

**REPORT ON AGRICULTURAL CLEAN WATER INVESTMENT**

Submitted by  
Vermont Agency of Agriculture, Foods and Markets  
Water Quality Division

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## *A Summary of Agricultural Clean Water Investment Funding and Activities in the State of Vermont*

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## Highlights



**\$1,385,318**  
Invested in Partners



**4,439 Farmers**  
and Agricultural  
Professionals  
Reached



**50+ Agricultural**  
Professionals  
working with  
Vermont Farmers



**344.5 Hours of**  
Education Provided



**135 Agricultural Water**  
Quality Events



**3,211 Acres Enrolled in**  
Farm Agronomic  
Practices



**29 Farms Receiving**  
Water Quality Business  
Analysis



**70 Certified Custom**  
Applicators



**30 Agricultural**  
Professionals with  
Increased Credentials



**270 Certified Small**  
Farm Operations



**9 New Services Offered to Vermont**  
Farmers and **14 Services Expanded**  
to Meet Increased Demand

## Introduction

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The Water Quality Division within the Vermont Agency of Agriculture, Food and Markets (VAAFMM or the Agency) is responsible for ensuring farms meet the State water quality non-point source regulations. The Agency performs this task through the use of regulatory, technical and financial assistance programs provided to farmers and partner organizations. In this effort to reduce nonpoint source loading from agricultural operations, grants and contracts are executed statewide either directly with farms or through organizations and private businesses who provide direct assistance to farmers in meeting the overall water quality goals.

The Agricultural Clean Water Initiative Program (Ag-CWIP) represents the Agency of Agriculture, Food & Markets' effort to reduce nonpoint source nutrient pollution from agricultural land through grant awards for educational programs, innovative phosphorus reduction strategies and technical assistance to agricultural landowners. This goal is furthered through a variety of additional efforts and programs, specifically inspection and enforcement, the Best Management Practice (BMP) Program, the Capital Equipment Assistance Program (CEAP), and more. For purposes of this report, funding for external partners that implement innovative phosphorus reduction activities as well as educational and technical assistance programs for Required Agricultural Practice (RAP) compliance to support efforts to meet State water quality goals, will be addressed. Federal agencies and programs continue to serve a critical role in helping to leverage local and state clean water investments. Federal funds, such as funds from the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), are outside the scope of this report.

While the scope of this report focuses on the Agency of Agriculture's grants, contracts and program activities through fiscal year 2017, the Vermont Clean Water Initiative 2017 Investment Report (2017 Investment Report) summarizes statewide efforts across the Agency of Administration, Natural Resources, Transportation, Commerce and Community Development as well as the Agency of Agriculture, Food and Markets. This report is meant to augment the information reported within the 2017 Investment Report and provide a more detailed description of the grants, contracts, and activities executed through VAAFMM efforts.

VAAFMM's efforts include the continual inspection of Medium, Large and more recently Certified Small Farm Operations for compliance with state water quality regulations including the Required Agricultural Practices (RAPs), Large Farm Operating Permits and Rules, as well as Medium Farm Operation General Permit and Rules. Technical assistance and financial assistance is offered to farm operations as needed and when staff and funding capacity allows to meet or maintain compliance with regulatory standards through Agency staff and programs such as the Best Management Practices (BMP) Program and the Capital Equipment Assistance Program (CEAP).

VAAFMM Water Quality Division has expanded to help meet state water quality goals, and thus VAAFMM supports partners across Vermont to increase efforts to meet state water quality goals as well. Local and regional partners play a vital role in the education, outreach, and implementation of conservation practices that will achieve reductions in nutrient runoff from agricultural operations. Additionally, partners provide a critical link between state agency programs, federal agency programs and landowners. Especially during times of unfortunate economic circumstances for Vermont dairy operations, outreach to farmers about financial assistance opportunities is essential for implementation of conservation practices. Implementation on private agricultural land has unique challenges in comparison with public lands and infrastructure. Changing behavior and attitudes towards conservation practices as well as identifying the causes of nonpoint source pollution through education and outreach is integral. Additionally, education and outreach are essential for understanding, adopting, and maintaining compliance with the RAPs, which require management changes on farms to decrease nutrient pollution from agricultural land.

This report summarizes investments and impacts of agricultural clean water funding provided to partners through fiscal year (FY) 2017, which covers July 2016 through June 2017. Scopes of measures reported include funding invested, hours of education and outreach, attendees reached through education and outreach events, as well as hours of education received by Vermont farmers and agricultural professionals and service providers.

## Funding Invested

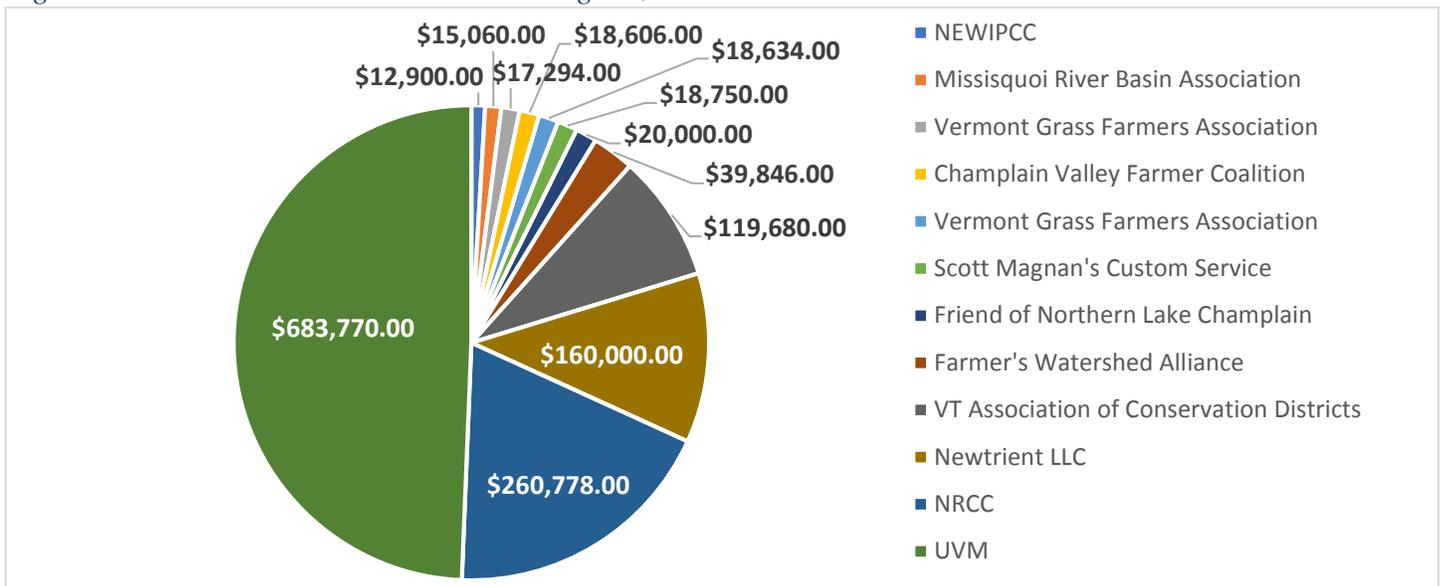


In FY 2017, \$1,385,318 in state funding was obligated for educational, technical assistance programs, and innovative phosphorus reduction activities through Ag-CWIP grants. This funding enabled 47 grant projects to be implemented across Vermont including organizational development for partners working with agricultural landowners and farmers, educational programs to increase awareness and understanding of the RAPs, as well as technical assistance for cost-share programs, best management practices, conservation practice implementation and more. Innovative phosphorus reduction projects were also funded to incentivize innovation and research regarding reduction and prevention of agricultural contaminants entering waters of the State. Figure 1. below illustrates the dispersal of grant funding to 11 partner organizations across the state of Vermont (represented from least to greatest in the clockwise direction).

Educational programs include workshops (both in-field and out of field), stakeholder meetings, and trainings. Technical assistance programs include conservation program enrollment assistance, nutrient management plan (NMP) development and implementation assistance, as well as best management practice and conservation practice implementation. Innovative phosphorus reduction activities include phosphorus reduction technology, practice standard development, market research in the export of phosphorus, and coordinating with labs servicing Vermont to streamline soil test data and explore feasibility of direct data import from labs into nutrient management software.

Agricultural clean water investment is represented by funds for partners comprised of clean water investment funds as allocated by the Clean Water Fund (10 VSA §1389) in combination with additional agency funds. For more information regarding on farm implementation please see the Investments in Implementation section below as well as the Agency of Agriculture’s Annual Report on Financial and Technical Assistance for Agricultural Water Quality.

*Figure 1. VAAFM Investments in Partner Organizations*



## Hours of Education and Outreach

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**344.5 Hours of  
Education Provided**

FY 2017 represents the first complete year of funding for partners through the Ag-CWIP. Substantial work has been employed throughout the entire State to provide education and outreach to the agricultural community on funding opportunities, new and changing regulations, as well as actions to improve water quality. While a few of these grant awards were executed in September of 2016, the majority of the funding was awarded in May of 2017. As agricultural water quality programs are augmented and developed, partner organizations are finding better success in their outreach and technical assistance efforts. In total for FY 2017, 19 workshops, trainings, and stakeholder meetings were provided to the agricultural community through the Ag-CWIP grants and contracts, providing 47.5 hours of education on water quality to 537 attendees. Collectively, 1,183 hours of education and outreach was received by attendees of these events in FY 2017.

From July 1, 2017, through January 1, 2018, which is the first half of FY 2018, Ag-CWIP programs educated farmers and the agricultural community with 23 events, providing 68 hours of education to 765 attendees. Collectively, 3,193.5 hours of education and outreach on water quality were received by farmers and the agricultural community as a result of grants and contracts funded in FY 2017 through Ag-CWIP.

In addition to the hours of educational and outreach events provided through grants and contracts to partners, Agency staff also provide education and outreach directly. The education and outreach efforts provided directly by Agency personnel in FY 2017 represent a total of 229 hours of education provided to the agricultural community with 3,137 attendees at 93 events. This resulted in a total of 13,111 hours of education received by the agricultural community through FY 2017 as direct education and outreach from Agency staff.

In combination, the education and outreach efforts provided by Agency personnel as well as by Partners through Ag-CWIP from funding awarded in FY 2017 represent a total of 344.5 hours of education provided to the agricultural community through 135 events. This results in a total of 17,487.5 hours of education received by the agricultural community through FY 2017 grants and contracts as well as direct education from Agency staff.

Events included topics such as conducting outreach about soil health and its impact on water quality, requirements for farmers in the RAPs, informing small farms how the RAPs or local jurisdiction affects them, business planning for pasture health and quality, cover cropping, informing farmers about rules regulating wetlands, educating municipalities about jurisdiction over non-RAP operations, No Till Roller Crimping in action, and much more.

## Extent of Outreach

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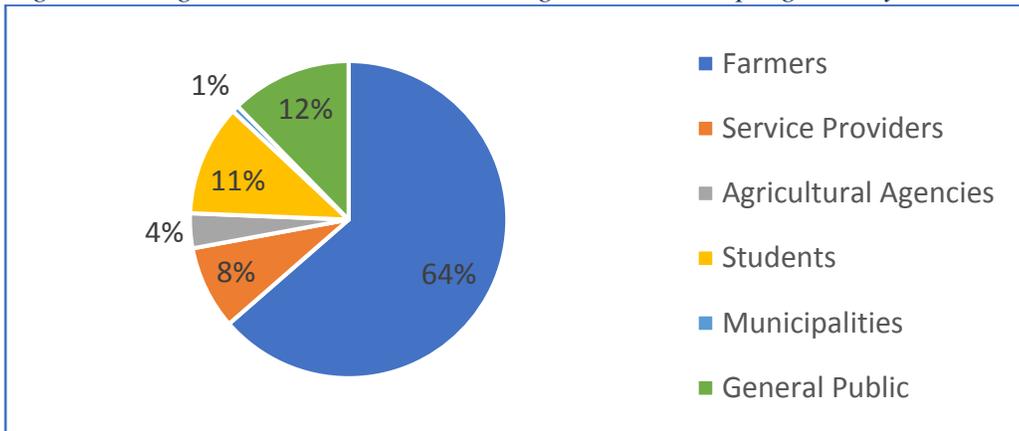


**4,439 Farmers and  
Agricultural  
Professionals Reached**

Education and outreach events made possible by Ag-CWIP FY 2017 grants and contracts reached at least 1,302 attendees within the Vermont agricultural community. Regarding events provided through Ag-CWIP recipients, the majority (64%) of events targeted farmers, 12% targeted the general public, 11% targeted students, and 8% targeted agricultural service providers including Custom Manure Applicators. Other events targeted municipalities, which includes town officials, and agricultural agencies, which includes the United States Department of Agriculture (USDA).

One of the state funding priorities for the Clean Water Fund as outlined in Act 64 Sec. 37 (10 VSA §1389) are to provide education and outreach regarding the implementation of water quality requirements. In regard to addressing agricultural water quality impact; education and outreach is focused on the implementation of the RAPs as well as financial and technical assistance to support farmers in RAP compliance. The goal of educational programming is not to reach only farmers, but to reach the people who interact with farmers such as service providers and agricultural agencies, as well as the general public. While farmers are the main target audience for Ag-CWIP education and outreach, educating agricultural professionals about how they can better advise farmers regarding water quality concerns as well as cost effective solutions for mitigating impacts is required to make any reasonable change across Vermont farmland. Outreach to these groups is important. It is also important to keep the public engaged for broader support of the state’s clean water efforts.

Figure 2. Target audiences reached through educational programs by attendees.\*



\* If events recorded had more than one type of audience group, i.e. farmers and service providers, 10% of attendees were attributed to the secondary targeted audience, while 90% of attendees were attributed to the main target audience, farmers. If an event had more than three types of target audience group then 80% of attendees were attributed to the focus group and 10% each to other target

A combination of direct outreach provided by Agency staff in FY 2017 as well as education and outreach made possible by Ag-CWIP FY 2017 grants and contracts, results in a total of 4,439 farmers and agricultural professionals reached through education and outreach efforts as a result of clean water funding.

In addition to the outreach provided through events such as public/stakeholder meetings, workshops, and trainings, VAAFAM engages in direct outreach with agricultural producers and the Vermont agricultural community through a monthly newspaper that is provided complimentary to 3400 Vermont farmers. Agriview provides a platform for relevant reminders about water quality regulations throughout the different seasons, notices of upcoming funding opportunity deadlines, and technical and financial resources available to Vermont producers, delivered right to farmer’s doorsteps. Many older generation farmers do not have emails, and some do not have access to computers. In addition, farmers face extraordinary pressures of time management and limited resources, financial and personal, to complete their seasonal activities that generally can restrict their off farm educational activities.



Agriview is available as an online or print newspaper complimentary for Vermont producers and available to the general public with a small annual subscription price. For more information visit [http://agriculture.vermont.gov/news\\_media/agrivi ew](http://agriculture.vermont.gov/news_media/agrivi ew).

## Development of Organizations

Through the Agency’s Ag-CWIP funding, organizational development funds were granted to 14 recipients. These funds support local organizations across Vermont to promote increased organizational capacity and long-term effectiveness when working to help farmers understand and implement innovative farming practices to improve water quality. It is crucial that partners across Vermont increase their capacity to implement agricultural water quality programs to meet State water quality goals. Additionally, the increased number of farm operations that are now required to be inspected under Act 64 for compliance with the RAPs, an estimated 800 Certified Small Farm Operations (according to the 2012 USDA Census of Agriculture), creates an increased amount of private agricultural landowners in need of education and technical assistance.

Organizational Development projects include additional staffing, expansion of existing programs, development of collaborative partnerships, strategic planning and/or program development, equipment necessary for implementing educational and technical assistance programing, and staff trainings to improve organization effectiveness.

As a result of this funding, 9 new services are offered to the Vermont agricultural community including web-based software with increased mobile capabilities for planning and updating NMPs, expansion of educational programs to watershed residents, portable scales to weigh manure spreaders and harvest to improve NMP accuracy, and more. In addition to new services offered, 14 services have been expanded across the State, including program coordination, water sampling program expansion, membership management, educational materials to expand programming offered, and more.

Within FY 2017, a total of 7,176 hours of additional staff time was enabled through organizational development funding including an AmeriCorp service member, program coordinators, and an executive director. Increased credentials were obtained by 30 staff members as a result of organizational development funds through Ag-CWIP, including trainings on farm systems, erosion potential, regulatory requirements, and more.

Number of New Services Offered	Number of Existing Services Expanded	Number of Existing Staff with Increased Credentials	New Staff hours
9	14	30	7176

## Projects Funded:

Agricultural Clean Water Initiative funding is for local and regional partners, for organizational development, education and outreach, as well as innovative phosphorus reduction activities in order to reduce agricultural nonpoint source loading to waters of the State. Through the Ag-CWIP in FY 2017, 47 grant projects have been funded. A complete list of funded projects is available as Attachment A., while examples of projects funded in FY 2017 include:

**Development and Delivery of Manure Certification Curricula:** \$60,000.00 in grant funding was awarded to University of Vermont (UVM) Extension for the development of the Custom Applicator Certification Program. The RAPs require custom applicators of manure be certified by the Secretary to operate within the state of Vermont. This grant project developed the curriculum and implemented the educational trainings and examinations for the inaugural custom applicator certification program. As part of this project, three certification trainings were held for custom applicator owners/operators - totaling 105 employees in 56 businesses from three states (VT, NH, and NY). Additionally, five workshops were held to train seasonal employees of custom applicator operations and farmers, totaling 125 people in attendance. In December, a total of 73 custom applicators were certified after satisfactory completion of their

examinations. The following figures represent challenges encountered by Custom Applicators in their work, beliefs Custom Applicators hold regarding water quality, as well as relative occurrences of farmer/client providing spreading recommendations from farm Nutrient Management Plan (NMP) (See figures 3-6 below). Figure 3 shows that the biggest challenges for custom applicators complying with RAPs are weather, getting application rates from the client/farmer, and following recommended application rates. Weather can impede timely applications in ideal soil and weather conditions. Weather, in conjunction with not receiving rates from farmers, makes it difficult to adequately determine application rates. The issues that presented the least challenge were cost of compliance, adhering to setbacks, and staff. These responses indicate that, for custom applicators, complying with RAPs is not cost prohibitive and that staff are willing to comply as well. Figure 4 shows that more than 70% of custom applicators agree or strongly agree that manure applications can impact water quality and that water quality is important. One reason that some applicators may disagree with statements in Figure 4 is that custom application of manure is not the sole issue that contributes to water quality.

Figure 3. Challenges to RAP Compliance for Custom Applicators

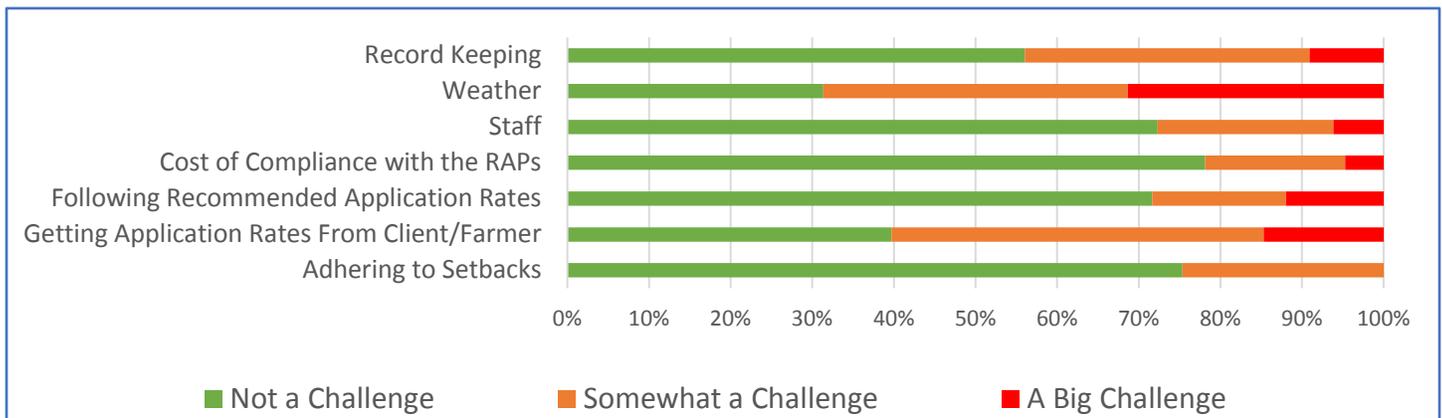


Figure 4. Custom Applicator Beliefs About Water Quality

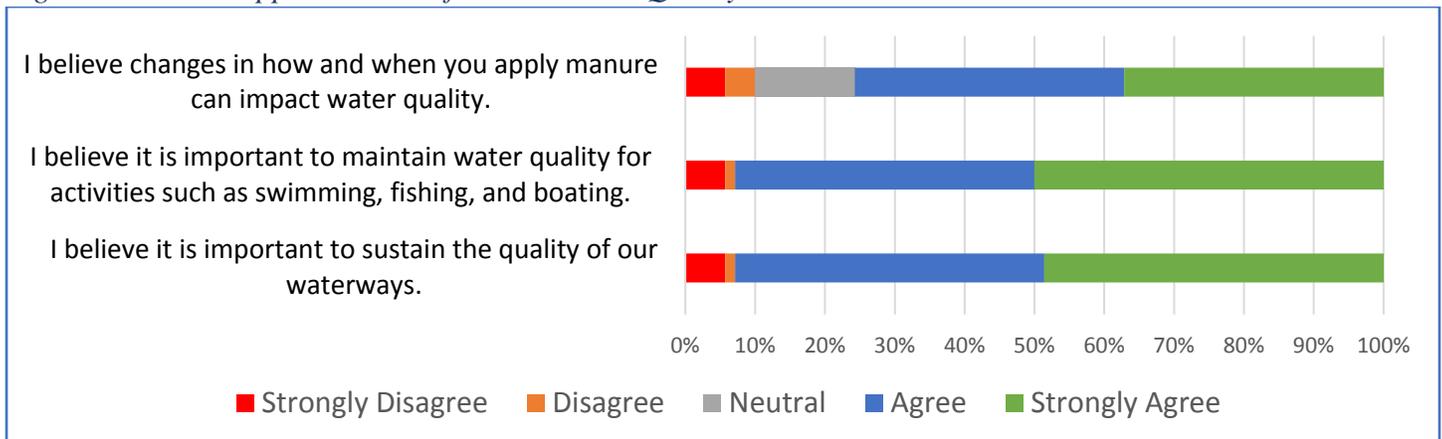
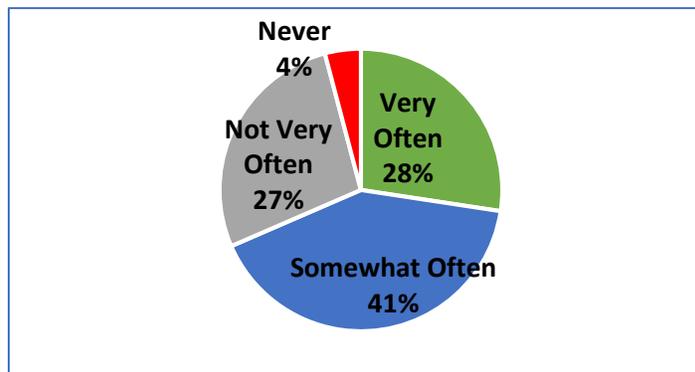


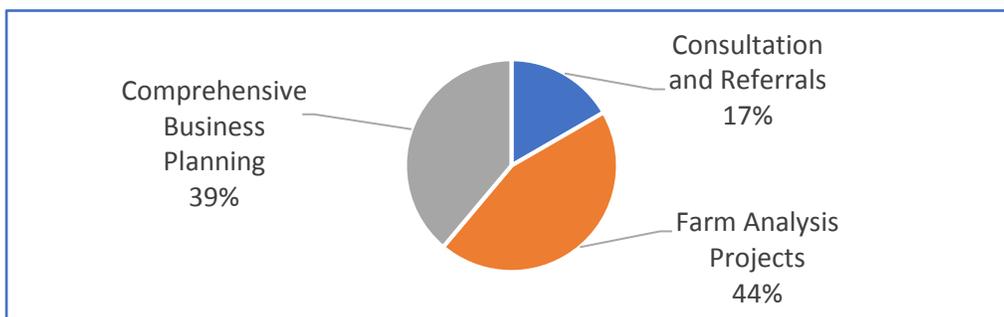
Figure 5 below represents how often the farmer/client provided spreading recommendations from their NMP,” (n=73) most respondents (41.1%) checked “somewhat often.” There was an equal number of responses (27.4%) for “very often” and “not very often.” A minority of respondents (4.1%), checked that they never got NMP recommendations. These answers represent a gap that should be filled by non-custom applicators: encouraging farmers and stressing the importance to the farmer of providing custom applicators with NMP recommended rates. One respondent wrote that they declined to spread manure because of “field conditions, not run-off.”

*Figure 5. Relative Occurrence of Farmer/Client Providing Spreading Recommendations from Farm Nutrient Management Plan*

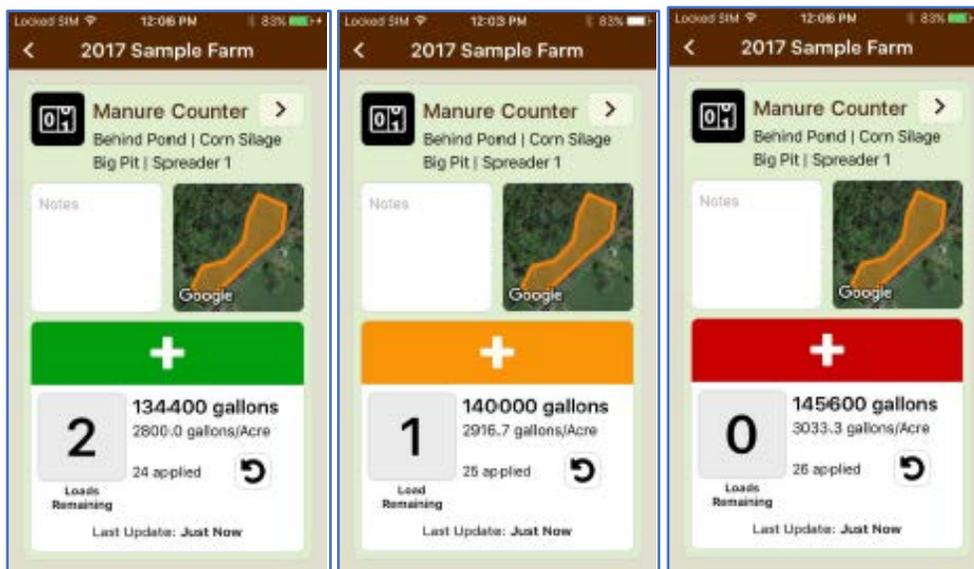


**Farm Business Technical Assistance and Outreach Education:** \$105,000.00 in grant funding was awarded to UVM Extension to offer business planning, analysis and education to Vermont farms working to make changes to meet water quality goals. The work to date has demonstrated that providing introductory business and financial analysis assistance is a good entry point for farm owners planning for short term changes to the business. Very often, the initial analysis is prompting the farm owners to consider mid to long term planning topics that integrate water quality outcomes with the future business outlook. Longer term profitability analysis is proving to be very important to owners considering the adoption of new farming practices. The addition of new capital investments prompts planning for farm succession within families. 29 Vermont farms have received water quality business planning or analysis as a result, ranging from consultations and referrals (17%), which may entail phone consultations, general business information, and referrals to service providers or agencies, to farm analysis projects (44%), which may entail consultation and referral activities in addition to farm visits to conduct analysis and continued consultation, to comprehensive business planning (39%), which entails several consultations, cash flow analysis, grant application assistance, strategic planning, project management and coordination, as well as referrals. See figure 6 below for the level of business analysis provided through this program as well as the percentage of farms who receive each level of business analysis.

*Figure 6. Level of Business Analysis*



**Modify goCrop Tool, Improve Record Keeping and Implementation of NMPs:** \$56,000.00 in grant funding was awarded to UVM Extension to continue regular maintenance, improve general functionality, and enhance specific goCrop features. goCrop is an integrated web and mobile application that helps farmers plan, analyze and report nutrient management practices efficiently. As part of this grant award, robust reporting mechanisms were created to facilitate farmer NMP implementation, such as a Planned Manure Application Report and a Planned Fertilizer Application Report. Additional updates to the integrated application include improvements to the user interface, ease of record keeping, and ability to see a real-time balance of field nutrients based on records entered to date. Programming also included development of the Nutrient Mass Balance (NMB) which is based on Cornell's whole Farm Nutrient Balance Calculator and provides a comprehensive review of all nutrients that enter and exit the farm. The images below illustrate the record keeping updates. Users can enter records immediately after logging into the app, from any page within the app, from the field record page, and by utilizing the manure or harvest load counter. The manure counter tracks total number of loads applied, calculates the rate in real time, and changes from green to orange to red as the application reaches its target.

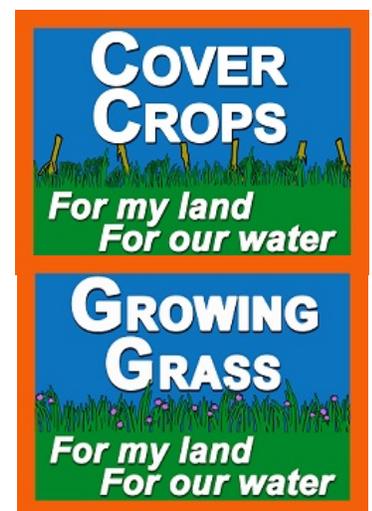


*Nutrient Load Record Keeping on goCrop mobile application.*

**Natural Resource Conservation Council (NRCC) Clean Water Projects:**

\$260,778.00 in grant funding was awarded to the NRCC for sub-grants to 12 individual Natural Resource Conservation Districts (NRCD) across the state of Vermont. Grant funding was awarded for education and outreach, organizational development, and innovative phosphorus reduction activities. As of January 1, 2018, 94.5 hours of education have been provided through this grant, with a total of 163 farmers reached through educational efforts. Educational efforts include workshops, events, and farm visits to educate the agricultural community about the Required Agricultural Practices (RAP), financial and technical assistance resources available, as well as management practices to reduce nonpoint source agricultural runoff.

Within NRCC Clean Water Projects, \$19,943 in grant funding was awarded to Franklin County NRCD for reducing phosphorus loading through education and outreach in the dairy capitol of Vermont. This grant project reduces phosphorus loading through five solution-oriented outreach strategies; development of two novel brochures to explain key aspects of the nutrient management planning process, two large public workshops for wetland compliance and tree planting, development of a peer reference system for farmers implementing water quality protection practices, roadside signs that advertise effective



*Examples of Franklin NRCD roadside signs to advertise effective water quality protection.*

water quality protection measures to increase public engagement and outreach for conservation practices, and four specific water quality meetings targeted to new audience groups such as women or young farmers to promote innovation and water quality stewardship as an economic opportunity.

Also within NRCC Clean Water Projects, \$17,048 in grant funding was awarded to Orleans County NRCD to develop an online RAP quiz to engage agricultural operators in an effort to improve the quality of waters of the state and to meet RAP water quality educational credit requirements. This project launched an innovative, interactive and fun online educational resource, the Vermont Required Agricultural Practices (RAP) Quiz, allowing farmers statewide to accomplish water quality training from their home, at their own pace. With any audience meeting them where they are at is an important part of an effective educational program, farmers face extraordinary pressures of time management and limited resources, financial and personal, to complete their seasonal activities that generally can restrict their off farm educational activities. This engaging online quiz explains the most important and confusing topics in the new RAPs through interesting photos, videos and fun facts. All this while providing relevant resources to help farmers meet state regulations and implement farm management practices for soil health and water quality. The quiz is available on the Vermont Association of Conservation Districts webpage (<https://www.vacd.org/rapquiz/>).



### Missisquoi River Basin Association AmeriCorps Host Site Support:

\$10,360.00 in grant funding was awarded to the Missisquoi River Basin Association to host an AmeriCorps service member to provide support for a range of water quality projects: help design and deliver new educational programs, deliver programs to local schools and community groups, as well as provide project assistance and conduct follow-up visits to previous conservation project sites. Heather Murphy began her AmeriCorps service with MRBA on September 11, 2017. In addition to the operational support she provides for MRBA, Heather has been conducting site visits to past MRBA projects, engaging in project monitoring and data collection to streamline project implementation record keeping.

*AmeriCorp service member Heather Murphy planting trees with MRBA.*

### Newtrient LLC:

\$160,000 in grant funding was awarded to Newtrient to research and develop market opportunities for trading extracted Phosphorus, development of an interim conservation practices standard for installation of phosphorus reduction technologies, as well as developing the phosphorus trading protocol to equitably quantify phosphorus reductions for a market exchange. Newtrient is a private company that was formed in 2015 by 12 leading dairy cooperatives as well as Dairy Management, Inc. and the National Milk Producers Federation. Newtrient was created to address some of the most challenging environmental issues facing the industry with the overarching goal of reducing dairy's environmental footprint.

Newtrient's approach has been centered around the development of a market-based mechanism (as one tool) to drive water quality improvement in the Lake Champlain Basin. The tool is known as the Environmental Services Marketplace ("ESM"). The ESM seeks to optimize resources to enhance environmental benefits with verified and certified low-cost reductions (e.g., dairy farms employing practices and/or technologies) to ensure known regulatory outcomes (see image below). The result is water quality improvements, reduced tax payer burdens, and the economic certainty necessary to drive the adoption of farm-based sustainable practices and technologies.



Newtrient’s work includes the development of a phosphorus protocol for translating farm practice to water quality benefit. The protocol, which will use an APEX-based model, is the “math” behind quantifying the reduction in phosphorus losses to surface waters in the basin resulting from the adoption of practices and/or technologies. The APEX-based model represents the key to a scientifically defensible outcome. Considered in aggregate, the protocol and clearinghouse form the underpinnings of the ESM (see image left).

*Environmental Services Marketplace model used by Newtrient in designing innovative Phosphorus market solutions.*

## Investments in Implementation

Funding made possible through the Clean Water Act prescribes funding for education as well as implementation. State clean water fund priorities allocate funding for addressing sources of water pollution as stated in Act 64 Sec. 37 (10 VSA §1389). The Agency is fully engaged in conservation practice implementation to address sources of water pollution through a variety of programs including the Best Management Practice (BMP) Program, the FAP Program, the Capital Equipment Assistance Program (CEAP), as well as the Conservation Reserve Enhancement Program (CREP).

Total State expenditure on the construction of BMP practices in FY 2017 amounts to \$1,131,778.21. Investments totaling \$32,968.95 in State funding was paid as incentive payments for the implementation of CREP projects. Through the CREP Program, every state dollar leverages \$4.95 federal dollars for planting riparian forest buffers along Vermont’s waterways, and compensation to farmers for removing this environmentally sensitive land from agricultural production. Through the Agency’s CEAP program, \$9,466.18 in grant funding for innovative equipment was awarded to one farmer in Missisquoi Bay for the purchase and installation of a flow meter to be utilized in conjunction with GPS technology. Additional information regarding these programs as well as state, federal and private funds invested for the BMP Program, CREP and CEAP programs are available in the Agency’s Annual BMP Program Report available here

<http://agriculture.vermont.gov/sites/ag/files/VAAFAM-Annual-Report-On-Financial-and-Technical-Assistance-For-Agricultural-Water-Quality-FY2017.pdf>.

In addition to the programs mentioned above, the Agency has obligated FY 2018 funds for additional programs that have been developed for conservation practice implementation, as well as research and monitoring.

### Pasture and Surface Water Fencing (PSWF) Program (\$149,824.00)

PSWF Program provides pasture management technical assistance to Vermont farmers to improve water quality and on-farm livestock exclusion from surface waters statewide. Administration of the Program, as well as technical assistance, has been contracted to the University of Vermont Center for Sustainable Agriculture. The goal of this contract is to provide technical service to farms that cannot, or choose not to, meet the requirements of other programs that promote livestock exclusion from surface waters, such as CREP and EQIP, and to provide pasture management assistance where water quality benefits can be realized from improved management.

## Grassed Waterway and Filter Strip (GWFS) Program (\$150,000.00)

GWFS Program was developed in accordance with legislative direction as outlined in 6 V.S.A. § 4900. This Program compensates farmers via incentive payments for participation and cost-share to cover 90% of the installation costs for establishing perennially vegetated grassed waterways and filter strips and associated infrastructure (e.g. erosion or grade control structures), if necessary on agricultural cropland adjacent to surface waters and ditches (6 V.S.A. § 4900). Administration of the Program, as well as technical assistance, has been contracted to the Vermont Association of Conservation Districts and the Farmers Watershed Alliance of Franklin and Grand Isle Counties. Program's goal is to reduce soil erosion and improve soil and water quality on cropland that contributes a disproportionately high level of nutrients in runoff. Such areas of cropland are considered "Critical Source Areas" (CSAs), representing a small proportion of the landscape yet a high proportion of nonpoint source pollution loads. Practice implementation as well as incentive payments will be made through the BMP Program.

## Subsurface Tile Drain Sampling and Analysis Services: (\$99,999.00)

These sampling and analysis services for subsurface tile drainage systems have been contracted to the Franklin County Conservation District and sub-contracted to the Vermont Association of Conservation Districts, University of Vermont Extension, and Poultney, Winooski, Otter Creek, and Orleans Natural Resources Conservation Districts. The main focus of these services is data collection from tile drains geographically dispersed on farms throughout the State. This data will help the State understand the effects of field management and conservation practices on nutrient loss from drainage systems and inform scientifically based and thoughtful decision making. These services are set to begin in January 2018, and in some instances – began in December 2017, and last for the duration of the year with the intent to renew if available funding exists.

## Farm Agronomic Practices (FAP) Program

In FY 2017, \$76,575.39 in grant funding was awarded to 24 farmers for the implementation of farm agronomic improvements. The FAP Program is a voluntary financial assistance program that helps Vermont farms implement soil-based agronomic practices that improve soil quality, increase crop production, and reduce erosion and agricultural waste discharges. Thus, agronomic improvements made by farmers through external funding programs or out of pocket are not represented through FAP Program implementation results.



**3,211 Acres**



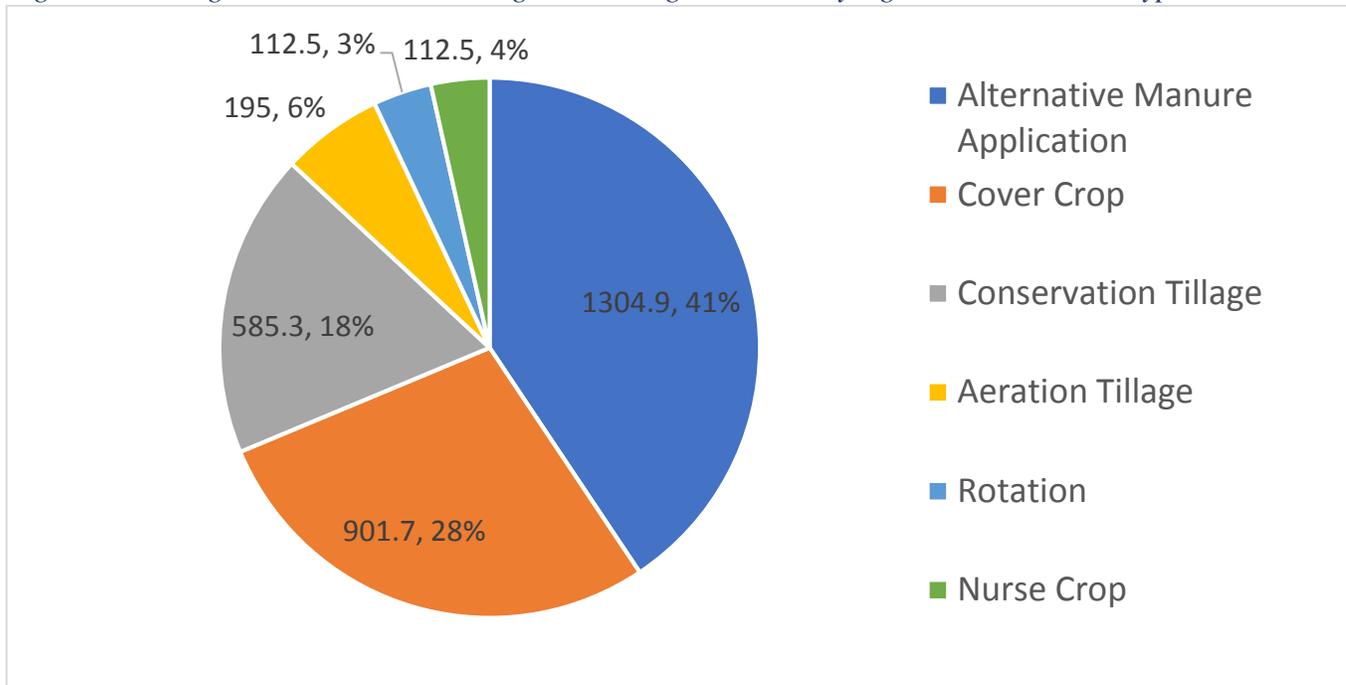
**\$76,575  
Invested**



**24 Farms**

On average, State investments in the FAP program averaged out to \$23 per acre for annual agronomic practices. Figure 8 below illustrates the different types of practices funded through the FAP program, and the implementation of each practice based off of acreage. Through FY 2017, the majority of acreage (41%) enrolled in FAP was for alternative manure incorporation, or subsurface injection. Subsurface injection is when liquid manure is placed at or below the soil surface and incorporated into the soil profile, which reduces risk of nutrient runoff or volatilization.

Figure 7. Acreage Enrolled in FAP Program Through FY 2017 by Agronomic Practice Type



The FAP Program also provides education and instructional activity grants to support nutrient management and general outreach regarding the impacts of agricultural practices on water quality and current State agricultural water quality regulations. Through FY 2017, a total investment of \$11,500.00 was awarded to three grant recipients; UVM Extension, Friends of Northern Lake Champlain Inc., and Scott Magnan Custom Service.

## Looking Ahead

### Agricultural Clean Water Initiative Program Grants

Proposals were due January 10, 2018 in response to a request for proposals that opened November 17, 2017 for Ag-CWIP grants, with eligible activities including education and outreach, technical assistance, and more. Approximately \$1.4M has been earmarked annually for this grant funding opportunity for partners. The Agency aims to fund larger programmatic proposals that support RAP implementation and nonpoint source pollution reduction, as well as economic and environmental viability on Vermont Farms.

The Agency is currently piloting additional social measures to quantify the impact of education, outreach, and technical assistance in changing behaviors, knowledge and understanding, as well as implementation of best practices. Efforts include post event evaluation by attendees as well as post-event follow-ups, technical assistance exit interviews, focus groups, and more. These measurements will provide consistent statewide indicators for future reporting.

### On Farm Implementation Programs

Since the Vermont Clean Water Act passed in 2015 followed by the RAPs in December of 2016, the Agency is operating at new program capacity and enforcement levels enabling the development of new and existing programs. There is an estimated 400% increase in farms receiving regular inspections statewide with launch of the Certified Small Farm Operation Program. Through Ag-CWIP, local conservationists, extension agents, farmer watershed groups, and community organizations across Vermont are providing education, outreach and technical assistance to assist in state efforts to meet water quality goals and achieve RAP compliance for improved water quality statewide. As these grant

recipients educate producers statewide, research innovative solutions, and work with operations to implement on farm conservation practices, the Agency has expanded programming for on farm implementation financial assistance.

Two new on farm implementation financial assistance programs have been developed, the GWFS and PSWF Programs, in addition to a soil health certification program, the Vermont Environmental Stewardship Program (VESP).

Vermont Environmental Stewardship Program (VESP) is a voluntary program that encourages and supports local agricultural producers to achieve environmental and agricultural excellence. VESP's goal is to accelerate water-quality improvements through additional voluntary implementation efforts, and to honor farmers who have already embraced a high level of land stewardship. Using a combination of on-farm natural resource assessments and Cornell soil health tests, VESP applicants will be evaluated by a team of conservation planners and technical service providers to ascertain current land-use practices. The resulting data is used to set customized environmental goals for the farm, and to enact a long-range plan encompassing a full range of regenerative farming practices. To be certified under this new program, applicants must meet high environmental standards regarding nutrient management, sediment and erosion control, soil health, greenhouse-gas emissions and carbon sequestration, and pasture health.

Upcoming investments are planned for staff support and capacity for the VESP Program, implementation of projects brought forward through the GWFS and PSWF programs, in addition the continued efforts of the BMP, CREP, CEAP, and FAP programs.

### Planning, Development and Research

As partner organizations statewide increase their capacity to deliver agricultural water quality programs, coordination and synergy across state and federal agencies, extension, and community organizations is essential in making progress towards state water quality goals.

The Vermont Agricultural Water Quality Partnership (VAWQP) is dedicated to collaborating with and supporting agricultural producers in their efforts to improve water quality. VAWQP is comprised of the agencies and organizations that signed the Lake Champlain Memorandum of Understanding (MOU) in January 2012. The Partnership seeks to accelerate improved water quality by collaborating to provide outreach, education, technical and financial assistance directly to agricultural producers with respect for each partner's vision, role and capacity. The MOU partners currently includes USDA Natural Resources Conservation Service, USDA Farm Service Agency, Vermont Association of Conservation Districts, United States Fish and Wildlife Service, University of Vermont Extension, Vermont Agency of Natural Resources Department of Environmental Conservation, Vermont Agency of Agriculture, Food and Markets, Vermont Housing and Conservation Board and Lake Champlain Basin Program. This partnership is currently developing a strategic planning process and action plan for VAWQP to be supported and funded through VAAFM.

The Agency filed a proposed amendment to the Required Agricultural Practices (RAPs) Rule with the Vermont Secretary of State. This amendment was filed pursuant to 6 V.S.A. §4810a(b), which required the Agency to amend the RAPs to include requirements for reducing nutrient contribution to waters of the State from subsurface tile drainage. In addition to revising regulatory requirements for subsurface tile drainage the Agency will continue to expand tile drain research across Vermont to better understand the potential nutrient contribution of subsurface tile drainage to waters of the state.

As economic uncertainty surrounds the dairy industry in Vermont, and production area improvements can occasionally outweigh a farm's resale value, the Agency is exploring alternative financial assistance opportunities to ensure farms are provided with a variety of options to address the pollution challenges. The term "buy out" has been used to describe this effort, however that term is incorrect and misleading. What the Agency is working on in partnership with other organizations is making sure that sound investments are made that fit within the farm's goals. These options, in very specific circumstances based on water quality benefits and overall project costs and risks, is to implement best practices such as easements to protect sensitive areas on the farm in lieu of the traditional conservation practices which would have had a higher cost. These areas are often limited for agricultural production, which has created challenges for the

environment. Farms do not have to sell their land to do this, however there may be instances where a local partner and the farmer are interested in repurposing the land for other benefits such as a natural area.

As identified by phase the Vermont Lake Champlain Phosphorus TMDL Phase 1 Implementation Plan, VAAFMM will invest in the development and coordination of a Nutrient Management Commission charged with reviewing, revising, and keeping nutrient management standards up to date and ensuring nutrient management planners are appropriately certified, and professionally accountable. This will occur in collaboration with the USDA NRCS, partners and state agencies to evaluate any needed changes in the current VT NRCS 590 Conservation Practice Standard to potentially address nutrient management.

Upcoming investments in planning and development include a strategic planning process for the VAWQP partnership, continued expansion and support of subsurface tile drain research in Vermont, assistance alternatives to production area improvements, as well as revisions to the Large Farm Operation (LFO) program.

## Attachment A. Grants and Contracts Funded Through Agricultural Clean Water Investments in FY 2017

	Grant Project	Organization	Amount
1	Development and Delivery of Manure Certification Curricula	UVM Extension	\$60,000.00
2	Provide Farm Business Technical Assistance and Outreach Education	UVM Extension	\$105,000.00
3	Modify goCrop Tool, Improve Recordkeeping, and Implementation of NMPs	UVM Extension	\$56,000.00
4	Expanding VT Agricultural WQ Educational Offerings with RAP Online Quiz	Orleans County Natural Resource Conservation District (NRCD)	\$17,048.00
5	Small Farm Outreach: Bringing "Ag" Programs and Alternatives Home to Farmers in Vermont	Winooski NRCD	\$7,618.00
6	Upper Otter Creek Agricultural & Landowner Outreach & Education	Rutland NRCD	\$5,925.00
7	Outreach & Education on RAPs and BMP Program in Basins 9 and 10	White River NRCD and Ottaquechee NRCD	\$18,038.00
8	South Lake Agricultural Outreach Assistance	Poultney Mettowee NRCD	\$9,032.00
9	Agricultural BMP Planning in the Headwaters & 2nd Branch of the White River	White River NRCD	\$14,590.00
10	Lake Champlain Direct and Lewis Creek Agricultural Outreach Assistance	Otter Creek NRCD	\$9,032.00
11	BCCD RAP Outreach	Bennington County NRCD	\$2,687.00
12	Reducing Phosphorus Loading through Education and Outreach in the Dairy Capital of Vermont	Franklin County NRCD	\$19,943.00
13	Champlain Islands Outreach Project (CIFOP)	Grand Isle NRCD	\$7,500.00
14	Agricultural Education & Outreach Program	Essex NRCD	\$18,400.00
15	Memphremagog RCPP Long-Term Quality Partnership Program Management	Orleans NRCD	\$19,970.00
16	Organizational Development for the Connecticut River Watershed Farmers Alliance	White River NRCD	\$19,998.00
17	Supporting Nutrient Management Plans: South Lake Agricultural Scale Purchase	Poultney Mettowee NRCD	\$20,000.00
18	Facilitating the WNRCD to Empower Small Farm Outreach: Bringing "Ag" Programs & Alternatives Home to Farmers	WNRCD	\$6,562.00
19	Organizational Development for the White River NRCD	White River NRCD	\$19,437.00
20	Building Capacity Grand Isle County Natural Resources Conservation District	Grand Isle NRCD	\$2,500.00
21	Increasing NRCD Capacity to Develop and Implement Agricultural Water Quality Programs	VT Association of Conservation Districts (VACD)	\$20,000.00

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22	Investing in the Future of Agriculture & Clean Water in Windham County	Windham County NRCD	\$4,026.00
23	Streamlining the Use of Soil Test Data through a Common Format	Franklin County NRCD	\$10,472.00
24	Agricultural Education and Outreach	Lamoille County NRCD	\$8,000.00
25	Precision Ag Management	Scott Magnan's Custom Service	\$18,750.00
26	Strategic Pathway for Inducing P Control Technologies at Vermont Dairies	Newtrient LLC	\$160,000.00
27	Reduction of Nutrient Runoff to Lake Champlain through No-Till Workshops and Equipment Upgrades	UVM Extension	\$19,547.00
28	Nutrient Management Planning Courses and Update Classes	UVM Extension	\$18,995.00
29	Expanding the Implementation of Innovative Cover Cropping Systems in the Northern Lake Champlain Basin and Beyond	UVM Extension	\$18,592.00
30	Implementing Nutrient Management Plans in the South Lake Basin	UVM Extension	\$18,868.00
31	Outreach Education to Help Specialty Crop Growers Meet Vermont's RAPs	UVM Extension	\$19,068.00
32	Developing a Web-Based Nutrient Management Platform for Vegetable Growers	UVM Extension	\$18,468.00
33	The Next Generation of Controlled Drainage for Preventing Tile P Loss	UVM Extension	\$27,139.00
34	The Vermont Manure Transfer Program: A Feasibility Study	UVM Extension	\$55,958.00
35	Grassland Manure Shallow Slot Injection	UVM Extension	\$213,837.00
36	Innovative Training Tools to Help Small Farm Operations Comply with RAPs	UVM Extension	\$32,298.00
37	Discovery Acres: Establishing a Research and Education Site in the St. Albans Bay Watershed	UVM Extension	\$20,000.00
38	Land Treatment Planning to Support NMP Development	VT Association of Conservation Districts (VACD)	\$119,680.00
39	Grass-Based Farming Outreach & Education	Vermont Grass Farmers Association	\$17,294.00
40	Soil Health Seminars	Missisquoi River Basin Association	\$4,700.00
41	Comprehensive Precision Agriculture Forum	Farmer's Watershed Alliance	\$19,878.00
42	Strengthening Vermont's Network of Grass-based Farmers to Protect Soil & Water	Vermont Grass Farmers Association	\$18,634.00
43	On-Farm Workshops & Farmer Follow-up for Increased Conservation Participation & Adoption	Champlain Valley Farmer Coalition	\$18,606.00
44	FWA Farm Mentorship Program	Farmers Watershed Alliance	\$19,968.00

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45	Organizational Capacity Building Grant for FNLC	Friends of Northern Lake Champlain	\$20,000.00
46	MRBA AmeriCorps Position	Missisquoi River Basin Association	\$10,360.00
47	New England Interstate Water Pollution Control Commission	Support for Tile Drainage Study in Jewett Brook Watershed	\$12,900