

ANNUAL REPORT ON THE VERMONT CLEAN WATER INITIATIVE
PROGRAM (FORMERLY ECOSYSTEM RESTORATION PROGRAM) FOR
STATE FISCAL YEAR 2015

In Accordance with 10 V.S.A. §1386(e)

Submitted to the
House Committee on Fish, Wildlife and Water Resources
Senate Committee on Natural Resources and Energy
House Committee on Agriculture and Forest Products
Senate Committee on Agriculture

Agency of Natural Resources
Department of Environmental Conservation

February 1, 2016



Acknowledgements

This report was prepared by the staff of the Vermont Department of Environmental Conservation Vermont Clean Water Initiative Program (formerly referred to as the Ecosystem Restoration Program), with contributions from staff of the Watershed Management Division, Vermont Transportation Agency's Vermont Better Back Roads Program, Vermont Department of Forests, Parks and Recreation, Vermont League of Cities and Towns, Lake Champlain Sea Grant, and Vermont Association of Conservation Districts.

Cover photos: Before and after photos of Ecosystem Restoration Grant-funded projects including a bioretention system installed at the Peoples Academy parking area, a road and ditch stabilization project in Fairfield, and a stone-lined back roads culvert outfall settling pool in Morgan.

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Acronyms

AAFM	Vermont Agency of Agriculture, Food and Markets
ACCD	Vermont Agency of Commerce and Community Development
ANR	Vermont Agency of Natural Resources
AoA	Vermont Agency of Administration
CSA	Critical Source Area
CWIP	Vermont Clean Water Initiative Program
DEC	Vermont Department of Environmental Protection
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentive Program
ERP	Ecosystem Restoration Program
GIC	Green Infrastructure Collaborative
GIS	Geographic Information System
GSI	Green Stormwater Infrastructure
IDDE	Illicit Discharge Detection and Elimination
LID	Low Impact Development
NRPC	Northwest Regional Planning Commission
RCPP	Regional Conservation Partnership Program
SFY	State Fiscal Year
TMDL	Total Maximum Daily Load
USDA-NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
UVM	University of Vermont
UVM-EXT	University of Vermont Extension
VACD	Vermont Association of Conservation Districts
VBBR	Vermont Better Back Roads
VLCT	Vermont League of Cities and Towns
VTrans	Vermont Agency of Transportation

Executive Summary

The Ecosystem Restoration Program (ERP), housed in the Vermont Department of Environmental Conservation's (DEC) Watershed Management Division, was recently restructured to become the Vermont Clean Water Initiative Program (CWIP). Restructuring expanded the program's mission, which now involves:

- Coordinating implementation of priority clean water restoration activities throughout Vermont;
- Managing ecosystem restoration funding programs to support nonpoint source pollution controls; and
- Tracking and reporting on the State's progress in achieving and maintaining clean water statewide.

Implementation activities continue to focus on nonpoint pollution sources. Nonpoint sources are diffuse water pollution sources caused by precipitation or snowmelt running off of developed areas, roads, agricultural lands, and logging areas. Nonpoint source pollution, often referred to as polluted runoff and erosion, delivers excessive amounts of sediment, nutrients, and other pollutants to surface waters, and is the leading cause of water quality degradation in Vermont.

Implementation activities are to address specific requirements of the new Vermont Clean Water Act, commonly referred to as "Act 64," and the Lake Champlain Total Maximum Daily Load (TMDL) and Phase 1 Implementation Plan, as well as other approved TMDLs. The Program also provides support to the new Vermont Clean Water Fund Board to ensure effective allocation and use of monies for TMDL implementation efforts.

The program awarded a total of 61 grants and contracts worth over \$2 million of State Fiscal Year (SFY) 2015 funds to municipalities, watershed organizations, natural resources conservation districts, the regional planning commissions, the University of Vermont, and non-governmental organizations to improve water quality. The following tables, accompanying figures, and appendices summarize the SFY2015 grant awards:

- Table 1: Summarizes the number of projects and dollars awarded by watershed;
- Table 2: Summarizes the number of projects and dollars awarded by county;
- Figure 1: Summarizes the projects awarded by project type;
- Appendix A: Outlines the projects funded with SFY2015 capital funds;
- Appendix B: Summarizes information in Table 1 & 2 as pie charts and maps; and
- Appendix C: Offers a compendium of selected success stories.

In addition to the management of the water quality grant program, CWIP staff and program partners work on a variety of water quality initiatives. Those initiatives include the U.S. Environmental Protection Agency's Vermont Lake Champlain Phosphorus TMDL process, the U.S. Department of Agriculture's Natural Resources Conservation Service Lake Champlain Regional Conservation Partnership Program, the Vermont Better Back Roads Program, the St. Albans Watershed Initiative, and stormwater management technical assistance that includes management of the State's Green Infrastructure Initiative, Stormwater Master Planning, Stormwater Infrastructure Mapping, and Illicit Discharge Detection and Elimination mapping and assessment. The report describes this past year's accomplishments under these initiatives.

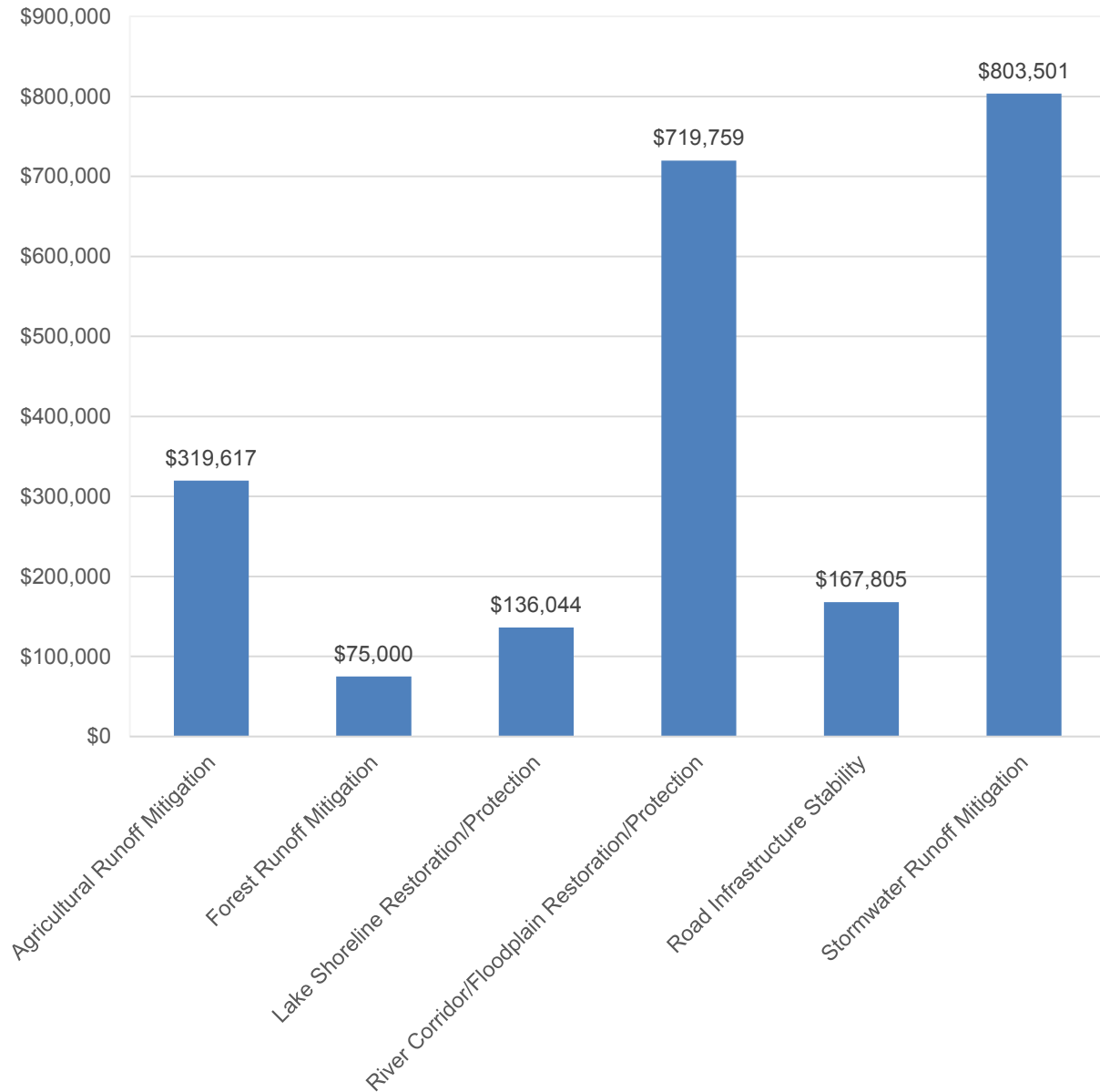
Table 1. SFY2015 Ecosystem Restoration Grant-Funded Projects by Watershed

Watershed	Number of Projects	Total SFY2015 Amount
Batten Kill-Walloomsac-Hoosic	2	\$84,182
Poultney-Mettawee	4	\$198,200
Otter, Little Otter, Lewis Creek	4	\$118,180
Southern Lake Champlain	0	\$0
Northern Lake Champlain	4	\$153,468
Missisquoi	6	\$254,810
Lamoille	6	\$227,542
Winooski	13	\$299,705
White	2	\$88,663
Ottawaquechee-Black	3	\$80,888
West-Williams-Saxtons	0	\$0
Deerfield	0	\$0
Lower Connecticut	0	\$0
Stevens-Wells-Waits-Ompompanoosuc	2	\$152,395
Passumpsic	5	\$138,409
Upper Connecticut	1	\$51,736
Lake Memphremagog	4	\$95,648
Multiple Watersheds (Most projects applied statewide)	5	\$277,900
Total for SFY2015	61	\$2,221,726

Table 2. SFY2015 Ecosystem Restoration Grant-Funded Projects by County

County	Number of Projects	Total SFY2015 Amount
Addison	3	\$87,293
Bennington	1	\$32,990
Caledonia	4	\$80,309
Chittenden	6	\$124,141
Essex	2	\$69,086
Franklin	6	\$258,030
Grand Isle	0	\$0
Lamoille	5	\$179,322
Orange	1	\$84,597
Orleans	2	\$29,040
Rutland	6	\$283,200
Washington	8	\$217,350
Windham	0	\$0
Windsor	3	\$80,888
Multiple Counties	14	\$695,480
Total for SFY2015	61	\$2,221,726

Figure 1. SFY2015 Ecosystem Restoration Grant-Funded Projects in Dollars and by Project Type



Clean Water Initiative Program Year in Review

Introduction

The Vermont Clean Water Initiative Program (CWIP), formerly the Ecosystem Restoration Program (ERP), has expanded its mission, which now involves coordinating implementation of priority clean water restoration activities throughout Vermont; managing the Ecosystem Restoration Grant program to support nonpoint source pollution controls; and tracking and reporting on the State's progress in achieving and maintaining clean water statewide.

The CWIP provides capital funds, in the form of competitive Ecosystem Restoration Grants and contracts, to implement priority water quality restoration and protection projects. CWIP awards approximately 50-60 Ecosystem Restoration Grants each year, totaling approximately \$2-3.75 million of state capital construction funds. The fundamental goal of the program is to reduce sediment and nutrient pollution, including phosphorus, from uncontrolled runoff and erosion into the State's surface waters.

The objectives of the CWIP and the Ecosystem Restoration Grant program are to:

- Reduce unmanaged stormwater runoff from developed areas;
- Reduce polluted runoff from farms and timberlands;
- Upgrade road networks with best road-related stormwater management practices; and
- Restore and protect floodplains, river corridors, wetlands, and riparian areas. (The term, "riparian" means the land immediately adjacent to rivers, streams, lakes, ponds, and wetlands.)

Ecosystem Restoration Grant funded activities support implementation of the Lake Champlain Total Maximum Daily Load (TMDL) and its Phase I Implementation Plan, as well as other approved TMDLs. Funds are targeted to mitigate priority problem sites specified in tactical basin plans, or other state-sanctioned water quality plans, such as river corridor plans, stormwater master plans, stormwater infrastructure maps, road erosion inventories, and other relevant assessments. The tactical basin planning process involves assessing the water quality of surface waters (rivers, streams, lakes, ponds, and wetlands) throughout a basin, identifying problem areas, and prioritizing actions. Partner organizations are encouraged to participate in identifying the highest priority projects for state funded support. Partners include municipalities, watershed organizations, conservation districts, regional planning commissions, other local and regional citizen groups, and other state agencies. The Department of Environmental Conservation (DEC) watershed coordinators and technical staff in the rivers, lakes, and wetlands programs provide technical assistance to partners in the development of Ecosystem Restoration Grant applications.

The Vermont Clean Water Fund

Governor Shumlin signed the Vermont Clean Water Act (Act 64) into law in June, 2015. The Act provides statutory support to strengthen efforts aimed at reducing water pollution, focusing on reducing sediment and nutrient (phosphorus and nitrogen) pollution across the State. Act 64 also established a new **Clean Water Fund** that will build on existing grant and loan programs to help communities and partners finance high priority clean water activities that include:

- Targeting implementation of priority, cost effective and smart practices on our farms to reduce the amount of pollution that runs off of farm fields and barnyards;
- Reducing polluted runoff from developed lands including highways, roads, parking lots, yards, and roofs;
- Using our “natural infrastructure” – river corridors, floodplains, wetlands, and forests– to reduce stormwater pollution and erosion and build resilience; and
- Supporting municipalities, farmers, and other partners in meeting our clean water goals through education and outreach, technical assistance, planning, and financial support.

The Clean Water Fund will be overseen by the Vermont Clean Water Fund Board with representation from the Agency of Administration (AoA), the Agency of Agriculture, Food & Markets (AAFM), the Agency of Commerce & Community Development (ACCD), the Agency of Natural Resources (ANR), and the Agency of Transportation (VTrans). The Vermont Clean Water Initiative supports the Clean Water Fund Board to ensure the most effective allocation and use of monies for clean water activities.

The Vermont Clean Water Initiative

The Vermont Clean Water Initiative reflects an exciting and growing collaboration to safeguard the public's access to clean and safe water throughout the state. The initiative is made up of the state agencies represented in the Vermont Clean Water Fund Board and local and regional partners that represent all sectors. The state partner agencies are working together to consistently track clean water progress that will allow for transparent reporting to the legislature and the public. Agencies are also coordinating their communications to ensure consistent messaging across sectors. This “all-in” approach is reflected in the Initiative's logo (below). The logo creates a common brand for a common purpose that is recognizable to the public and across sectors. For more information on the Vermont Clean Water Initiative, visit www.cleanwater.vermont.gov.



Lake Champlain Phosphorus TMDL Update

The U.S. Environmental Protection Agency (EPA) New England has developed a draft TMDL for the Vermont segment of Lake Champlain. The TMDL identifies the total amount of phosphorus the Lake can assimilate and still meet water quality standards. The TMDL will establish phosphorus loading targets for various sectors, serving as a restoration plan for the Lake. The draft **Phosphorus TMDL for Vermont Segments of Lake Champlain** was released by EPA in August 2015 for public comment. EPA is expected to finalize the TMDL in the first quarter of calendar year 2016. To describe how the phosphorus loading targets will be achieved across all sources, the DEC prepared the **Lake Champlain Phosphorus Total Maximum Daily Load Phase I Implementation Plan** (Phase I Plan). Documents and updates related to the Lake Champlain TMDL can be found here: <http://www.watershedmanagement.vt.gov/erp/champlain/>.

Lake Champlain Regional Conservation Partnership Program

In October of 2014, the State of Vermont submitted a grant proposal for the accelerated implementation of agricultural and forestry conservation practices in the Lake Champlain Basin of Vermont and New York to the U.S. Department of Agriculture Natural Resources Conservation Service's (USDA-NRCS) Regional Conservation Partnership Program (RCPP). In April 2015, the State of Vermont was awarded the second largest RCPP grant in the country, totaling \$16 million and involving 25 partner organizations, agencies, businesses, and non-profits contributing \$20 million in match to the effort. The five-year RCPP grant will help landowners invest in conservation practices to improve water quality through financial and technical assistance. This RCPP affords funding to conserve important and environmentally critical agricultural lands, and to restore and protect wetlands that are crucial to absorbing runoff and slowing floodwaters.

The Lake Champlain RCPP provides the opportunity for expanding the many strong partnerships that already exist in the Lake Champlain Basin. This project brings together traditional partners such as state agencies, federal agencies, and non-profits, while adding new partners such as dairy cooperatives and lenders. Partners will support education and assistance to landowners, increasing participation and water quality improvement project installation. The RCPP also brings new initiatives to the conservation field including the Environmental Stewardship Program that provides incentives to go above and beyond regulatory requirements and to increase participation in wetland and floodplain restoration projects.

The Lake Champlain RCPP grant funds will be allocated as follows:

- \$9,980,000 is allocated to Vermont and \$1,000,000 to New York for on-farm conservation practices through the NRCS Environmental Quality Incentive Program (EQIP). Funding is available for development of farm conservation plans, and agricultural and forestry water quality improvements. A conservation plan is an NRCS tool designed to help landowners better manage the natural resources on their lands. These plans evaluate the soil, water, air, plant, and animal resources and offer a suite of alternatives to address resource conditions and concerns. The farmer decides which alternatives to use (best management practices) in addressing their resource concerns and those decisions are recorded in the conservation plan which includes a schedule for installation.
- \$4,000,000 is allocated in Vermont to the Agricultural Conservation Enhancement Program for Agricultural Land Easements. Farms participating agree to conserve land in perpetuity, and as of the 2014 Farm Bill, are required to have and implement a conservation plan that addresses natural resource concerns on the conserved property. Farms that are being conserved through the Lake Champlain RCPP as well as prior conserved farms will be prioritized for the EQIP funds described above.
- \$1,020,000 is allocated in Vermont to Wetlands Reserve Easements. Through this program, landowners are compensated for retiring land from agriculture in perpetuity, and restoring wetland functions and values. As match, the State of Vermont is developing a wetlands payment calculator that will determine an incentive payment to accelerate landowner participation in high priority wetland, riparian, and floodplain restoration projects. The State of Vermont is also providing cash payments to pilot this innovative approach.

- Of the \$16 million Lake Champlain RCPP grant listed above, \$12,847,250 is for direct payments to farmers and landowners. The remaining \$3,152,750 is for technical assistance to help landowners develop and implement these valuable conservation practices. Three conservation planners have been hired through a partner grant agreement to work directly with landowners, as well as one forester.

Green Infrastructure Initiative

CWIP's Green Infrastructure Initiative merged with the University of Vermont's (UVM) Lake Champlain Sea Grant Program in August 2015 to create the Green Infrastructure Collaborative (GIC). The Collaborative represents a partnership between DEC and UVM in continuing efforts to increase adoption of Low Impact Development (LID) principles and implementation of Green Stormwater Infrastructure (GSI) practices throughout Vermont. LID is a term used to describe a suite of innovative land use planning and site design techniques that help minimize stormwater runoff across the landscape. GSI refers to a set of best management practices that primarily rely on natural processes to manage and treat stormwater runoff.

The Collaborative represents an important connection to an institute focused on research and extension outreach. The program's historical effort to use education, training, and technical assistance to accomplish its goals is further strengthened with this partnership. University researchers are more directly linked to State agency questions regarding GSI performance and maintenance, while a diverse group of stakeholders are engaged in academic GSI endeavors, increasing the knowledge base of all. This year the GIC promoted GSI/LID efforts in Vermont through coordination with the Green Infrastructure Roundtable, professional development, public outreach, and technical assistance.

Coordinating LID and GSI Efforts Statewide via the Green Infrastructure Roundtable

In 2010, ANR established the Green Infrastructure Roundtable – a group of interested parties representing both the public and private sector. The group was instrumental in the development of the State's 2014 – 2019 GSI Strategic Plan, linked here: http://www.watershedmanagement.vt.gov/stormwater/docs/sw_gi_2014_2019_strategic_plan_final.pdf. In 2015, the Roundtable continues to make progress implementing the five-year strategic plan with a renewed focus on high quality professional development for Roundtable members.

Providing Training Opportunities for Professionals

Design professionals were afforded a number of opportunities to learn more about GSI practices. The Initiative hosted five different workshops focused on the technical aspects of GSI. These workshops were attended by roughly 100 professionals working in the stormwater field. In September 2015, the GIC sponsored an all-day tour and design course at the University of New Hampshire Stormwater Center attended by twenty-four members of the Green Infrastructure Roundtable. The content presented in this private tour included some cutting-edge data on best practices for GSI maintenance and design. As a result of that professional development opportunity, Roundtable members are changing the way they design, construct, and maintain GSI practices to improve performance based on the newest scientific research. A continued focus on high-level professional development for Roundtable members is planned for 2016. Further training opportunities will include a GSI conference for University students in the spring of 2016. GIC will also share data from ongoing University led investigations into

bioretention practices, as well as floating treatment wetlands for stormwater pond performance improvement.

Raising Public Awareness of LID Principles and GSI Practices

The concepts of LID and GSI continue to be new for Vermonters so the initiative places a large focus on education and outreach. In 2015, GIC delivered at least 13 different presentations and webinars to high schools and colleges, municipalities, civic groups, non-profit organizations, and professional trade groups. These presentations reached roughly 300 individuals throughout the state and beyond. The [LID fact sheets](#) and [GSI fact sheets](#) that were prepared by the Green Infrastructure Initiative in 2014 were used as tools to discuss these topics with a broad range of populations. Additionally, three Watershed Management Division blog posts featured work of the GIC in 2015.

Providing Technical Assistance to Municipalities and Watershed Groups

CWIP provided technical assistance to municipalities and other partners on a wide range of projects throughout the State. Such assistance is tremendously important for LID and GSI projects, which require a greater understanding of site-specific elements. Assistance included site visits, desktop reviews, place-specific workshops, input on project designs, technical specifications, and identification of potential funding sources.

Implementing Executive Order 06-12

On behalf of ANR, CWIP continued to play a pivotal role in the implementation of [Executive Order 06-12](#). CWIP staff assisted in the coordination of the Green Infrastructure Council (council membership from the ANR, VTrans, the Department of Buildings and General Services, and the ACCD) and moved forward with a number of projects, initiatives and programmatic changes within ANR. A full ANR report for 2015 can be found here: http://www.watershedmanagement.vt.gov/stormwater/docs/sw_gi_ANR_GSI_Annual_Report_2015.pdf. Major accomplishments include training for ANR staff, discussion of contractor certification programs, beginning the process of updating the Vermont Stormwater Management Manual to include a wider array of GSI practices, incorporating GSI into the design of two major rehabilitation projects in Vermont State Parks, and providing funding for GSI design and implementation to outside partners.

Stormwater Master Planning

In 2015, CWIP funded 13 stormwater master planning projects ranging in size from the City of Montpelier's plan, which covers approximately 6,000 acres, to the Cabot Elementary School campus, which covers about 10 acres.

The Vermont **Stormwater Master Planning Guidelines** can be found on the web at: <http://www.vtwaterquality.org/erp/docs/SWMPstatewidetable.pdf>.

The Vermont **Stormwater Master Planning Guidelines Webinar Series** has been taped and can be found under CWIP's Municipal Stormwater Management webpage: <http://www.watershedmanagement.vt.gov/erp/htm/erp-stormwater.htm>.

Illicit Discharge Detection and Elimination and Stormwater Infrastructure Mapping

In 2015, CWIP completed draft stormwater geographic information system (GIS) drainage maps and final reports for 18 municipalities across the State. Statewide drainage maps of all urbanized areas are anticipated to be completed by 2017. The maps illustrate how storm drainage systems are connected to public and private properties to raise awareness about stormwater runoff impacts to Vermont's waterways and the need for regular drainage system maintenance in addition to pollution prevention.

When water drains directly to rivers and streams in pipes without passing through vegetation or over soil, pollutants in that water contribute to water quality impairments and flooding risks increase. Also, understanding how drainage systems are connected is a valuable tool for hazardous spill prevention for local fire and police departments.

Illicit discharges are unauthorized connected sewer or wastewater lines to stormwater lines. Information on the extent of the connected drain system and how it is associated with the municipal sewer system is also essential for the detection and elimination of illicit discharges. Knowledge of sewer service areas that have combined stormwater and sewer systems can better assist municipalities in planning and implementing combined sewer separation projects. Knowledge of the layout and extent of the stormwater system can inform options for remediating existing polluted stormwater discharges.

This mapping initiative provides information, guidance, and funding assistance for potential stormwater retrofit and clean up opportunities. Knowledge of where storm drains are located can also assist municipalities and residents with emergency preparedness for large rainfall events or spring snowmelt runoff events. Localized flooding and property damage can be prevented by keeping storm drains clean. Mapping drainage systems also helps municipalities implement stormwater ordinances or create a municipal stormwater management program.

The 18 mapped urbanized areas completed in SFY2015 include Alburgh, Barnard, Bennington, Bridgewater, Cavendish, Craftsbury, Hartland, Killington and Killington and Pico Ski Areas, Ludlow and Okemo Ski Area, North Springfield, Pawlet, Plymouth, Rockingham, Washington, Weathersfield, West Windsor, Windsor, and Woodstock. For more information, visit: http://www.watershedmanagement.vt.gov/erp/htm/SW_IDDE_program.htm



Dye indicative of raw sewage in stormwater outfall. This illicit discharge has been corrected since this photo was taken.

Vermont Better Back Roads Program and Road Related Initiatives

In 2015, DEC continued a strong partnership with VTrans to implement the Vermont Better Back Roads (VBBR) Program. The VBBR is a grant program that supports water quality improvement practices, such as sediment and erosion controls, along town roads. There are two types of VBBR grants. Category A funds support the development of road erosion inventories and capital budget plans to implement road erosion control practices. Category B funds support implementation of road best management practices.

Voluntary Road Erosion Inventory Methodology Released

CWIP retained Watershed Consulting Associates, Inc. to develop a **Road Erosion Inventory Methodology and Capital Budget Planning Guide**. The methodology and guide provide a standard methodology to inventory, ground-truth, and prioritize erosion risk for road segments. The voluntary inventory is available to municipalities and others to conduct road erosion assessments which may be done via a geo-referenced mobile application (mobile “app”) or on paper. This inventory builds on the **Class 3 and Class 4 Road Erosion Hazard Risk Analysis and Mapping** project by Stone Environmental, Inc. in 2014 that was also funded by the Ecosystem Restoration Grant program. The mapping, available in the online ANR Atlas, identifies the degree of erosion risk for all Class 3 and 4 roads statewide, based on criteria such as proximity to surface water and road slope.

Both the inventory and mapping tools are available to municipalities who wish to conduct inventories using DEC or VTrans funding. Transportation planners with several regional planning commissions statewide are currently testing the inventory and ground-truthing the maps. It is hoped that their direct experiences will help inform the emerging Municipal Roads General Permit which is due for release in December 2017. This new general permit will likely require an inventory on unpaved and paved roads based on a specified schedule. In combination, these related efforts will help to strategically target funds to address the highest priority erosion and sediment sources along our road networks statewide.

Better Backroad Grants Awarded

The VTrans VBBR program contributed \$440,000 and DEC added \$30,000 for a combined total of \$470,000 to municipalities to install water quality friendly best management practices in SFY2016. In addition to these implementation funds, VTrans provided another \$145,945 of federal funds specifically for road erosion inventories and capital budget plans to remediate identified priority erosion sites. The DEC funding is linked directly to road improvement priorities described in tactical basin plans, and may be used to fund projects addressing road erosion on private roads or lands that are often significant sources of sediment and phosphorus to surface waters.

Staff from VTrans delivered several workshops to municipalities statewide to learn about better backroad practices, water quality concerns, and how to complete VBBR funding applications. This direct outreach approach resulted in an unprecedented 89 projects funded, including 38 Category A Inventory and Capital Budget Planning projects and 51 Category B Implementation projects. Five new towns that had never before received VBBR funds received awards, specifically the towns of Brookline, Canaan, Lemington, Middletown Springs, and Milton. In the past three years, VTrans has consistently funded ever increasing numbers of projects statewide to both improve unpaved roads and water quality.

With the passage of Act 64, VTrans is preparing to expand and refine the VBBR program in anticipation of increased grant funding for SFY2017. In August and September of 2015, VTrans, DEC, and Federal Highway Administration employees participated in a statewide field review over four days of 23 Better Backroads grant recipient sites. With DEC participation, VTrans prepared a draft report outlining recommendations to expand the maximum amount of funding; expand the types of projects to include paved roads, river and road conflicts, and larger culvert replacements and increase technical assistance statewide regarding water quality effective best management practices. For more information, see:

<http://vtransengineering.vermont.gov/bureaus/mab/better-back-roads>



LEFT – Rock-lined and planted ditch to slow runoff and prevent erosion, supported by the VT Better Backroads Program.



RIGHT – Stone culvert header to protect the soils around the culvert from eroding.

St. Albans Watershed Initiative

The St. Albans Bay Watershed Initiative was created by DEC in 2012 to focus attention on water quality problems that continually plague St. Albans Bay. The Initiative focuses on reducing nutrient and sediment-laden polluted runoff that drains directly into the Bay. Sources include polluted runoff from agricultural lands, developed lands, and roads, as well as unstable river channels. The Initiative is being implemented in close partnership with the Northwest Regional Planning Commission (NRPC), the City of St. Albans, the University of Vermont Extension System (UVM-EXT), the AAFM, and the VBBR Program.

During 2015 the following activities occurred:

- NRPC completed a three-part effort consisting of evaluating previously completed water quality improvement reports to identify recommended projects that have not been undertaken; using GIS overlay mapping techniques to identify potential critical source areas (CSA) in the watershed likely to contribute phosphorus runoff; and identifying capital funds-eligible nonpoint source pollution reduction projects concerning public and privately owned road-related projects and stormwater retrofit opportunities in areas of the watershed that are not within the boundary of the municipal stormwater permit.

- UVM-EXT completed its work with agricultural landowners in the Jewett Brook and lower Stevens Brook watersheds. The purpose of the work was to help landowners implementing soil and water conservation practices at CSAs. UVM-EXT served as 'case manager' to assist landowners with their enrollment in USDA-NRCS cost share soil and water conservation programs.
- DEC provided \$60,000 in Ecosystem Restoration Grant funds to target erosion control purposes at six priority projects on unpaved town roads in three towns within the watershed (Swanton, Fairfield, and St. Albans).
- Heightened concern and attention to St. Albans Bay by DEC contributed to USDA-NRCS designating the 33,000 acre watershed as one of four priority strategic watersheds in its programming of financial assistance to agricultural landowners, including the Lake Champlain RCPP.
- In response to DEC's stepped up efforts to improve water quality in St. Albans Bay and its watershed, AAFM initiated a farm inspection and compliance determination effort. Compliance was assessed with respect to Accepted Agricultural Practices, or AAPs (renamed as Required Agricultural Practices in SFY2016) and conditions of the Medium Farm Operations general permit (no farms in the watershed are currently permitted as a Large Farm Operation).

Local Municipal Actions

CWIP continues to support a part-time Water Resources Coordinator at the Vermont League of Cities and Towns (VLCT). The coordinator provides municipalities with technical and educational assistance to protect water quality. Work focuses on stormwater management, municipal implementation of the Lake Champlain TMDL, GSI, river corridor protection, and flood hazard protection.

VLCT's Water Resources Coordinator's accomplishments in 2015 include the following:

- Technical assistance to 36 towns on water resource protection including written summaries of existing water quality and stormwater protection features included in town zoning bylaws or other pertinent regulatory documents and individual technical assistance to municipal officials.
- Sponsored, organized and presented at workshops, webinars, forums and conferences attended by municipal officials pertaining to GSI and LID management practices, municipal backroad erosion, Act 64 and municipal TMDL implementation. These events occurred at the following venues: four VLCT Water Quality Advisory Committee to the Commissioner meetings; three workshops at the Town Officer's Educational Conference series; the VLCT Spring Planning and Zoning Forum; three workshops at the VLCT Town Fair; two workshops at the Northeastern Vermont Development Association; and at a VLCT sponsored GSI webinar attended by 51 town officials, planners, and colleagues.
- Published 8 articles in the *VLCT News* and a blog on the DEC Watershed Management Division blog site on subjects including changes in the National Flood Insurance Program, floodplain zoning, the Emergency Relief and Assistance Fund, municipal road erosion, and GSI.
- Posted over 22 announcements and news briefs on the VLCT website related to water quality and resilience issues.

Portable Skidder Bridge Initiative

Portable skidder bridges are designed and intended for use as temporary structures for crossing streams during logging. Portable skidder bridges are becoming widely viewed as a best management practice for controlling nonpoint source pollution associated with logging operations. When properly installed, used, and removed, they create less stream bank and stream bed disturbance as compared to other alternatives such as culverts or poled fords. They are also economical since they are reusable, easy to install and can be transported from job to job. Portable skidder bridges will reduce the potential for sedimentation, channeling, and degradation of aquatic habitat to occur while allowing loggers to harvest timber in compliance with *Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont*.

To make these bridges more accessible to loggers, the State of Vermont initiated a portable skidder bridge rental program. The state continues to support the rental program through a two-year Ecosystem Restoration Grant to the Vermont Association of Conservation Districts (VACD). The VACD now administers portable skidder bridge rental programs to ensure that all Vermont conservation districts have the opportunity to provide technical assistance to loggers in their regions.

Under VACD's grant, conservation districts applied for mini-grants to build portable skidder bridges. In 2015, seven bridges were built with an additional six bridges planned for 2016, totaling 13 bridges for the project. This grant opportunity also enabled the start-up of two additional rental programs for the Essex County and the Poultney/Mettowee Natural Resources Conservation Districts. Bridges were built by engaging students enrolled in high school vocational forestry programs and by conducting logger training workshops. The bridges are located at participating sawmills and log yards for loggers to conveniently pick up and return. Loggers who rent bridges are provided an educational packet that illustrates guidelines to follow for installation, use, and removal of the bridges.



Skidder Bridge, Photo Courtesy of the VT Department of Forests, Parks and Recreation



Bridge under construction at a May 2015 Portable Skidder Bridge Workshop to educate loggers on the how and why to use portable skidder bridges. Photo courtesy of the Winooski Natural Resources Conservation District.

Appendix A: Ecosystem Restoration Grants Awarded in SFY2015

County	Partner	Summary Title	Funding	Topic	Category
Addison	Addison County Regional Planning	Stormwater Master Planning for the Town of Middlebury	\$22,750	S	1
Addison	Lake Champlain Committee	Assessment and Project Design for Modifications to the Crosby Farms Stormwater Treatment Pond in the City of Vergennes	\$10,430	S	1
Addison	White River Partnership	Upper White River Corridor Restoration Project	\$54,113	R	3
Bennington	Watershed Consulting	Bennington Infrastructure Stormwater Mapping Project	\$32,990	S	1
Bennington and Rutland	Watershed Consulting	Bennington and Pawlet Illicit Discharge Detection and Elimination (IDDE)	\$51,192	S	1
Caledonia	Caledonia County Natural Resources Conservation District	Lower Passumpsic Watershed Restoration and Project Development	\$13,640	R	1
Caledonia	Caledonia County Natural Resources Conservation District	Dishmill Brook Watershed Stormwater Master Planning and Stormwater Treatment Design in East Burke Village	\$37,550	S	1
Caledonia	Caledonia County Natural Resources Conservation District	Western Avenue, St. Johnsbury Stormwater Treatment Project Design to Improve Water Quality in the Sleepers River	\$14,829	S	1
Caledonia	NorthWoods Stewardship Center	NorthWoods Conservation Corps – Watershed Crew	\$14,290	S	2
Caledonia and Orange	Connecticut River Watershed Council	Upper Wells River Corridor Planning Project: Phase 2 Stream Geomorphic Assessment and Project Development	\$67,798	R	1

Topic Key

A Agricultural Runoff
 F Forestry
 L Lake Shoreland Restoration/Protection

R River Corridor/Floodplain Restoration/Protection
 Rd Road Construction/Maintenance
 S Stormwater Runoff

Category Key

1 Project Development/Scoping
 2 Project Implementation
 3 Resource Protection

Vermont Clean Water Initiative Program Annual Report

County	Partner	Summary Title	Funding	Topic	Category
Caledonia and Orleans	NorthWoods Stewardship Center	Phosphorous Reduction in the Lake Memphremagog Basin through Riparian Buffer Installations	\$49,258	L	2
Chittenden	Birds of Vermont Museum	Birds of Vermont Stream Restoration to Improve Stream Bank Stability of Sherman Hollow Brook	\$15,000	R	2
Chittenden	City of Burlington	Installation of Pervious Sidewalk (Stormwater Sidewalk) to Increase Infiltration and Reduce Stormwater Runoff	\$11,890	S	2
Chittenden	Fitzgerald Environmental Associates	Crooked Creek Gully Restoration	\$13,000	S	2
Chittenden	Lake Champlain Land Trust	The Upper LaPlatte River Natural Area Floodplain & River Restoration Project	\$15,750	R	2
Chittenden	Lake Iroquois Recreation District	Lake Iroquois Public Beach Area Ecological Landscape Design, Erosion Control, and Stormwater Management	\$49,661	L	2
Chittenden	Winooski Natural Resources Conservation District	Colchester High School Stormwater Runoff Mitigation Project	\$18,840	S	1
Chittenden and Washington	Winooski Natural Resources Conservation District	Installation of Forested Riparian Buffers in the Winooski River Basin – Trees for Streams, Spring 2015	\$23,625	R	2
Essex	Essex County Natural Resources Conservation District	Town of Brighton Stormwater Management Retrofit Planning and Design	\$17,350	S	1

Topic Key

A Agricultural Runoff

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3 Resource Protection

County	Partner	Summary Title	Funding	Topic	Category
Essex	Vermont River Conservancy	Merck Parcel: River Corridor Easement along the Nulhegan River	\$51,736	R	3
Franklin	Franklin Watershed Committee	Restore Lake Carmi Shorelands through Installation of Best Management Practices	\$37,125	L	2
Franklin	Friends of Northern Lake Champlain	Agricultural Best Management Practices Project Identification in Critical Source Areas of Hungerford Brook	\$35,000	A	1
Franklin	Missisquoi River Basin Association	Installation of Road Erosion Best Management Practices along Northrop Road at Talcott Road (WB-3) in the Town of Fairfield	\$32,805	Rd	2
Franklin	Town of Fairfield	Erosion Reduction along Shenang Road	\$30,000	Rd	2
Franklin	Vermont River Conservancy	Hurteau River Corridor Easement along the Lamoille River	\$48,220	R	3
Franklin	Village of Swanton	Marble Mill Park Underground Stormwater Treatment: Final Design and Implementation	\$74,880	S	2
Franklin and Orleans	Missisquoi River Basin Association	Missisquoi Watershed Riparian Buffer Restoration	\$45,000	R	2
Lamoille	Lamoille County Natural Resources Conservation District	Hyde Park Stormwater Improvement Project	\$75,000	S	2
Lamoille	Town of Cambridge	Floodplain Restoration at the Cambridge Trail Bridge along the Lamoille and Brewster Rivers	\$61,605	R	2

Topic Key

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Vermont Clean Water Initiative Program Annual Report

County	Partner	Summary Title	Funding	Topic	Category
Lamoille	Vermont River Conservancy	Selawsky River Corridor Easement: Wild Branch	\$11,500	R	3
Lamoille	Vermont River Conservancy	Selawsky River Corridor Easement: Wild Branch – Phase 2	\$26,540	R	3
Lamoille	Village of Jeffersonville	Jeffersonville River Corridor Easement Acquisition	\$4,677	R	3
Orange	Upper Valley Land Trust	Ompompanoosuc River Corridor Conservation at Dresser Farm and Odd Dog Farm	\$84,597	R	3
Orange and Windsor	White River Natural Resources Conservation District	Agriculture No-Till Drill Equipment Rental Program	\$34,550	A	2
Orleans	Memphremagog Watershed Association	Project Identification and Design for Stormwater Treatment in the Memphremagog Watershed	\$20,000	S	1
Orleans	Stone Environmental	Memphremagog IDDE Completion	\$9,040	S	1
Rutland	Fitzgerald Environmental Associates	Project Prioritization and Design for Implementation of the Cold River Corridor Plan	\$10,000	R	1
Rutland	Middletown Springs Fire Association	Middletown Springs Stormwater Runoff Mitigation through Green Stormwater Infrastructure	\$10,580	S	1
Rutland	Poultney-Mettowee Natural Resources Conservation District	Agricultural Runoff Mitigation Project on a Tributary to Beaver Brook	\$75,000	A	2
Rutland	Poultney-Mettowee Natural Resources Conservation District	Flower Brook Watershed Stormwater Master Planning in the Town of Pawlet	\$38,610	S	1

Topic Key

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Category Key

1 Project Development/Scoping
 2 Project Implementation
 3 Resource Protection

County	Partner	Summary Title	Funding	Topic	Category
Rutland	Poultney-Mettowee Natural Resources Conservation District	Agricultural Water Quality Best Management Practices Implementation Project	\$74,010	A	2
Rutland	Rutland Natural Resources Conservation District	East Creek Watershed Stormwater Runoff Reduction Project in Rutland City	\$75,000	S	2
Washington	Central Vermont Regional Planning Commission	Northfield Stormwater Mitigation Site Construction	\$59,842	S	2
Washington	City of Montpelier	Stormwater Master Planning for the City of Montpelier	\$40,000	S	1
Washington	Friends of the Mad River	Slow, Spread, and Sink it – Stormwater Mitigation Project Identification and Design at Harwood Union Middle School and High School	\$29,810	S	1
Washington	Friends of the Winooski River	Barre Neighborhood Stormwater Management Plan	\$15,970	S	1
Washington	Friends of the Winooski River	Cabot School Stormwater Mitigation Designs	\$8,881	S	1
Washington	Friends of the Winooski River	Stormwater Mitigation Project Design to Address Gully Erosion and Sedimentation along Pouliot Avenue in Barre Town	\$17,147	S	1
Washington	Friends of the Winooski River	Flood Mitigation Project Identification and Design along the Dog River in the Town of Northfield	\$37,570	R	1
Washington	Winooski Natural Resources Conservation District	Rumney Memorial School Stormwater Mitigation Project	\$8,130	S	1

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1 Project Development/Scoping

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Vermont Clean Water Initiative Program Annual Report

County	Partner	Summary Title	Funding	Topic	Category
Windsor	Lake Rescue Association	Implementation of Projects to Address Sediment Sources in the Upper Black River Watershed	\$44,688	R	2
Windsor	Two Rivers-Ottawaquechee Regional Commission	Pinney Hollow Brook Floodplain and Streambed Restoration Design	\$21,200	R	1
Windsor	Vermont River Conservancy	Pingree Flats Floodplain Restoration in Plymouth	\$15,000	R	2
Regional - Connecticut River	Stone Environmental	Upper and Middle Connecticut River and Passumpsic River IDDE	\$58,100	S	1
Regional - Lake Champlain Basin	Stone Environmental	Advanced Follow-up Investigation on IDDE in the Otter Creek, Poultney River, and Lamoille River	\$30,400	S	1
Regional - Lake Champlain Basin	University of Vermont	Implementing Precision Agriculture Technology to Improve Application and Minimize Nutrient Loss of Manure	\$75,057	A	2
Regional - Lake Champlain Basin	Winooski Natural Resources Conservation District	Equine Manure Runoff Management Program	\$13,000	A	2
Statewide	VTrans	Better Back Roads Projects	\$30,000	Rd	2
Statewide	VACD	Trees for Streams - Installation of Forested Buffers	\$67,500	R	2
Statewide	VACD	Expansion of Portable Skidder Bridge Program to Reduce Erosion from Logging Operations	\$75,000	F	2
Statewide	Vermont Youth Conservation Corps	Implement Road Erosion Best Management Practices along Class IV Roads	\$75,000	Rd	2

Topic Key

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S Stormwater Runoff

Category Key

1 Project Development/Scoping

2 Project Implementation

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Appendix B: Number of Ecosystem Restoration Grant Projects and Dollars Awarded with SFY2015 Funds by Watershed and County

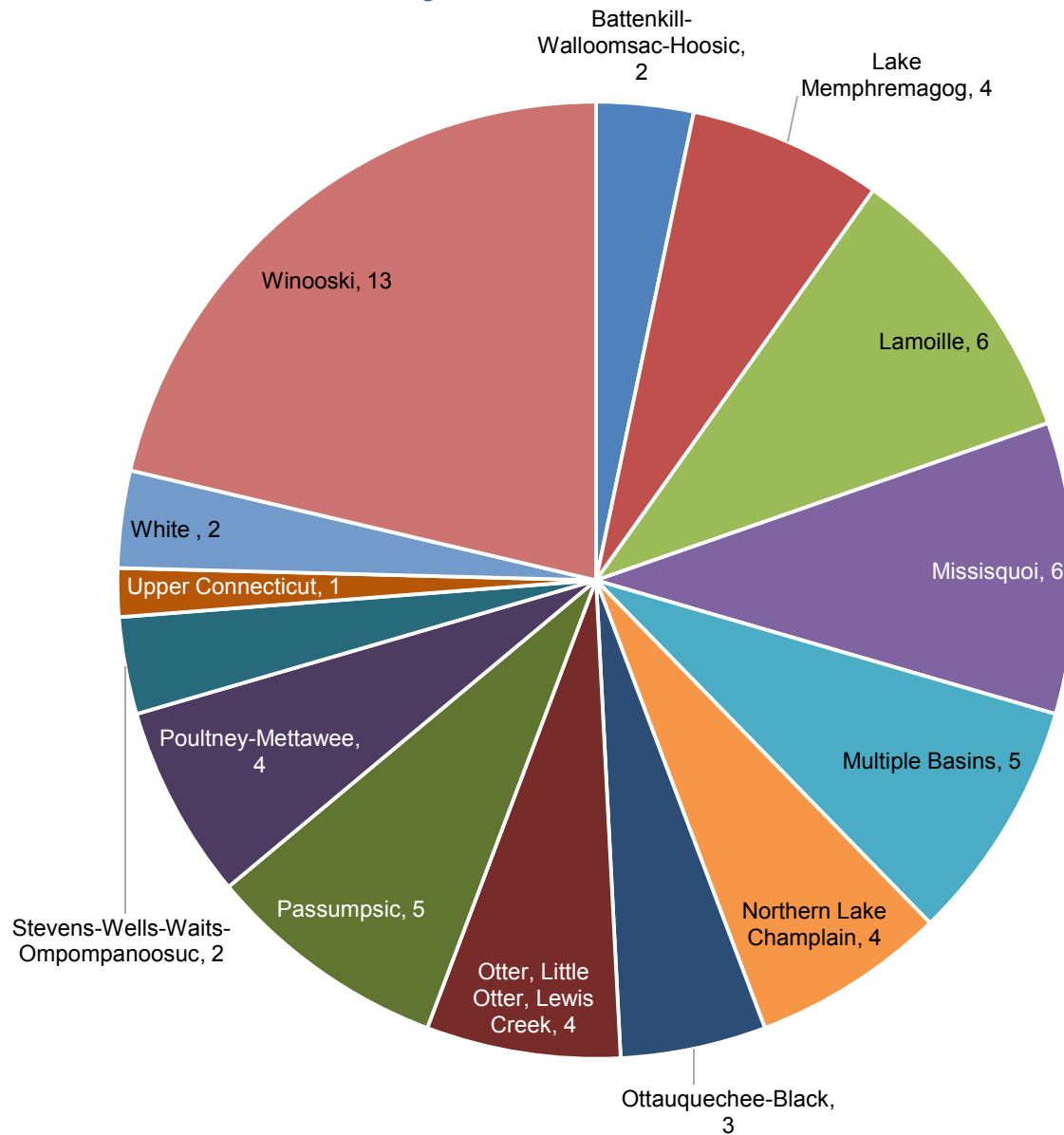


Figure 1. Number of Projects Awarded with SFY2015 Ecosystem Restoration Grant Funds by Watershed¹

¹ The watershed name is followed by the number of projects funded in that watershed.

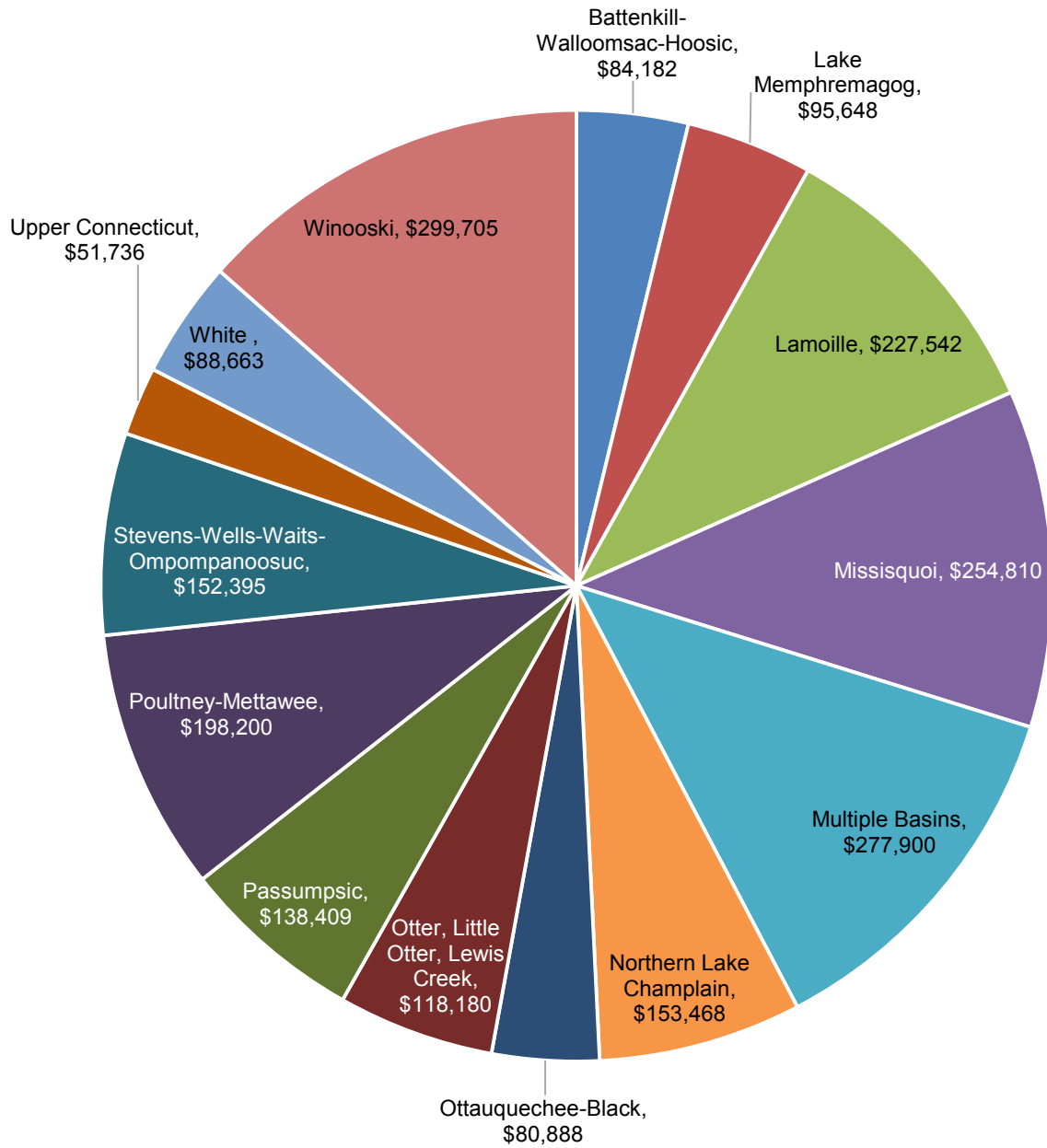


Figure 2. Dollars Awarded with SFY2015 Ecosystem Restoration Grant Funds by Watershed

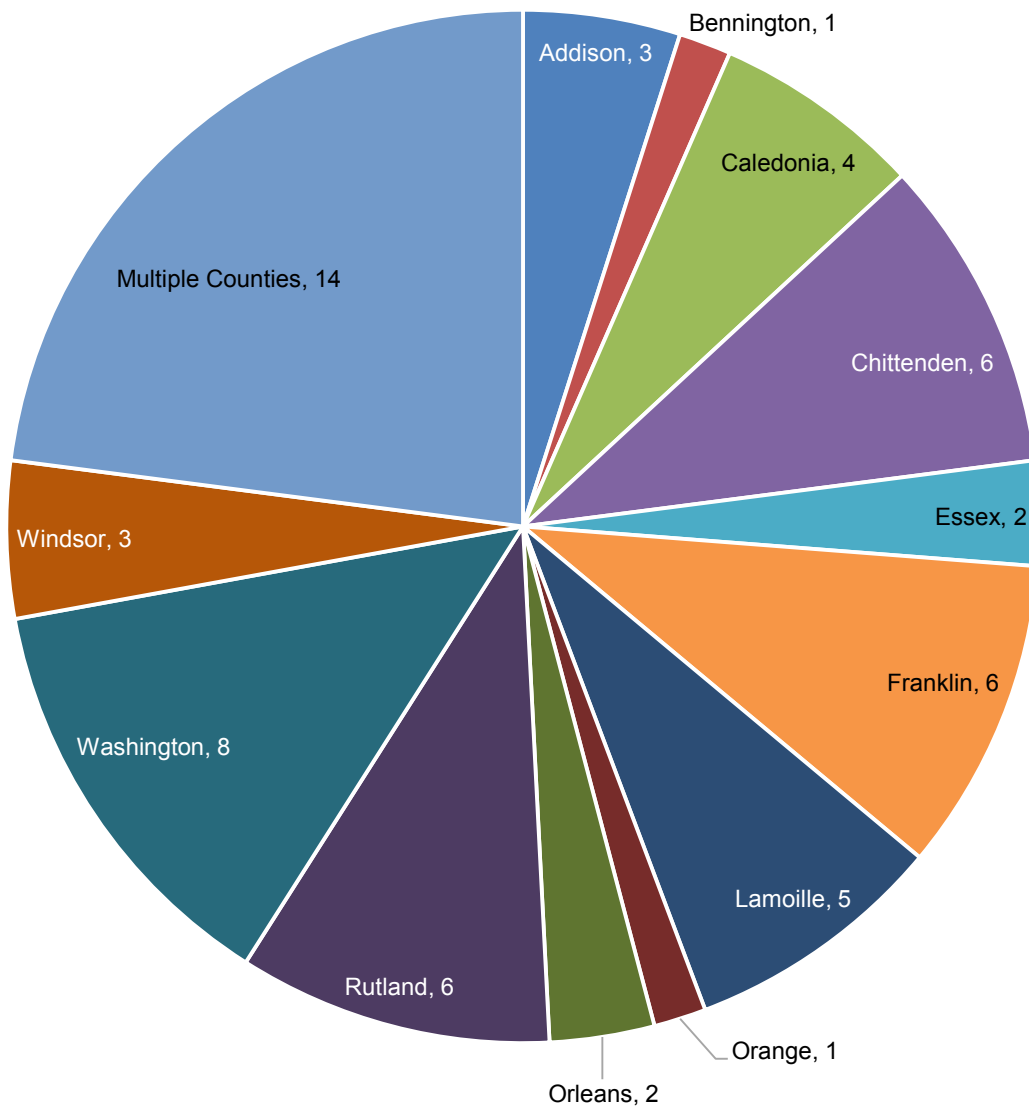


Figure 3. Number of Projects Awarded with SFY2015 Ecosystem Restoration Grant Funds by County²

² The county name is followed by the number of projects funded in that county.

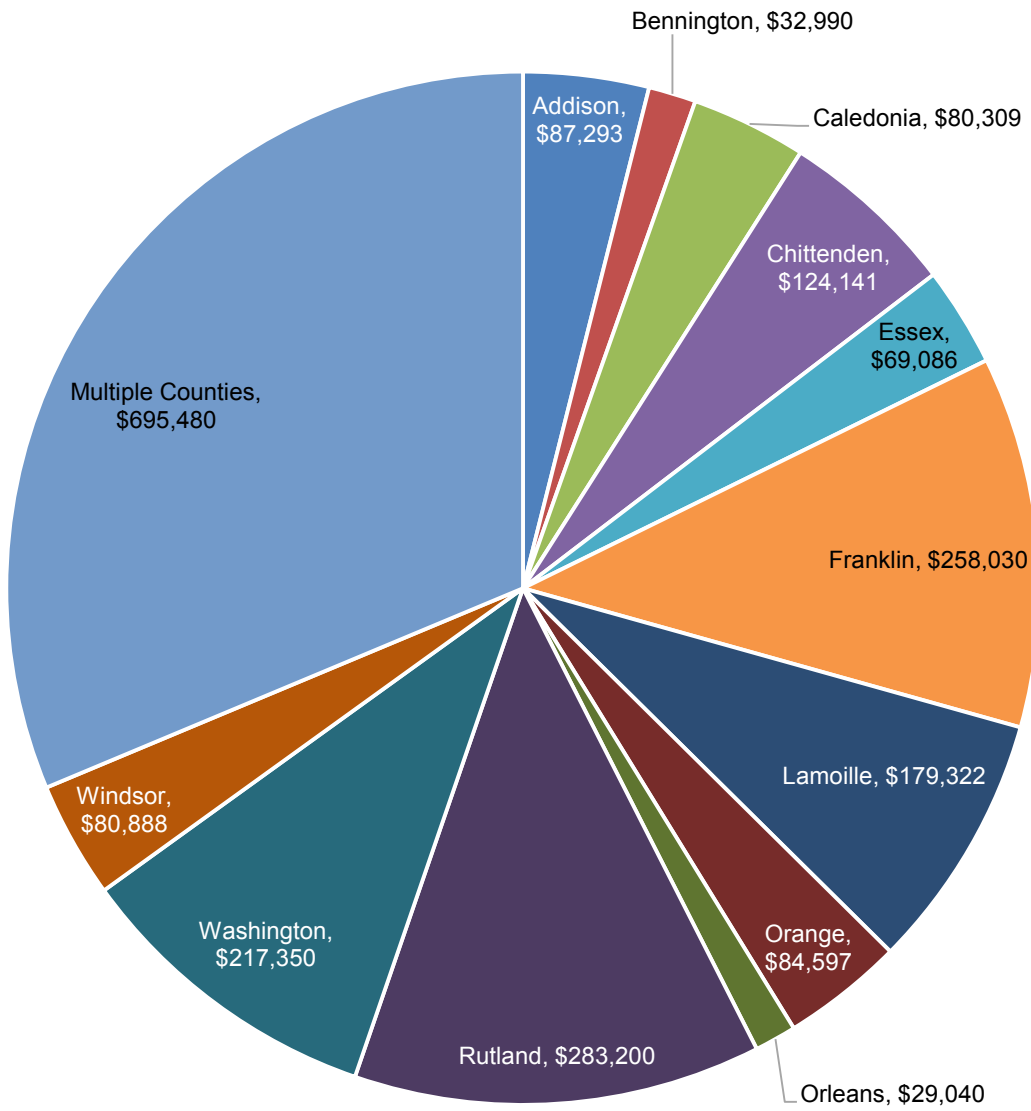


Figure 4. Dollars Awarded with SFY2015 Ecosystem Restoration Grant Funds by County

Figure 5. Map Showing Dollars Awarded with SFY2015 Ecosystem Restoration Grant Funds by Watershed

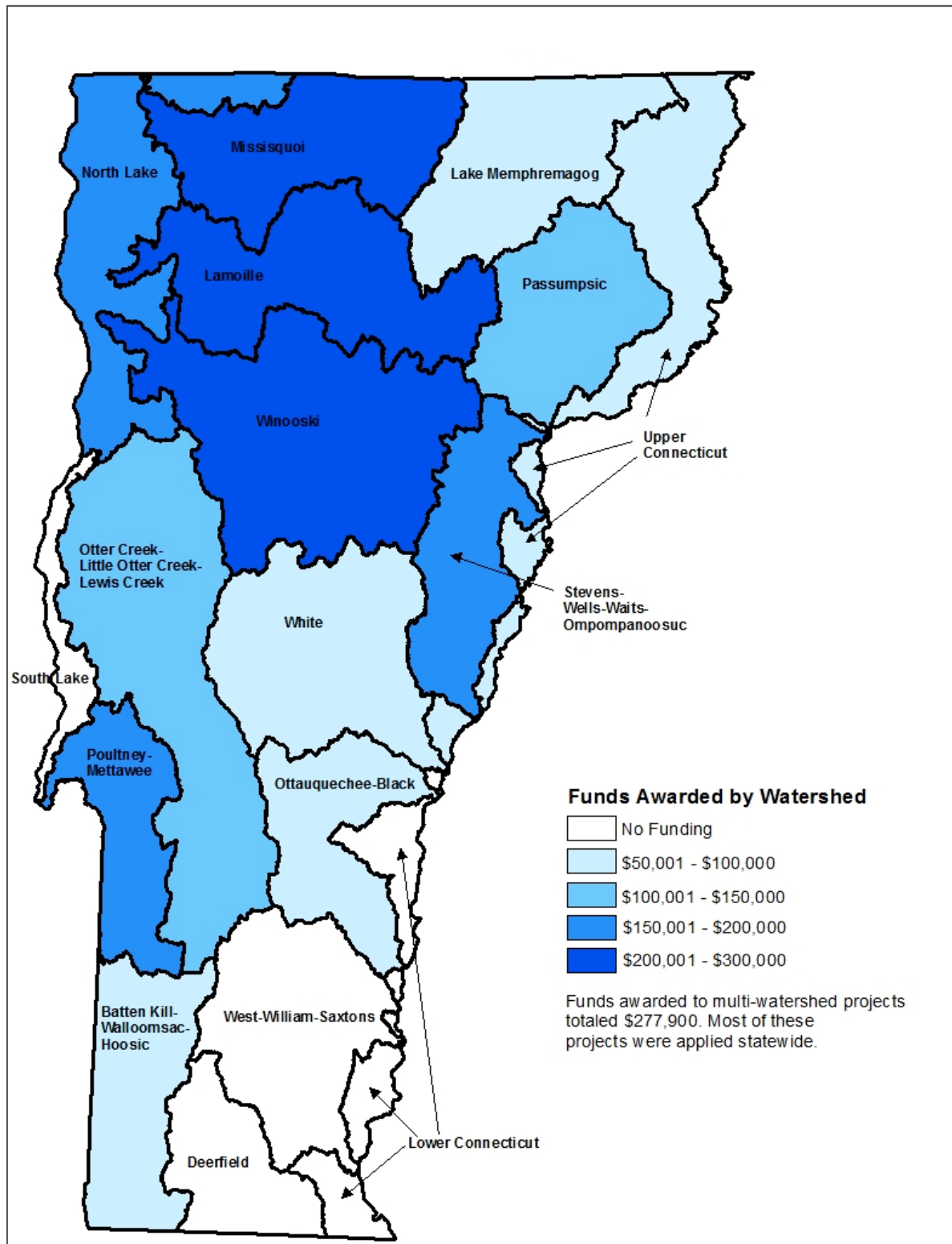
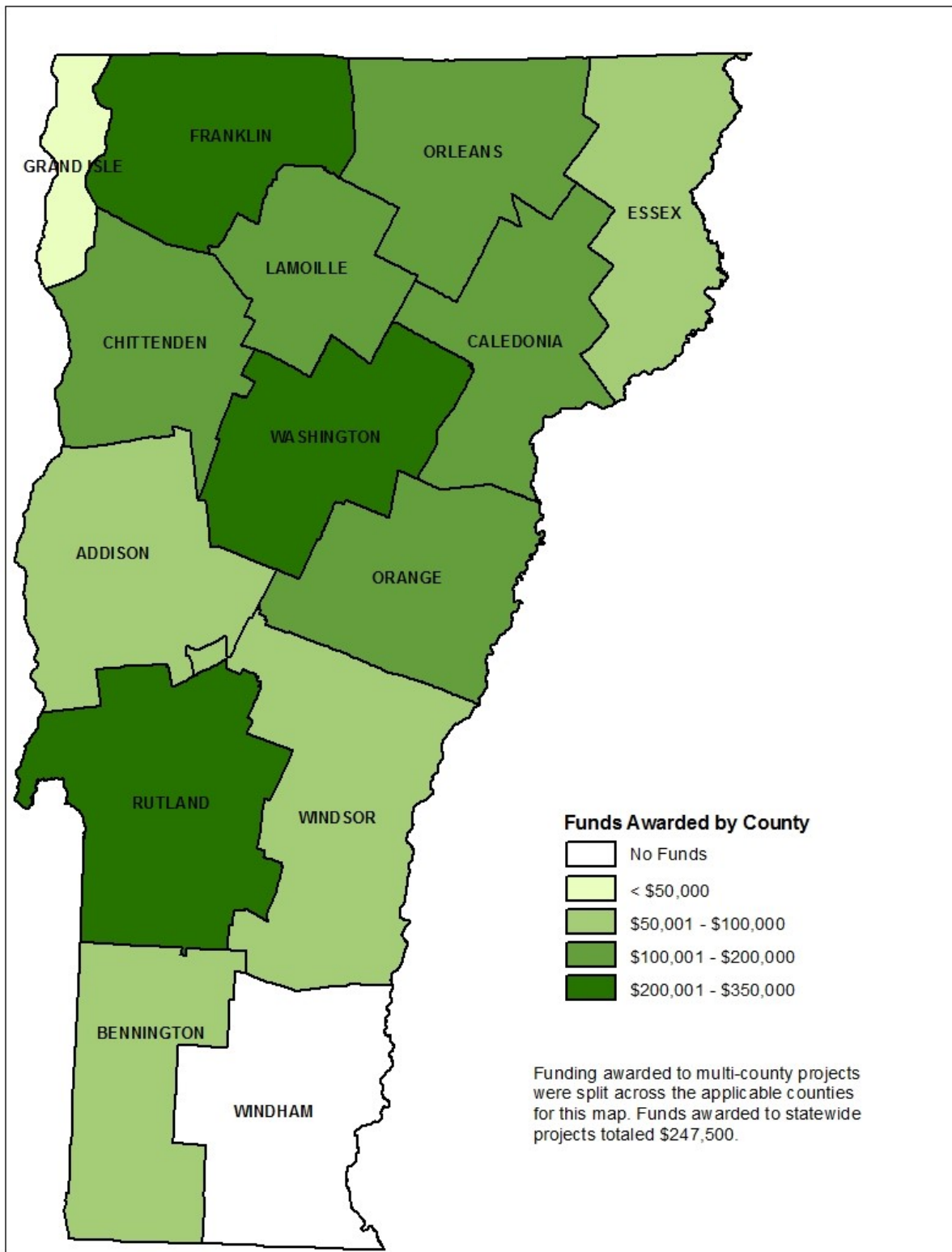


Figure 6. Map Showing Dollars Awarded with SFY2015 Ecosystem Restoration Grant Funds by County



Appendix C: Success Stories

The following selected projects represent types of implementation projects supported with SFY2015 Ecosystem Restoration Grants. These projects are representative of GSI practices to control stormwater runoff from developed lands, road-related erosion and sediment controls, agricultural pollutant runoff prevention, and river corridor and floodplain protection to improve flood resilience and enhance water quality locally.

Project #1: Birds of Vermont Stream Restoration, Town of Huntington, Chittenden County

The Birds of Vermont Museum, in partnership with the town of Huntington, stabilized an actively eroding gully that was caused by a flood in 2013. The flood also destabilized a town road culvert at the site and caused significant road/parking lot erosion near the stream. Construction of the project was completed in summer 2015 and additional planting will occur in spring 2016 to complete the project. This effort reduced a significant sediment/nutrient load to a tributary of the Huntington River. The gully stabilized was approximately 270 feet long and encompassed approximately 0.25 acres.



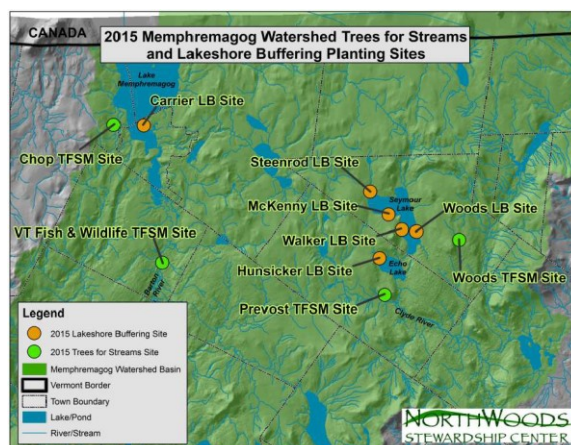
BEFORE – Damage after the 2013 flood downstream of the town culvert at the head of the gully.



AFTER – Restoration work installed summer 2015 downstream of the town culvert at the head of the restored stream. The area will be planted in spring 2016.

Project #2: Phosphorous Reduction in the Lake Memphremagog Basin, Caledonia and Orleans Counties

The NorthWoods Stewardship Center coordinated the implementation of several best management practices to reduce phosphorus in the Lake Memphremagog Basin. In partnership with Beck Pond, LLC, the Center conducted riparian and lakeshore buffer plantings at ten sites, mapped below. Under this project 1,648 trees and shrubs were planted across 4.5 acres of river and lakeshore riparian buffer.



Project #3: Woodlawn Farm Agricultural Runoff Project, Town of Pawlet, Rutland County

The Poultney Mettowee Natural Resource Conservation District worked with the Woodlawn Farm to keep manure out of surface waters. The project involved containing the area where manure from the barn is collected for hauling to the manure pit. Before project implementation, the uncovered area was a source of polluted runoff. The barn also did not have roof gutter downspouts necessary to transport roof water away from the animal housing areas. The improvements made included installing a taller, reinforced concrete wall; connecting the roof gutters via downspouts to underground drainpipes and engineered outfalls away from the barn; and covering the manure scrape-out area with a roof.



BEFORE – Manure handling area before improvements were installed.



AFTER – Manure handling area with roof and containment wall installed to prevent polluted runoff.

Project #4: Regional Hydroseeder Rental Program for Municipalities, Franklin County

The NRPC established a hydroseeder equipment rental program for Franklin County municipalities. Hydroseeders accelerate the planting of vegetation to stabilize soils in roadside ditches and steep side slopes in order to prevent erosion and runoff of nutrient-rich sediment. The equipment rental program provides municipalities with access to the equipment at a low cost. The NRPC provided training to the participating municipalities and is responsible for managing the hydroseeder program. Five towns participate in the program including Fairfield, Georgia, Montgomery, St. Albans Town, and Swanton.



Hydroseeder equipment in use to quickly plant grass in a roadside ditch.



Hydroseeder training provided by NRPC to participating municipalities.

Project #5: Hurteau Property River Corridor Easement, Town of Fairfax, Franklin County

The Vermont River Conservancy worked with landowners to restore 23.7 acres of floodplains along 1,800 feet of the Lamoille River in the Town of Fairfax. The Conservancy will work with the landowner to install and maintain a 100 foot vegetated buffer along the Lamoille River that will provide the river with access to its floodplain. Benefits include enhanced flood resilience and water quality improvements by providing sediment and nutrient storage during flood events.



View of Lamoille River along the Hurteau easement land.

Project #6: Class IV Roads Rehabilitation Project, Town of Elmore, Lamoille County

In the summer of 2015, the Vermont Youth Conservation Corps, in conjunction with the Town of Elmore, worked to address erosion issues by improving drainage on 2,500 feet of Class IV road. Using Better Backroads best management practices as a guide, crews installed 39 drainage structures, which help prevent sediment-laden runoff from entering waterways and, at the same time, improve ease and safety for travel.



VYCC staff assessing drainage issues on Class IV roads.



VYCC crews dig drainage ditches to allow standing water to drain from the roadway.



VYCC crew member deposits backfill into a newly constructed culvert wingwall.



Energy dissipaters installed at the end of an armored drainage ditch.

Project #7: Stormwater Treatment in the LaPlatte River Basin, Town of Hinesburg, Chittenden County

The Lewis Creek Association, in partnership with the Town of Hinesburg, constructed a tiered rain garden on town-owned land at the corner of Route 116 and Silver Street. The area that drains to the rain garden is approximately 6.7 acres, of which 39% is impervious cover. Due to the large impervious cover, this area generates a large volume of stormwater runoff making it a high priority area for stormwater treatment. The rain garden now provides rain runoff storage and infiltration that is expected to remove 87% of sediment and 34% of total phosphorus from stormwater, reducing sediment and nutrient pollution in the LaPlatte River that flows into Shelburne Bay of Lake Champlain.



Rain garden consisted of two treatment cells designed to capture runoff before entering into the LaPlatte River.

Project #8 Agriculture No-Till Drill Equipment Rental Program, Connecticut River Basin, Orange and Windsor Counties

The White River Natural Resources Conservation District purchased a no-till drill and established an equipment rental program for farmers in the Connecticut River Basin. The program will assist farmers in establishing winter cover crops and pasture and hay inter-seeding. These agricultural practices improve soil health and reduce agricultural runoff that may carry nutrients and sediment into waterways. The District held a no-till field day for farmers to learn about no tillage practices, cover cropping, and the new no-till drill rental program. The field day was attended by 17 farmers and technical assistance providers.



No-Till Drill Field Day included a demonstration of the no-till drill equipment.

Project #9: Poultney High School Stormwater Management, Town of Poultney, Rutland County

The Town of Poultney, Poultney High School, and the Poultney Mettowee Natural Resources Conservation District worked together to install three large bioretention/rain garden areas within an existing parking lot at Poultney High School. This project was designed to infiltrate and treat stormwater runoff from the school rooftops and parking lot in order to reduce sediment and phosphorous loading into the Poultney River. The rain gardens treat stormwater from 0.89 acres of impervious surfaces potentially treating over 130,000 cubic feet of stormwater runoff each year.



BEFORE – Poultney High School parking lot before construction of bioretention/rain garden areas (above).



AFTER – Three bioretention/rain garden areas installed to treat stormwater runoff (above and below).



Project #10: Trees for Streams – Riparian Buffer Plantings, Statewide

The Vermont Association of Conservation Districts (VACD) and 7 of the 14 conservation districts are implementing a riparian buffer planting program across the state. VACD and the conservation districts have identified a number of buffer planting sites that will result in 7.3 acres of buffer planted. In addition, the Winooski Natural Resources Conservation District completed another round of riparian buffer plantings in spring 2015. The District planted 2,128 trees and shrubs enhancing 5.3 acres of forested riparian buffer in Washington and Chittenden counties. These buffers, once established, prevent erosion and nutrient-rich sediment from entering waterways, as well as enhance native habitat and floodplain resiliency.



BEFORE – Riparian stream buffer before tree planting.



AFTER – Riparian stream buffer after the tree planting.

Project #11: White Creek Berm Removal, Town of Rupert, Bennington County

The Bennington County Conservation District and the Town of Rupert partnered to remove a berm on White Creek. The berm was a result of dredging sediment out of the Creek after Tropical Storm Irene. At the time, the dredging allowed the Creek to return to its original course and alleviate flooding in the area. The resulting berms, however, remained a source of potential sediment and restricted access to the Creek's floodplain since that storm event. Removal of the berm restored the Creek's access to the floodplain and prevented future erosion of the berm that would load sediment into the Creek.



BEFORE – Berm along White Creek.



AFTER – The bank of White Creek after berm removal.

Project #12: Reducing Road Erosion in the Mad River Valley, Towns of Waitsfield and Fayston, Washington County

Friends of Mad River implemented best management practices to reduce road erosion along three backroads identified in a road erosion inventory including Tucker Hill Road and Kew Vasseur Road in Waitsfield and Center Fayston Road in Fayston. Friends of the Mad River rock-lined and vegetated road-side ditches and shoulders and installed stone around culvert entrances and outfalls. Two of the projects required digging roadside drainage ditches. In the process of installing these practices some roads were slightly narrowed rather than disturbing roadside trees. On the three roads, 2,600 linear feet of treatments were installed.



BEFORE – An eroded ditch on Kew Vasseur Road in Waitsfield sending sediment towards a nearby stream.



AFTER – Ditch was properly sloped and rock-lined to slow water velocity and five feet of the road shoulder was vegetated, leaving trees undisturbed.