FY 2020 ANNUAL REPORT ON FINANCIAL AND TECHNICAL ASSISTANCE FOR AGRICULTURAL WATER QUALITY

Prepared for the Vermont General Assembly in Accordance with

6 V.S.A. § 4825

Submitted by Vermont Agency of Agriculture, Food and Markets

January 15, 2021

Clean Water Project Sign outside at the entrance of a Best Management Practice (BMP) project site in West Pawlet, Vermont. See grantee spotlight in the BMP Program section included in this report for more information.

To: Vermont General Assembly

RE: Vermont Agency of Agriculture, Food & Markets annual report to the Vermont Legislature on financial and technical assistance for water quality.

The Vermont Agency of Agriculture, Food & Markets (VAAFM) presents this annual report to the General Assembly of Vermont regarding activities in support of the objectives of Subchapter 3: Water Quality; Financial And Technical Assistance of 6 V.SA. Chapter 215, including use of State, federal, and private funds: (1) undertaken during the preceding fiscal year; (2) in progress during the current fiscal year; (3) projected for the following fiscal year; and (4) remaining to be undertaken after the following fiscal year.

Table of Contents

Executive Summary 4
Best Management Practice Program 9
BMP FY 2020 9
BMP FY 2021 12
BMP FY 2022 & Beyond 12
Conservation Reserve Enhancement Program 14
CREP FY 2020 15
CREP FY 2021 16
CREP FY 2022 & Beyond 16
Capital Equipment Assistance Program 17
CEAP FY 2020 17
CEAP FY 2021 18
CEAP FY 2022 & Beyond 19
Farm Agronomic Practice Program 20
FAP FY 2020 21
FAP FY 2021 22
FAP FY 2022 & Beyond 22
Grassed Waterway and Filter Strip Program 24
GWFS FY 2020 24
GWFS FY 2021 24
GWFS FY 2022 & Beyond 24
Pasture Surface Water Fencing 25
PSWF FY 2020 25
PSWF FY 2021 26
PSWF FY 2022 & Beyond 26
Looking Ahead 27

List of Figures

Figure 1. Summary of FY 2020 Financial Assistance Programs 4
Figure 2. Total Expenditure by Major Watershed and Tactical Basin 5
Figure 3. Total Funding by Source and VAAFM Program from FY 2016-2020 6
Figure 4. Total P-Reductions by State Cost-share Program from FY 2016-2020 7
Figure 5. Total P Reductions by Conservation Practice from FY 2016-2020 7
Figure 6. Summary of FY 2020 BMP Program Expenditure by Source 10
Figure 7. FY 2020 BMP Expenditure and Conservation Practices Implemented by Watershed 10
Figure 8. FY 2020 BMP Expenditure by County 11
Figure 9. FY 2020 BMP Implementation by Conservation Practice Type 11
Figure 10. BMP Recent Year Metrics 13
Figure 11. CREP Buffer Planting 15
Figure 12. Re-enrolled CREP Buffer 16
Figure 13. FY 2020 Number of CEAP Grant Awards and Average Funding by Equipment Type 18
Figure 14. Eligible Equipment Types, Funding Rates, Descriptions for FY 2021 CEAP Program 19
Figure 15. FY 2020 Summary of FAP grant completion by practice type and acreage 21
Figure 16. FAP Program trends FY 2017 – FY 2020 23
Figure 17. FY 2020 PSWF Expenditure and Implemented Practices by Conservation Practice Type 26

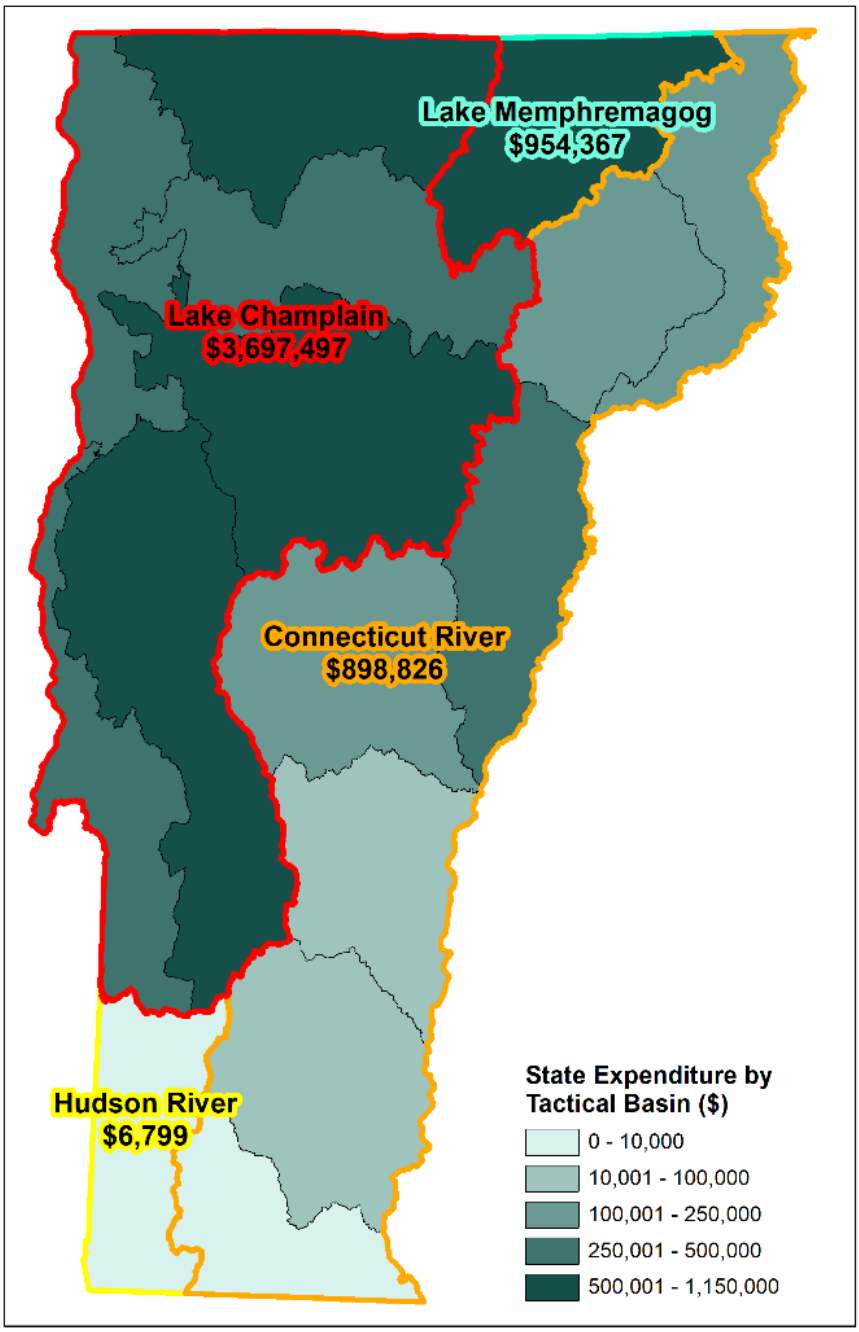
Executive Summary

The Vermont Agency of Agriculture, Food and Markets (VAAFM) Water Quality Division provides State financial and technical assistance to Vermont farmers in support of their construction and implementation of on-farm improvements and maintenance of acceptable operating standards designed to abate nonpoint source agricultural waste discharges into the waters of the State of Vermont, consistent with the goals of the federal Water Pollution Control Act and with State water quality standards per 6 V.S.A. § 4821. In support of this charge, VAAFM administers six financial and technical assistance programs available to Vermont farms. These programs include the Best Management Practices (BMP) Program, the Conservation Reserve Enhancement Program (CREP), the Capital Equipment Assistance Program (CEAP), the Farm Agronomic Practices (FAP) Program, the Grassed Waterway and Filter Strip (GWFS) Program and the Pasture and Surface Water Fencing (PSWF) Program. In State Fiscal Year (FY) 2020, these conservation programs enabled $5,645,982 in State expenditures and leveraged $4,718,950 in Federal expenditures. Vermont farmers and agricultural landowners invested $1,587,488 in water quality improvements through cost share contributions for the programs addressed in this report. Figure 1 below summarizes FY 2020 financial assistance programs and associated impacts, and Figure 2 shows State expenditures by tactical basin for water quality programs. Please note, Figure 2 below does not include five Education and Outreach grants awarded through the FAP program, totaling $5,993 in FY 2019, as these were multi-basin efforts.

Figure 1. Summary of FY 2020 Financial Assistance Programs

PROGRAM	EXPENDITURE	AWARDS	IMPACT
FAP	$ 575,767	$ 759,645	22,205 Acres of Conservation Practices Implemented
BMP	$ 3,933,116	$ 4,147,750	110 Conservation Practices Implemented
CEAP	$ 938,564	$ 1,413,600	27 Pieces of Conservation Equipment/Technology Awarded
PSWF	$ 183,040	$ 326,300	35 Conservation Practices Implemented
GWFS	$ 15,495	$ 25,865	14.8 Acres of Conservation Practices Implemented
CREP	*No new agreements due to FSA National Office determination that land subject to environmental regulations was ineligible. CREP is now available to VT farms in FY 2021.		

Figure 2. Total Expenditure by Major Watershed and Tactical Basin



VAAFM leverages several State funding sources with local and federal match to provide technical and financial assistance towards the implementation of conservation practices on farms in Vermont. Figure 3 below shows total expenditures by VAAFM program and by funding source from State FY 2016 – 2020. Collaboration between partners and leveraging funds is a critical piece to improving and protecting water quality on Vermont farms. Since FY 2016, VAAFM cost-share programs have leveraged approximately $15 million in federal match. Furthermore, an additional $6 million was leveraged in local match from farmers despite the significant challenge of tight profit margins caused by low milk and commodity prices facing the agricultural community in Vermont.

Figure 3. Total Funding by Source and VAAFM Program from FY 2016-2020

VAAFM Program	General Fund	Capital Fund	Clean Water Fund	Lake Champlain Basin Program	State Total	Federal Match	Local Match	Match Total	Grand Total
Best Management Practice Program	$0	$13,986,400	$152,966	$0	$14,139,366	$14,280,642	$4,780,456	$19,061,098	$33,200,464
Farm Agronomic Practice Program	$917,942	$0	$0	$426,328	$1,344,270	$0	$0	$0	$1,344,270
Capital Equipment Assistance Program	$0	$3,292,503	$0	$0	$3,292,503	$76,000	$1,051,301	$1,127,301	$4,419,804
Conservation Reserve Enhancement Program	$0	$107,307	$0	$0	$107,307	$871,242	$61,919	$933,161	$1,040,468
Vermont Phosphorus Innovation Challenge*	$0	$708,093	$193,607	$0	$901,700	$0	$0	$0	$901,700
Clean Water Fund Grants and Contracts*	$586,737	$99,400	$5,981,405	$67,497	$6,735,038	$198,729	$47,734	$246,463	$6,981,501
Pasture & Surface Water Fencing Program	$0	$0	$369,218	$0	$369,218	$54,557	$60,142	$114,700	$483,917
Grassed Waterway & Filter Strip Program	$0	$0	$45,515	$0	$45,515	$0	$17,821	$17,821	$63,336
Water Quality Grants	$710,000	$88,717	$0	$0	$798,717	$0	$0	$0	$798,717
Total	**$2,214,679**	**$18,282,420**	**$6,742,711**	**$493,825**	**$27,733,634**	**$15,481,170**	**$6,019,375**	**$21,500,545**	**$49,234,179**
Percent of Total	4%	37%	14%	1%	56%	31%	12%	44%	100%

**The Vermont Phosphorus Innovative Challenge and Clean Water Fund Grants and Contracts are not detailed in this report. Investments and outcomes for these programs are included in the Vermont Clean Water Initiative 2020 Performance Report (2020 Clean Water Performance Report).*

Beginning in FY 2016, VAAFM annually reports the clean water efforts made through VAAFM programs to the Water Investment Division (WID), managed by the Vermont Agency of Natural Resources Department of Environmental Conservation (DEC), to account for the financial investments and progress being made towards meeting the State's clean water goals. VAAFM has enhanced the tracking efforts of its cost-share program outcomes through internal process improvements and through the reporting framework to WID. Conservation practice implementation tracking provides the data required for modelling phosphorus reductions from VAAFM financial assistance programs in the phosphorus impaired Lake Champlain and Lake Memphremagog watersheds. Modelled phosphorus reductions from production area compliance (PAC) assessed through VAAFM's regulatory program are also highlighted in the 2020 Clean Water Performance Report.

Figure 4. Total P-Reductions by State Cost-share Program from FY 2016-2020 below shows the total phosphorus reduction (kg) by State cost-share program and by State FY for the Lake Champlain and Lake Memphremagog watersheds based on VAAFM water quality program data reported to DEC from FY 2016 to FY 2020. For a full report on investments and progress made towards State water quality goals in the Agricultural Sector, please read the Vermont Clean Water Initiative 2020 Performance Report.

Figure 4. Total P-Reductions by State Cost-share Program from FY 2016-2020

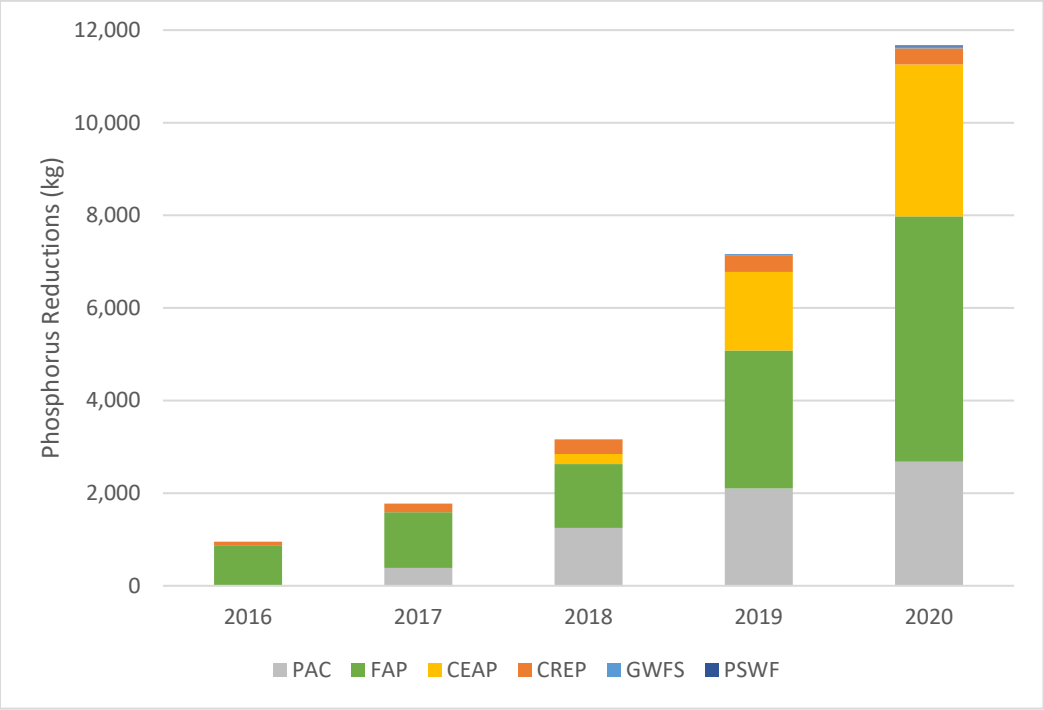
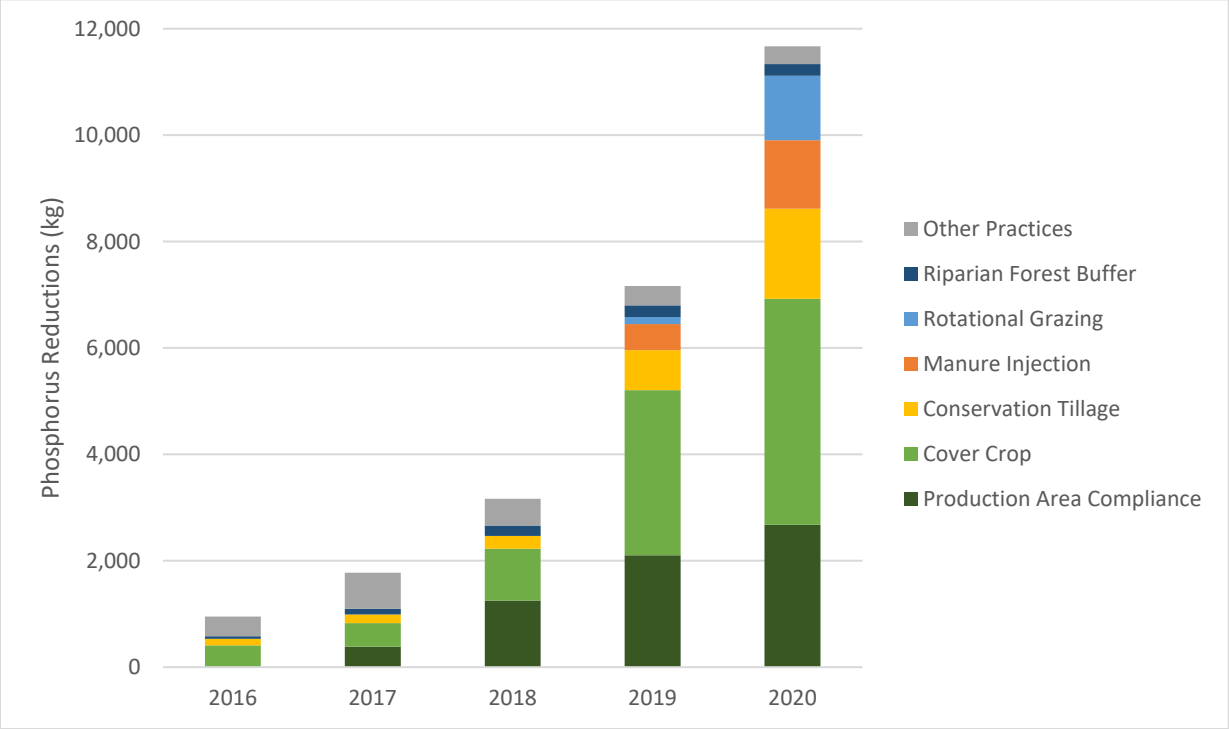


Figure 5. Total P Reductions by Conservation Practice from FY 2016-2020



VAAFM programs have experienced recent expansion leading to increased implementation of conservation practices on the ground resulting in additional phosphorus reductions and improved water quality since FY 2016. For example, total phosphorus reductions more than doubled from FY 2018-2019 and increased more than 50% all years. Current trends indicate continued increase in phosphorus reductions as a result of VAAFM cost-share programs. Highlights from FY 2016 – 2020:

- **Production Area Compliance (PAC)** accounts for significant reductions since reporting began in FY 2017, over a quarter of total reductions.
- **FAP** accounts for the largest reductions among VAAFM programs and continues to grow with increased program expansion and participation by farmers. The new Rotational Grazing practice is the fastest growing practice with P reductions.
- **CEAP** has the largest increase in reductions since program expansion in FY 2018.
- **CREP** accounts for consistent and long-term reductions with significant cumulative reductions.
- **GWFS** and **PSWF** programs are programs recently launched. Although low acres implemented and low total P reductions compared to other programs, they are among the most cost effective (along with CREP) in terms of cost per pound of P reduced.

PAC is assessed through VAAFM's inspection and enforcement program and phosphorus reductions are modelled for the whole production area rather than for individual BMPs within the production area. BMP practices are typically implemented within a farm's production area and BMP implementation may be correlated with compliance. BMPs are essential to improve farm infrastructure and prevent discharges. VAAFM staff inspected 2,719 acres of production areas *statewide*, a 35% increase from FY 2019, despite the challenges of the COVID-19 pandemic.

In support of RAP compliance and planning, development, and implementation of conservation practices in FY 2020, VAAFM staff completed 752 farm visits. On site farm visits are an essential component of enabling the farming community with the information and resources available to implement effective conservation practices leading to improved water quality. Partner organizations working under VAAFM grants and contracts completed an additional 539 water quality technical assistance visits to farms during FY 2020.

The programs reported on throughout this report provide opportunities to significantly offset costs for Vermont farmers and agricultural landowners to implement conservation and best management practices. This has been especially important and will continue to be important in the coming years as the impacts of the 2020 COVID-19 Pandemic continue to unfold. Many farmers have been adversely impacted by the COVID-19 Pandemic with closed markets, disrupted food supply systems, volatile milk and commodity prices, and many continued uncertainties. Despite these adverse impacts, VAAFM continued to receive inquiries and applications for technical and cost share assistance, demonstrating the farming community's commitment to adopting and implementing conservation practices. The effects of the 2020 COVID-19 Pandemic are expected to continue for the next several years. With the disruption to daily activities, economy, dairy/commodity prices, and farmer morale it is uncertain how farm interest or ability to participate in cost share programs and willingness to embark on new, and often costly, projects may be influenced.

The following sections summarize each VAAFM cost share program's FY 2020 activities, FY 2021 in progress activities, and projections for FY 2022 and beyond.

Best Management Practice Program

The Best Management Practice (BMP) Program assists farmers with on-farm improvements designed to abate agricultural waste discharges into the waters of the State of Vermont. The Program was created to provide State technical and financial assistance to Vermont farmers to improve water quality. The BMP Program identifies and assists in resolving risk of surface and ground water contamination from agricultural wastes. Technical assistance, which includes a combination of agricultural, civil, and environmental engineering consultation and design, is available on a priority basis at no cost to the farmer. Financial assistance is available to help assist the farmer with the construction costs of the designed practice(s).

In 2019, the BMP Program established three sub-programs within the BMP Program to effectively meet the needs of the agricultural community. The three sub-programs are:

1. **EQIP-Assist**: Applications accepted on a rolling basis. Apply when your farm has ranked out for an EQIP contract to receive additional cost share on the practices installed as part of the EQIP contract.
2. **Technical Assistance:** Applications accepted on a rolling basis. Apply when a water quality concern is identified to receive engineering consultation and design services.
3. **Farmstead BMP:** Apply annually by April 1. Apply when preliminary design and cost estimates are completed to receive state financial assistance.

For more information about the BMP Program, including services, eligibility, and application materials, visit: agriculture.vermont.gov/bmp.

BMP FY 2020

In the FY 2020, 40 BMP grants were awarded to Vermont farmers and 110 conservation practices received cost share assistance that addressed water quality concerns.

Figure 6. Summary of FY 2020 BMP Program Expenditure by Source below summarizes BMP (State), federal United States Department of Agriculture (USDA), landowner and other funding spent on practice implementation through the VAAFM BMP Program. Funding contributed by the landowner or farmer represents at least 10% of total funds spent on the cost of construction. Other funding spent represents private grant funding resources used to meet match requirements, such as funding through the Vermont Housing Conservation Board (VHCB). Overall, through FY 2020, these conservation programs enabled $3,933,116 in VAAFM State expenditures to leverage $4,667,923 in federal expenditures, as well as $1,198,877 in cost-share contributions from Vermont farmers and agricultural landowners.

The BMP program leveraged 60% of total project costs from other sources.

Figure 6. Summary of FY 2020 BMP Program Expenditure by Source

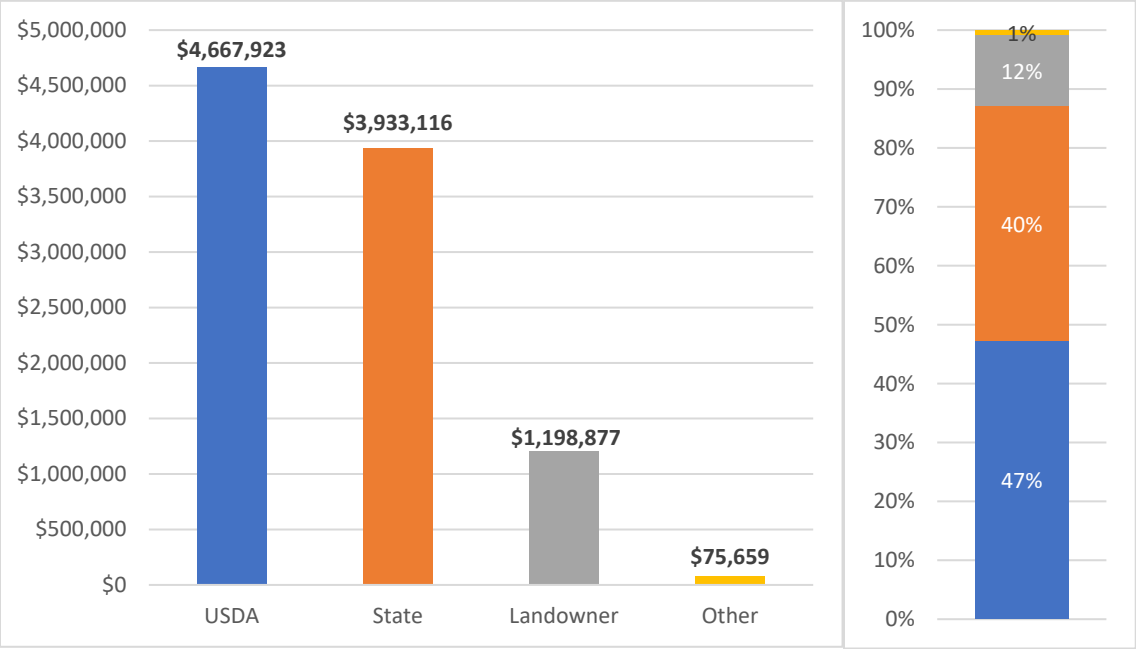


Figure 7. FY 2020 BMP Expenditure and Conservation Practices Implemented by Watershed below summarizes VAAFM BMP Program expenditure and the number of conservation practices implemented in each major watershed basin. Most practices were implemented in the Lake Champlain Basin, where the majority of farm operations and agricultural lands are located, accounting for 71% of practices implemented.

Figure 8. FY 2020 BMP Expenditure by County below displays total funds spent per county; with most of the spending occurring in Orleans, Franklin, and Caledonia counties.

Figure 7. FY 2020 BMP Expenditure and Conservation Practices Implemented by Watershed

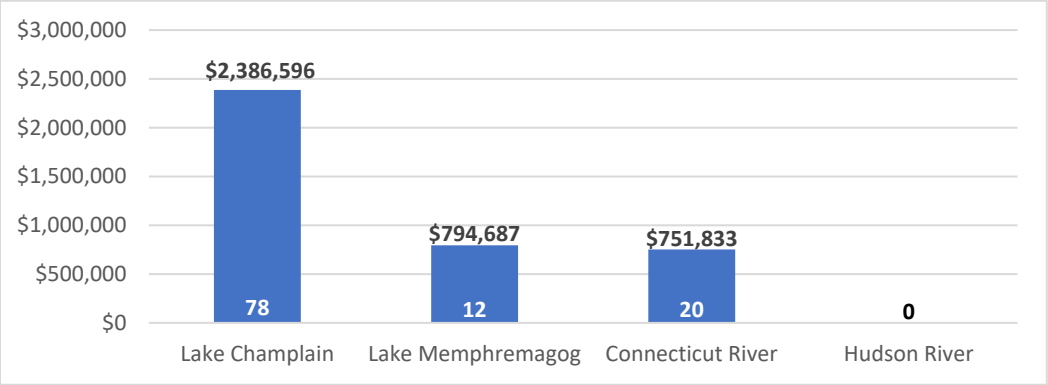


Figure 8. FY 2020 BMP Expenditure by County

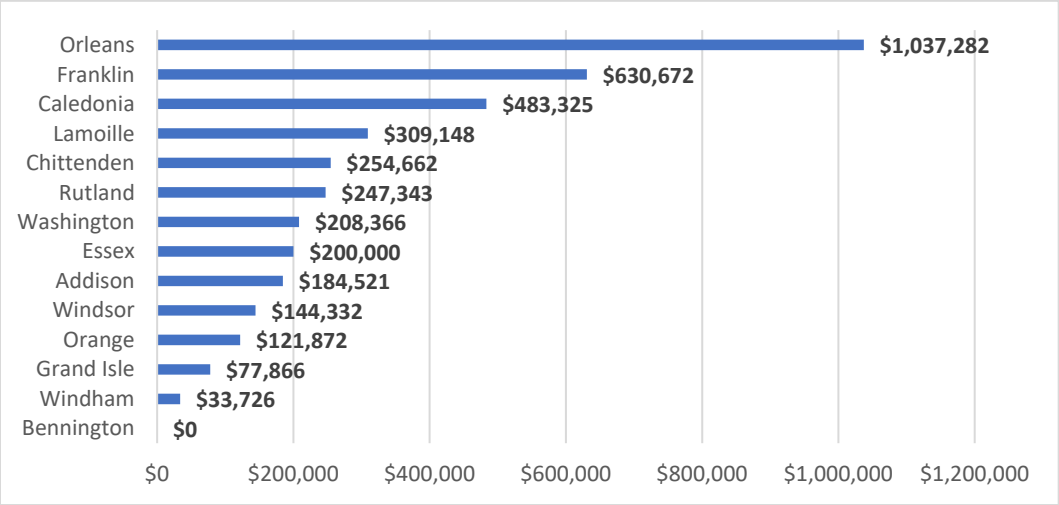
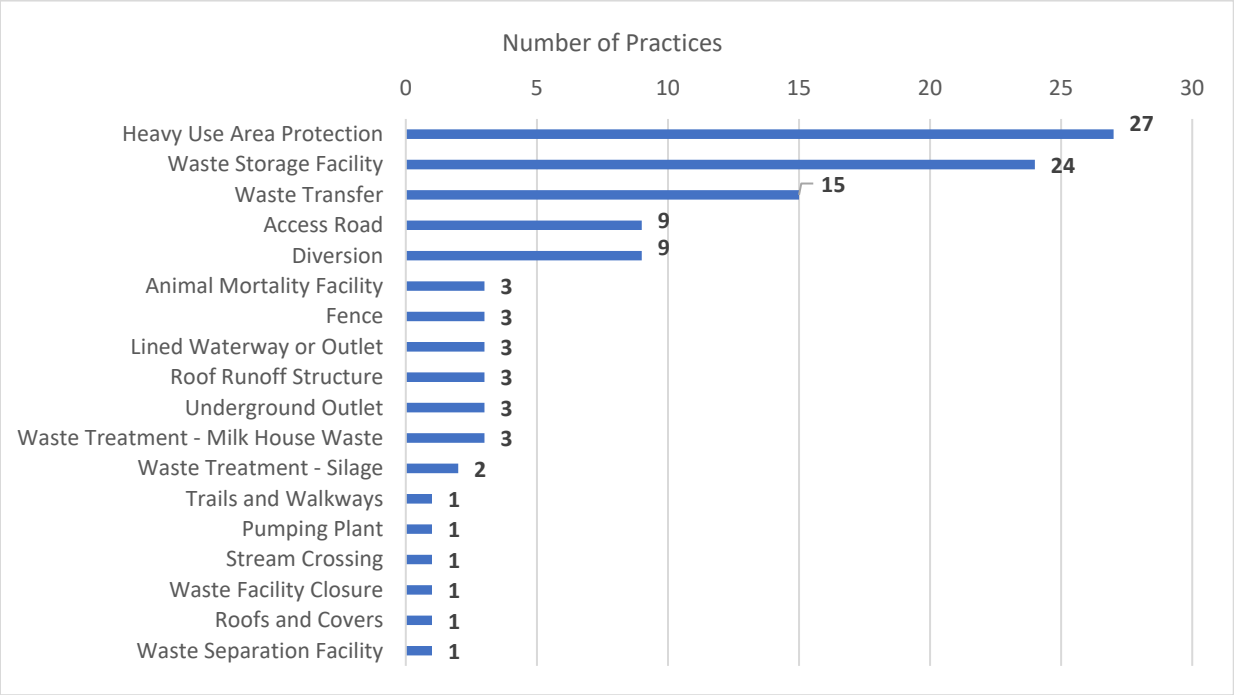


Figure 9 below illustrates the type and number of practices completed in FY 2020 through the VAAFM BMP Program. Of the 110 practices completed, the majority were Heavy Use Area Protection (24.5%), which includes barnyards and improved surfaces that are typically high traffic and are prone to erosion. The second most prominent practice was Waste Storage Facility (22%), which includes manure pits, silage leachate management systems, solid manure stacking facilities, 'Slurrystores', and in-ground pits lined with clay, concrete, or geosynthetic liner, followed by Waste Transfer (14%), which includes waste holding tanks, pumps and plumbing installed to transfer waste from a collection point to a storage point. Further descriptions including conservation practice standards and required operation and maintenance can be found on the Vermont NRCS website.

Figure 9. FY 2020 BMP Implementation by Conservation Practice Type



To augment VAAFM BMP engineering capacity, additional projects are contracted to external Architecture and Engineering (A&E) consultants. VAAFM engineers facilitate project management and assign projects requiring specific expertise to A&E consultants. During FY 2020, $156,737 was spent on contracting A&E consultants to serve 11 farms. The consultants are hired to produce preliminary plans, final designs including construction documents and specifications, engineering cost estimates, construction oversight and project certification.

BMP FY 2021

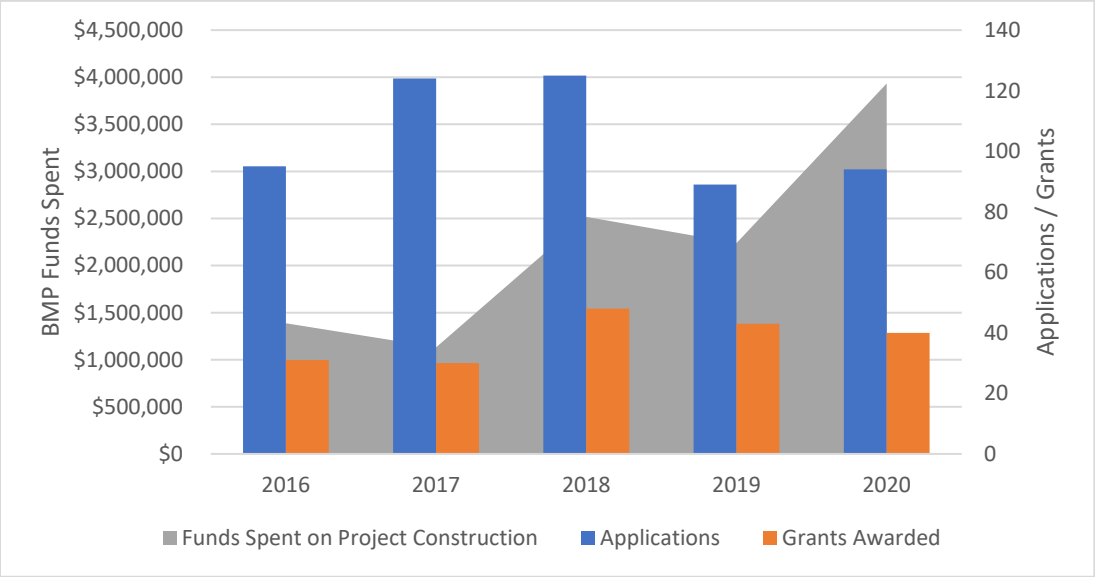
There continues to exist a high demand for funds within the BMP Program. Project requests from farmers for construction in State FY 2021 totaled $4.4 million, exceeding the $3 million FY 2021 BMP budget. Through VAAFMs prioritization process, 49 projects were prioritized for funding in FY 2021, with 16 projects deferred to FY 2022. Requests for funding show farmers are willing to adopt farmstead conservation practices to improve water quality. As farmers face challenges with volatile milk and commodity prices and tight profit margins, financial assistance is necessary to enable the timely implementation of these practices.

As of December 1st, the BMP Program has received 10 applications in FY 2021 for technical assistance, financial assistance, and EQIP Assistance compared to more than 45 received in the same timeframe in FY 2020. The low number of BMP applications is likely a result of impacts from the COVID-19 pandemic, such as a reduced number of VAAFM field staff visits both technical assistance and regulatory due to the stay home order, State budgeting uncertainties, and farmer uncertainty of proceeding with often costly structural projects. Although the applications received are low compared to previous years, VAAFM anticipates applications will continue to be submitted throughout FY 2021 as field visits resume, project development continues for FY 2020 technical assistance applications, and State budgets are approved and appropriations to programs are made. Applications will be reviewed for funding by July of 2021 and prioritized for funding in FY 2022 in addition to the 16 projects deferred from FY 2021, unless otherwise determined to be an immediate priority for water quality.

BMP FY 2022 & Beyond

As farmers continue to face volatile milk and commodity prices, tight profit margins, and now adverse impacts from the 2020 COVID-19 Pandemic, technical and financial assistance remains necessary for implementation of conservation practices. By considering the current circumstances facing the agricultural community, and looking at application, grant award, and expenditure trends, the BMP Program can project future spending at or above the level of current expenditure.

Figure 10. BMP Recent Year Metrics



As Figure 10. BMP Recent Year Metrics illustrates above, there is an apparent increase in BMP Funds spent, while the number of grants and applications has remained fairly consistent. Spending has increased largely due to increased funding received from the legislature, an increase in the number of engineers on staff available to provide technical assistance, as well as an influx of EQIP-assistance grants. When comparing the number of grants and applications, these have remained consistent while spending increased per project due to an increase in the BMP grant cap in response to higher project costs owing to the complexity of whole farm fixes and agricultural stormwater collection.

With the unprecedented COVID19 Pandemic arriving in the second half of FY 2020, financial assistance has become even more necessary to move projects in development to implementation during a time where farmers are facing tight profit margins and prioritizing investments. In addition to the funding sources discussed in this report, farmers have access to water quality grants through the Vermont Housing Conservation Board, an important funding source that helps farmers meet their cost share requirements and leverage all funds available on BMP projects.

Based on program trends from FY 2016-2021 and the anticipated budget for FY 2022 the BMP program anticipates State obligations will utilize the $3.4 million included in the Recommended Clean Water Board FY 2022 Clean Water Budget. Whether the demand will exceed available funding remains subject to volatile milk and commodity prices, and the continued impacts of the COVID19 pandemic, which may affect the farmers' ability to pay the 10% minimum cost share requirement for the BMP program.

Best Management Practice (BMP) Program Grantee Spotlight:
Dry Brook Farm – Heavy Use Area Protection

George Hollister raises 35-40 beef animals each year on Dry Brook Farm in West Pawlet. Prior to applying to the BMP program, the heavy use area for the farm's beef herd was located near a water source at the bottom of a hill. The site was consistently wet and George had trouble managing his manure, especially in the winter and shoulder seasons when his cattle are concentrated in this area.

George was able to remedy this issue with financial and technical assistance from the AAFM BMP program, matched by labor contributed by the farm, alongside funds from the Vermont Housing and Conservation Board.

AAFM engineers worked with Dry Brook Farm to install surface water diversion above the site to keep runoff from the adjacent hill from running through the heavy use area, put a roof over the area to keep it drier, and installed concrete so that George can better manage the manure that collects in this area and remove it to an appropriate stacking site.

By the numbers:

250,000 gallons clean water diverted

$55,593 awarded (90% cost-share)

"I think it's a **good program**... I **would not have done** this project without it."

– *George Hollister, owner and operator of Dry Brook Farm*

Heavy use area before (*top*) and after (*bottom*) implementation of a heavy use area protection BMP. This project reduced erosion and surface runoff of agricultural waste.

Conservation Reserve Enhancement Program

The Conservation Reserve Enhancement Program (CREP) is part of the Conservation Reserve Program (CRP), the country's largest private-land conservation program. CREP is administered via a partnership between the State of Vermont and the United States Department of Agriculture (USDA) Farm Service Agency (FSA). The program compensates agricultural landowners who remove environmentally sensitive riparian land from agricultural production and convert it to forested buffers, filter strips, or grassed waterways. Landowners are provided upfront financial incentive payments for participating in the Program and are paid an annual rental rate for the 15-year agreement period. Federal cost-share has provided 90% of the implementation costs for CREP and, in most instances, 100% of implementation costs for forested riparian buffers are covered with the last 10% coming from the U.S. Fish and Wildlife Service Partners for Fish and Wildlife (PFW).

For more information about CREP, including program eligibility and how to sign up, visit: https://agriculture.vermont.gov/crep.

Figure 11. CREP Buffer Planting
Left, year two of Riparian Buffer Tree Planting through CREP Agreement on the banks of the Missisquoi River in Sheldon, VT. Right, year 13 of the same Riparian Buffer once established. (VAAFM Photo, 2020)

CREP FY 2020

In the State FY 2020, no new CREP conservation agreements were completed as a result of a 2015 change to the Code of Federal Regulations (CFR) Section 1410.6(d)(4), for the CRP program that was codified in the CRP manual in January of 2018. This change revised characteristics for ineligible land by adding "*Land for which Tribal, State or other locals laws, ordinances, or other regulations require any resource conserving or environmental protection measures or practices and the owners or operators of such land have been notified in writing of such requirements"*. FSA's national office determined that this change would make any land subject to the VT Required Agricultural Practices (RAP's) vegetated buffer requirement ineligible for enrollment in CREP.

In December 2018, the United State Congress passed a farm bill which included language that required a change to the Code of Federal Regulations that should allow land subject to CFR Section 1410.6(d)(4) to be eligible for CREP. The intent was for a waiver process to be a one-time, statewide request covering all riparian lands subject to the RAP buffer requirement and that landowners be eligible for the full rental rate. Despite this intention, the USDA's updated CFR requires a 25% reduction on the annual rental payment for land that is subject to the RAP's. In addition to the required reduction in the annual rental rates, the FSA national office interpreted the farm bill change to mean that landowners would need to submit a waiver request to enroll land in CREP on a project-by-project basis. Having to submit waivers for each individual project as opposed to the intended, one-time statewide waiver, and a reduced payment rate have increased the administrative challenge to staff and decreased the level of interest from farms in implementing the program.

Figure 12. Re-enrolled CREP Buffer
Addison County landowners admire their 15-year old, re-enrolled CREP Buffer (VAAFM Photo).

In FY 2019 and FY 2020 VAAFM staff continued to work with the Vermont delegation in Washington, D.C. and with FSA to address rental rates, program regulations and corresponding manuals and administrative processes. As VAAFM waited on the release of the new program regulations and corresponding manual, program staff continued to do project scoping, education, and outreach to Vermont landowners on CREP and other programs, completing approximately 49 site visits in FY 2020. Outreach and assistance included agreement follow up, re-enrollment, and project scoping and development. In FY 2020, 4 farms encompassing 35.6 acres in the Lake Champlain Basin were re-enrolled in the CREP program, a process which renews expiring agreements for an additional 15 years. In June of 2020, the FSA national office shared a process with Vermont FSA which gave landowners interested in enrolling in CREP the option of requesting a waiver from the national office for a determination that their land was "otherwise eligible and appropriate" for enrollment in the program. No new CREP agreements had been fully executed in FY 2020. Further information regarding this program can be found in the Annual Performance Report to the FSA for CREP FY 2020.

CREP FY 2021

Already in FY 2021, three new grant agreements have been executed covering 48.1 acres. One additional agreement encompassing 7.17 acres is nearing complete agreement execution. With CREP a fully active program once again, many projects are in development and will hopefully be ready for finalization in FY 2022. Currently, there are up to ten projects planned for FY 2022 agreements.

CREP FY 2022 & Beyond

VAAFM anticipates the continuation of this program for FY 2022 and into the future. The current goal for the CREP program in Vermont is to enroll 200 acres annually into the program. Although this goal has not been met in recent years, it is anticipated that this goal can be attained in future years with the sizeable backlog and renewed focus on the program, if VAAFM is able to surmount the challenges of further-reduced rental rates. A second goal in Vermont for the past few years has been to enroll more annual crop land into the program. Annual cropland is the largest contributor of phosphorus to Vermont's portion of Lake Champlain. Unfortunately, in FY 2018, only 22.14 cropland-rate acres were enrolled, and zero acres were enrolled in FY 2019 and FY 2020. In FY 2021, 19.55 cropland-rate acres have been enrolled. This level of cropland enrollment speaks to the value of cropland in Vermont and the strong reluctance to taking land out of production. Another factor in the reduction of cropland acres enrolled is the continued reductions to cropland soil rental rates established by the FSA. Since 2010 the average cropland soil rental rate has been reduced by 14% while land values have increased by 25%. This contradiction needs to be rectified if water quality and program enrollment goals are to be met.

Capital Equipment Assistance Program

The Capital Equipment Assistance Program (CEAP) offers financial assistance to farms, nonprofit organizations, and custom applicators in Vermont. CEAP assists in the purchase of innovative equipment or technology that will aid in the reduction of surface runoff of agricultural wastes to State waters, improve water quality of State waters, reduce odors from manure application, separate phosphorus from manure, decrease greenhouse gas emissions, and reduce costs to farmers when they apply manure.

For more information about CEAP, including eligibility, funding rates, and application information, visit: agriculture.vermont.gov/ceap.

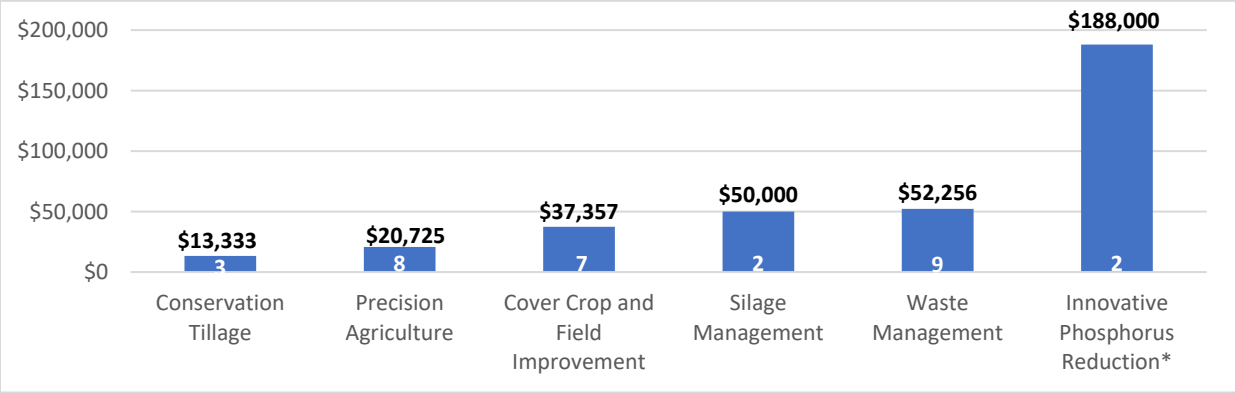
CEAP FY 2020

High demand continues for the CEAP program as farmers seek assistance to purchase equipment to aid in conservation practice adoption. In FY 2020, 71 farmers, nonprofit organizations, and custom applicators applied for funding for 87 pieces of equipment through the CEAP program totaling approximately $2,600,000 in requests against VAAFM's approximate $1 million FY 2020 CEAP budget. VAAFM ranked and prioritized the 71 applications, resulting in 30 grant awards to farmers to assist with purchasing conservation equipment. One additional project was funded as a referral from the BMP Program.

In FY 2020, $938,564 in state expenditure was paid towards 28 pieces of equipment or technology, with landowner contributions towards these State expenditures amounting to approximately $358,122, with approximately $150,000 of the landowner contributions derived through Vermont Housing and Conservation Board (VHCB) Water Quality Grant Awards. Several FY 2019 grant awards were reimbursed within FY 2020 and are reflected in total FY 2020 expenditure, while several FY 2020 grant awards are still active and have not yet been reimbursed for equipment purchases and will be reflected in total FY 2021 expenditure. In FY 2020, with the equipment acquired through CEAP, farmers, nonprofits, and custom applicators have already implemented best management practices and improved nutrient management on approximately 13,900 acres of agricultural land. Overall, the program has contributed to more than 27,935 acres of conservation practice implementation since FY 2016. Conservation practices and nutrient management will continue to be implemented and expanded as farmers acquire and utilize innovative conservation equipment.

Figure 13. FY 2020 Number of CEAP Grant Awards and Average Funding by Equipment Type below provides a summary of the different types of equipment awarded in the FY 2020 funding round, as well as the average award amount for each type of equipment.

Figure 13. FY 2020 Number of CEAP Grant Awards and Average Funding by Equipment Type



In addition to the equipment previously mentioned, CEAP funds are also available for physical or chemical methods of phosphorus removal. Innovative CEAP funds were awarded through funding opportunities released in FY 2018, and 2019. Similar innovative funds are also available through the Vermont Phosphorus Innovation Challenge (VPIC).

A 2019 Case Study was published with funding through an Agricultural Clean Water Initiative Grant to highlight equipment funded under a FY 2018 CEAP award for a Dissolved Air Flotation (DAF) unit installed at Blue Spruce Farm in Bridport, VT. In respect of work completed in FY 2020, two companies were awarded grants in FY 2020 for Innovative Phosphorus Removal Equipment or Technologies. One company was awarded $300,000 to purchase a DAF system and associated equipment as part of a larger nutrient-recovery and renewable energy project. The DAF system and associated equipment will be used to recover phosphorus from digested material, before the final nutrient liquid fertilizer is stored and later land-applied to corn and hay crops. The other company was awarded $75,000 to purchase a pyrolysis unit that will process separated solids from manure into biochar. The pyrolysis unit will utilize a pre-existing screw press separator to separate a portion of solid fibers from on average, 3,000 gallons of raw dairy manure per day. The pyrolysis unit will process these solids into biochar which will retain phosphorus. The biochar is lower in weight and mass than the original solids allowing for more cost-effective transport.

CEAP FY 2021

In September of 2020, a CEAP funding opportunity was made available to Vermont farmers, custom operators, and nonprofit organizations. This funding round included a variety of eligible equipment categories with specific funding maximums based on each category correlated to water quality impact as well as relative cost of equipment, all with no more than a 90% cost-share opportunity. Figure 14 below provides details on the funding caps and equipment categories available to applicants.

Figure 14. Eligible Equipment Types, Funding Rates, Descriptions for FY 2021 CEAP Program

Equipment Type	Examples of Eligible Equipment	Funding Rates *All recipients must pay 10% of the total eligible equipment cost, (shipping/freight fees are not eligible for reimbursement cost).*
Precision Agricultural Equipment	- GPS, Flow Meter & Display Unit -Hydraulic Downforce -Autosteer	90% cost-share up to $25,000 per applicant
Conservation Tillage Equipment	-No-Till Corn Planter -Ridge-Till	90% cost-share up to $10,000 per applicant, OR (90% cost-share up to $20,000 only if applying for equipment AND precision agriculture component to be used in conjunction with equipment)
Cover Crop and Field Improvement Equipment	-No-Till Grain Drill -Roller Crimper	90% cost-share up to $40,000 per applicant, OR (90% cost-share up to $50,000 only if applying for equipment AND precision agriculture component to be used in conjunction with equipment)
Manure* and Feed Management Equipment**	-Injectors* -Irrigation* -Dragline System* -Balers/Wrappers**	90% cost-share up to $50,000 per applicant, OR (90% cost-share up to $60,000 only if applying for equipment AND precision agriculture component to be used in conjunction with equipment)

**Manure management equipment only eligible for funding if precision manure record keeping system [GPS, Flow Meter & Display Unit] are included in application, or operational unit exists on farm to be used with proposed equipment.*
***Feed management equipment eligible only as an alternative to leachate management improvement as least cost alternative, and will require VAAFM Engineer site visit to ensure eligibility*

The CEAP program continues to be highly competitive with 78 applications received through the Fall FY 2021 funding round. The total request for funding, which considers the relative equipment funding rate or cap, was about $2.45 million. Of the applications submitted, most (31%) of funding requests were for Cover Crop management equipment, followed by Manure Management equipment (29%). In comparing the types of applicants for the program, there was a rough split across all farm sizes, ranging from small to large. Preliminary grant awards will be offered in January of 2021 for at least $1 Million in State funding to be awarded for innovative equipment acquisition enabling conservation practice implementation on Vermont Farms.

CEAP FY 2022 & Beyond

VAAFM anticipates the demand for this program will continue at or above its current capacity into the FY 2022. The substantial response VAAFM received through the previous three years of CEAP prescribe the demand for this program. Specifically, farmers are looking for financial assistance to aid in capital equipment acquisition. With low market prices for milk and extremely tight profit margins in the Vermont dairy industry, many other operational costs are prioritized before investments in new or innovative capital equipment. Equipment is often identified as a major barrier to implementation of conservation practices or improving existing conservation efforts.

The program anticipates seeing increased requests for innovative manure management and application equipment. Climate change continues to create various annual weather crises for farming in Vermont from early snows, to persistent drought, to increased and more intense precipitation. As our climate continues to change, promoting resilience and adaptation is critical for environmental viability on Vermont Farms. The CEAP program incentivizes Vermont farmers to voluntarily invest in innovative equipment and technology upgrades that are beneficial for water quality, furthering the reduction of nonpoint source agricultural pollution.

Conservation Equipment Assistance Program (CEAP) Grantee Spotlight:
Lyle F. Hurtubise & Sons -- Manure Injection System

L.F. Hurtubise and Sons was funded by CEAP in 2019 for a manure injection system, and saw its benefits right off the bat. The manure injector incorporates manure directly into the ground, which limits the need for extra tillage, decreases soil disturbance and reduces the number of truck passes over the field, minimizing compaction. The manure injector also enables the farm to get their manure into the ground faster, which captures nutrients, reduces runoff, enables them to take advantage of short windows of good weather, and opens the opportunity for increased cover-cropping. It has also decreased the number of complaints from neighbors since injection reduces the smell of liquid manure spreading.

In 2019, the Hurtubises reported usage of the injector on 381 acres of corn. The farm hopes to use the manure injector on even more land in future years. They will report usage of the injector to AAFM for three years, but intend to use the equipment to implement conservation practices well beyond the end of that period.

"It's a **good investment** for the **environment** and the **people** you live near... [but] it's a **hard investment** to make **without a grant.**"

– Wayne Hurtubise, co-owner of L.F. Hurtubise & Sons

By the numbers:

1 manure injector

380+ acres per year

~170lb P reductions in 2019 (estimated)

$57,774 awarded (90% cost-share)

Farm invested **$5,864** in innovative equipment

Farm Agronomic Practice Program

Farm Agronomic Practices (FAP) Program offers financial assistance to farms, nonprofit organizations, and custom operators in Vermont. The FAP Program incentivizes agronomic practices, improving soil quality, reducing erosion, and improving water quality. Financial assistance is also available for educational and instructional activities that increase farmer understanding of the impact of agricultural waste discharges as well as any federal or state water quality regulations and requirements. In order to streamline reporting requirements for this program within the set reporting requirements for 'Subchapter 003 : Water Quality; Financial And Technical Assistance' (6 V.S.A. § 4825), the authorizing legislation for this program was relocated without any changes from 6 V.S.A. § 4951 to 6 V.S.A. § 4832.
Grant funding through the FAP program is provided on a per acre payment rate (see table below), based on relevant cost of implementation. VAAFM references USDA NRCS payment rates which are

developed based on regional cost and develops FAP rates in a way to promote and leverage federal funding to improve water quality in Vermont.

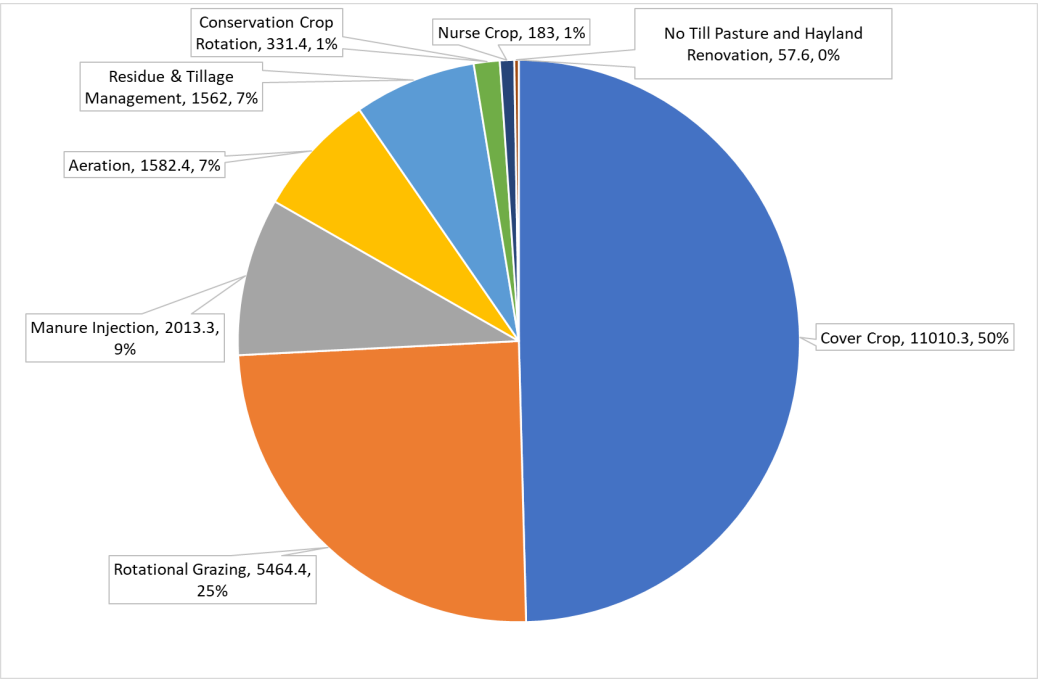
For more information about the FAP Program, including practice eligibility, funding rates, and application information, visit: agriculture.vermont.gov/fap.

FAP FY 2020

In FY 2020, a total of $759,645 of State funding was awarded and $575,767 was expended. Several FY 2019 grant awards were reimbursed in FY 2020 and are reflected in total FY 2020 expenditure, while several FY 2020 grant awards are still active and have not yet been reimbursed for practice implementation and are not reflected in total FY 2020 expenditure. The FY 2020 awards provided financial assistance to 150 farms to implement agronomic practices, as well as 5 grant awards for educational and instructional opportunities. In FY 2020, farmers were paid for approximately 22,204 acres of agronomic practices with cost-share assistance through the FAP program.

Figure 15. FY 2020 Summary of FAP grant completion by practice type and acreage below summarizes the percentage and acreage of agronomic practices paid under the FAP Program per practice type in FY 2020. The majority of agronomic conservation practice implementation that occurred through this program was Cover Crops (50%), followed by Rotational Grazing (25%), Manure Injection (9%), Residue and Tillage Management (7%), and Aeration Tillage (7%).

Figure 15. FY 2020 Summary of FAP grant completion by practice type and acreage



Cover crop continues to be the most popular practice receiving assistance under the FAP program but Rotational Grazing which became eligible for funding under FAP in FY 2019, is the second highest practice for acres of completed grants in Figure 15 above. The popularity of this newly eligible practice

shows the demand and commitment grazing and pasture-based farms have for improving water quality and soil health through rotational grazing pasture management practices.

Additional funding for financial assistance under this program has been secured through an agreement with Vermont Agency of Natural Resources Department of Environmental Conservation with funding through the Lake Champlain Basin Program (LCBP). This additional funding has augmented the program's existing funding and enabled an increase in agronomic practice implementation across Vermont.
Since FY 2019, VAAFM uses geospatial informational system (GIS) for verification of all acreage claimed under this program in addition to existing field check verification of practice implementation. This ensures more accurate data on the acreage reported for statewide Phosphorus reductions, as well as provides an additional guarantee for precise payments under this program. Accurate GIS data of all practice implementation increases the opportunity to target regions of the State for improved adoption of agronomic best practices via technical assistance, as well as education and outreach about the benefits and financial assistance opportunities available to farms for implementation of agronomic practices.

FAP FY 2021

Total State expenditure under the FAP program in FY 2021 is $149,365 as of December 10, 2020. Overall, $862,474.00 in funding for 164 grants have been awarded under this program for fall and spring agronomic practices during FY 2021. This equates to an 10% increase in the number of awards under this program since FY 2020 and a 48% increase since FY 2019.

Changes to the FY 2021 FAP program included a set payment rate for broadcast helicopter cover crop of $35 / acre. LCBP funding also continues to augment the program's existing funding. Additionally, aeration has been removed as an eligible practice under this financial assistance program.

FAP FY 2022 & Beyond

Farm agronomic practices are a critical component of the successful implementation of the 2016 Lake Champlain TMDL cleanup plan as the majority of agricultural phosphorus was modelled to originate from cropland; roughly 35% of phosphorus loading to Lake Champlain was estimated to originate from agricultural cropland. Between State FY 2016 and FY 2020, agronomic practice implementation accounted for the majority of phosphorus reductions in Vermont.

VAAFM anticipates the continuation of this program above its current capacity into the FY 2022 and beyond. VAAFM and its partners anticipate additional funding for the FAP program for FY 2022 and FY 2023 through agreements and funding proposals with ANR Department of Environmental Conservation with funding through the LCBP. This will continue to augment the program's existing budget and enable increased implementation of agronomic practices across Vermont.

Figure 16. FAP Program trends FY 2017 – FY 2020

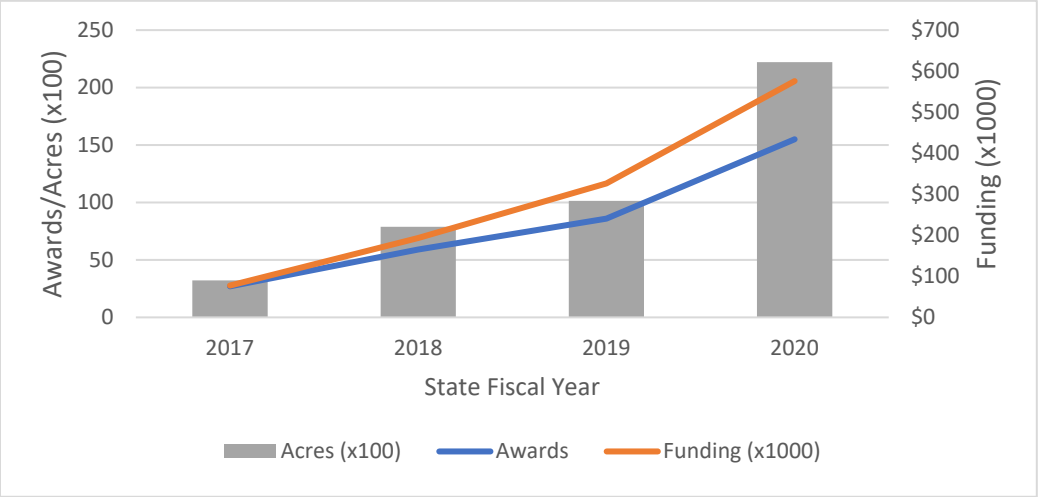


Figure 16. FAP Program trends FY 2017 – FY 2020 above shows the increased implementation of agronomic practices and increased participation through the State's FAP program. Requests for assistance have increased exponentially in the last several years as outreach, education, and resources for implementing these practices are leading to widespread adoption. This increase may also be attributed to a higher rate of agronomic practice adoption by farmers and expiring NRCS EQIP contracts that fund these practices at a higher rate, but often only for three years.

Field Agronomic Practice (FAP) Program Grantee Spotlight:
Royer Family Farm -- Cover Crop

Royer Family Farm has planted their crops completely no-till since 2016. With the assistance of Jeff Sanders, an Agronomy Specialist from University of Vermont Extension, the farm interseeds a diverse cover crop mix, including radishes, grasses, winter rye, and clover, on their corn acres. The farm's cover cropping was funded through the FAP program in 2020.

Since starting her cover cropping and no-till system, Lori Royer has seen much less erosion and richer soil on the family farm. "My soils are better, my crop yield is better. It's proven itself," she shared. She also finds that cover crops help with weed control, and have improved her heavy wet soils to the point that she no longer gets stuck as regularly in wet spots while chopping.

Lori Royer appreciates the Farm Agronomic Practice (FAP) program because it helps pay for the cover crop seed. This payment makes it more possible for her to continue using this practice, which she knows provides such great benefits for her farm and soil.

"If you hold your **soils** where **they belong**, they're not **leaching** into your water system and the **nutrients** stay where **you need them**."

– Lori Royer, owner and operator of Royer Family Farm

By the numbers:

$2700 awarded

103 acres cover cropped in 2019

~67lb P reduced from cover crop implemented in FY2020 (estimated)

Grassed Waterway and Filter Strip Program

The Grassed Waterway and Filter Strip (GWFS) Program can provide technical and financial assistance to Vermont farmers for in-field agronomic best practices to address critical source areas, erosion, and surface runoff. This program provides compensation to farmers via incentive payments for participation ($500/acre) and cost-share to cover 90% of the installation costs for establishing perennially vegetated grassed waterways, filter strips, and forage and biomass seedings, and associated infrastructure if necessary, on agricultural cropland adjacent to surface waters and ditches (6 V.S.A. § 4831). In order to streamline reporting requirements for this program within the set reporting requirements for 'Subchapter 003 : Water Quality; Financial And Technical Assistance' (6 V.S.A. § 4825), the authorizing legislation for this program was relocated without any changes from 6 V.S.A. § 4900 to 6 V.S.A. § 4831. Contrary to similar existing financial assistance programs, the benefit of this program is that all the practices implemented under GWFS can be harvested.

For more information about the GWFS Program, including practice eligibility and application information, visit: agriculture.vermont.gov/gwfs.

GWFS FY 2020

In FY 2020, a total of $25,865 of State funding was awarded to two farmers in the Otter Creek and Missisquoi Bay watersheds. A total of $15,495 was expended in FY 2020 enabling conversion of 14.18 acres of critical source land to be seeded and converted from annual crop land to harvestable perennial grassland with limited manure application for a ten-year practice lifespan. This acreage included six practices total; two forage and biomass plantings and four grassed waterways. FY 2020 expenditure includes implementation of individual practices from FY 2019 and FY 2020 grant awards. Some FY 2020 grant awards and planned practices remain active.

GWFS FY 2021

In FY 2021, as of December 1st, a total of $11,250 of State funding has been awarded to one farm in the Rock River watershed. At the time of this report writing, four lined waterways or outlets have been installed to stabilize gully erosion in fields, and 44 acres of perennial planting maintained in areas surrounding the lined waterways, with an additional planting prepared for spring to finalize the project.

GWFS FY 2022 & Beyond

The GWFS program has been available for Vermont farmers for three years. Grassed Waterways are often a difficult conservation practice to manage for operations that rotate their fields through corn and hay, and often a difficult practice to persuade operators and landowners to implement. Vermont farm fields are small, often making it a better use of field space to convert the entire field to perennial crop, especially if a field area is contributing a high proportion of soil, sediment or pollution to nearby waterways. More success has been observed with seeding critical source areas as forage and biomass plantings as well as filter strips under this program.

Enrollment in the program has remained low in the last three years. In FY 2020 and continuing into FY 2021, VAAFM has started to evaluate the program and gather feedback from farmers and partners to

better understand the low enrollment and interest. Based on this evaluation, VAAFM anticipates making revisions to the program, including modified branding, outreach, and educational materials to make the program more palatable for the agricultural community. VAAFM anticipates continuing and expanding the GWFS program through these efforts.

Pasture Surface Water Fencing

The Pasture and Surface Water Fencing (PSWF) Program (the Program) provides technical and financial assistance to Vermont farmers to improve water quality through improved and expanded pasture management, as well as on-farm livestock exclusion from surface waters statewide. Technical assistance available to farmers under this program addresses and mitigates water quality concerns on their farms. The goal of this Program is to increase participant understanding of best pasture management practices for water quality, identify water quality improvement projects, in addition to providing 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 the Conservation Reserve Enhancement Program (CREP) and NRCS's Environmental Quality Incentives Program (EQIP). Providing pasture management assistance and grazing assistance where water quality benefits can be realized from improved management is also a large component of this Program.

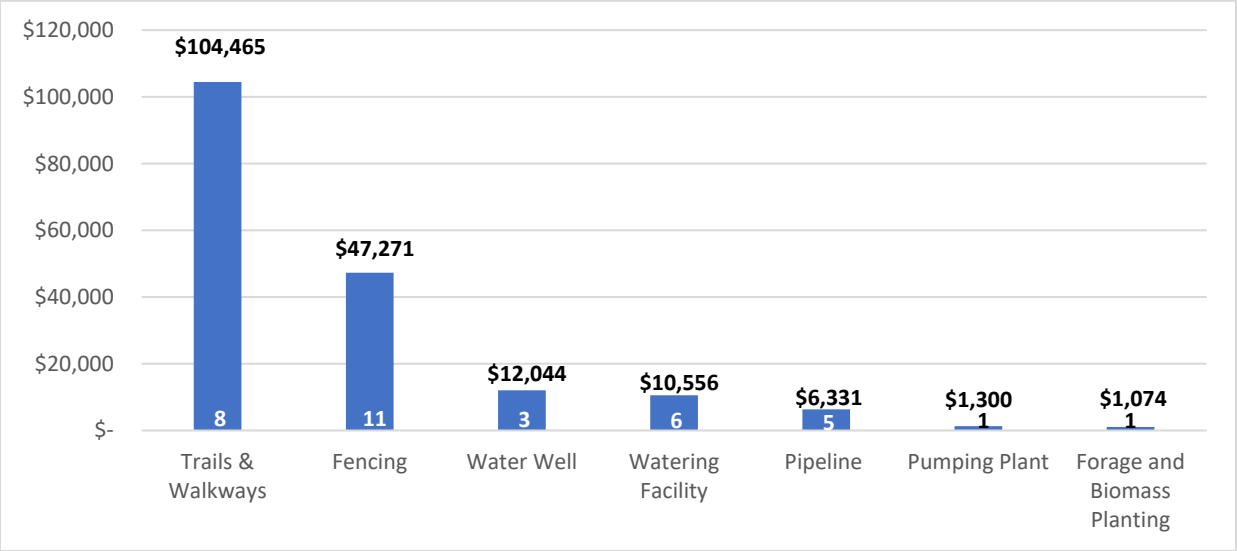
For more information about the PSWF Program, including practice eligibility and application information, visit: agriculture.vermont.gov/pswf.

PSWF FY 2020

The PSWF program was developed and launched in FY 2018. Through December 2020, the administration of the Program had been contracted to University of Vermont (UVM) Extension's Center for Sustainable Agriculture Pasture Program, while VAAFM staff provided technical and administrative support for practice implementation and managed grant awards. The program has been heavily focused on outreach, education, and project planning. As a result, the rate of implemented projects and grant awards increased considerably in FY 2020, the third year of this program.

In FY 2020, a total of $326,300 in State funds were awarded to 19 farms compared to 4 grant awards in FY 2019. Additionally, $183,040 in State funds were expended to leverage $51,027 in federal expenditures, as well as $42,535 in cost-share contributions from agricultural landowners to implement conservation practices. FY 2020 State expenditures include practice payments for fencing, forage and biomass plantings, water pipeline, water pumping plants, trails and walkways, water wells, and watering facilities. Figure 17 below summarizes FY 2020 state expenditures and number of implemented practices by conservation practice type. Some FY 2020 grant awards remain active and are not included in total FY 2020 expenditure or practice completion figures.

Figure 17. FY 2020 PSWF Expenditure and Implemented Practices by Conservation Practice Type



PSWF FY 2021

As of December 15th, in FY 2021, a total of $41,500 of State funding has been awarded through six grants to farmers in the Headwaters Dog River, Willoughby Brook-Barton River, East Creek, Upper Lemon Fair River, Mud Creek, and Stevens River watersheds. As of December 15th, in FY 2021, $61,017.03 total State funds have been expended on completed practices from these and prior year grants. Completed practices include trails and walkways, interior paddock temporary fence & electric fence chargers, water wells, stream crossings, watering facilities, livestock pipelines, and fencing.
In light of the COVID-19 pandemic and reduced funding available to grant programs in FY 21, the Agency elected to address these funding challenges in the PSWF Program by establishing rate caps for varying practices, in addition to an overall individual grant cap of $15,000 for FY21.

PSWF FY 2022 & Beyond

With many projects in the planning and initial installation/granting phase of this Program, VAAFM predicts that the rate of implemented projects and grant agreements will continue to increase in subsequent years as long as funding remains available.

Looking Ahead

Looking ahead, VAAFM anticipates continued demand for agricultural technical and financial assistance. Despite the challenging economic situation for farming with fluctuating milk and commodity prices and the impacts of COVID-19, farmers continue to demonstrate their commitment to adoption of conservation practices and improving water quality. VAAFM will need to continue serving the agricultural community to meet technical and financial assistance needs while improving process and efficiency. Currently, VAAFM supports financial and technical assistance for implementation of conservation practices through the programs described in this report: BMP Program, CREP, CEAP, FAP, GWFS Program, and PSWF Program. These programs provide opportunities to significantly offset costs for Vermont farmers and agricultural landowners to implement conservation practices and best management practices that improve water quality on farms in the State of Vermont. Additionally, these programs are becoming more and more foundational in leveraging and partnering with other funding sources and agricultural partners to ensure projects move from planning and development to implementation. This will be especially important in the coming years as farms consider their tight profit margins and continue progress on implementing farmstead projects as required by the RAPs.

To assist with project coordination between agricultural partners and tracking State, Federal, and farmer funded conservation practice planning and implementation, VAAFM launched the Multi-Partner Agricultural Conservation Practice Tracking and Planning Geospatial Database (Partner Database) and the related Quality Assurance Project Plan in FY 2019. Conservation practice data exports from the Partner Database are entered into the VT DEC's Clean Water Reporting Framework and nutrient pollution reductions are estimated using the BMP Accounting and Tracking Tool (BATT) each fiscal year. Estimated nutrient pollution reductions are used to track and report on progress in meeting the State's water quality standards, including the phosphorus Total Maximum Daily Loads (TMDL) for the Lake Champlain and Lake Memphremagog basins.

In the current climate of low milk prices and the decline of institutional buying for all Vermont farmers, funding for education, outreach, technical assistance, and practice implementation is essential to support voluntary conservation on private agricultural land. The VAAFM water quality technical and financial assistance programs are a cornerstone to providing farmers with the resources needed to meet Vermont water quality goals. Looking ahead, VAAFM is committed to continuing these programs and partnering with farmers and the agricultural community to meet Vermont water quality goals and ensure viability of Vermont's farming landscape.

For more information on the Vermont Agency of Agriculture, Food & Markets Water Quality Division grant opportunities, regulations, or educational opportunities visit Agriculture.Vermont.gov, or call 802-828-2431.

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