Vermont Nonpoint Source Management Program
Federal Fiscal Year 2020 Annual Report




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

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VERMONT

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Bottom Right: Rutland Town Elementary School Green Stormwater Infrastructure Project

Introduction

This *Vermont Nonpoint Source (NPS) Management Program 2020 Annual Report* addresses milestones and progress updates for the federal fiscal year (FFY) 2020 reporting period (October 2019-September 2020). The Vermont NPS Management Program Plan (2015) was prepared by the Vermont Department of Environmental Conservation (DEC) to fulfill Clean Water Act Section 319 program requirements following U.S. Environmental Protection Agency (EPA) guidance.[1] During this fiscal year, DEC developed the new FFY 2021-2025 Vermont NPS Management Program Plan, approved by EPA in September of 2020.[2] This Annual Report is the final report on 2015 NPS program plan milestones. Next year's annual report will address milestones under the FFY 2021-2025 plan.

During this FFY 2020 reporting period, the State of Vermont has continued to make substantial progress completing milestones associated with the *Vermont NPS Management Program* also driven by:

- Implementing elements of the Clean Water Service Delivery Act (Act 76 of 2019): Act 76 establishes regional organizations called clean water service providers (CWSP) in the Lake Champlain and Lake Memphremagog basins. CWSPs are responsible for partnering with Basin Water Quality Councils to identify, implement, operate, and maintain non-regulatory projects to meet non-regulatory interim phosphorus reduction targets. The Act requires formula dispersal of funds for non-regulatory projects in the Lake Champlain and Lake Memphremagog basins. DEC is on track to meet these requirements.
- Implementation of the *Phosphorus Total Maximum Daily Loads (TMDLs) for Vermont Segments of Lake Champlain* (i.e., Lake Champlain TMDL): The Lake Champlain TMDL and its accountability framework drive NPS management efforts in the Lake Champlain basin of Vermont. The State of Vermont published Lake Champlain TMDL progress report in January 2021, as part of the *Vermont Clean Water Initiative 2020 Performance Report*.[3]

NPS pollution is the leading cause of water use impairment to Vermont's surface water and ground water resources. 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) and Department of Forests, Parks and Recreation (FPR); Agency of Agriculture, Food and Markets (AAFM); and Agency of Transportation (VTrans).

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[1]The Vermont Nonpoint Source Management Program Plan approved in 2015. https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/VCWIP-Vermont-Nonpoint-Source-Management-Program.pdf

[2] The Vermont Nonpoint Source Management Program Plan (FFY 2021-2025) was finalized and approved September 2020 https://dec.vermont.gov/water-investment/cwi/reports#NPSPlan

[3] Vermont Clean Water Initiative 2020 Performance Report: http://dec.vermont.gov/water-investment/cwi/reports.

Appendix A illustrates the entire suite of NPS-related goals, objectives, milestones, and respective completion year based on the 2015 Vermont NPS Management Program Plan. A progress update is provided for those NPS milestones that were completed or moved forward during FFY 2020. The milestones laid out in the 2015 NPS Program Plan have largely been completed for this five-year period and marked "complete" in Appendix A. Some milestones related to field inspections and in-person trainings were impacted by COVID-19 in 2020, resulting in smaller numbers of inspections or trainings compared to previous years. Milestones that repeat annually or will continue after this reporting period are marked as "ongoing." For example, many of the outreach and education programs established under this plan will continue those efforts into the future. In six cases, a milestone was marked as "discontinued" because the intent of the milestone was able to be met in an alternative manner as described in Appendix A.

Section 319-Funded Statewide Programs and Watershed Projects

SECTION 319 FUNDED STATEWIDE PROGRAMS

DEC's FFY 2020 Section 319 federal funding award totaled approximately $1.15 million, of which approximately 84 percent was used to carry out DEC's NPS activities on a statewide basis. The remaining 16 percent was passed through to AAFM to support agricultural NPS pollution reduction programs. 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. Clean Water Act Section 319 funds supported 11.41 full time equivalent (FTE) staff members in the DEC NPS-related programs as shown in Table 1. Further information about these program activities and respective accomplishments during the reporting period are summarized below.

Table 1. DEC use of FFY 2020 Section 319 Funds

Vermont DEC Program	Program Activities	FTE
Clean Water Initiative Program (CWIP)	NPS program management, administration, and support	6.00
Watershed Planning Program (WPP)	Water quality planning including Total Maximum Daily Load (TMDL) implementation planning	5.25
Water Investment Division (WID)	WID management and administrative support	0.16
Total		11.41

DEC's Water Investment Division (WID) supports the prioritization (through Tactical Basin Planning), funding/financing, management, reporting, and accountability of clean water and water infrastructure projects. Section 319 funds support DEC personnel, within Water Investment Division programs in FFY 2020, including the Clean Water Initiative Program (CWIP) and the Watershed Planning Program (WPP).

Nonpoint Source Program Management/Administration

Federal Funding – Clean Water Act Section 319

DEC developed the new FFY 2021-2025 Vermont NPS Management Program Plan, approved by EPA in September of 2020. EPA approved of Vermont's FFY 2020 Section 319 workplan in February 2020. Consistent with EPA program guidance, DEC continued using Section 319 funds to support personnel working under the NPS management program and leveraged over $1.15 million in state funded NPS projects, in addition to providing the required 40% non-federal match. DEC's leveraged state-funded watershed projects were reported in the EPA Grants Reporting and Tracking System (GRTS). A portion of the Section 319 award ($187,431) was provided to the Vermont AAFM, and matched by that Agency, to support their work on the management of agricultural NPS pollution across Vermont.

Federal Funding – Clean Water Act Section 604(b)

DEC has effectively utilized federal Clean Water Act Section 604(b) funds, a "set-aside" of the Federal Clean Water State Revolving Loan Fund capitalization grant, to further the inventory, evaluation, strategic planning, and management of its water resources. DEC used a portion of FFY 2020 Section 604(b) funds to complete field work, compile data, and generate assessment reports in conjunction with the statewide rotational water quality assessment process. DEC has designed a rotational watershed assessment process with a goal that surface waters (rivers, streams, lakes, ponds) of all 15 major river basins in the state are evaluated once every five years. The assessment process, including preparation of basin-specific assessment reports, is an essential and ongoing first phase of Tactical Basin Plan update and development process.

DEC also used FFY 2020 604(b) funds in conjunction with preparation of the 2020 305(b) Water Quality Assessment Report and to migrate assessment information concurrent with the EPA Assessment, TMDL Tracking and Implementation System (ATTAINS) data management system. The DEC assessment process integrates relevant DEC maintained surface water assessment and planning database information.

DEC continues to allow for the pass through federal Clean Water Act Section 604(b) funding to support water quality and NPS planning activities carried out by the 11 Regional Planning Commissions (RPCs). DEC will continue to assist in the identification and selection of planning activities conducted by the eligible regional comprehensive planning organizations (herein referred to as RPCs) consistent with the following: Statewide Surface Water Management Strategy (revised January 2017); the Lake Champlain

Opportunities for Action (2017); subsequent phases of Tactical Basin Plans for Lake Champlain TMDL implementation; and river basin assessment reports incorporated into revised river basin water quality management plans (i.e., DEC's Tactical Basin Plans).[4]

The 604(b) funding also supports water quality monitoring activities, including the municipal awareness of testing results, and how these results are used to support Tactical Basin Plan development.

State-Administered Clean Water Funding

In addition to 604(b) funds, DEC awarded $330,000 in state funds to RPCs and Natural Resource Conservation Districts to support Tactical Basin Plan development and outreach in SFY 2020, which was complemented by funding for Watersheds United Vermont (WUV) to promote that organizations engagement in tactical basin planning. WUV became a statutory partner to support Tactical Basin Planning in SFY 2021. Funds to support Tactical Basin Plan development and outreach increased to $500,000 in SFY 2021.

The State of Vermont offers clean water funding opportunities in the form of grants, loans, and contracts across state agencies from a variety of sources, including the Clean Water Fund (CWF), Clean Water State Revolving Loan Fund, Capital Bill, Transportation Fund, Lake Champlain Basin Program federal funds, and many others as shown in Figure 1. Vermont's CWF was established by Act 64 of 2015 (i.e., the "Vermont Clean Water Act"). CWF and Capital Bill clean water dollars are proposed for appropriation by the Clean Water Board through an annual budget process with public participation opportunities. All state investments made across agencies in support of clean water projects are reported in the *Vermont Clean Water Initiative Annual Performance Report*. Part two of the Performance Report contains a progress update for the Lake Champlain TMDL. The Performance Report dataset is made available to the public through two online tools.

1. The "Clean Water Projects Explorer" allows interested parties to search for and learn more details about individual state-funded clean water projects. The Explorer also contains potential projects identified through Tactical Basin Planning.
2. New to the Portal in SFY 2021 is the "Clean Water Interactive Dashboard" (CWID). CWID is an online tool that allows interested parties to interact with Performance Report data on investments, project outputs, estimated pollutant load reductions and project cost effectiveness.[5]

[4] 2017 Statewide Surface Water Quality Strategy, available at: https://dec.vermont.gov/watershed/map/strategy. Lake Champlain Opportunities for Action, available at: https://www.lcbp.org/about-us/opportunities-for-action. Tactical Basin Plans, available at: https://dec.vermont.gov/water-investment/watershed-planning.

[5] Clean Water Projects Explorer and Clean Water Interactive Dashboard are available at: https://dec.vermont.gov/water-investment/cwi/projects/clean-water-portal.

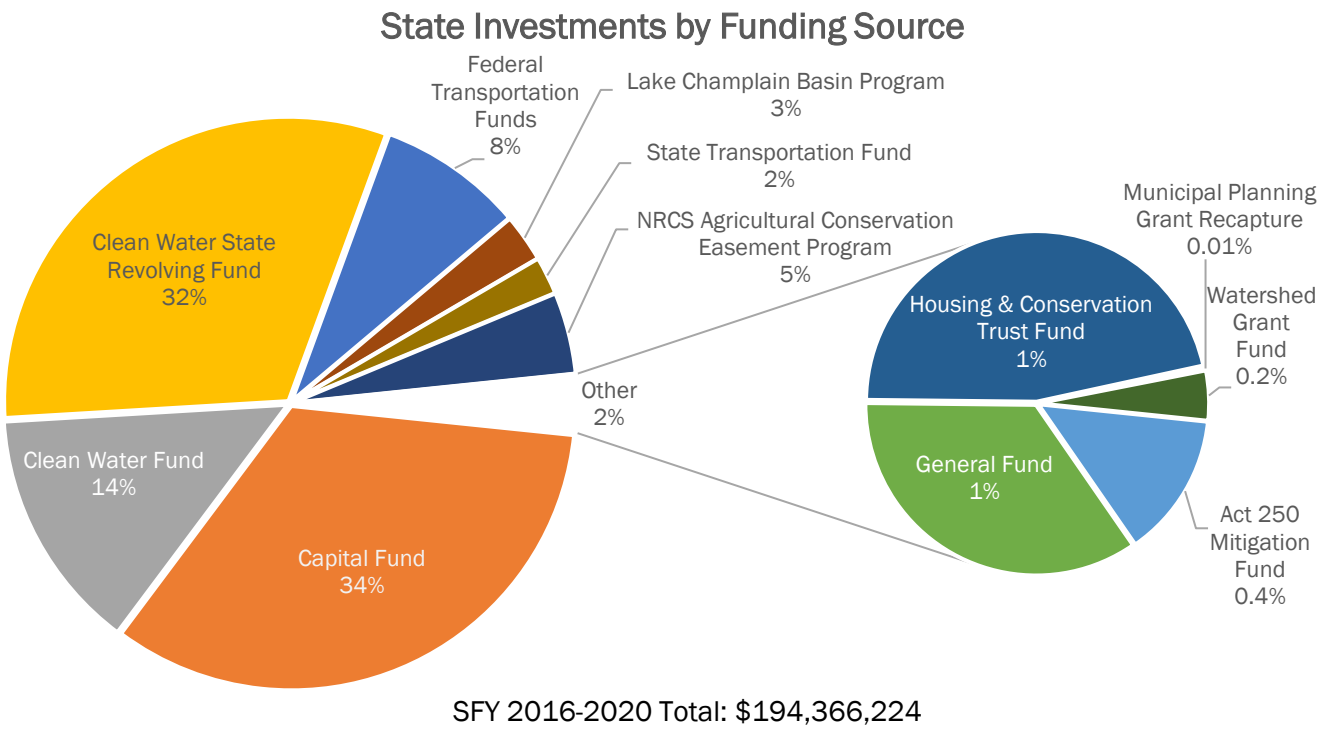

Figure 1. Proportion of dollars awarded to clean water projects through State of Vermont agencies, SFY 2016-2020 by funding or financing source (see page 18 of the *Vermont Clean Water Initiative 2020 Performance Report*).

DEC CWIP staff supported a variety of efforts during the reporting period to fund, track, and report on NPS projects, including:

- Assisting the Clean Water Board in completing its SFY 2020 and 2021 clean water budget process and initiating its SFY 2022 clean water budget process;
- Awarding millions of state dollars to NPS projects through Ecosystem Restoration Dam Removal Grants, River Corridor Easement Grants, Design/Implementation Block Grants, the Municipal Roads Grants-in-Aid Program, and various other block grants;
- Tracking and accounting outputs and outcomes for all CWIP-funded clean water projects in the state's tracking database;
- Developing and documenting methods to account for nutrient pollutant reductions to show progress toward meeting TMDLs;
- Fulfilling all Section 319 planning and reporting requirements;
- Coordinating with state and federal agencies to gather clean water project data through state funding programs, federal funding programs, and regulatory programs; and
- Publishing the *Vermont Clean Water Initiative Annual Performance Report*, which fulfills the State of Vermont's clean water investment statutory reporting requirements and Lake Champlain TMDL progress federal reporting requirements.

DEC staff, working under Vermont's NPS Management Program, assisted in the planning, review,

selection, initiation, management, and closing out of NPS projects funded through CWIP grants and contracts.

Concurrently with Vermont's budgeting, granting, and reporting processes, DEC has begun implementing elements of the Clean Water Service Delivery Act (Act 76 of 2019). The Act requires that the Agency assign, by rule, entities that will serve as Clean Water Service Providers. During FFY 2020, Clean Water Service Providers (CWSPs) were chosen for the watersheds within Lake Champlain Basin and a draft rule was developed. DEC is working with consultants to address gaps in clean water project phosphorus accounting methods in the forestry sector and floodplain and river restoration sector. In addition, DEC worked with consultants to establish a cost calculator tool to assist in the development of Water Quality Restoration Formula Grants that will be provided to CWSPs. Staff are also working to establish operation and maintenance (O&M) standards and O&M verification protocols to ensure long term performance of clean water projects.

Continued Coordination with USDA-NRCS

DEC staff continued to participate as a member of U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) State Technical Committee to advise on cost-sharing assistance programs for Vermont landowners seeking to implement conservation practices. Staff coordinate with NRCS and AAFM on nutrient management planning and using technical and financial resources efficiently.

USDA-NRCS National Water Quality Initiative

DEC staff continue to engage 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 coordinates with the Vermont Office of NRCS on NWQI watershed identification and selection and, when applicable, coordinates funding of NWQI activities. 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. In FFY 2020, East Creek and Hungerford Brook were the two NWQI watersheds targeted for conservation practice implementation and were allocated $545,506 in cost share dollars. Rock River was not included but will be added back for FY21.

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. NRCS has automatically extended this RCPP project through April 30, 2021, due to delays in federal rule changes. The funding in the grant has been fully allocated and final reporting will be completed on time.

In January 2021, DEC signed an agreement with NRCS to extend RCPP for an additional five years, and with an additional $10 million. These funds will be split among the following categories:

- Agricultural best management practices: $2,500,000
- Forestry best management practices: $1,000,000
- Wetland restoration: $250,000
- Agricultural/forestry easements: $2,250,000
- Wetland easements: $1,000,000
- Technical assistance: $2,500,000

DEC has also coordinated with multiple partners in establishing and providing support for other RCPP grants in Vermont. One of these, the Memphremagog Long-term Water Quality Partnership RCPP grant, has also been renewed for five years.

303(d) List and Total Maximum Daily Load Development

The 2020 303(d) listing cycle was completed in September 2020 with EPA's approval of the 303(d) List.[6] Several changes were realized in 2020 pertaining to impaired waters. Newly delisted waters included two stream segments where combined sewer overflows have been eliminated (Black River in Springfield and Castleton River in Fair Haven), an acid-deposition impacted stream with documented recovery (Ball Mountain Brook in Stratton and Jamaica), a nutrient-impaired lake for which TMDL implementation is complete and recovery is evident (Ticklenaked Pond in Ryegate), a stream segment previously impaired due to nutrients from a wastewater treatment facility (Stevens Branch, Tributary #23 in Williamstown), and a stormwater impaired segment at a ski resort that has shown significant aquatic life improvements (North Branch Deerfield River in Dover).

Newly impaired waters were identified through ongoing in-house and citizen science monitoring projects and included ten stream reaches. These included one stream impaired by sediment and pollutants in stormwater runoff, four streams impaired by nutrients sourced in agriculture dominated watersheds, two E. coli impairments (combined sewer overflows and unknown sources), and one impaired by acidity and low alkalinity due to acid deposition. Chloride was added as a cause parameter of impairment to three streams after the highest on record chloride concentrations were reported in 2018. Temperature was added as a cause of impairment to two streams after in-stream temperatures were monitored continuously over multiple seasons. E. coli was added as a cause parameter to two other streams already impaired by stormwater, sources may include illicit discharges and runoff from developed lands.

DEC staff completed impaired waters remediation planning, TMDL planning and development, and

[6] The 2020 303(d) list available here: https://dec.vermont.gov/sites/dec/files/documents/mp_PriorityWatersList_PartA_303d_2020.pdf.

continued 303(d) assessment activities during this reporting period. TMDL development activities included:

- TMDL methodologies were developed, and data collection 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 TMDL alternatives are under development for ten small streams in Basins 5 and 6, Northern Lake Champlain Direct and Missisquoi River respectively. Rather than developing complex phosphorus TMDLs in these waters, a more "direct to implementation" approach is being developed in cooperation with EPA called an Alternative Restoration Plan (ARP). It is anticipated that a target loading analysis report and the respective Tactical Basin Plans will act in concert to provide the necessary planning to restore these waters.

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.

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

Ongoing work related to alternative water quality remediation plans continued, 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 implementation progress reports, conducting site visits, and holding annual public meetings.

Stormwater Management Priority Focus Areas

Municipal Stormwater Mapping and Stormwater Permit Inspections

DEC staff provided final reports and stormwater infrastructure maps to the towns of Bolton, Brandon (the Forestdale section), Clarendon, Coventry, Jay, Montgomery Village, Northfield, Starksboro, St. Johnsbury, Shrewsbury, and Troy. Updated stormwater infrastructure data were also collected for Stowe and Stowe Mountain Resort. During the reporting period, DEC staff inspected 50 stormwater permitted facilities in the towns listed above and sent the findings to the Stormwater Program. Additional contacts were made, and field work was conducted in the towns of Mendon, Enosburg, Castleton, Fairfax, Sheldon, and Springfield.

Illicit Discharge Detection and Elimination

DEC staff participated in the public noticing of illicit discharges and oversaw four illicit discharge detection and elimination (IDDE) contracts during the reporting period. Contracts awarded or managed during this period involved IDDE work in the Deerfield River (Basin 12) and the Battenkill, Hoosic, and Wallomsac River Basin (Basin 1), Montpelier and three statewide IDDE contracts. This includes about 75 small towns statewide. Figure 2 shows watershed/basin boundaries by name and basin number. Seven illicit discharges are under investigation in Montpelier, and several are scheduled to be eliminated. New illicit discharges have been found in Bennington, Newport City, Manchester, St. Johnsbury, and other small towns. Several discharges have been confirmed to be eliminated through monitoring. Ten discharges in the MS4 communities of Burlington and St. Albans City are under investigation.

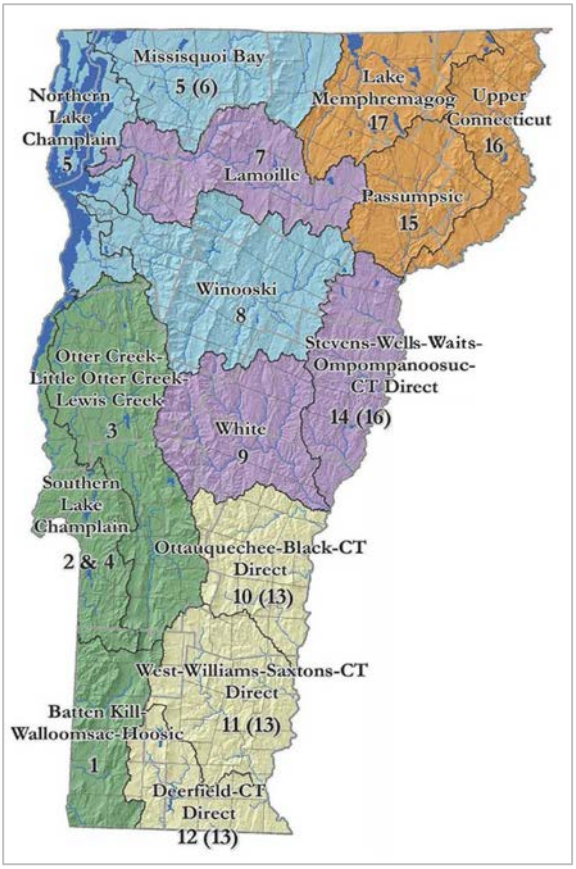

Figure 2. Tactical Basin Planning boundaries by watershed name and number.

Grant Technical Assistance and Education

DEC staff participated in the Chittenden County Regional Stormwater Education Program steering committee meetings during the reporting period. Staff collaborated with the U.S. EPA, U.S. Geological Survey (USGS) New England Water Science Center, the University of Vermont, nine municipalities, and the Chittenden County Regional Planning Commission on a two-year study on the effectiveness of street cleaning practices and strategies for improving phosphorus reduction. Towns will have the option to obtain sweeping credit by sweeping leaves four times in the fall to achieve required phosphorus reductions under the Lake Champlain TMDL.

Staff met with numerous towns statewide on stormwater retrofit projects and provided technical assistance on preliminary and final designs. One example of this is the Shelburne Bay-VELCO gravel wetland constructed in fall 2020 by Town of Shelburne with CWIP grant funding.

Staff provided technical and geographic information system (GIS) assistance in development of the Municipal Roads General Permit (MRGP). Road segments with stormwater collection systems throughout the state have been mapped and added to the MRGP hydrologically connected road segment database.

The Green Infrastructure Roundtable – a statewide group of Green Stormwater Infrastructure (GSI)

practitioners – and its Advisory Committee met three times to share information of mutual interest, discuss technical and programmatic topics, and initiate a conversation on the long-term operation and maintenance of GSI systems.

Stormwater Technical Assistance

DEC staff provided Stormwater Master Planning technical assistance to the following towns and entities: Burlington, Fairlee, Johnson, Ludlow, Middlebury, Newport, Northfield, Shelburne, and the Vermont Technical College in Randolph.

DEC staff provided comments on additions to the 2020 303(d) list on streams impaired for stormwater runoff including Giddings Brook in Enosburg, Blanchard Brook in Montpelier, Tenney Brook in Rutland, Deer Brook in Georgia, Munson Brook in Manchester, Inn Brook in Stowe, and Dothan Brook in Hartford.

DEC staff provided comments to the DEC Wastewater Program and the Towns of Hartford, St. Johnsbury, Montpelier, and Rutland City on their draft Combined Sewer Long Term Control Plans. Numerous combined sewer surface inlet locations in each service area were noted and several significant mapping mistakes by consultants were found and corrected. Staff also provided comments on the implementation phase(s) of the upcoming municipal combined sewer separation projects.

River and River Corridor Management

DEC Rivers Program field staff receive and respond to an average of ten new requests per day from landowners, municipalities, and other state agencies for technical and regulatory assistance on river and floodplain projects. In FFY 2020, Rivers Program staff provided technical assistance on 2,284 projects, permitted or was involved in the permitting of 1,269 projects, and offered 328 hours of training. This level of interaction shows that adoption of state river conservation policies and the establishment of the Vermont DEC Rivers Program has increased awareness of the environmental damage and erosion hazards of river and floodplain encroachments.

The 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 initiated the Functioning Floodplains Initiative (FFI) in 2019. The FFI is developing methodologies for evaluating river reach and watershed-scale restoration of stream, riparian, wetland, and floodplain function. The identification and prioritization of natural resource conservation and

restoration projects will be vastly improved through a publicly accessible mapping platform. The initiative seeks to garner local community support by tracking and publicizing the accumulation of the natural and socio-economic assets derived from connected and naturally functioning floodplains and wetlands.[7]

Phase 1 FFI contract work began in March 2019 by developing methods and maps to quantify and display stream and floodplain connectivity and optimal locations where restoration and protection practices would increase connectivity and stream equilibrium conditions. Work under the Phase 2 contract began in 2020. Phase 2 is building upon the stream and floodplain connectivity mapping and the hydrology-hydraulics framework developed in Phase 1 to include:

- Maps of river, wetland, and floodplain forms with estimates of dynamic processes (flow storage, sediment erosion/deposition, and nutrient and carbon retention) to indicate a weighted prioritization of wetland/floodplain and river reconnection projects in a river network context.
- Ecological and economic valuation of floodplain functions to inform weighted priorities for restoration and conservation projects.
- Five-year estimated allocations for pollutant load reductions for Lake Champlain sub-watersheds at the HUC 12 scale. This includes pollutant reduction accounting methods for common restoration and protection practices.
- A web-based system to track implementation, effectiveness, and value of river and floodplain/wetland restoration and conservation projects.
- Training modules and a user manual for the web-based tracking tools.
- Outreach materials that can be used to engage a greater range of stakeholders in the initiative and learn about their perceptions of place and river dynamics as they relate to both local and statewide initiatives to reconnect Vermont's rivers.

The FFI project is at the most cutting edge of advanced science-based river management and will serve as a template internationally for jurisdictions where policy directs pursuit of river equilibrium. The project is being funded by the Lake Champlain Basin Program and the State of Vermont (via the Clean Water Fund and Clean Water State Revolving Fund).

Lakes and Ponds Watershed and Shoreland Management

DEC's Lakes and Ponds Program continued work on numerous priorities identified in the Program's Strategic Plan aimed at reducing nonpoint source pollution, namely:

- Better integrate Lakes and Ponds Program priorities into the Tactical Basin Planning process.

[7] An FFI project summary and supporting information is available here: https://dec.vermont.gov/rivers/ffi.

- Empower lake leaders to participate in monitoring and managing their lakes including through direct participation in monitoring and project planning.
- Preserve and restore the natural lakeshore to protect and improve water quality, aquatic and terrestrial wildlife habitat, and lake ecosystem functions.
- Implement a suite of shoreland protection and lake encroachment regulatory actions collectively aimed at reducing nonpoint source pollution to lake ecosystems.

The Lakes and Ponds Program actively participates in the Watershed Management Division's Annual Monitoring Summit each year, aimed at coordinating monitoring teams across the Division. Goals of the summit are to review water quality challenges in 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 and Assessment, Rivers, and Wetlands Programs. In 2020, the Monitoring Summit focused on coordinating staff sampling of surface waters, as well as expanding the scope of the Vermont Lay Monitoring Program and improving integration between in-lake sampling and lake tributary sampling performed through the LaRosa Watershed Partnership, both vital statewide citizen monitoring programs. The Summit also identified priority sites for continued cyanobacteria monitoring at inland lakes and on Lake Champlain.

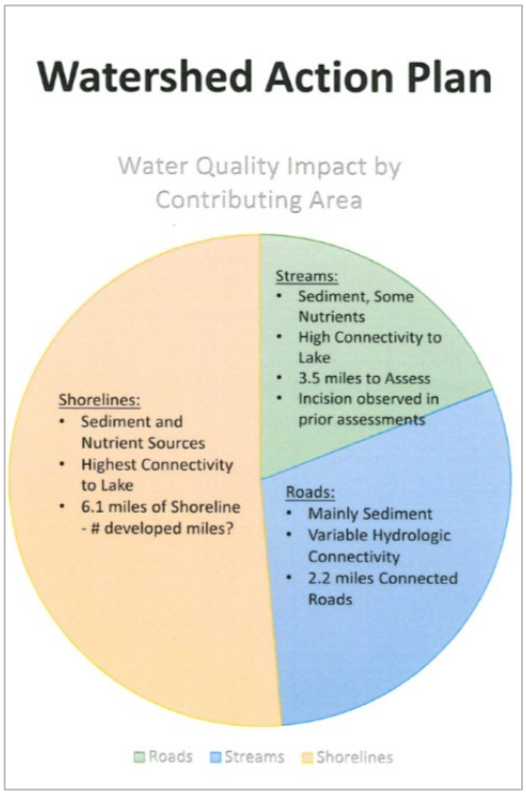

Figure 3. Water quality impacts by contributing area, identified in the Lake Eden Watershed Plan.

These summits highlight the need to protect many of Vermont's lakes from excessive nutrient loading. In 2020 the Lakes and Ponds Program collaborated with basin planners to develop a new clean water project type called Lake Watershed Action Plans which was incorporated into Tactical Basin Plans and the Watershed Projects Database. The Lakes and Ponds Program is scaling up this process at lakes across the state. Watershed Action Plans are under development and implementation at four lakes (Carmi, Eden, Dunmore, and Elmore) and future watershed action plans are being developed at an additional six lakes (Iroquois Fairfield, Caspian, St. Catherine, Fairlee, and Maidstone). The Lake Eden Watershed Plan was completed in 2020 and provides a template for other lake watersheds to understand the major water quality threats and solutions in and around the lake. The plan combines assessments of three contributing areas: shoreland, roads, and tributaries (Figure 3).

The Lakes and Ponds Program has continued implementation of a Lake Carmi Crisis Response Plan mandated by Act 168 of 2018, which declared Lake Carmi a "Lake in Crisis." From SFY 2016 to SFY 2019,

the State of Vermont invested $1.4 million in clean water projects in Lake Carmi and its watershed and has achieved approximately 41% of the phosphorus reduction required to meet the Lake Carmi Phosphorus TMDL according to modeled estimates.[8] Continued investments and efforts across all land use sectors within the Lake Carmi watershed are needed to achieve the remainder of Lake Carmi's TMDL goal, and DEC will embark on an effort in 2021 to update the critical path section of the Crisis Response Plan.

The Lakes and Ponds Program also maintained its monitoring efforts during the 2020 field season, albeit at a slightly reduced pace due to the COVID-19 pandemic. Volunteer lay monitors collected data throughout the summer at almost 60 lakes and ponds, and DEC scientists performed next generation lake assessments, macrophyte surveys, and water drawdown impact assessments during the 2020 field season. DEC anticipates returning to a more normal set of summer lake monitoring activities in 2021, with lay monitoring taking place at 75 or more lakes in the state, next generation lake assessments taking place at around 10 lakes, and climate change impact monitoring at five sentinel lakes. Monitoring for aquatic invasive species also continued during the 2020 field season, with a new Eurasian Water Milfoil outbreak detected and eradicated at Lake Pauline and a new water chestnut infestation detected and eradicated at a site on the Connecticut River.

The Lake Wise Program provides technical assistance to shoreland property owners seeking to restore previously developed property. In 2020, the Lake Wise Program supported bioengineering projects to restore living shorelands on four lakes, including:

- Salem Lake: Using biodegradable products, native plants, and natural materials, the Town of Derby and the Siskin Ecological Center reestablished a living shoreland along 300 feet of shore that had been previously cleared of native vegetation and planted with lawn. The new plantings stabilize the bank, filter rain and snowmelt runoff, provide habitat for wildlife, and bring some shade and intrigue to all town beach users. The snowmobile path from the lake onto the shore was improved and stabilized as well.
- Lake Champlain in North Hero: Shoreland property owners partnered with the Federation of Vermont Lakes and Ponds to purchase native plantings to help stabilize their eroding shore. This softscape stabilization technique used fiber coir rolls to establish a new toe and regraded to a gentle slope and prepared for plantings (Figure 4). Native plants are used because of their value as keystone species for healthy lake ecosystems and to avoid ever introducing an invasive, non-native species. The network of plant roots grip and bind the bank, while the rest of the plant filters upland runoff, intercepts pelting rain and snow, shades the water, and feeds the wildlife.

[8] Modeled estimates of total phosphorus load reductions achieved by clean water projects implemented in the Lake Carmi watershed are summarized in the *2019 Lake Carmi Clean Water Progress Report*, available here: https://dec.vermont.gov/sites/dec/files/wsm/erp/docs/2019%20Lake%20Carmi%20Clean%20Water%20Progress%20Report%20AMENDED%207.17.2020.pdf.

Figure 4. Before (left), during (center) and after (right) installation of a Lake Wise project showing fiber coir roll toe placement with an erosion control blanket along Lake Champlain in North Hero, VT.

Agency of Agriculture, Food and Markets Nonpoint Source Programs

The remaining 16 percent of Vermont's 2019 Section 319 award was passed through to the Vermont AAFM. AAFM used FFY 2020 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 best management practice (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
- Resources and materials to assist in conservation planning and engineering design.

Completed Section 319 and Leveraged Watershed Projects

COMPLETED SECTION 319 PROJECTS

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

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 state funded NPS projects that qualify as Section 319 leveraging. In FFY 2020, five state funded leveraged NPS projects were completed, and one project was discontinued due to issues with the landowner. 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 annual NPS pollution reductions accomplished by completed projects. Reported pollutant reductions are modeled estimates based on DEC's phosphorus accounting methodologies. Actual pollutant reductions 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 2020. Additional details on all listed projects, completed or active, can be obtained by contacting the Vermont NPS Coordinator, by visiting the Clean Water Project Explorer, or through GRTS.

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 directly 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 2020. The status of projects (ongoing, completed, discontinued) are noted along with completion dates (where applicable). The outputs and outcomes of the 5 projects completed within FFY 2020 are described in Appendix C of this report.

Newly added to the list of ongoing projects are five block grant projects approved in the FFY 2020 workplan. Once known, individual projects under those block grants will be identified for EPA approval and subsequently updated in future annual reports and in GRTS.

Acronyms

AAFM	Agency of Agriculture, Food and Markets
BMP	Best Management Practice
CWF	Clean Water Fund
CWIP	Clean Water Initiative Program
CWSP	Clean Water Service Provider
DEC	Department of Environmental Conservation
EPA	Environmental Protection Agency
FFI	Functioning Floodplain Initiative
FFY	Federal Fiscal Year
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
MRGP	Municipal Roads General Permit
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
NWQI	National Water Quality Initiative
PPA	Performance Partnership Agreement
RCPP	Regional Conservation Partnership Program
RPC	Regional Planning Commission
SFY	State Fiscal Year
TMDL	Total Maximum Daily Load
USDA	U.S. Department of Agriculture

Appendices

APPENDIX A – NONPOINT SOURCE MANAGEMENT PROGRAM MILESTONES

APPENDIX B – SECTION 319 LEVERAGED WATERSHED PROJECTS AND STATUS

APPENDIX C – OUTPUTS AND OUTCOMES OF SECTION 319 LEVERAGED PROJECTS COMPLETED IN FFY 2020

Appendix A- Nonpoint Source Management Program Milestones

Summary of progress concerning actions and milestones appearing in EPA-approved Vermont NPS Management Program Plan (August 6, 2015). Each milestone below is marked as “Complete” if it has been met; “Ongoing” if it repeats annually or will continue after this reporting period; or “Discontinued” if the intent of the milestone was able to be met in an alternative manner as described in the progress column.

AGRICULTURE

Required Agricultural Practices

Objectives	Actions by Agency of Agriculture, Food and Markets (AAFM)	Milestones	Schedule (2015 - 2020)	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. (Complete) Initiate rulemaking. (Complete) Complete rulemaking. (Complete) Begin enforcement of new regulations to be known as RAP. (Complete) Increased livestock exclusion from surface waters throughout Vermont. (Ongoing)	2014 2015 - 2016 2016 – 2018 2018 2017 - 2018	RAPs updated, effective December 5, 2016. RAP implementation began July 2017. Outreach and education to agricultural producers will be ongoing. In state fiscal year (SFY) 2018, AAFM reported 208 hours of education provided to 6,181 attendees, primarily targeting agricultural producers with a focus on implementing the RAPs. In SFY 2019, AAFM reported 627 hours of education provided to 8,451 attendees, through 230 events primarily targeting agricultural producers with a focus on implementing the RAPs. In SFY 2020, AAFM reported 595 hours of education provided to 4,277 attendees, through 140 events, 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. In November 2018, AAFM amended RAPs to include requirements for agricultural subsurface tile drainage. AAFM has developed and provided financial assistance under two ongoing programs the Farm Agronomic Practice program for rotational grazing in instances where livestock exclusion is present, and the Pasture and Surface Water program to assist in cost reimbursement towards excluding livestock from surface water (see also Agricultural Nutrient Management Table, Objective 2). Lastly, methodology for tracking and reporting livestock exclusion has been established and launched within 2020.
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. (Complete) 100% small dairies evaluated in South Lake watershed. (Ongoing) All small dairies evaluated in other watersheds of Lake Champlain drainage (2020). (Ongoing) Evaluation of small farms in VT outside Lake Champlain basin. (Ongoing)	2015 – 2016 2016 - 2019 2015 - 2019 2018 - 2019	From May 2015 to June 2016, AAFM completed small farm survey in Northern Lake Champlain basin, which includes evaluations in the Missisquoi River basin and St. Albans Bay watershed AAFM has visited all dairy small farm operations and is on track to completing full inspections per schedule. In SFY 2017-2018, AAFM began visiting with small farmers in the South Lake watershed, conducting 27 inspections and 24 regulatory education visits. In SFY 2019, AAFM performed 10 inspections on small farms in the South Lake and completed 10 regulatory education visits. AAFM performed 15 inspections on small farms outside of the Lake Champlain basin and completed 3 regulatory education visits. In SFY 2020 inspection schedules were impacted by the Governor-imposed restrictions on in-person field visits due to the COVID-19 Pandemic. Due to the circumstances of 2020, few CSFOs were inspected so that AAFM could focus on meeting statutory inspection requirements for MFOs and LFOs. Additionally, in the last several years many small farm dairies have gone out of business or transitioned ownership leading to a flux in annual CSFO certifications across the State. Due to these circumstances, the evaluations of small dairies in the South Lake watershed is ongoing. Since 2016, 22 CSFOs in the South Lake Basin have been inspected. Since 2016, 174 CSFOs have been inspected by AAFM in Vermont; 124 in the Lake Champlain basin and 50 outside of Lake Champlain basin. In 2020, a total of 253 CSFOs in Vermont certified with AAFM. AAFM continues to prioritize CSFO inspections in South Lake and Lake Champlain basins.

Objectives	Actions by Agency of Agriculture, Food and Markets (AAFM)	Milestones	Schedule (2015 - 2020)	Progress
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. (Complete) Develop online COC process. (Complete) Conduct education and outreach process. (Ongoing) Require submittal of certifications. (Complete)	2016 2018 2016 – 2019 2017	COC threshold established with RAP rulemaking, effective December 5, 2016. COC education and outreach has been done on all dairy small farm operations. Certified small farms were required to certify by January 31, 2018. In SFY 2019, 310 small farms submitted their COC with the Small Farm Certification Program required by the RAPs administered by AAFM. AAFM continues inspecting and providing education regarding the RAPs to Certified Small Farm Operation (CSFO) and Small Farm Operation (SFO). About 14% of CSFOs inspected per year. In SFY 2018, AAFM conducted 376 inspections of SFOs to assess compliance with the RAPs. In SFY 2019, a total of 787 visits were made to SFO/CSFOs. Of these, 325 inspections were conducted to assess compliance with the RAPs and 462 visits were conducted to offer technical and engineering assistance to farms. In SFY 2020, AAFM conducted 160 visits to SFOs. Of these, 73 were conducted to assess compliance with the RAPs and 87 visits were conducted to offer technical and engineering assistance to farms. In SFY 2020 AAFM conducted 350 visits to CSFOs. Of these, 198 inspections were conducted to assess compliance with the RAPs and 152 visits were conducted to provide technical assistance and engineering to farms.
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. (Complete)	2016	AAFM has contracted with University of Vermont (UVM) Extension to develop a livestock exclusion incentive program. Work in 2018 included outreach and technical assistance to 31 farmers and two farmers signing implementation contracts. Work in 2019 included outreach and technical assistance to 50 farmers and 10 farmers signing implementation contracts. In 2019, a total of $50,923 in state funding was awarded to leverage $9,905 in federal expenditures, as well as $3,827 in cost-share contributions from agricultural landowners. Four grants were awarded to farmers in the Southern Lake Champlain, Missisquoi Bay, Passumpsic, and Otter Creek watersheds. Practices implemented in 2019 included exclusion fencing, pipeline, watering facilities, spring development, and pumping plant. In SFY 2020, a total of $326,300 in State funding was awarded to 19 farms. Practices implemented included fencing, forage and biomass plantings, water pipeline, pumping plants, trails and walkways, water wells, and watering facilities. In the last 5 years, technical assistance has not been able to meet the high demand from farmers for livestock exclusion and pasture management practices. Due to the high demand and limited technical assistance resources, the cost share program will not be incorporating declining cost share levels as a program goal. AAFM is instead working on investing in technical assistance capacity through grant agreements with UVM Extension and agricultural partners that will lead to higher rates of project implementation and better meet the requests from farmers.

Agricultural Permitting

Objectives	Actions by AAFM unless noted otherwise	Milestones	Schedule (2015 - 2020)	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. (Complete)	Ongoing	In SFY 2019, a total of 233 visits were made on 34 permitted LFOs. Of these, 149 inspections were conducted to assess farm compliance with LFO Individual Permit, the LFO Rules, and the RAPs. Technical and engineering assistance was offered on 84 of the visits conducted. In SFY 2020, a total of 153 visits were made to LFOs. Of these, 118 inspections were conducted to assess a farm's compliance with their LFO IP, the LFO Rule, and the RAPs. Technical and engineering assistance was offered on 35 of the visits. 100% of LFOs are inspected annually as required by statute. There are 37 farms operating or permitted as LFOs in the State and each gets inspected on a calendar year basis. More information and details

Objectives	Actions by AAFM unless noted otherwise	Milestones	Schedule (2015 - 2020)	Progress
				about LFO inspections and outcomes can be found in AAFM's FY 2020 – Annual Water Quality Enforcement Report
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. (Complete) At least 25% MFO inspected per year. (Complete)	2015 - 2016 2018 - 2019	In 2018, AAFM made 225 visits to MFOs. Of these, 103 were regulatory in nature to assess and support compliance with the MFO general permit. There were 126 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. In SFY 2019, a total of 220 visits were made on 114 permitted MFOs. Of these, 97 inspections were conducted to assess compliance with the state's MFO General Permit, MFO Rule, and the RAPs. Technical and engineering assistance was offered on 124 of the visits conducted. In SFY 2020, a total of 179 visits were made to MFOs. Of these, 114 inspections were conducted to assess compliance with the State's MFO General Permit, the MFO Rules, and the RAPs. Technical and engineering assistance was offered at 65 of the visits conducted. 100% of MFOs inspected every three years. Statute requires MFOs to be inspected at least every 3 years. Percentage of MFO inspected per year ranges from 17-47% and is generally based on when farms were inspected prior to the change in statute. As of April 8, 2021, there are 110 MFOs in Vermont. More information and details about MFO inspections and outcomes can be found in AAFM's FY 2020 – Annual Water Quality Enforcement Report
Enhance MFO inspection protocols	Improve MFO inspection methods concerning number and scope of field-based inspections.	Modified inspection methods put into place and utilized. (Complete)	2015	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. The general permit for MFOs was amended and became effective on June 12, 2018.
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. (Complete) Trainings for staff twice per year starting 2015. (Complete)	2015 - 2019 2015 - 2019	In 2019, Vermont Department of Environmental Conservation (DEC) performed one MFO inspection and 26 LFO inspections jointly with AAFM. DEC and AAFM continue to hold annual joint inspection training to increase shared knowledge of agency practices and regulatory oversight. In SFY 2020, DEC performed two joint farm operation inspections (encompassing 9 farm facilities) jointly with AAFM. In SFY 2020 inspection schedules were impacted by the Governor-imposed restrictions on in-person field visits due to the COVID-19 Pandemic. DEC and AAFM continue to provide training opportunities to DEC and AAFM staff.
Improve compliance reporting	Increase coordination. Monthly meetings between DEC-Watershed Management Division (WSMD), DEC-CED and AAFM to share current activities. Quarterly meetings to include VT Attorney General's Office. Ensure compliance reporting follows AAFM/ANR MOU.	Compliance findings shared among agencies per MOU amended in 2017. (Complete)	2015 - 2019	In 2018, AAFM referred 32 investigations to ANR, and seven referrals were made from AAFM to the VT Attorney General's office. In 2019, AAFM referred 38 investigations to ANR, and six referrals were made from AAFM to the Vermont Attorney General's Office. Investigations are referred to ANR where potential exists for a point source discharge. In 2020, AAFM referred 35 investigations to ANR, and two referrals were made from AAFM to the Vermont Attorney General's Office. Investigations are referred to ANR where potential exists for a point source discharge.

Agricultural Nutrient Management

Objectives	Actions by AAFM unless noted otherwise	Milestones	Schedule (2015-2020)	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. (Complete) Expand offerings of small farm NMP development courses/workshops. (Complete) Provide increased cost sharing for NMP development. (Complete) Develop and deliver NMP training program for technical service providers and custom manure applicators. (Complete) Require certification of custom manure applicators. (Complete) Develop educational courses for farmers. (Complete)	2016 2017 2018 2016 - 2019	UVM Extension and the Vermont Association of Conservation Districts (VACD) held NMP training classes for approximately 60 farmers between January-March 2018, 30 farmers between January – March 2019, and 25 farmers between January – March 2020. Many of these farms attend with cost share assistance from a VACD Regional Conservation Partnership Program (RCPP) grant designed to support the cost of course attendance and NMP development. This program also provides NMP implementation follow up visits to support adoption of NMPs. In SFY 2019, AAFM certified 88 *Custom Manure Applicators* who are trained to implement NMPs on all farms in Vermont. In SFY 2020, 79 Custom Manure Applicators were certified and trained to implement NMPs. Education courses for farmers are ongoing with funding from AAFM Clean Water Funds. In SFY 2020, 140 educational events were hosted statewide.
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. (Complete) Continue and increase targeted NMP outreach and technical assistance. (Complete) Continue and expand, if funding allows, technical assistance efforts under Agronomy and Conservation Assistance Program (ACAP). (Complete) Support existing farmer-led groups. (Complete) Create/establish additional farmer-led groups. (Complete) Increase participation with Conservation Reserve Enhancement Program (CREP) via increased enrollment leading up to RAPs for livestock exclusion. (Ongoing) Improved accounting of acres cover-cropped and manure injected. (Complete) Article(s) describing NMP related successes. (Complete)	2015 - 2019 2015 - 2019 2015 - 2019 2015 - 2019 2016 - 2019 2015 - 2017 2017 - 2019	In 2019, AAFM performed 462 technical assistance visits on small farms and an additional 207 technical assistance visits on medium and large farms. In 2020, AAFM performed 239 technical assistance visits on small and certified small farms. An additional 100 technical assistance visits on medium and large farms were conducted. AAFM continued their support of NMP development through a $600,000 grant to support land treatment planning staff at VACD from 2018 to 2022, as well as an ongoing agreement to support Conservation Districts to assist farms in preparing for NMP development. AAFM also continues to provide funding to UVM Extension and the Poultney Mettowee Natural Resource Conservation District agronomists to provide technical assistance through a program historically referred to as ACAP. AAFM also provides matching funds for a RCPP grant that helps farmers who wish to develop their own NMP through a course taught by UVM Extension. 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. Implementation of this program has been on hold while program interpretations are clarified by USDA. In the meantime, AAFM is providing on-site technical assistance and project development for new agreements. One additional staff person was hired in SFY 2019 to support the anticipated increase in CREP workload once CREP is reauthorized in VT. In SFY 2020, AAFM worked with Vermont delegation in Washington D.C. and with USDA Farm Service Agency to address rental rates, program regulations, and corresponding administrative processes due to changes made in 2015 to the Code of Federal Regulations for the federal Conservation Reserve Program. Staff continued CREP project scoping, education, and outreach. In June of 2020, the CREP program began enrollment with the revised eligibility requirements. AAFM supports the implementation of conservation practices in coordination with the NRCS Environmental Quality Incentives Program (EQIP) program through the AAFM best management practice (BMP)/EQIP-Assist program. AAFM offers direct financial assistance to farmers through its BMP and Farm Agronomic Practices (FAP) Programs.

Objectives	Actions by AAFM unless noted otherwise	Milestones	Schedule (2015-2020)	Progress
				AAFM received $1,447,000 in funding to assist with FAP, CREP, and engineering assistance from ANR as pass-through from the Lake Champlain Basin Program (LCBP). Additional funds are anticipated to support FAP, CREP, and engineering assistance through 2024. In SFY 2019, the FAP program improved 11,468 acres and the BMP program installed 76 new practices. The Capital Equipment Assistance Program (CEAP) funded 34 pieces of water quality improvement related equipment. The Pasture and Surface Water Fencing (PSWF) program funded 9 projects, and the Grassed Waterway and Filter Strip program improved over 21 acres. In SFY 2020, the FAP program improved 22,205 acres and the BMP program installed 110 practices. The CEAP program funded 27 pieces of equipment. The PSWF program funded installation of 35 practices and the Grassed Waterway and Filter Strip program improved over 14 acres. From SFY 2016 through 2020, AAFM has distributed over $27 million dollars from the Clean Water Fund, General Fund, Capital Fund, and LCBP to implement phosphorus reduction strategies. In SFY 2019, AAFM's clean water implementation efforts, including state funding and regulatory programs, resulted in an estimated total phosphorus load of 5,412 kilograms per year reduced in the Lake Champlain basin. In SFY 2020, AAFM's clean water implementation efforts through technical and financial assistance programs resulted in an estimated total phosphorus load reduction of 11,291 kilograms in the Lake Champlain and Lake Memphremagog basins. Cover cropping accounted for 44% and Manure Injection 26% of all TP load reductions SFY 2016-2020. Estimated total phosphorus load reductions associated with state-funded agricultural practices in the Lake Champlain and Lake Memphremagog basins have increased 11-fold since SFY 2016.
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). (Complete) Interim and final reports for VT legislature on recommendations for management of tile drains. (Complete) Report from USDA-CIG funded evaluation effort concerning tile outflow treatment media effectiveness. (Complete) RAPs to include requirements for tile drain management. (Complete)	2015 - 2016 2017 2017 - 2018 2018	LCBP-funded tile drainage literature review completed November 2016. 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 continued to meet in 2019 to assist in implementation of the tile drain final report recommendations. Stone Environmental Inc. and Friends of Northern Lake Champlain conducted a research project on a farm in Franklin County to evaluate the effectiveness of two phosphorus filtering media at tile drain outflows. The media showed positive results. The Final Report was completed in 2017. AAFM revised the RAPs in 2018 to include changes to regulations related to tile drains.

Additional Agricultural Efforts/Measures in Priority Areas.

Objectives	Actions	Milestones	Schedule (2015 - 2020)	Progress
Achieve higher levels of land treatment implementation in Lake Champlain	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. (Complete) Assist with launch of Connecticut River related RCPP efforts focused on improving nitrogen management. (Complete)	2015 2015	DEC's Lake Champlain RCPP and VACD's RCPP launched in 2015 and will be completed in April 2021. DEC received a five-year renewal with an additional $10 million to expand this program. VACD and DEC continue to assist the Long Island Sound RCPP, launched in 2015, and Lake Memphremagog RCPP, launched in 2016.

Objectives	Actions	Milestones	Schedule (2015 - 2020)	Progress
and Connecticut River basins		Land treatment and NPS implementation progress documented annually by lead agency responsible for respective RCPP effort. (Complete)	2016 - 2019	
Improve understanding of land treatment and water quality response in conjunction with National Water Quality Initiative (NWQI)	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. (Ongoing) Mutually agreed upon process to document the nature and location of treatment. (Complete) Content and schedule for NWQI educational forums. (Ongoing)	2015 – 2019 2018 2017 - 2019	DEC provides annual progress reports on the Rock River NWQI watershed. In SFY 2020, NRCS designated East Creek and Hungerford Brook watersheds as NWQI watersheds for an additional $545,506 targeted EQIP cost sharing. AAFM continues to coordinate with partners to populate the Agricultural Partners' Database that documents efforts by partners and increase implementation, coordination, and tracking. Currently, NRCS is unable to participate due to federally mandated privacy concerns. However, NRCS provides BMP data for phosphorus accounting directly to DEC with personally identifiable information removed.
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). (Complete)	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 five-year certification, an on-farm sign designating the farm as meeting high levels of environmental stewardship, and other potential recognition-based incentives. In 2018, nine farmers of diverse operations, participated in a pilot of a Resource Stewardship Evaluation Tool (RSET) to evaluate level of stewardship and eligibility for ESP. VACD staff were trained in the tool and worked to collect data and input to the model to evaluate how these farms are meeting specific resource concern targets. In SFY 2019-2020, four planners assessed eight farms across five counties in Vermont totaling 81 fields which included over 1,012 acres of land assessed through the RSET Tool. In SFY 2020, AAFM was awarded funds through LCBP to conduct a Comparison of Stewardship Evaluation Tools between RSET and APEX with the pilot ESP farms.

STORMWATER RUNOFF AND TRANSPORTATION NONPOINT SOURCE POLLUTION

Non-Regulated Stormwater Management

Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2020)	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. (Complete) 35% of ERP applications for stormwater projects done in consultation with SWMP guidance. (Complete) Stormwater management practices handbook for sub-jurisdictional activities produced. (Complete)	2016 2019 2016	In SFY 2019, the Clean Water Initiative Program (CWIP) funded 17 out of 63 grants/contracts focused on stormwater management, four were stormwater master plans. Other stormwater initiatives funded in SFY 2019 included Municipal Public-Private Partnership Stormwater Assessments for 3-acre permit compliance, using GSI to address CSO mitigation, and a large portion of the design/implementation block grants will fund stormwater treatment 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 were printed.

Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2020)	Progress
		Stormwater related trainings provided referencing demonstration sites/projects. (Complete)	2015 – 2019	In SFY 2019, DEC's Stormwater Program held trainings providing 16 hours of education to over 377 participants. Seven of the 11 events were focused on stormwater regulatory programs including upcoming Developed Lands Permit (3-acre permit), and the MRGP. In 2019, Stormwater Master Planning Guidelines and Town Recommendations (Appendix A) were updated. In 2020, six Stormwater Master Plans were funded through CWIP, three additional towns were funded through the VTrans Better Connections grant program and one through the Lake Champlain Basin Program.
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. (Complete) Final adopted VSMM made available for distribution. (Complete) Plan-defined GSI projects or initiatives undertaken by applicable state agencies. (Complete)	2015 – 2019 2017 2016 – 2019	State agencies produced annual GSI progress reports (July 2015 and 2016) under Executive Order 06-12. The final adopted VSMM was issued and took effect July 2017. In 2017, the GSI Coordinator developed a tool to assess the condition of GSI projects using ArcGIS Collector software. A report summarizing the findings and proposed improvements to the CWIP granting process to improve outcomes was developed. The GSI Coordinator also advised CWIP staff on methods and procedures to expand this assessment to other project types. In 2018, the GSI Coordinator hosted a partner discussion on GSI operation and maintenance challenges and recommendations to identify common themes and design outreach programs on these issues in the future. Also, the "Vermont Guide to Stormwater Management for Homeowners and Small Businesses" was published by DEC and 1,000 copies were printed and distributed. The "Vermont Green Streets Guide" for low impact development was published by the Department of Forests, Parks and Recreation's Community Forestry Program with significant input from the Agency of Transportation (VTrans). From 2017 to 2020, CWIP staff in conjunction with AmeriCorps Members, developed and piloted a "BMP Verification System" to verify practices funded with state dollars are being maintained and properly functioning. Expanded implementation and training around BMP Verification and maintence will continue to roll out as is required by Act 76 of 2019. In 2020, the Green Infrastructure Roundtable– comprised of over 299 representatives from state agencies and public/private sector stakeholders statewide – met three times to share information of mutual interest. Conversations increasingly revealed growing interest to learn more and talk about the operation and maintenance of GSI. In February 2020, an Operation and Maintenance (O&M) Summit was held with over 100 attendees. Topics included CWIP's BMP Verification System, Municipal O&M needs, and O&M programs under development required by Act 76 of 2019.
Erosion and runoff reduced from Class 3 and Class 4 roadways	Promote availability of statewide maps defining erosion control priority Class 3 and 4 road segments. Distribute backroad erosion inventory methodology.	Statewide erosion priority map information at each town and regional planning commission (RPC). (Complete) Priority road segment map information used by applicants seeking road erosion control grant funding. (Complete) Road erosion control inventory methodology finalized. (Complete) Methodology used in 50% of grant applications. (Complete)	2015 2016 2015 2017	DEC and statewide partners have developed a municipal roads hydrologically connected road segment GIS layer for all towns in the state. 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 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 (REI's) were required to be completed by municipalities by December 2020. Using a DEC-provided template consistent with the Municipal Roads General Permit standards, REI's involve field verification of hydrologically connected road segments. DEC

Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2020)	Progress
		Methodology used in 100% of grant applications. (Complete)	2019	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. In SFY 2017 through 2020, DEC implemented the 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 Municipal Roads General Permit (MRGP) standards under this program. From SFY 2016 to 2020, 1,976 miles of municipal roads were inventoried, and 200 miles of municipal roads were improved. In SFY 2021, management of the Municipal Roads Grants-in-Aid program will transfer to VTrans.
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. (Complete) Revised draft VSMM issued for public comment. (Complete) Final adopted VSMM issued. (Complete) Transportation Separate Storm Sewer System (TS4 permit)-Effective November 2017. (Complete) Municipal Roads General Permit (MRGP)-Effective January 2018. (Complete) MS4 permit- updated 2018. (Complete)	2016 2016 2017	CWIP and Stormwater Program staff continue to meet biweekly to coordinate updates, implementation, funding, and tracking on developed lands permit programs and the MRGP; the outcome of these are newly developed stormwater permit program tracking and accounting standard operating procedures. The final adopted VSMM was issued and took effect July 2017. The updated TS4 permit took effect in 2017 and requires VTrans to develop and implement phosphorus control plans for state highways and VTrans owned/operated developed lands. The MS4 permit was updated to integrate the requirement to develop and implement phosphorus control plans in 2018. The MRGP went into effect January 2018 and municipalities must complete inventories by December 2020 and begin implementing by 2021. DEC and VTrans are incentivizing early adoption through grant programs such as the Municipal Roads Grants-in-Aid program. The Developed Lands General Permit (3-9050) was issued in 2020 and requires treatment of unpermitted sites and sites permitted under pre-2002 standards with three acres or more of impervious surface. CWIP is working with the Stormwater Program to track and account for upgrades made under this permit.

HYDROMODIFICATION (RIVER CHANNEL STABILITY)

Encroachments and Buffers

Encroachments and Buffers Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2020)	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). (Complete) Amendment/revision procedures finalized. (Discontinued) MOUs drafted and in effect. (Discontinued) Changes to dam removal inventory list. (Ongoing)	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. From 2017 to 2018, the Dam Task Force coordinated the removal of three major impoundments in the Passumpsic and White River watersheds, opening hundreds of miles of previously blocked habitat. 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 (2015-2020)	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. (Complete) Initiation of certified technician program. (Complete) Outreach provided to towns and regional planning commissions regarding floodplain and river corridor protection methods. (Ongoing) Create/modify spatially referenced catalog of river corridor conservation easements. (Complete)	2015 2016 2015 - 2020 2016 - 2019	A general permit was put into place in spring 2015. After a year of use, the general permit was revised during spring 2016 and reissued in late 2016. Vermont received federal funds through the LCBP to develop floodplain protection outreach materials to include multi-media outreach products. This work has been completed and posted at https://floodtraining.vermont.gov/ 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. (Complete) Secure funding needed to acquire LiDAR imagery. (Complete) LiDAR data used to develop DEM for eastern Vermont. (Complete) Statewide LiDAR Coverage (Complete)	2015 2016 2017 2018	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. Statewide LiDAR products, including digital elevation models (DEMs), are available at: https://geodata.vermont.gov/.
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. (Complete) Update mapping center with new data as it becomes available. (Ongoing)	2015 2015 - 2020	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 has now fine-tuned all river corridor information for which ANR has Phase 2 stream geomorphic data. Map revisions and data integration were completed by the end of 2018. After a public review and comment period, river corridor base map revisions were published on the ANR Natural Resources Atlas in August 2019.
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. (Ongoing) Adopt ANR Riparian Zone Management policy and guidelines. (Complete) 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. (Complete)	2015 – 2020 2015 -2019 2015 - 2019	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. The same FEMA grant listed above for river corridor mapping, was used to put in place a contract for Vermont Association of Planning and Development Agencies to pilot and develop regional planning commission (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.
Establish/Enhance Flood Resilient Communities Program with funding and technical assistance	Track municipalities where enhanced river corridor and floodplain bylaws have been adopted.	Municipal bylaw tracking system developed. (Complete)	2015	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 Division of Emergency Management.

Encroachments and Buffers Objectives	Actions by DEC unless otherwise noted	Milestones	Schedule (2015-2020)	Progress
incentives for municipalities to adopt regulations for floodplains, river corridors, and riparian buffers.	Provide increased state cost share recovery under the Vermont Emergency Relief and Assistance Fund (ERAF) to those municipalities with enhanced bylaws.	ERAF program in effect with an increase in towns taking advantage of 12.5% or 17.5% ERAF reimbursement incentives. (Complete)	2015 - 2020	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. (Complete) River corridor/ERAF protection incentives tracked and promoted. (Ongoing) Assistance offered by the state to increase adoption by municipalities. (Complete)	2015 2015 – 2020 2015 – 2020	Flood Ready webpage is online, fully functional and updated on a regular basis. Go to: http://floodready.vermont.gov/ See ERAF updates, above. In 2020, 97 communities have adopted river corridor or floodplain protection bylaws consistent with ANR Model Hazard Bylaw standards and qualify for increased funding under ERAF.

River Channel Modification

Channel modification objectives	Actions by DEC	Milestones	Schedule (2015-2020)	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). (Complete) Enforcement of rules and general permit. (Complete) Assessment of response actions following future emergencies. (Ongoing)	2015 - 2020 2016 - 2020 2016 - 2020	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/replaced bridges and culverts as eligible for federal cost share in the FEMA Public Assistance Program. DEC's River Management Engineers issue stream alteration permits and provide river diagnostics, alternatives analysis, project design, and construction inspection for instream work. They also provide technical and regulatory assistance for emergency and next-flood protective measures during flood recovery operations
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. (Complete)	2015 - 2017	RAP implementation and enforcement began in 2017. They include stream buffer requirements.
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. (Ongoing) Deputy river management engineers trained as part of ICS river operations. (Complete) Coordination meetings with VTrans and VT Emergency Management. (Ongoing)	2015-2020 2016 2015 - 2020	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. River management engineer training and coordination with VTrans and VT Emergency Management are 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. (Ongoing) Coordination of critical source, river corridor and river basin planning. (Complete)	2015 – 2020 2015 - 2020 2015 – 2020	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 Basin Planners to prioritize these projects in Tactical Basin Plans to inform project funding. This process is now in place and slated to continue.

Channel modification objectives	Actions by DEC	Milestones	Schedule (2015-2020)	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. (Ongoing)		DEC WSMD 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. 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. In 2018-2020, DEC has incentivized implementation of river corridor easements and riparian buffer plantings through two block grants.
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. (Complete) Achieve recognition of SRMPP by FEMA. (Complete) Update SRMPP manual as new techniques are developed in the field. (Complete)	2014 2017 2016 - 2020	Manual Published. Completed 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 to the bridge and culvert standards. Town road and bridge standards, consistent with state standards, haven been adopted by 93% of Vermont municipalities.
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. (Ongoing) Develop Tier 3 trainings. (Complete) Annual 3-tiered trainings made available. (Ongoing)	2015 - 2020 2016 – 2017 2017 – 2020	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 staff through Tier 2 training and now the class is being attended by municipal road workers, consultants, and contractors. Development of Tier 3 Rivers and Roads training modules has been completed. A full set of pilot Tier 3 training modules was conducted during the winter of 2019. Funding will need to be secured annually to conduct the Tier 3 trainings on a year-in/year-out basis. In 2020, Tier 2 and Tier 3 Trainings were cancelled due to COVID. Short-form trainings were conducted at the virtual Vermont Emergency Preparedness Conference.
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. (Complete) Create separate training program for towns regarding how to conduct and authorize Emergency Protective Measures. (Discontinued)	2015 - 2019 2016 - 2019	See descriptions of Tier 2 trainings, above. VTrans has put several hundred staff through Tier 2 training and now the class is being attended by municipal road workers, consultants, and contractors. A separate training is not needed.

FOREST MANAGEMENT

Acceptable Management Practices for Maintaining Water Quality on Logging Roads

AMP Objectives	Actions by FPR	Milestones	Schedule (2015 - 2020)	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. Create new AMP manual using the updated AMP rules.	Improved/updated AMPs promulgated as rules. (Complete) Updated AMP manual published (Complete)	2016 2019	AMP rules were revised and took 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 was approved on August 11, 2018. The updated AMP manual was completed in September of 2019. The manual can be found at: https://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Forest_Management/Library/FullDocument-7.29.pdf
Reporting of AMP enforcement and compliance activities	Refine AMP reporting protocol.	Initiate annual AMP enforcement reporting under revised AMPs. (Complete)	2017	The rule is complete, and the draft procedure is not yet signed but it is being used. It outlines the process of how FPR responds to AMP complaints and technical assistance calls. AMP complaints and technical assistance provided to landowners by AMP Foresters and County Foresters continued to be reported annually.
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. (Discontinued – FPR action sustained, strategy modified – see notes in "Progress") Quantify forest acres treated by practice by watershed. (Ongoing)	2015-2016 2015-2019	MOA was signed by VT Department of Fish and Wildlife (DFW) and FPR in August 2015. The MOA is revisited and renewed annually. Under this agreement, FPR collaborates with DFW 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 Lake Champlain. In 2020, due to COVID related budget and capacity issues, FPR had to step away from MOA with DFW. FPR continues its commitment to provide outreach and advocacy for implementation of EQIP practices and through RCPP.

Forest Cover

Forest Cover Objectives	Actions by FPR	Milestones	Schedule (2015 - 2020)	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. (Complete) *Landscape Guide for VT Roadways* and *Better Backroads Manual* updated to include GSI practices. (Complete) 30 training events in different contexts (10 state/regional, 10 urban, 10 rural). (Complete) 20 towns with completed GI assessments. (Complete) Plans completed for 10 urban areas and 10 rural towns. (Complete)	2015 2016 2017-2020 2018 2019	Partners have discussed information available and criteria to assist with identifying high-priority communities to provide technical assistance. Maps were produced in fall 2016. In 2018, the Vermont Green Streets Guide, was published incorporating GSI practices, (replacing the Landscape Guide for Vermont Roadways). Six trainings for municipal road crews have been held in 2019, 14 community presentations were held in 2019 and Six were held in 2020, and over 200 hard copies of the Vermont Green Streets Guide have been distributed at presentations for target audiences (transportation planners, town planning commission members, municipal staff). In 2020 the Resilient Right-of-Way Guide was published to describe typical Vermont vegetated roadside communities and the challenges and best practices associated with maintaining them (replacing the *Better Backroads Manual*). Four trainings for municipal road crews were held. Through a contract with Watershed Consulting Associates, three trainings for targeted audiences were held to communicate the content of the Vermont Green Streets Guide and to distribute over 100 hard copies of the guide. In total 10 urban, 10 rural, and 13 state/regional trainings were held. Ten high-priority urban towns - Milton, Shelburne, Rutland, West Rutland, Williston, Burlington, Winooski, Essex Junction/Essex Town, Colchester, and Montpelier received technical assistance including bylaw and public works specifications assessments/review, and several suites of photo visualizations of what GSI could look like in their community. Rather than a specific plan for each town,

Forest Cover Objectives	Actions by FPR	Milestones	Schedule (2015 - 2020)	Progress
				a package of materials to support GSI development in the urban towns was produced. A GI assessment was completed in the 10 urban towns. The rural roadside vegetation assessment protocol was developed through the engagement of two pilot communities, Calais and East Montpelier. Eight additional community assessments are complete: Stowe, Tinmouth, Charlotte, Marshfield, Hyde Park, Johnson, Plainfield, and Panton. These rural towns received a GI assessment and had a plan developed.

NONPOINT SOURCE PROGRAM PARTNERSHIPS AND FUNDING STRATEGIES

Partnerships and NPS funding objectives	Actions by DEC	Milestones	Schedule (2015 - 2020)	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. (Complete) Continue to use state funded projects for '319 leveraging' if annual evaluation reveals a 319 pass-through program not feasible. (Complete) 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. (Discontinued- the state has continued to use the leveraging option)	2015 - 2020 2015 - 2020	DEC did not offer Section 319 pass-through under FFY 2015-2020 workplans. However, DEC continues to pursue the "leveraging" option and continues to administer Capital and Clean Water Fund dollars through competitive processes to support nonpoint source improvements throughout Vermont. The *Vermont Clean Water Initiative 2020 Performance Report* documents over $133 million awarded by state agencies in non-wastewater related nonpoint source projects SFY 2016-2020. Thus, more than sufficient state funds are available each year to leverage NPS projects.
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. (Complete) Process created for selecting one or more projects to undertake. (Complete) At least 3 NPS projects initiated under WEAP. (Complete)	2017 2018 2018 – 2019	The Lake Champlain Basin Program (LCBP) administers the Section 542 WEAP in partnership with the U.S. Army Corps of Engineers (ACOE). 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 Section 542 program provides project assessment, design, and implementation services to local sponsors, with a 65% Federal, 35% local matching rate. Under this program, ACOE conducts the work upon payment of matching funds by the local sponsor. The LCBP Executive Committee, with representation from DEC, oversees prioritization of WEAP project proposals. NPS projects initiated under WEAP include: (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) The St. Albans Bay wetland restoration and phosphorus management project on the Black Creek Wetland involves evaluation of alternatives to in-lake management for internal phosphorus loading and considers the longevity of any in-lake and wetland restoration relative to the proportional reduction in upstream watershed loading. The project was executed between the ANR and ACOE in April 2018 and will result in a conceptual design and cost estimate for implementation ($0.5 million project cost). (3) Waterbury Day phase I risk assessment for restoration of aquatic habitat consists of the first phase of analysis necessary to reconstruct the dam spillway. Reconstruction of the spillway is necessary to allow the reservoir to be operated in accordance with the existing water quality certification ($0.6 million project cost anticipated to lead to $40 million reconstruction project).

Partnerships and NPS funding objectives	Actions by DEC	Milestones	Schedule (2015 - 2020)	Progress
			2020-2021	DEC has engaged the following activities in conjunction with the ACOE during the FFY 2020: 1) Assisted in the development and LCBP approval of a project factsheet and project management Plan for the Moon Brook Thermal TMDL Restoration Project; a partnership between Rutland City and ACOE. As of January 2021, the City of Rutland has elected to withdraw from participation, as the City believes that more advantageous financing is available from the State Revolving Loan Fund. 2) Assisted in the development, LCBP approval of, and subsequent refinement of a project factsheet and project plan for a major stormwater refurbishment design for the City of Vergennes. 3) In partnership with NYSDEC, assisted in the LCBP approval of a project factsheet for a major stormwater refurbishment design for the City of Whitehall, NY. This project merits mention in this Vermont NPS plan report as the project will reduce sediment and phosphorus in the South Lake B segment of Lake Champlain. 4) Assisted the Vermont congressional delegation in the development of statutory language that would allow additional flexibilities and usages of Section 542 in a manner that will support restoration of habitat and management of stormwater runoff in Vermont and the Lake Champlain basin.
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. (Complete) Additional NPS pollution sources made eligible for CWSRF dollars under VT's Intended Use Plan. (Complete)	2018 2019	Significant coordination is occurring between nonpoint source programs and the CWSRF. The Vermont State Legislature passed a bill relating to the CWSRF (Act 185) on May 9, 2018. The Act expands CWSRF eligibility to natural resources restoration projects. It also enacted a new sponsorship program to allow coupling of traditional wastewater and stormwater projects with natural resources restoration projects but providing loan forgiveness covering the natural resources project. This can be accomplished by making private entities eligible for CWSRF loans, but at a slightly higher administrative fee than municipalities. Additionally, CWSRF will offer interim financing for agriculture and natural resources restoration and protection projects. Loan recipients will have five years to pay back the loan, which allows partners time to gather grant funding to pay off the project without incurring costs associated with higher interest private loans. The 2020 NPS Management Program Plan documents Clean Water State Revolving Loan Fund eligibility for NPS projects.
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. (Complete) Agreement reached between NRCS (VT), AAFM and DEC concerning process and metrics concerning land treatment and water quality reporting. (Complete)	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. NRCS designated Rock River, East Creek and Hungerford Brook watersheds as NWQI watersheds 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. (Complete)	2016 - 2020	The Clean Water Board has completed annual budget processes for SFY 2016-2022. SFY 2016-2021 Clean Water Fund dollars have been awarded to priority NPS and stormwater projects, and SFY 2022 Clean Water Fund dollars will be awarded beginning July 2021. From SFY 2016 to 2020, the *Vermont Clean Water Initiative 2020 Performance Report* documents over $133 million investment in non-wastewater related nonpoint source projects. In the latter stages of SFY 2020, CWIP administered two budget adjustment processes in light of revenue uncertainties caused by the COVID-19 pandemic.

NPS PROGRAM ADMINISTRATION AND OVERSIGHT

Program administration/oversight Objectives	Actions by DEC	Milestones	Schedule (2015 - 2020)	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. (Complete) Define criteria for priority NPS threatened waters and apply to candidate waters. (Complete) Updated priority NPS threatened waters list. (Complete)	2015 2016 2018	DEC rotational watershed assessment reports identify waters that are attaining standards but are considered stressed due to various stressors. A methodology for determining stressed waters is identified in the *Assessment and Listing Methodology*. A subset of the stressed waters are identified as stemming from NPS pollutants. These, along with impaired waters, are considered as top priorities for project identification and development through the rotational Tactical Basin Planning process. The stressed waters list was updated in 2016. The Water Quality Integrated Assessment Report was updated in 2018.
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. (Complete) Depending on outcome, plan next steps for potentially enabling data entry of mandated elements into GRTS by willing/capable NPS grant project partners. (Discontinued)	2017 2018	DEC has enhanced reporting since 2015 to support state and federal 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 (WPD) and Clean Water Reporting Framework (CWRF) using the 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 with EPA requirements (under measure WQ-10).	At least two Vermont NPS success stories submitted and made part of EPA's NPS Success Stories web page. (Complete)	2015 - 2020	Jay Branch and Tributary #9 to Jay Branch were impaired due to sediment. Biomonitoring data show these waters are now complaint with State of Vermont water quality standards. DEC and EPA submitted success stories for these waterbodies in FFY 2019. In 2020, several waters were removed from the 303(d) list and some may qualify as success stories. Vermont will work with EPA to determine if more success stories can be produced.
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 Satisfactory Progress Determinations (SPD) on an annual basis in a timely fashion. (Complete)	2015 - 2020	DEC effectively managed its NPS program and has received SPD's FFY 2015-2019. SPD for 2020 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.	Draft and final annual NPS program reports. (Complete)	2015 - 2020	This FFY 2020 Annual NPS report prepared April 2021. 2015-2019 Annual NPS reports successfully completed.

Program administration/oversight Objectives	Actions by DEC	Milestones	Schedule (2015 - 2020)	Progress
	Provide draft annual program report to EPA for review. Submit annual report.			
Revised NPS Management Program plan	Track the status of actions, milestones and accomplishments found in current 2015–2020 NPS Management Program plan. Prepare revised and updated NPS Management Program plan for 2021-2025 period with submittal to EPA for review/approval prior to effective date.	EPA-approved Vermont NPS Management Program plan (2021-2025) in place by 10/1/2020. (Complete)	2020	A new NPS Program Plan covering FFY 2021-2025 was developed by DEC and approved by EPA in September 2020. Next year's annual reporting will be based on the new plan.
Revised DEC strategic plan	Link results-based accountability (RBA) with planning effort.	RBA measure(s) defined for NPS program level. (Complete) Measure(s) fed into DEC-WSMD plan. (Complete) WSMD measure(s) linked to DEC plan. (Complete)	2015 2016 2016 - 2019	DEC has developed an interagency tracking and accounting system known as the Clean Water Reporting Framework (CWRF) for all clean water projects, including NPS projects, completed under funding and regulatory programs. RBA performance measures of completed projects are reported annually in the *Vermont Clean Water Initiative Annual Performance Report.* Select NPS RBA measures from this report are also integrated in DEC 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. (Complete)	2019	Between 2015 and 2020, the new regulatory program received 1,080 lakeshore development applications. All applications, except one, were either approved or determined to be in compliance with the new lakeshore development regulations. While no specific studies occurred, it can be assumed that there has been a reduction or leveling off the amount of stormwater runoff reaching surface waters from shoreline development as a result of the Shoreland Protection Act requirements. The Lakes and Ponds Program within DEC is planning to assess the impact of the Shoreland Protection Act and related Lake Wise Program BMPs on reducing nonpoint source pollution to lakes and ponds beginning in 2021.
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. (Complete) Implement strategies/outreach delivered affecting river corridors, flood hazard areas, land disturbance 1 acre or more or within 250' of lakeshore. (Complete)	2015 - 2017 2018	CWIP 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 CWIP-funded projects do not adversely impact natural resources. Starting in SFY 2019, all grant applications require sign off from permit programs indicating they have permits in place or they do not require permits. Funding programs are continuing to work with permitting programs to further smooth out this process. Staff have developed the Water Quality Project Screening Tool that helps stakeholders easily identify regulatory and non-regulatory contacts for discrete project locations.

Appendix B – Section 319 Leveraged Watershed Projects and Status

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

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
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
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	Completed	6/30/2016
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

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
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
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

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
2016	City of Montpelier	One Taylor Street Stormwater Treatment	$230,000	Ongoing	
2016	City of Montpelier	Taylor Street Reconstruction Stormwater Treatment	$250,000	Ongoing	
2016	University of Vermont Extension/Farmers Watershed Alliance	Reduction of Fall Tillage in Jewett Brook/Stevens Brook Watersheds	$102,154	Completed	9/15/2018
2016	Vermont Association of Conservation Districts	Statewide Trees for Streams	$173,250	Completed	4/19/2019
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	Completed	12/9/2019
2017	City of Barre	City of Barre Vacuum Sweeper	$260,750	Completed	11/9/2018
2017	City of Barre	City of Barre Vactor Truck	$14,043	Completed	6/5/2019
2017	City of Barre	Park-Winter Meadow Stormwater Reduction	$36,978	Discontinued in FY 2020*	9/29/2020
2017	University of Vermont Extension	Enhancing the Water Quality Benefit of Cover Crops	$99,554	Completed	6/3/2019
2017	Lake Iroquois Association	Lake Iroquois Streambed Restoration and Erosion Control	$34,000	Completed	11/21/2018
2017	Town of Wolcott	Wolcott Town Garage and Fire Station Stormwater Management Improvements	$15,888	Completed	10/22/2018
2017	Central Vermont Regional Planning Commission	Northfield Water Street Stormwater Structure	$173,785	Completed	1/21/2020
2018	Northwest Regional Planning Commission	Municipal Roads Grants-in-Aid 2018	$1,068,150	Completed	6/30/2018
2018	Warren Town	Fuller Hill Road, Warren Stormwater Treatment Implementation	$164,074	Completed	12/22/2018
2018	Jericho Town	Packard Road, Jericho Stormwater Treatment Implementation	$56,635	Completed	1/28/2019
2019	Vermont Land Trust	River Corridor Easement Grant- Lewis Creek-Briggs	$137,377	Ongoing	
2019	Vermont Land Trust	River Corridor Easement Grant- Lewis Creek, Clifford	$117,832	Ongoing	
2019	Vermont Natural Resources Council	Mill Pond Dam Removal	$100,000	Completed	1/27/2020

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
2019	Warren Town	Warren School Campus Stormwater Management – Subsurface Chambers	$22,051	Completed	11/27/2018
2019	Stowe Town	Town of Stowe Grader-Mounted Rollers	$19,045	Completed	7/19/2018
2019	Vermont Department of Forests Parks and Recreation	Cotton Brook Culvert Upgrades	$130,800	Completed	5/29/2019
2019	Rutland County Natural Resources Conservation District	Cold River Berm Removal	$36,400	Ongoing	
2019	Cambridge Town	Cambridge Elementary Stormwater Project	$18,589	Completed	3/28/2019
2019	Friends of Northern Lake Champlain	Bouchard Farm Ditch Improvement Project- Rock River	$47,913	Completed	11/27/2018
2019	Franklin Watershed Committee	Towle neighborhood Road culvert stabilization	$21,293	Discontinued	N/A
2019	The Nature Conservancy	Hathaway Point Agricultural Stormwater Runoff Project	$22,565	Completed	12/20/2018
2019	Vermont Department of Forests Parks and Recreation	Waterman Brook Culvert to Bridge Project – Johnson	$26,540	Completed	5/21/2019
2019	Vermont Department of Forests Parks and Recreation	Bombardier Forest Road- Preston Brook logging road remediation	$60,170	Completed	5/29/2019
2019	Derby Town	Derby, Morgan and Brownington shared Hydroseeder program	$24,390	Completed	4/10/2019
2019	Friends of Winooski River	Pouliot Stormwater Mitigation – Gully Restoration	$ 144,000	Completed*	2/11/2020
2019	Franklin Watershed Committee	Franklin Town Garage Stormwater Treatment	$38,000	Completed*	2/11/2020
2019	Poultney-Mettowee Natural Resources Conservation District	West Rutland School Stormwater Management	$ 30,268	Completed*	3/13/2020
2019	Otter Creek Natural Resource Conservation District	Elephant Mountain Gully Stabilization	$ 39,100	Completed*	3/13/2020
2019	Rutland Town	Rutland Town Elementary School Green Stormwater Infrastructure	$ 16,244	Completed*	3/13/2020
2019	Natural Resources Conservation Service	Wetland Incentive Payment – Salisbury	$ 115,700	Completed	9/24/2018
2020	Vermont River Conservancy (VRC)	River Corridor Easement Grant 2019 – Lamoille River	$70,945	Ongoing	
2020	Vermont Youth Conservation Corps (VYCC)	2019 Vermont Youth Conservation Corps Watershed Work Crew Project	$93,316	Ongoing	
2020	Watersheds United Vermont (WUV)	Woody Buffer Block Grant – WUV 2019	$132,576	Ongoing	

Workplan Year	Grantee/Contractor	Project Title	Total Amount	Project Status	Date Completed
2020	Watersheds United Vermont (WUV)	WUV Clean Water Projects Design and Implementation Grant	$575,000	Ongoing	
2020	Vermont Natural Resources Council (NRCC)	NRCC Clean Water Projects Design and Implementation Grant	$925,000	Ongoing	
2020	Southern Windsor County Regional Planning Commission (SWCRPC)	SWCRPC Design and Implementation Block Grant	$1,500,000	Ongoing	

*Projects completed in FFY 2020, further described in Appendix C.

Appendix C: Outputs and Outcomes of Section 319 Leveraged Projects Completed in FFY 2020

The following projects were completed during the FFY 2020 reporting period. Each completed project includes project photos, project outputs and estimated pollutant reductions, if available.

Pouliot Stormwater Mitigation – Gully Restoration	
Project Type	Stormwater Implementation
Watershed(s)	Stevens Branch Winooski River
Partner	Friends of the Winooski River
Funding Amount	$140,623
Project Output	58 acres of existing impervious surface treated
Estimated Total Phosphorus Load Reduction	16 lbs/yr[1]
Estimated Total Suspended Solids	Sediment accounting methods under development

A highly eroded gully created by high stormwater flows has lost naturalized features transporting sediment and nutrients to the Steven's Branch of the Winooski River.

The gully was stabilized, and a sand infiltration practice was installed along with an armored step pool system to slow water flow and allow sediment and phosphorous to infiltrate before draining to the river.

[1] Estimated phosphorus reduction comes from the associated infiltration practice, it does not incorporate restoration of the gully itself. Gully restoration phosphorus and sediment accounting methods are under development.

Franklin Town Garage Stormwater Treatment	
Project Type	Stormwater Implementation
Watershed(s)	Pike River
Partner	Franklin Watershed Committee
Funding Amount	$22,617
Project Output	1.2 acres of existing impervious surface treated
Estimated Total Phosphorus Load Reduction	0.41 lbs/yr
Estimated Total Suspended Solids	223 lbs/yr

Stormwater runoff from town garage and park & ride area drained to existing catch basins which flowed directly to the Pike River and Missisquoi Bay.

A system of vegetative swales capture runoff from impervious surfaces allowing sediment to settle before flow reaches upgraded catch basins reducing phosphorous and sediment to the river and bay.

West Rutland School Stormwater Management

Project Type	Stormwater Implementation
Watershed(s)	Castleton River
Partner	Poultney-Mettowee Natural Resources Conservation District
Funding Amount	$26,710
Project Output	0.42 acres of existing impervious surface treated
Estimated Total Phosphorus Load Reduction	0.43 lbs/yr
Estimated Total Suspended Solids	228 lbs/yr

West Rutland School parking lot before installation of treatment.

One of two bioretention systems installed at the school treating parking lot runoff.

Elephant Mountain Gully Stabilization	
Project Type	Stormwater Implementation
Watershed(s)	New Haven River
Partner	Otter Creek Natural Resources Conservation District
Funding Amount	$39,100
Project Output	1 acre of impervious surface treated
Estimated Total Phosphorus Load Reduction	Phosphorus accounting methods under development
Estimated Total Suspended Solids	Sediment accounting methods under development

Elephant Mountain gully shown before restoration, facing north

Gully stabilized with overflow, willow wattles, shrubs and trees planted, facing south

Rutland Town Elementary School Green Stormwater Infrastructure	
Project Type	Stormwater Implementation
Watershed(s)	East Creek (Basin 3)
Partner	Rutland Town
Funding Amount	$16,244
Project Output	1.25 acres of existing impervious surface treated
Estimated Total Phosphorus Load Reduction	1.41 lbs/yr
Estimated Total Suspended Solids	691 lbs/yr

After the installation of a vegetated bioretention area in the flagpole island of the school to reduce runoff from the access driveway. (area 3 of 4 small projects implemented at the school)

After the installation of an infiltration trench along the west side of the school's lower parking lot. (area 4 of 4 small projects implemented at the school)