acres of land.

Partners: Vermont River Conservancy

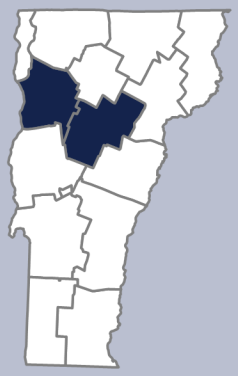
Bank along easment property slumping due to active river migration and undercutting

Vegetated buffer along easement property banks, shrubs and small trees present

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

River - Planting

Winooski River Trees for Streams Riparian Buffer Restoration/Planting



Project Status: Completed

Results:

- **4 acres riparian corridor planted**
- **20.7 kg/year phosphorus reduction**
- **3,470 linear feet riparian corridor planted**
- **17,196 kg/year sediment reduction**

Town: Cabot, Underhill, Jericho, Huntington, Charlotte

County: Chittenden, Washington

Watershed: Winooski

Funding Amount: $18,050

Funding Source: DEC Ecosystem Restoration Grant (Capital Fund, SFY 2017)

Description: The Trees for Streams program was created to enhance riparian buffers on private lands throughout Vermont. In conjunction with Trees for Streams, the current project seeks to plant 4 acres of riparian buffer along 3,470 linear feet at five, privately-owned properties within the Winooski Natural Resources Conservation District's including the following locations; Route 215 in Lower Cabot, Spear St. in Charlotte, Raceway Rd. in Jericho, Snyder Rd. in Underhill and Main Rd. in Huntington. Installing forested riparian buffers protects surface waters from sources of non-point source pollution by binding stream bank soils, preventing overland erosion by reducing and slowing sheet flow and allowing for greater infiltration into the soil.

Partners: Winooski Natural Resources Conservation District

Browns River site, pre-planting

Browns River site, post-planting

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

River - Planting

The Upper La Platte River Natural Area Floodplain & River Restoration Project

Project Status: Completed

Results:

- **4.4 kg/year phosphorus reduction**
- **5.6 acres riparian corridor planted**
- **1,577 kg/year sediment reduction**

Town: Shelburne

County: Chittenden

Watershed: North Champlain

Funding Amount: $15,750

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

Description: The Lake Champlain Land Trust was awarded funds to implement the Upper La Platte River Natural Area floodplain & river restoration project, which will serve to enhance riparian buffers along the LaPlatte River and its tributaries. The project implements a tree planting project that will restore 4.5 acres of floodplain riparian buffer area including nearly a mile of frontage of the La Platte River. Planting density of native species will be 300 plants per acre with a buffer width no less than 50 feet.

Partners: Lake Champlain Land Trust

Upper La Platte River natural area floodplain before tree plantings.

The Upper La Platte River natural area after the third tree planting project, out of five, in the spring of 2016, to restore an eroding riverbank.

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

River - Planting

Statewide Trees for Streams/Riparian Buffer Restoration, 2015

Project Status: Completed

Results:

- **10.1 acres riparian corridor planted**
- **50.7 kg/year phosphorus reduction**
- **37,966 kg/year sediment reduction**

Town: State Wide

County: State Wide

Watershed:

Funding Amount: $67,500

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

Description: This project implements the statewide Trees for Streams program, which serves to enhance riparian buffer areas along streams/rivers deemed as "stable". The program has expanded and extended the Natural Resources Conservation District State-wide Trees for Streams (TFS) Program and planting at least 10 acres of riparian buffers in priority watersheds in 2015. The State's goal to reduce sediment and nutrient pollution to Vermont's waterways is well addressed by the Trees for Streams program. The installation of vegetated river buffers is a widely supported practice with a number of critical benefits to water quality, riparian habitat, and overall river health and geomorphic conditions.

Partners: Vermont Association of Conservation Districts

Dog River planting site in Fall 2014, Pre-Planting

Dog River site, Spring 2015, post planting

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

Floodplain/Stream Restoration - Implementation

Birds of Vermont Museum, Huntington Stream Restoration and Gully Remediation

Project Status: Completed

Results:

- **0.3 acres riparian corridor planted**
- **300 linear feet riparian corridor planted**

Town: Huntington

County: Chittenden

Watershed: Winooski

Funding Amount: $11,000

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

Description: This restoration project, located at the Birds of Vermont Museum on Sherman Hollow Rd in Huntington, restores a large gully developed during a 2013 flood event on the tributary of Sherman Hollow Brook. Results include the installation of a series of step-pools which act as energy dissipaters and can reduce flow velocity and erosion potential. The design prepares for the likelihood of more frequent and intense storms, and is being designed to accommodate 100 year floods. It will prevent further erosion and sedimentation from occurring. Additionally the owners are partnering with the Town of Huntington to replace the undersized culverts, culvert headers, rock lining the outfalls, and redo roadside ditches on Sherman Hollow Road.

Partners: Birds of Vermont Museum

Looking upstream towards Sherman Hollow Road from unnamed tributary before construction.

One month after construction and installation of culvert under the road. The new culvert with large boulders creates step-pools and a more erosion-resistant streambed.

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

Lake Shoreland - Implementation

Lake Wise Practice Implementation- Lake Carmi, Franklin

Project Status: Funded and in Progress

Results:

- **11 drainage structures installed/repaired**

Town: Franklin

County: Franklin

Watershed: Missisquoi Bay

Funding Amount: $37,125

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

Description: This project implements Lake Wise practices within the Lake Carmi watershed in Franklin, which serve to restore and protect Lake Carmi shoreland through assessments followed by shoreland best management projects. Although much of Lake Carmi has shoreland development close to the water's edge, there are still many opportunities for "softening" the shores and re-naturalizing them with native plantings as well as implementing practices for controlling stormwater runoff. Improving shoreland conditions helps protect water quality and aquatic habitat, which recent science shows to be the greatest threat to Vermont lakes. Implemented practices include: shoreline ditches, rock aprons, stone lined-culvert inlet/outlets, check dams, shoreline plantings and stabilization.

Partners: Franklin Watershed Committee

Eroding path leading to lakeshore

Lakeshore path stabilized with stone to prevent further erosion

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

Forestry - Implementation

Portable Skidder Bridge Rental Program

Project Status: **Completed**

Results:

- **14 practices installed**

Town: State Wide

County: State Wide

Watershed:

Funding Amount: $75,000

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

Description: This project implements the Portable Skidder Bridge Rental Program, which serves to reduce nonpoint source pollution associated with logging operations by providing skidder bridge rentals. The Grantee will reduce nonpoint source pollution associated with logging operations by augmenting the supply of portable skidder bridges in the Natural Resources Conservation District Portable Skidder Bridge Rental Program with the construction of 14 new bridges. Portable skidder bridges are designed for use as temporary structures for crossing streams during logging. They are widely viewed as a Best Management Practice for controlling nonpoint source pollution associated with logging operations.

Partners: Vermont Association of Conservation Districts

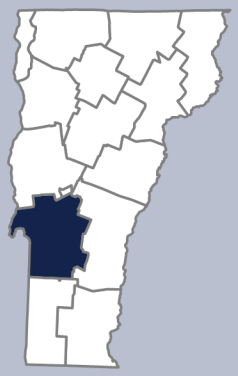
Students helping to construct skidder bridges for use in the rental program

Installation of Skidder Bridge across a stream

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

Agricultural Pollution Prevention - Implementation

Poultney and Mettowee Rivers Agricultural Conservation Practice Implementation



Project Status: Completed

Results:

- **1 100% designs completed**
- **6 practices installed**

Town: Rutland County

County: Rutland

Watershed: South Champlain

Funding Amount: $74,010

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

Description: This project provides assistance for the installation of soil and water conservation practices (such as livestock exclusion with associated practices, roof gutters and other clean water diversions, and animal walkways) on non-permitted livestock operations located within watersheds drained by the Poultney River and Mettowee River. Outreach to 30 farms within the Mettowee Valley or the West Haven area was conducted and 6 farms were chosen to participate in the program. This resulted in 6 water quality improvement projects installed and one final design was developed.

Partners: Poultney-Mettowee Natural Resources Conservation District

Pre-project road on Waite Farm, where farmers drove the width of the pasture, creating ruts and killing vegetation.

Post-construction with a new road, stabilized and graveled with a ditch installed to improve drainage and keep the road drivable during wet weather.

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