COVID-19 Impacts on AAFM WQ Division

Laura DiPietro
Water Quality Division Director
Vermont Agency of Agriculture, Food and Markets
Vermont Citizens Advisory Committee (VTCAC) Meeting
November 9, 2020
COVID-19 Impacts on Inspection

• During the stay home order staff did not perform inspections, however complaints were still followed up on.

• Phase 1 reopening (April 24) staff followed up on prior enforcement actions and programmatic concerns.

• Phase 2 reopening (June 2) staff prioritized inspections to ensure we could meet statutory requirements given the shorten period due to covid:

• All main facilities where feed and milking animals are housed

• All additional facilities with programmatic or enforcement follow ups
Staff Changes in COVID-19

Hiring freeze went into effect under covid.

• Three vacancies were involved: 1 Engineer in Middlebury, 2 Inspectors.
• Freeze recently released these positions, currently hiring 2 Inspectors and posting Engineer soon.

Restructuring within Division

• Permitting/TSP Certification and Inspection Split
• Shift more staff from CSFO to MFO/LFO as we rehire
Enforcement during COVID-19

• 41 cases enforced by VAAFM

• 17 referrals to DEC
  • 6 SFO’s
  • 3 CSFO’s
  • 4 MFO’s
  • 3 LFO’s

• Quarterly meetings with AGO Continue

• 12 referrals either jointly or through DEC that AGO is working on from VAAFM field work
Future in Agriculture
Vermont’s Healthy Soils & Payment for Phosphorus Program
The number of ‘marketable’ trees in the Champlain Valley by 1840.

From: Mike Winslow, A Natural and Human History of Lake Champlain. VJEL Vol. 17 p. 492
• Clearing trees for lumber and potash transformed Vermont.

• 1791: Vermont exported 2 million pounds of Potash to Great Britain.

  • 1823 the Champlain Canal was constructed.

• Burlington was the 3rd largest lumber port in the U.S. by the mid-1800s.

• By the late 19th Century, Vermont was 70% Cleared and 30% forested.
70% to 16%

Change from Late 1800’s open land to Agricultural land in the Champlain Valley by 2012.

From: Mike Winslow, A Natural and Human History of Lake Champlain. VJEL Vol. 17 p. 492
The Vermont Statehouse

Vermont Context

Legend:
- Stormwater_Impaired_Watersheds
- 303d_LakesPonds
- 303d_RiversStreams
- PriorityLakePond
- Priority_RiverStream
- Rivers
- Lake Champlain
- Counties
- Vermont Boundary

Land Cover:
- Corn/Field/Soybean
- Bare
- Forest
- Developed
- Cropland_cultivated/idle
- Grass/Pasture
- Wetlands
- Open Water: Water
- Grassland/Shrubland

Vermont Context

Lessons learned from the past 20 years

Phosphorus levels in the lake are above the allowable standards.

Vermont has taken many important actions, especially in the last 10 years.

Cleaning up the lake ecosystem is complex and recovery will take time.

We need to do a lot more.

Vermont Context

Base Load
631 Metric Tons/year

- WWTF: 25 MT/yr (4%)
- Stream bank: 180 MT/yr (21%)
- Developed: 110 MT/yr (18%)
- Forest: 101 MT/yr (16%)
- Agriculture: 261 MT/yr (41%)

Vermont Reduction
Required=213 mt/yr (34%)

- MOS: 21 MT/yr (9%)
- Stream bank: 72 MT/yr (17%)
- WWTF: 32 MT/yr (8%)
- Developed: 93 MT/yr (22%)
- Forest: 82 MT/yr (20%)
- Agriculture: 110 MT/yr (28%)

TMDL Loading Capacity and Allocations
418 Metric Tons/yr
## TABLE 1 - VERMONT PHASE 1 TMDL PLAN SUMMARY OF VERMONT COMMITMENTS.

*Tasks correspond with the Gantt Chart.*

<table>
<thead>
<tr>
<th>Task *</th>
<th>Description</th>
<th>Start Year</th>
<th>End Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. AGRICULTURE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water Quality Permitting Programs – LFO, MFO, CAFO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspect potential CAFOs</td>
<td>Inspect medium and large farms that could potentially be CAFOs with newly developed VT CAFO permit Inspect 75 potential CAFOs annually</td>
<td>2014</td>
<td>2018</td>
</tr>
<tr>
<td>Inspect MFOs and LFOs</td>
<td>MFOs currently inspected a minimum of every 3 years and LFOs annually MFO inspections increase to a minimum of every 3 years</td>
<td>2014</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Update agricultural enforcement MOU</strong></td>
<td>Update the MOU between DEC and AAFM regarding enforcement of agricultural regulations and program coordination</td>
<td>2015</td>
<td>2016</td>
</tr>
<tr>
<td><strong>Accepted Agricultural Practice Rule Update and Compliance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amend the Accepted Agricultural Practices</td>
<td>Amend the AAPs to become the Required Agricultural Practices through rulemaking. Role changes will include:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Develop small farm certification program</td>
<td>2015</td>
<td>2016</td>
</tr>
<tr>
<td></td>
<td>• Increased and consistent buffer sizes to 25’ from 10’</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Increased erosion tolerances to all farms to T (from 2T)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 10’ buffer requirements for field ditches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Required stabilization of field gully erosion Strengthening the livestock exclusion requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Develop and require certification of custom manure applicators and ongoing training Develop and require educational trainings for farmers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expand RAP education and outreach</td>
<td>Begin intensive education and outreach and enforcement of revised Required Agricultural Practices</td>
<td>2014</td>
<td>2018</td>
</tr>
<tr>
<td>Develop the Small Farm Inspection program</td>
<td>Hired first SFO inspector (2014) focusing on Missisquoi Bay and St. Albans Bay Hire three additional inspectors</td>
<td>2013</td>
<td>2014</td>
</tr>
<tr>
<td>Increase SFO dairy inspections</td>
<td>Complete evaluation of all farms in Missisquoi Bay and St. Albans Bay watersheds and require BMP installation where needed Complete evaluation of all small dairies in South Lake and require BMP installation where needed Complete evaluation of all small dairies and</td>
<td>2015</td>
<td>2016</td>
</tr>
</tbody>
</table>

### Nutrient Management Planning

- **Increase NMP efforts**
  - Develop small farm NMP matrix and small farm template
  - Provide increased cost-share funds for NMP development
  - Expand small farm NMP development courses and workshops, trainings for farmers, manure applicators and technical service providers
  | | 2016 | 2017 |
  | | 2018 | 2016 |
  | | 2016 | 2016 |

- **Mandate manure applicator certification**
  - Mandate certification of custom manure applicators
  | | 2016 | 2016 |

- **Improve field practice implementation**
  - Support partners focusing on key areas of field practices
  - Support farmer groups
  - Increase participation in CREP program
  | | 2017 | 2016 |
  | | 2017 | 2016 |

- **Revise RAPs to address tile drains**
  - Revise RAPs to include requirements to reduce nutrients from tile drains
  | | 2018 | 2016 |
  | | 2018 | 2016 |

### Additional Efforts in Critical Watersheds

- **Increase inspections in critical watersheds**
  - Target CAFO and SFO inspections
  - Conduct North Lake Farm Survey in Missisquoi Bay and St. Albans Bay watersheds
  - Expand this comprehensive evaluation to other critical watersheds
  | | 2014 | 2015 |
  | | 2015 | 2016 |
  | | 2016 | 2017 |

- **Increase implementation in critical watersheds**
  - Prioritize personnel in these areas for water quality improvement projects
  - Use $16M RCPP grant funding to implement high priority practices primarily in these watersheds
  | | 2014 | 2016 |
  | | 2015 | 2017 |
  | | 2016 | 2018 |

- **Increase technical assistance**
  - Hire consultants on retainer to immediately work with farmers following site-specific farm assessment
  - Target education and support for farmer groups
  | | 2015 | 2016 |
  | | 2015 | 2017 |

- **Develop and pilot ESP**
  - Develop and pilot the Environmental Stewardship Program to incentivize additional practice adoption
  | | 2015 | 2016 |
  | | 2015 | 2017 |

- **Develop and pilot nutrient trading program**
  - Evaluate feasibility of nutrient trading and pilot a trading program
  | | 2016 | 2017 |

- **Create grassed waterway projects**
  - Target funding to critical source areas in coordination with partners
  | | 2016 | 2017 |

- **Tide drain research**
  - NRCS grant funding testing of two treatment media for tile drain outflows on farms in Franklin county. Encouraging farmers to utilize NRCS Edge of Field Monitoring practice to test additional tile treatment options
  | | 2015 | 2016 |
  | | 2017 | 2018 |
September 3, 2020

Julia S. Moore, Secretary
Vermont Agency of Natural Resources
1 National Life Drive, Davis Bldg.
Montpelier VT 05600-3901

Anson Tebbets, Secretary
Vermont Agency of Agriculture, Food and Markets
116 State Street
Montpelier, VT 05620-2901

Peter Walke, Commissioner
Vermont Department of Environmental Conservation
1 National Life Drive, Davis Bldg.
Montpelier VT 05600-3520

Re: Lake Champlain TMDL Implementation Final Report Card for Phase 1 Milestones

Dear Secretary Moore, Secretary Tebbets, and Commissioner Walke,

EPA committed to periodically evaluate Vermont’s progress toward completion of its Lake Champlain Phosphorus TMDL Phase 1 implementation obligations. As you know, the 2016 TMDL includes an Accountability Framework containing 28 Phase 1 milestones to be completed by the end of 2017. EPA issued the State a provisional pass in April 2018 based on the successful completion of 25 of the 28 milestones and the State’s commitment to complete the remaining three milestones the following year. With its recent issuance of the Three-Acre Stormwater Permit, Vermont has successfully completed all Phase 1 Accountability Framework milestones.

The completion of the Phase 1 milestones (as documented in the attachment) sets the wheels in motion for restoration of the Lake in the years to come. These milestones are key foundational building blocks, including, among other things, the adoption of new Required Agricultural Practices to reduce phosphorus from agricultural sources, the issuance of a series of new stormwater permits to reduce phosphorus from developed land, the establishment of a long-term
Figure 7. Total dollars awarded to clean water projects through State of Vermont agencies. SFY 2016-2019 by land use sector.
FY2019 PROGRAM IMPACT:

8,541 ATTENDEES
REACHED THROUGH EDUCATIONAL EVENTS

627.3 HOURS
OF EDUCATIONAL OPPORTUNITIES FOR VT FARMERS

230 EVENTS
EDUCATIONAL EVENTS HELD STATEWIDE

1,448 TA VISITS
BY VAAFM STAFF AND PARTNERS

Map of VT showing TA visits by HUC12 and the number of outreach and education events by town. Darker blue regions received more TA, and bubbles are proportional to education and outreach events in each town. TA from VAAFM staff is not included.
Technical & Financial Assistance

11,490 ACRES
IMPROVED THROUGH FUNDED PRACTICES
85 PRACTICES
STRUCTURAL PRACTICES FUNDED AND INSTALLED
$3.7 MILLION
STATE EXPENDITURE FOR IMPLEMENTATION
$2.5 MILLION
FEDERAL EXPENDITURE LEVERAGED
NEARLY $1 MILLION
INVESTED BY VERMONT FARMERS

Above - Waste Storage Facility implemented voluntarily on a beef CSFO in Benson through Vermont’s BMP Program. Below - Clean Water Project Sign displayed adjacent to farm sign during
Inspection & Enforcement

**SUMMARY OF ENFORCEMENT ACTIONS AND REFERRALS 2016-2019**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>INVESTIGATIONS &amp; INSPECTIONS</th>
<th>FARMS RECEIVING ENFORCEMENT ACTIONS</th>
<th>REFERRALS TO ATTORNEY GENERAL'S OFFICE</th>
<th>REFERRALS TO AGENCY OF NATURAL RESOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016*</td>
<td>379</td>
<td>38</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2017*</td>
<td>505</td>
<td>82</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>2018</td>
<td>652</td>
<td>101</td>
<td>7</td>
<td>32</td>
</tr>
<tr>
<td>2019</td>
<td>571</td>
<td>98</td>
<td>6</td>
<td>38</td>
</tr>
</tbody>
</table>

*Data reported for 2016 and 2017 reflect calendar year reporting, 2018-2019 data reflects State Fiscal Year data.

**FISCAL YEAR 2019 FARM VISITS AND ENFORCEMENT BY FARM SIZE**

- **34 LFOS**
- **114 MFOS**
- **310 CSFOS**

**NUMBERS OF OPERATIONS OF VARYING SIZES PERMITTED WITH VAAFM**

- **91 APPLICATORS**
  - CERTIFIED CUSTOM MANURE APPLICATORS

- **1240 FARM VISITS**
  - FOR WATER QUALITY INSPECTION AND TECHNICAL ASSISTANCE

- **115 ENFORCEMENT ACTIONS**
  - ASSOCIATED WITH 179 ALLEGED VIOLATIONS
Figure 39. Annual estimated total phosphorus load reduction (metric tons per year) achieved by clean water projects that support implementation of the Lake Champlain TMDL completed SFY 2016-2019, by federal

Figure 40. Lake Champlain TMDL total phosphorus load baseline (2001-2010), quantified estimated total phosphorus load reductions achieved through federal funding, state funding, and regulatory programs (SFY 2016-2019 reporting period), and target phosphorus load (2038) in metric tons per year.”
5.4 CONSIDERATION OF CLIMATE CHANGE

EPA considered climate change to the extent feasible. As described in Section 5.1.2, EPA’s contractor, Tetra Tech, used the calibrated Lake Champlain SWAT model to project mid-century potential changes to phosphorus loads to the lake with six different precipitation and temperature projections derived from global climate change models. The model runs projected a possible overall average increase in phosphorus loading of approximately 30% for the period 2040 – 2070, assuming other factors remain the same. However, there are a variety of reasons why the results of this approach to projecting climate change impacts should be viewed with caution. First, as discussed in Vermont’s Phase 1 Implementation

Figure 9 | Freeze-over of Lake Champlain, 1906–2018

Source: NOAA NWS Burlington
Current vs. Revised: Avg. Precipitation

Northeast Annual Precip.: +4.15”/century (1895-2013)

Last 30 yrs:
- Northeastern VT: 9”
- Western VT: 7”
- Southeastern VT: 5”

Source: Joshua Faulkner, UVM Extension; NOAA
Vermont’s Definitions

6 V.S.A. § 4962(2) "Regenerative farming" means a series of cropland management practices that:
(A) contributes to generating or building soils and soil fertility and health;
(B) increases water percolation, increases water retention, and increases the amount of clean water running off farms;
(C) increases biodiversity and ecosystem health and resiliency; and
(D) sequesters carbon in agricultural soils.

6 V.S.A. § 4802(4) "Healthy soil" means soil that has a well-developed, porous structure, is chemically balanced, supports diverse microbial communities, and has abundant organic matter.
1. Disturb the soil as little as possible
2. Grow as many different species of plants as practical
3. Keep living plants in the soil as much as possible
4. Keep the soil covered year-round

HEALTHY SOILS ARE: high in organic matter.
# Examples of Soil Health Practices

**Conservation Crop Rotation**  
Growing a diverse number of crops in a planned sequence in order to increase soil organic matter and biodiversity in the soil.

**What does it do?**  
- Increases nutrient cycling  
- Manages plant pest (weeds, insects, and diseases)  
- Reduces sheet, rill, and wind erosion  
- Holds soil moisture  
- Adds diversity so soil microbes can thrive

**How does it help?**  
- Maximizes nutrients  
- Decreases use of pesticides  
- Improves water quality  
- Conserves water  
- Improves plant production

**Cover Crop**  
An un-harvested crop grown as part of planned rotation to provide conservation benefits to the soil.

**What does it do?**  
- Increases soil organic matter  
- Prevents soil erosion  
- Conserves soil moisture  
- Increases nutrient cycling  
- Provides nitrogen for plant use  
- Suppresses weeds  
- Reduces compaction

**How does it help?**  
- Improves crop production  
- Improves water quality  
- Conserves water  
- Maximizes nutrients  
- Decreases use of pesticides  
- Improves water efficiency to crop

**No Till**  
A way of growing crops without disturbing the soil through tillage.

**What does it do?**  
- Improves water holding capacity of soils  
- Increases organic matter  
- Reduces soil erosion  
- Reduces energy use  
- Decreases compaction

**How does it help?**  
- Improves water efficiency  
- Conserves water  
- Improves crop production  
- Improves water quality  
- Saves renewable resources  
- Improves air quality  
- Increases productivity

Source: USDA NRCS
Examples of Soil Health Practices

**Mulch Tillage**
Using tillage methods where the soil surface is disturbed but maintains a high level of crop residue on the surface. 
- Reduces soil erosion from wind and rain
- Increases soil moisture for plants
- Reduces energy use
- Increases soil organic matter
- Improves water quality
- Conserves water
- Saves renewable resources
- Improves air quality
- Improves crop production

**Mulching**
Applying plant residues or other suitable materials to the soil surface to compensate for loss of residue due to excessive tillage.
- Reduces erosion from wind and rain
- Moderates soil temperatures
- Increases soil organic matter
- Controls weeds
- Conserves soil moisture
- Reduces dust
- Improves water quality
- Improves plant productivity
- Increases crop production
- Reduces pesticide usage
- Conserves water
- Improves air quality

**Nutrient Management**
Managing soil nutrients to meet crop needs while minimizing the impact on the environment and the soil.
- Increases plant nutrient uptake
- Improves the physical, chemical, and biological properties of the soil
- Budgets, supplies, and conserves nutrients for plant production
- Reduces odors and nitrogen emissions
- Improves water quality
- Improves plant production
- Improves air quality

**Pest Management**
Managing pests by following an ecological approach that promotes the growth of healthy plants with strong defenses, while increasing stress on pests and enhancing the habitat for beneficial organisms.
- Reduces pesticide risks to water quality
- Reduces threat of chemicals entering the air
- Decreases pesticide risk to pollinators and other beneficial organisms
- Increases soil organic matter
- Improves water quality
- Improves air quality
- Increases plant pollination
- Increases plant productivity

Source: USDA NRCS
Healthy soil has amazing water-retention capacity. Every 1% increase in organic matter results in as much as 25,000 gal of available soil water per acre.

Source: Kansas State Extension Agronomy e-Updates, Number 357, July 6, 2012

Want more soil secrets? Check out www.nrcs.usda.gov
Why Soil Health is Important

Source: USDA NRCS
Why Soil Health is Important

Continuously Grazed Pasture

Rotationally Grazed Pasture

Tilled Soil

Multi-species Covercrop

Source: USDA NRCS
Ecosystem Services

Source: Taylor Ricketts, Gund Institute, UVM
Sec. 3. SOIL CONSERVATION PRACTICE AND PAYMENT FOR ECOSYSTEM SERVICES WORKING GROUP

(a) The Secretary of Agriculture, Food and Markets shall convene a Soil Conservation Practice and Payment for Ecosystem Services Working Group to recommend financial incentives designed to encourage farmers in Vermont to implement agricultural practices that exceed the requirements of 6 V.S.A. chapter 215 and that improve soil health, enhance crop resilience, increase carbon storage and stormwater storage capacity, and reduce agricultural runoff to waters. The Working Group shall:

VT LEG #342623 v.1
Indigo Agriculture's bold plan to reward farmers for burying 1 trillion tons of CO2 in soil

Meg Wilcox
Thursday, June 13, 2019 - 2:00am

Ecosystem Services Market Consortium
Credits Farmers for Caring for the Environment

The Ecosystem Services Market (ESM) will enable farmers to use improvements in soil health—the key to water conservation and soil carbon sequestration—to generate ecosystem-service credits that they will be able to sell.

NEW MARKET PLANNED TO PAY FARMERS FOR SOIL CARBON, WATER QUALITY

By Virginia Gewin
3/6/2019

General Mills, ADM, Cargill, McDonald’s, and The Nature Conservancy are among 10 companies and nonprofit organizations that are forming a national market by 2022 to incentivize the adoption of farming practices that build soil carbon and improve water conservation.

FFAR Joins Consortium to Establish Ecosystem Markets for Agriculture

November 14, 2019

WASHINGTON – Climate change is threatening food security and farmer livelihoods, however, implementing climate-smart farming practices that reduce emissions will help farmers thrive—not just survive. The Foundation for Food and Agriculture Research (FFAR) contributed $10.3 million to the Ecosystem Services Market Research Consortium (ESMRC) to establish a $20 million research arm for the Ecosystem Services Market Consortium, an innovative collaboration that is creating a functional ecosystem services market that will launch and be fully operational in 2022. The ecosystems market will pay and recognize farmers and ranchers who adopt conservation management practices that improve soil health and water usage and reduce greenhouse gas emissions; this research consortium will provide the research necessary to create a scaled, efficient, cost-effective marketplace that works for farmers and ranchers.
Membership of the working group, appointed by the Secretary of Agriculture, includes the following individuals and organizations:

- Alyson Eastman - Chair, Vermont Agency of Agriculture, Food & Markets
- Nancy Everhart - Vice Chair, Vermont Housing and Conservation Board
- Jill Arace, Vermont Association of Conservation Districts
- Cat Buxton, Vermont Healthy Soils Coalition
- Paul Doton, Connecticut River Watershed Farmers Alliance
- Vicky Drew, USDA Natural Resources Conservation Service - Vermont
- Eric Howe, Lake Champlain Basin Program
- Brian Kemp, Champlain Valley Farmer Coalition
- Maddie Kempner, Northeast Organic Farming Association of Vermont
- Taylor Ricketts, Gund Institute for Environment - The University of Vermont
- Chuck Ross, University of Vermont Extension
- Marli Rupe, Vermont Department of Environmental Conservation
- Tyler Webb, Franklin and Grand Isle Farmer’s Watershed Alliance

Program vs. Market Mechanism

Public goods
Private decisions
Externalities

Mongabay.com
The Working Group developed a collective view of the future:

The Working Group envisions a system in which farmers are hired to use their ingenuity and know-how in caring for the land to rebuild Vermont’s natural capital.

The Working Group concluded it should and can catalyze a paradigm shift in how farmers are acknowledged and empowered to perform their essential roles of environmental stewardship, as well as providing food and fiber. However, investment and capital, as well as technological, programmatic, and market developments that do not currently exist are essential to making this transformative change possible.
• During Tropical Storm Irene in 2011, floodplains and wetlands diminished damages in Middlebury, VT, by 84 to 95 percent – saving potentially as much as $1.8 million in flood damages.

• Middlebury saves an annual average of $126,000 to $450,000 in damages due to the Otter Creek floodplain, which reduced damages by 54 to 78 percent, on average, across 10 flooding events.

Source: Keri Bryan Watson, Gund Institute, UVM
### AGRICULTURE PROJECT OUTPUTS

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres of agricultural land treated by conservation practices</td>
<td>5,466</td>
<td>3,261</td>
<td>7,908</td>
<td>10,678</td>
<td>27,313</td>
</tr>
<tr>
<td>Acres of agricultural land treated by forest and grass buffers</td>
<td>258</td>
<td>200</td>
<td>228</td>
<td>–</td>
<td>686</td>
</tr>
<tr>
<td>Acres of pasture with livestock excluded from surface waters</td>
<td>258</td>
<td>117</td>
<td>97</td>
<td>–</td>
<td>472</td>
</tr>
<tr>
<td>Number of barnyard and production area practices installed</td>
<td>57</td>
<td>90</td>
<td>85</td>
<td>52</td>
<td>284</td>
</tr>
<tr>
<td>Acres of water quality protections within newly conserved agricultural lands</td>
<td>–</td>
<td>116</td>
<td>200</td>
<td>482</td>
<td>798</td>
</tr>
<tr>
<td>Estimated acres of agricultural land treated through equipment</td>
<td>–</td>
<td>2,043</td>
<td>6,594</td>
<td>7,765</td>
<td>16,402</td>
</tr>
</tbody>
</table>

### AGRICULTURE POLLUTANT REDUCTION

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total phosphorus load reduction (kilograms per year)</td>
<td>713</td>
<td>853</td>
<td>1,352</td>
<td>2,698</td>
</tr>
</tbody>
</table>

Estimated phosphorus reductions based on projects implemented SFY 2016-2019

Projected reductions based on lifespan of projects implemented SFY 2016-2019

USDA NRCS Awarded $7million in 2020 to VAAFM to implement the VPFP Program
Pay-For-Phosphorus is an innovative pay-for-performance approach that pays farmers for the pounds of phosphorus reduced by implementing conservation practices, as opposed to paying farmers a portion of the cost to install a practice.

- **Pays on results** improving cost-effectiveness and accelerating implementation
- **Flexibility for farms** to manage fields how they choose
- **Complements** existing State and Federal assistance programs (e.g. EQIP, FAP)
- **Statewide** voluntary program available to eligible farms
- **Incentive payments** for program enrollment regardless of farm performance
Goals

- **TMDL reductions and stewardship**
  - This program will serve Vermont’s need to reduce phosphorus loading under the TMDL while compensating and incentivizing farmers for beneficial land stewardship.

- **Farmer buy-in**
  - Farmers need autonomy over their land management decision-making and degrees of participation.
  - Farmers desire fairness: farmers’ stewardship efforts will be appropriately valued, and a variety of farm sizes and land use types will be eligible for payment.

- **Verifiable, measurable, location-specific outcomes**
  - The system will be designed with accurate, quantifiable, location-specific outcomes and payments that are directly tied to a positive value for the state.

- **Equity and Efficiency of program funding**
  - The system will be equitable across geographic location, farm size, and length of time as land stewards while efficiently directing funding in a way that provides the most value to the public and to the farmer.
  - There are inherent trade-offs, but with flat baselines and equal payment rates across the state, yet ranking priority within funding pools, a compromise will be reached between these goals.

- **Additionality of stewardship**
  - Farmers will be paid for voluntary stewardship that goes above and beyond their baseline levels of stewardship (i.e. TMDL P-reductions).

- **Sufficiency of payment**
  - Payment level will be sufficient to compensate farmers both for their stewardship and for their efforts to gather data and input it into the system.
  - Payment schedule will be fair, reduce risk to both the funder and the farmer, and acknowledge the upfront effort/costs of participation and the length of outcome benefits.
Implementation of a Farm Phosphorus Management Optimization Web-based Tool in the Vermont Portion of the Lake Champlain Basin
**Base Farm P Runoff** will be modeled based on historic TMDL management scenarios and will act as the baseline from which P runoff reductions are calculated.

Reductions can be achieved via improved nutrient management or conservation practices.

**Base Reductions/Threshold** corresponds to the P reductions that are estimated to be met through for the TMDL.

**Additional Reductions** beyond the threshold will be paid through the VPFP program based on a set price per pound of P.

**Current Farm P Runoff** based on a farm’s current management.
### Current Conditions Results - P Reduction Target: 0%

<table>
<thead>
<tr>
<th>Farm Practices Scenario</th>
<th>Total P Reduction from Baseline (%)</th>
<th>Total P Reduction from Current (%)</th>
<th>Total P (lbs/ac)</th>
<th>Soluble P (lbs/ac)</th>
<th>Sediment P (lbs/ac)</th>
<th>Tile P (lbs/ac)</th>
<th>P Input Reduction (%)</th>
<th>Compare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline:</td>
<td>3.35</td>
<td>1.38</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>✔</td>
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<tr>
<td>Current:</td>
<td>18.95</td>
<td>1.16</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Farm Practices Scenario</th>
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<th>Sediment P (lbs/ac)</th>
<th>Tile P (lbs/ac)</th>
<th>P Input Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1_Corn</td>
<td>15.62</td>
<td>9.83</td>
<td>5.4</td>
<td>4.43</td>
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<td>0</td>
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<tr>
<td>F2_Corn</td>
<td>30.15</td>
<td>0.95</td>
<td>0.57</td>
<td>0.38</td>
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<tr>
<td>F3_Corn+Nay</td>
<td>28.13</td>
<td>0.46</td>
<td>0.36</td>
<td>0.1</td>
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<tr>
<td>F4_Corn+Nay</td>
<td>28.05</td>
<td>0.59</td>
<td>0.42</td>
<td>0.17</td>
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</tbody>
</table>

### Soils

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Hydrologic Soil Group</th>
<th>Slope (%)</th>
<th>Slope Length (ft)</th>
<th>Modified Morgans Soil P (ppm)</th>
<th>pH</th>
<th>Al (ppm)</th>
<th>Tile Drainage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummerston</td>
<td>B</td>
<td>4.8</td>
<td>150</td>
<td>5</td>
<td>5.5</td>
<td>50</td>
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</tr>
</tbody>
</table>
Scope/Goals:

• $7,000,000 over 5 years

• Payment rate determined with an eye to the current cost to the state of P-reductions in various sectors (CWI Report).

Eligibility Requirements

• Actively farming in Vermont
• All fields managed (owned and leased) by the farm
• Annual cropland and hayland
• Up-to-date Nutrient Management Plan or Land Treatment Plan
• Good Standing with the Agency for state & federal environmental regulations, including VT’s Required Agricultural Practices (RAPs)
AAFM Pay-for-Performance webpage:  
https://agriculture.vermont.gov/vpfp

Contact:
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802-272-0323  |  Ryan.Patch@Vermont.gov