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

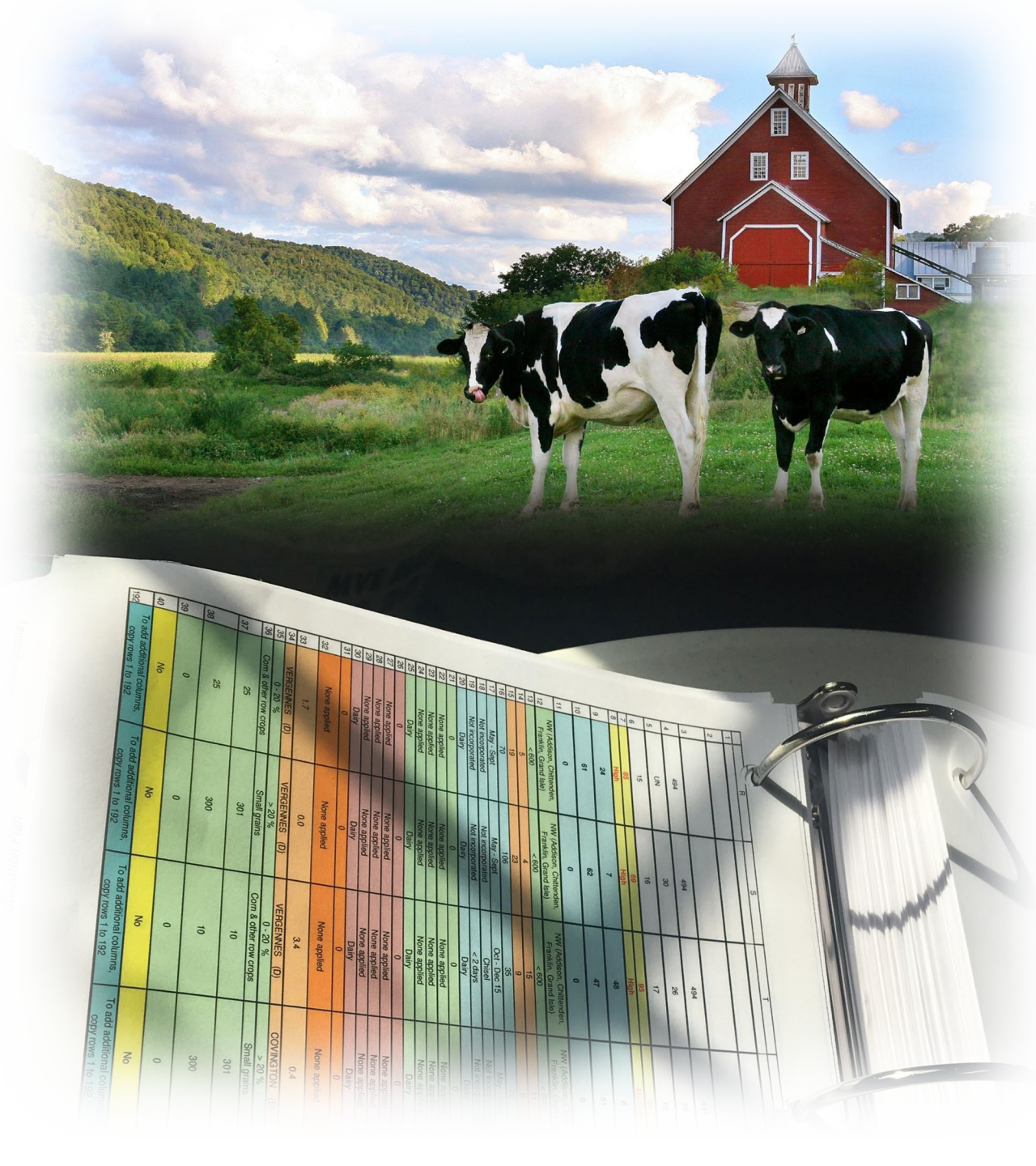
Staff Changes in COVID-19

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

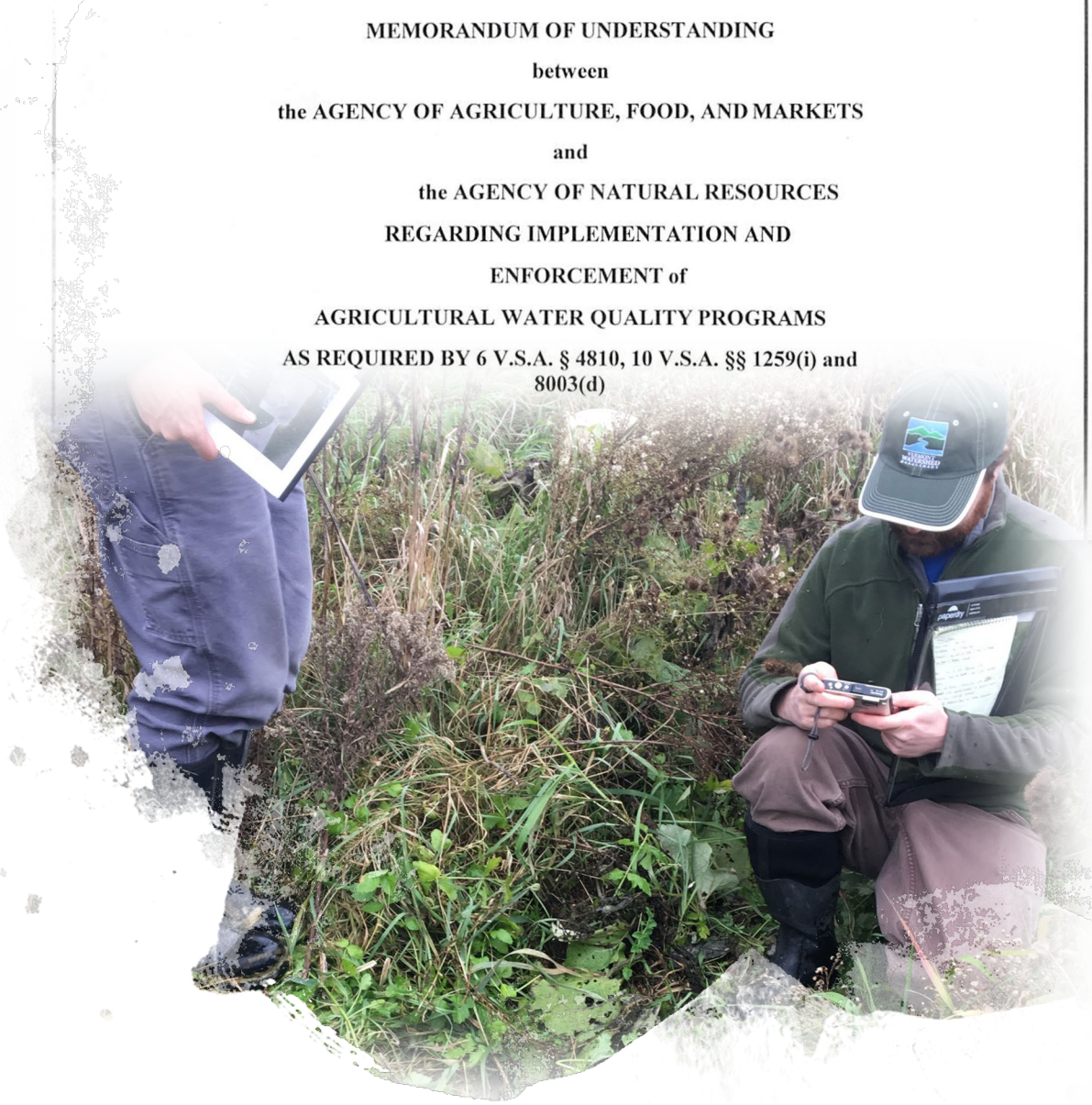


Enforcement during COVID-19

- 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

Ryan Patch
Water Quality Division Assistant Director
Vermont Agency of Agriculture, Food and Markets
Vermont Citizens Advisory Committee (VTCAC) Meeting
November 9, 2020

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

0

The number of ‘marketable’ trees in the Champlain Valley by 1840.

Source: JAN ALBERS, HANDS ON THE LAND: A HISTORY OF THE VERMONT LANDSCAPE 84 (2000).
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.

Source: JAN ALBERS, HANDS ON THE LAND: A HISTORY OF THE VERMONT LANDSCAPE 84 (2000).
Source: History, CITY OF BURLINGTON, VT., https://www.burlingtonvt.gov/CEDO/History [https://perma.cc/K887-HPXV] (last visited Apr. 1, 2016).
Source: CHARLES W. JOHNSON, THE NATURE OF VERMONT 60 (1998).
From: Mike Winslow, A Natural and Human History of Lake Champlain. VJEL Vol. 17 p. 492

70% to 16%

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

Source: JAN ALBERS, HANDS ON THE LAND: A HISTORY OF THE VERMONT LANDSCAPE 156 (2000).
From: Mike Winslow, A Natural and Human History of Lake Champlain. VJEL Vol. 17 p. 492

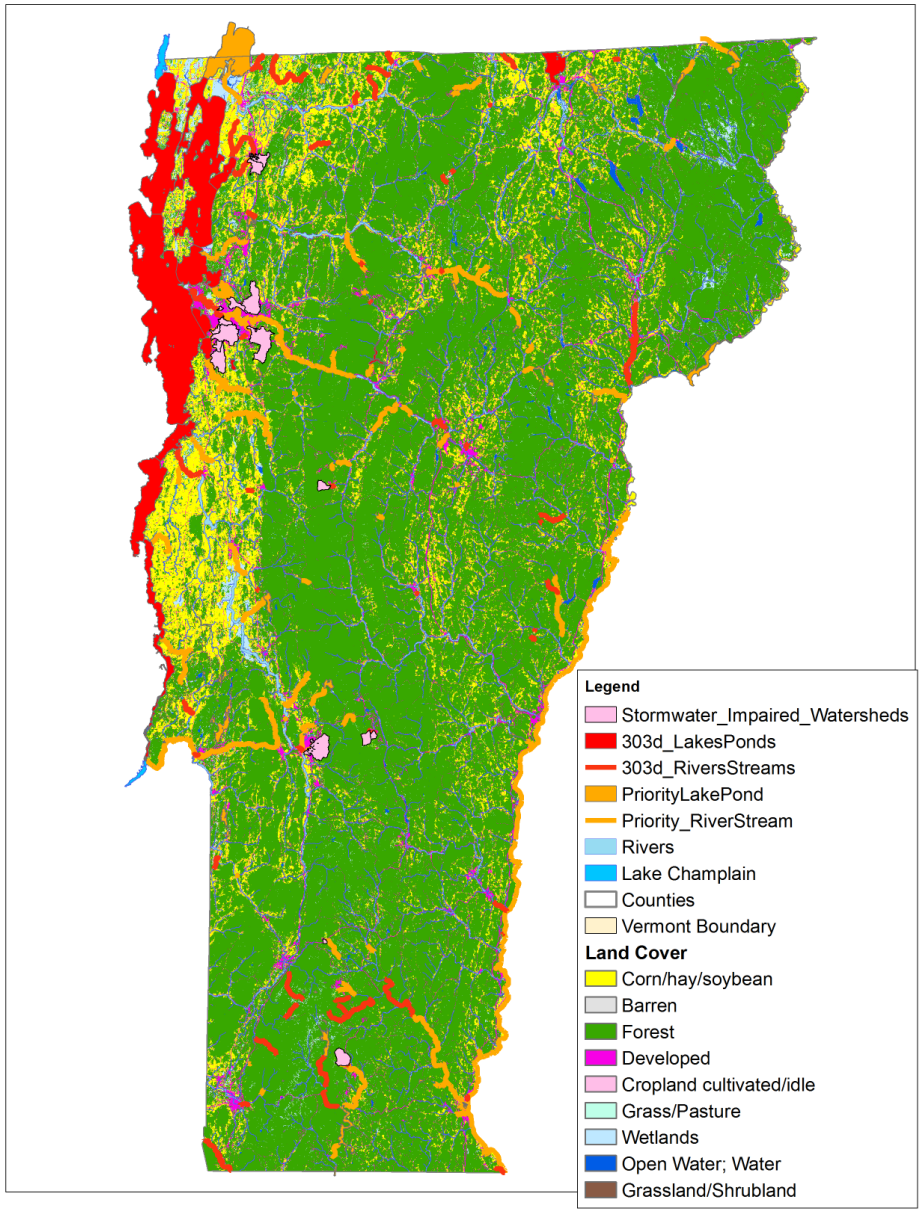
The Vermont Statehouse

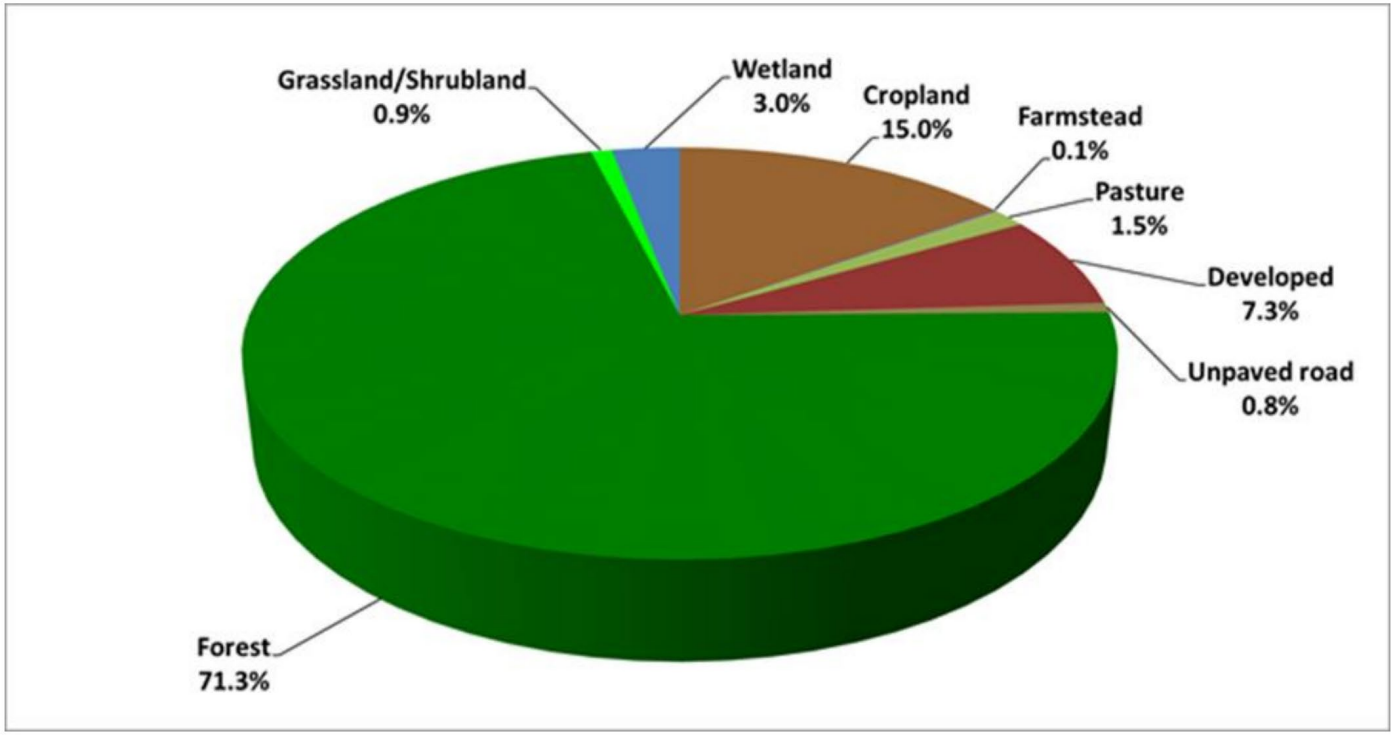
VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

From: State Curator's Office, BGS. Retrieved from: https://curator.vermont.gov/sites/curator/files/styles/slideshow_image_only/public/images/image_only_slides/historic-state-house-780x450.jpg?itok=lXOLbhmj

Vermont Context

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

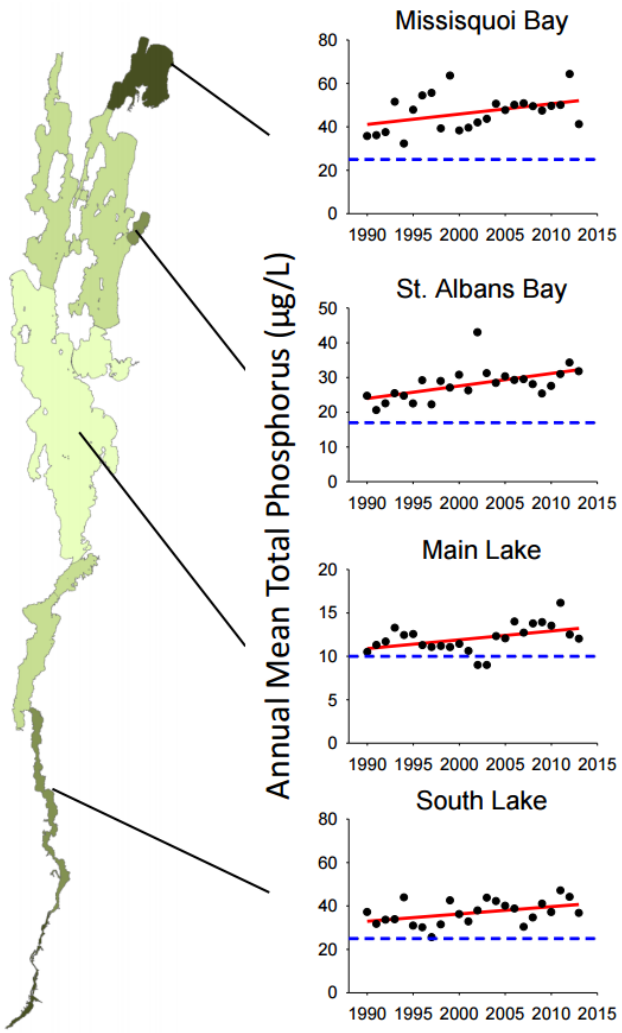




From: Eric Smeltzer, The Lake Champlain TMDL, by the Numbers. 2014. Retrieved from: https://www.vectogether.org/wp-content/uploads/2013/10/Eric-Smeltzer-VEC-6-4-14.pdf

Vermont Context

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION



Trend line
Water quality standard

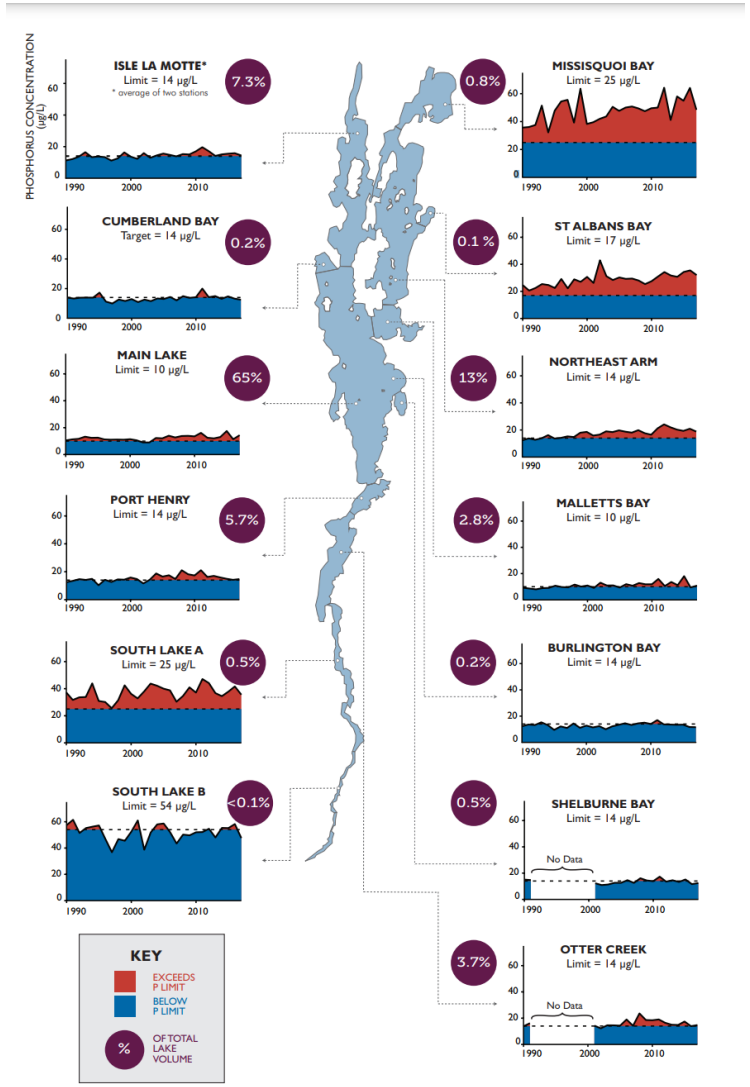
Lessons learned from the past 20 years

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.



DATA SOURCES: Long Term Monitoring Program (LCBP, VT ANR, NYSDEC)

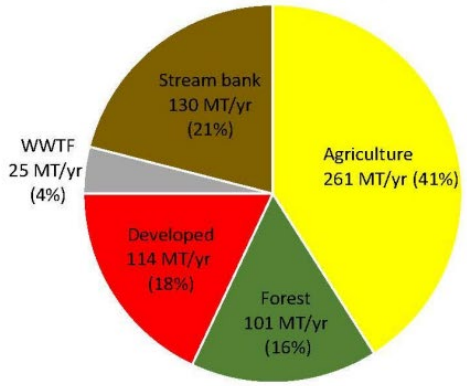
Figure 4 | Annual mean phosphorus concentration by lake segment, 1990–2017

From: Eric Smeltzer, The Lake Champlain TMDL, by the Numbers. 2014. Retrieved from: https://www.vectogether.org/wp-content/uploads/2013/10/Eric-Smeltzer-VEC-6-4-14.pdf.
Lake Champlain Basin Program, 2018 State of the Lake Report, 2018. Retrieved from: https://sol.lcbp.org/wp-content/uploads/2018/06/2018-State-of-the-Lake_web.pdf

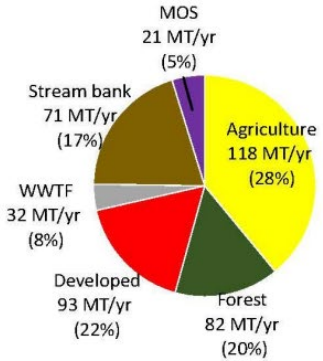
Vermont Context

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

Base Load
631 Metric Tons/year



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



TMDL Loading Capacity and Allocations
418 Metric Tons/yr

Vermont Context

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

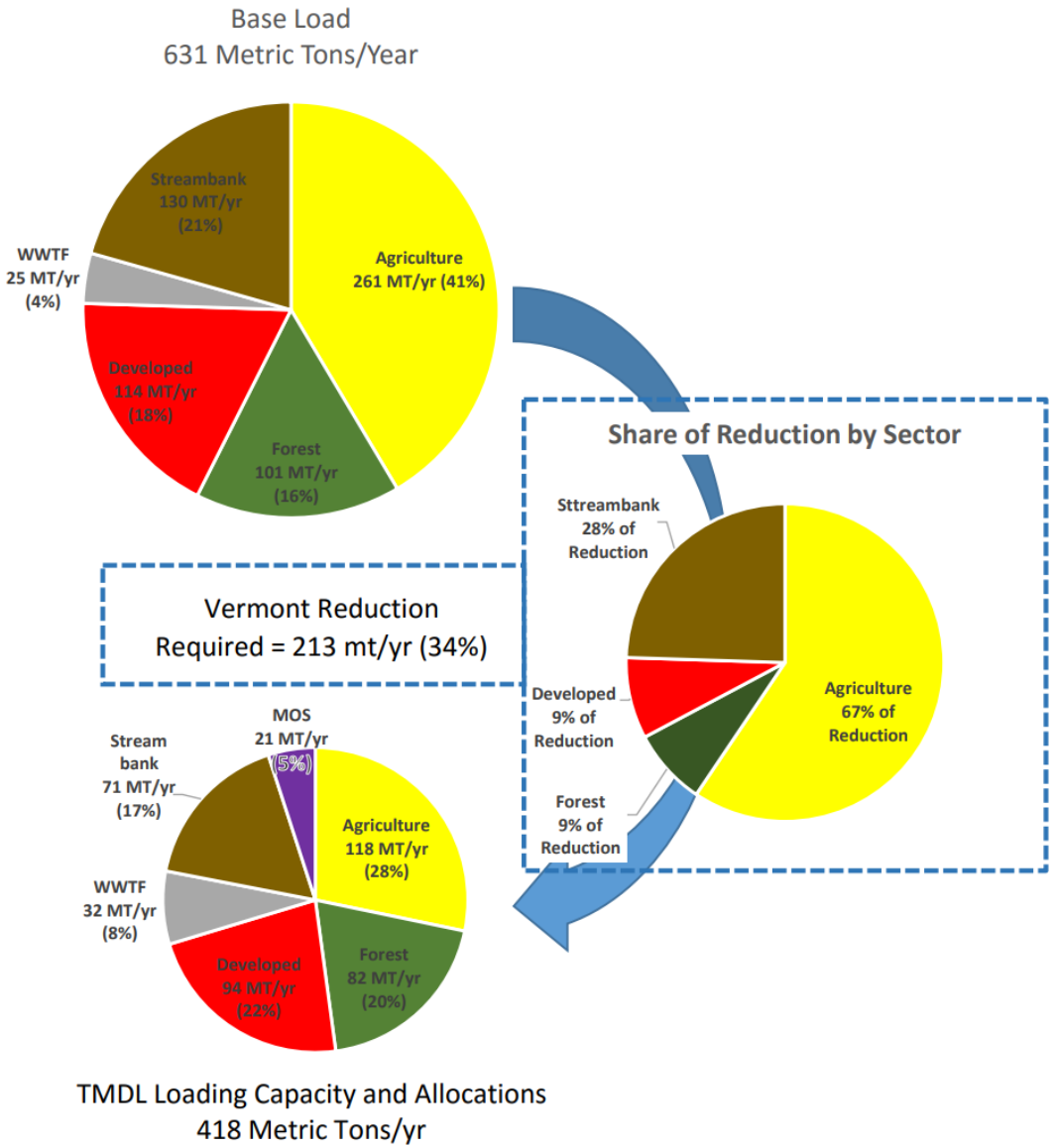


TABLE 1 - VERMONT PHASE 1 TMDL PLAN SUMMARY OF VERMONT COMMITMENTS.
** Tasks correspond with the Gantt Chart.*

Task *	Description	Start Year	End Year
A. AGRICULTURE			
Water Quality Permitting Programs – LFO, MFO, CAFO			
Inspect potential CAFOs	Inspect medium and large farms that could potentially be CAFOs with newly developed VT CAFO permit Inspect 75 potential CAFOs annually	2014 2019	2018 2036
Inspect MFOs and LFOs	MFOs currently inspected a minimum of every 3 years and LFOs annually. MFO inspections increase to a minimum of every 3 years	2014 2016	2016 2036
Update agricultural enforcement MOU	Update the MOU between DEC and AAFM regarding enforcement of agricultural regulations and program coordination	2015	2016
Accepted Agricultural Practice Rule Update and Compliance			
Amend the Accepted Agricultural Practices	Amend the AAPs to become the Required Agricultural Practices through rulemaking. Rules changes will include: • Develop small farm certification program • Increased and consistent buffer sizes to 25' (from 10') • Increased erosion tolerances to all farms to T (from 2T) • 10' buffer requirements for field ditches • Required stabilization of field gully erosion • Strengthening the livestock exclusion requirements. • Develop and require certification of custom manure applicators and ongoing training Develop and require educational trainings for farmers	2015	2016
Expand RAP education and outreach	Begin extensive education and outreach and enforcement of revised Required Agricultural Practices.	2014	2018
Develop the Small Farm Inspection program	Hired first SFO inspector (2014) focusing on Missisquoi Bay and St. Albans Bay Hire three additional inspectors	2013 2015	2014 2016
Increase SFO dairy inspections	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 significant livestock operations in the Lake Champlain Basin and require BMP installation where needed	2015 2016	2015 2019
Require small farm certification	Require small farms to submit annual certification forms	2017	2036
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 2018 2016	2017 2036 2036
Mandate manure applicator certification	Mandate certification of custom manure applicators	2016	2036
Improve field practice implementation	Support partners focusing on key areas of field practices Support farmer groups Increase participation in CREP program	2017	2036
Revise RAPs to address tile drains	Revise RAPs to include requirements to reduce nutrients from tile drains	2018	2036
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 2016	2036 2015 2020
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 2015	2036 2020
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	2017
Develop and pilot ESP	Develop and pilot the Environmental Stewardship Program to incentivize additional practice adoption	2015	2020
Develop and pilot nutrient trading program	Evaluate feasibility of nutrient trading and pilot a trading program	2016	2018
Create grassed waterways program	Target funding to critical source areas in coordination with partners	2016	2036
Tile 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	2017

How's it going?

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
5 POST OFFICE SQUARE SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

September 3, 2020

Julia S. Moore, Secretary
Vermont Agency of Natural Resources
1 National Life Drive, Davis Bldg.
Montpelier VT 05620-3901

Anson Tebbetts, 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 05620-3520

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

Dear Secretary Moore, Secretary Tebbetts, and Commissioner Walke:

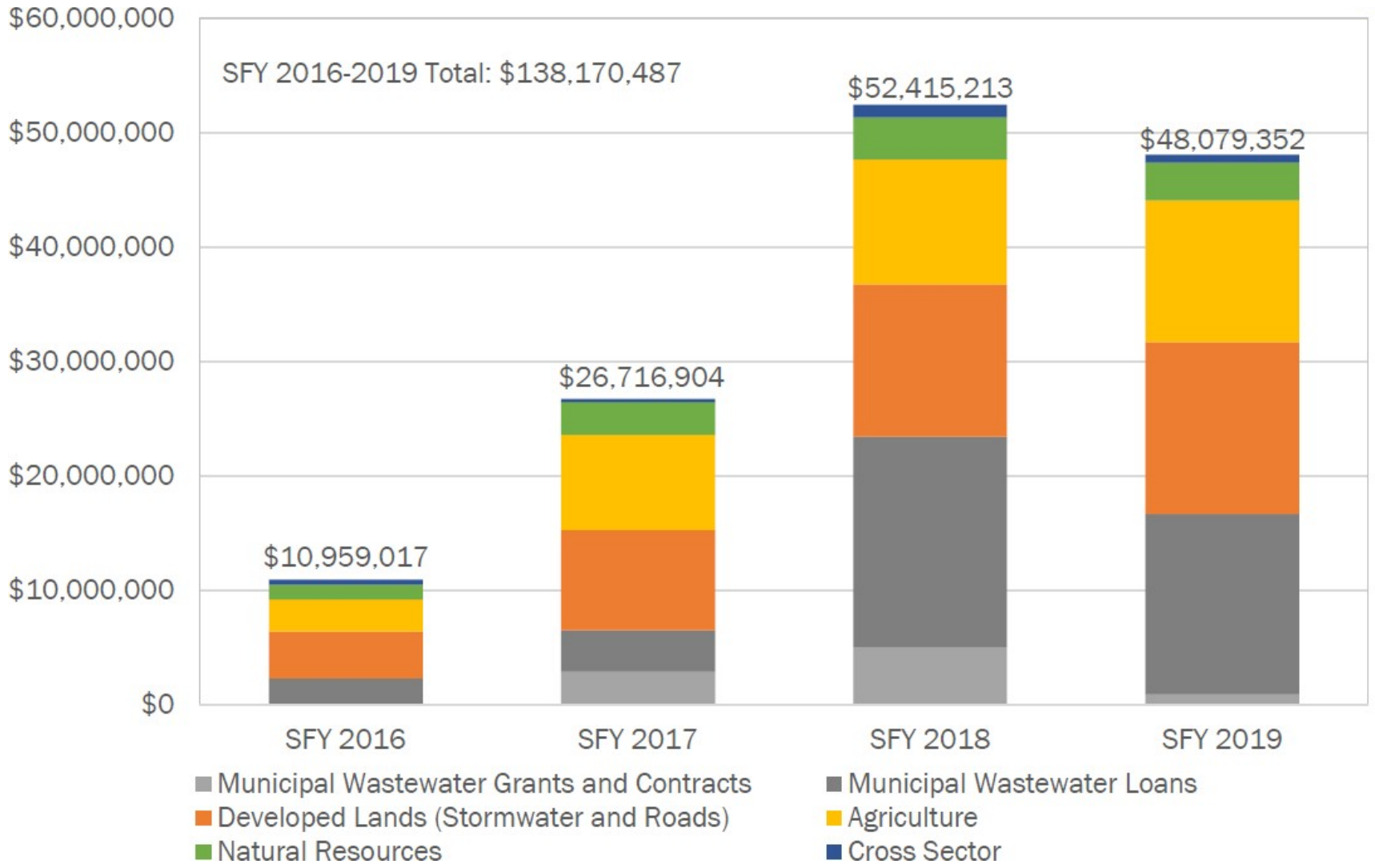
EPA committed to periodically evaluate Vermont's progress toward completion of its Lake Champlain Phosphorus TMDL Phase 1 implementation obligations. As you know, the 2016 TMDL includes an Accountability Framework containing 28 Phase 1 milestones to be completed by the end of 2017. EPA issued the State 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

Vermont's Clean Water Investments

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

Figure 7. Total dollars awarded to clean water projects through State of Vermont agencies, SFY 2016-2019 by land use sector[5]

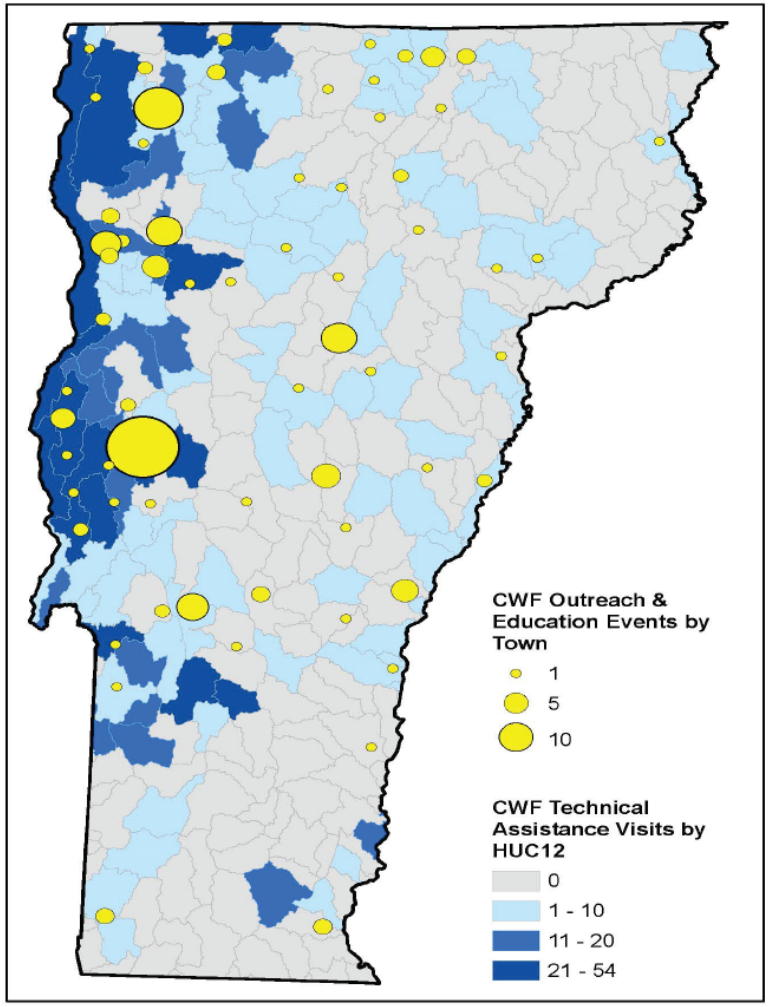


Vermont Clean Water Initiative 2019 Performance Report, Page 17: https://dec.vermont.gov/sites/dec/files/2020-01-14_CleanWaterPerformanceReport_SFY2019-FINAL.pdf

Education & Outreach

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

AGRICULTURAL CLEAN WATER INITIATIVE PROGRAM
EDUCATIONAL EVENTS AND TECHNICAL ASSISTANCE STATEWIDE



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.

FY2019 PROGRAM IMPACT:

8,541 ATTENDEES
REACHED THROUGH EDUCATIONAL EVENTS

627.3 HOURS
OF EDUCATIONAL OPPORTUNTIES FOR VT FARMERS

230 EVENTS
EDUCATIONAL EVENTS HELD STATEWIDE

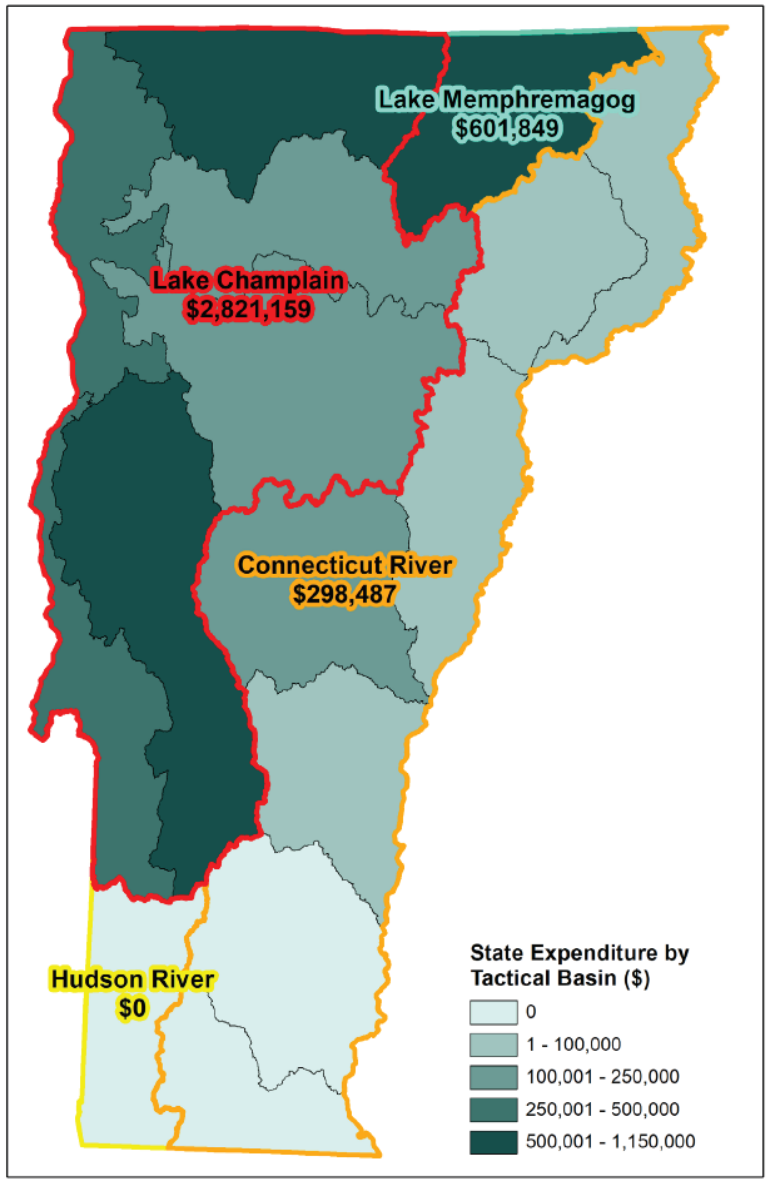
1,448 TA VISITS
BY VAAFM STAFF AND PARTNERS

AAFM staff train agricultural service providers about water quality regulations for farms and Required Agricultural Practices compliance and inspections.

Technical & Financial Assistance

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

FY19 ON-FARM IMPLEMENTATION BY MAJOR AND MINOR BASIN



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

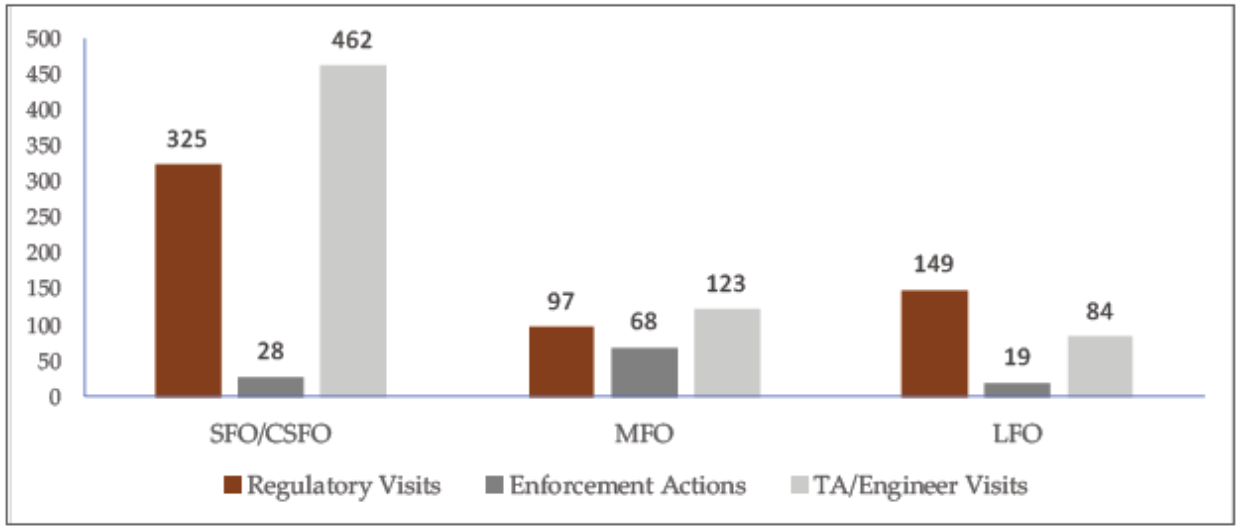
VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

SUMMARY OF ENFORCEMENT ACTIONS AND REFERRALS 2016-2019

YEAR	INVESTIGATIONS & INSPECTIONS	FARMS RECEIVING ENFORCEMENT ACTIONS	REFERRALS TO ATTORNEY GENERAL'S OFFICE	REFERRALS TO AGENCY OF NATURAL RESOURCES
2016*	379	38	1	1
2017*	505	82	2	18
2018	652	101	7	32
2019	571	98	6	38

**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

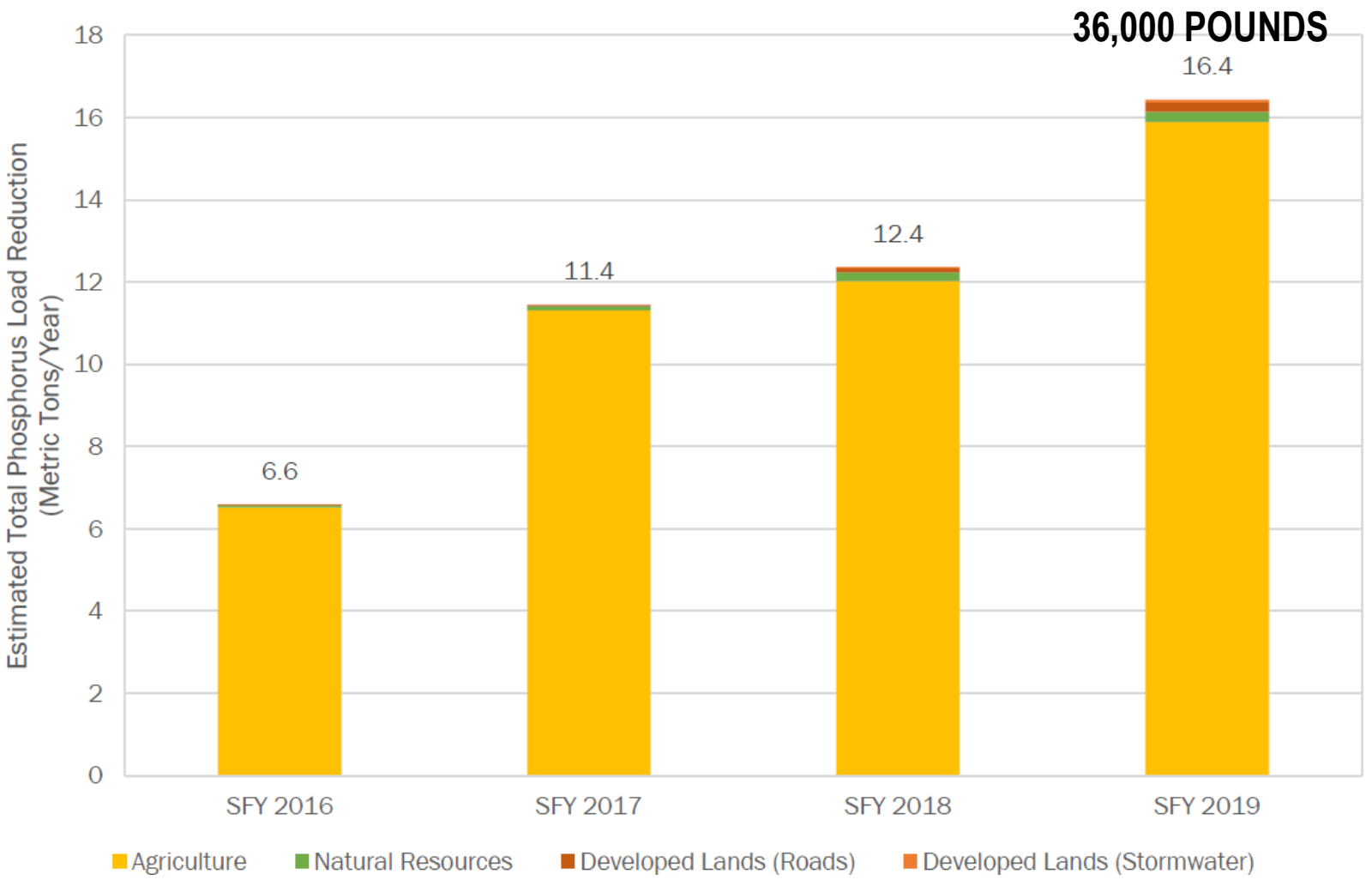
115 ENFORCEMENT ACTIONS

ASSOCIATED WITH 179 ALLEGED VIOLATIONS

Results of Lake Champlain Basin Cleanup to Date

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

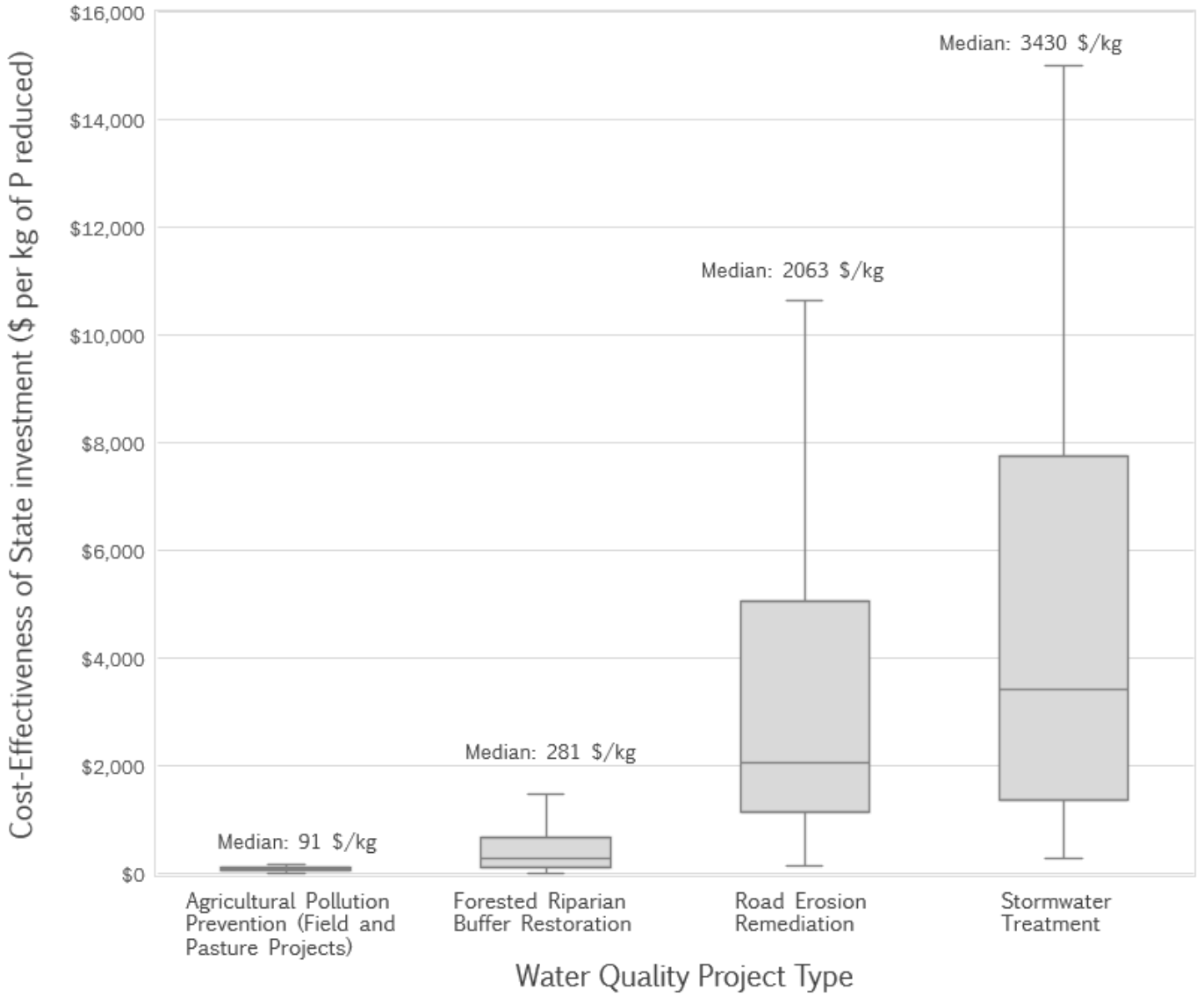
Figure 39. Annual estimated total phosphorus load reduction (metric tons per year) achieved by clean water projects that support implementation of the Lake Champlain TMDL completed SFY 2016-2019, by federal



Vermont Clean Water Initiative 2019 Performance Report, Page 48: https://dec.vermont.gov/sites/dec/files/2020-01-14_CleanWaterPerformanceReport_SFY2019-FINAL.pdf

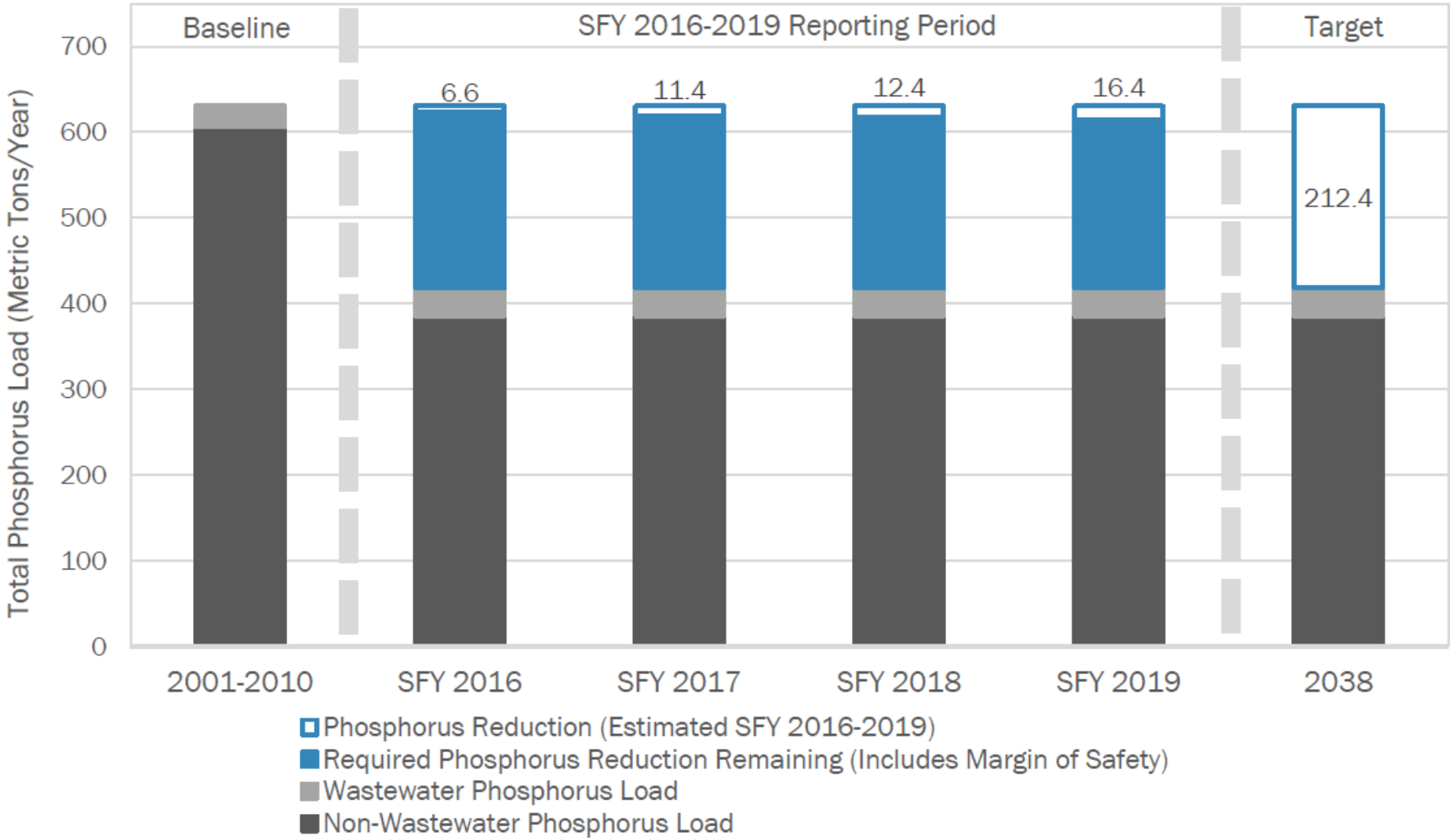
Cost Effectiveness of State Clean Water Investments

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION



Vermont Clean Water Initiative 2019 Performance Report, Page 44: https://dec.vermont.gov/sites/dec/files/2020-01-14_CleanWaterPerformanceReport_SFY2019-FINAL.pdf

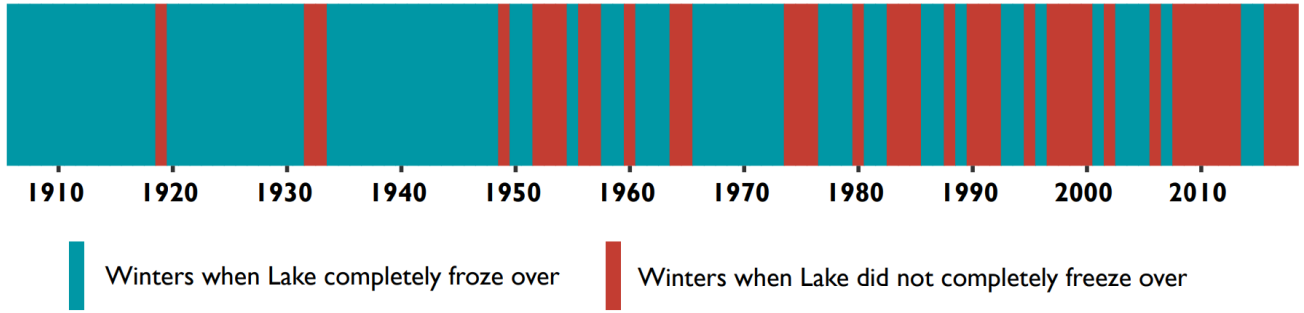
Figure 40. Lake Champlain TMDL total phosphorus load baseline (2001-2010), quantified estimated total phosphorus load reductions achieved through federal funding, state funding, and regulatory programs (SFY 2016-2019 reporting period), and target phosphorus load (2038) in metric tons per year[15]



Vermont Clean Water Initiative 2019 Performance Report, Page 50: https://dec.vermont.gov/sites/dec/files/2020-01-14_CleanWaterPerformanceReport_SFY2019-FINAL.pdf

5.4 CONSIDERATION OF CLIMATE CHANGE

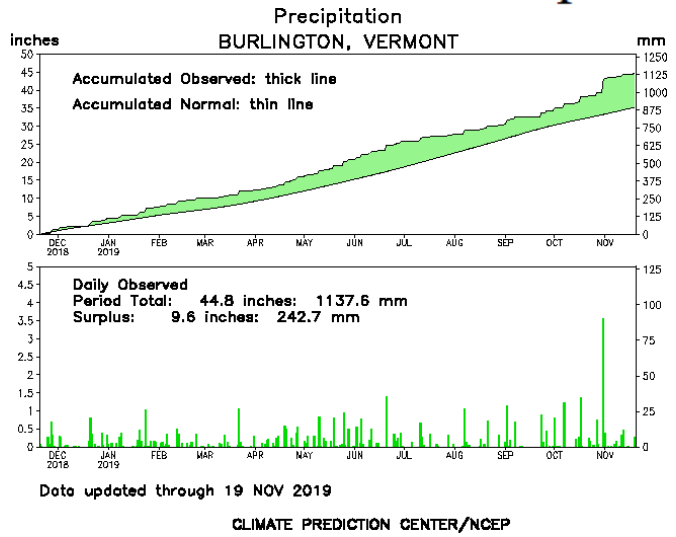
EPA considered climate change to the extent feasible. As described in Section 5.1.2, EPA's contractor, Tetra Tech, used the calibrated Lake Champlain SWAT model to project mid-century potential changes to phosphorus loads to the lake with six different precipitation and temperature projections derived 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



DATA SOURCE: National Weather Service/US Weather Bureau

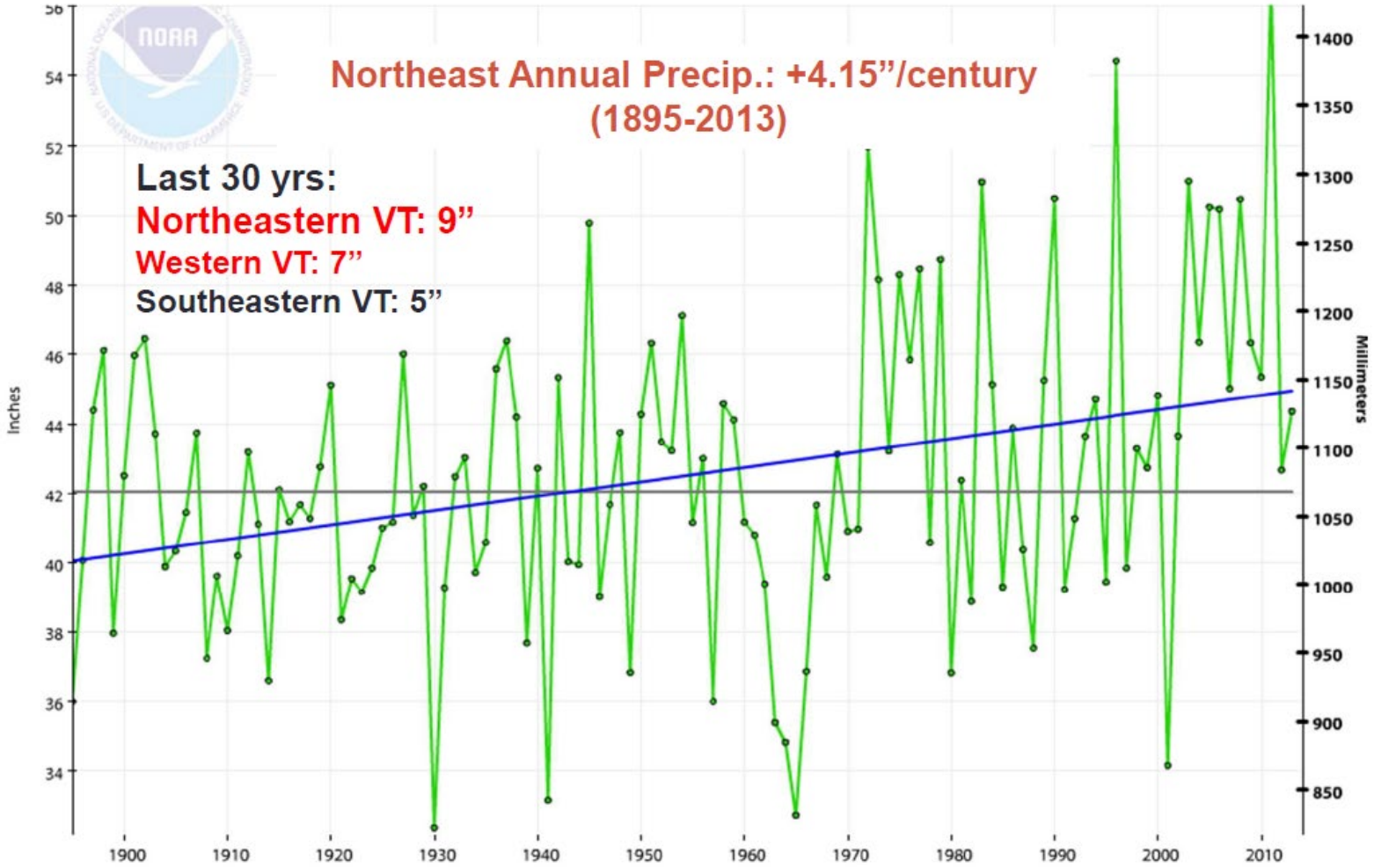
Figure 9 | Freeze-over of Lake Champlain, 1906–2018

Source: Lake Champlain Basin Program, 2018 State of the Lake Report, 2018. Retrieved from: https://sol.lcbp.org/wp-content/uploads/2018/06/2018-State-of-the-Lake_web.pdf



Source: NOAA NWS Burlington

Current vs. Revised: Avg. Precipitation



Source: Joshua Faulkner, UVM Extension; NOAA

Vermont's Definitions

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

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

Examples of Soil Health Practices

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

What is it?		What does it do?	How does it help?
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.		• 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	• Maximize 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.		• Increases soil organic matter • Prevents soil erosion • Conserves soil moisture • Increases nutrient cycling • Provides nitrogen for plant use • Suppresses weeds • Reduces compaction	• Improves crop production • Improves water quality • Conserves water • Maximize nutrients • Decreases use of pesticides • Improves water efficiency to crop
No Till A way of growing crops without disturbing the soil through tillage.		• Improves water holding capacity of soils • Increases organic matter • Reduces soil erosion • Reduces energy use • Decreases compaction	• 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

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

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

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

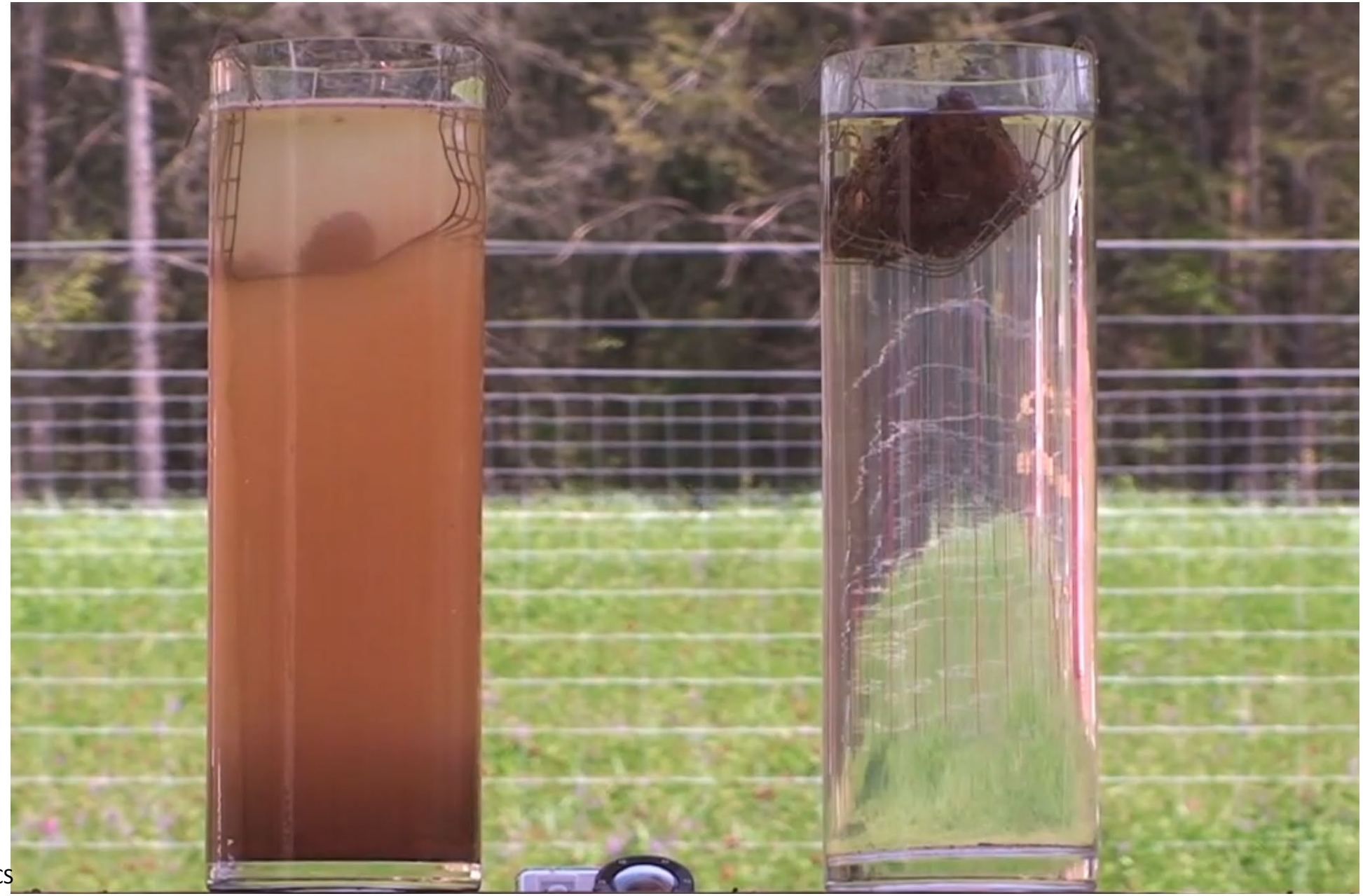
Source: USDA NRCS

Importance of Organic Matter

Source: USDA NRCS

Why Soil Health is Important

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION



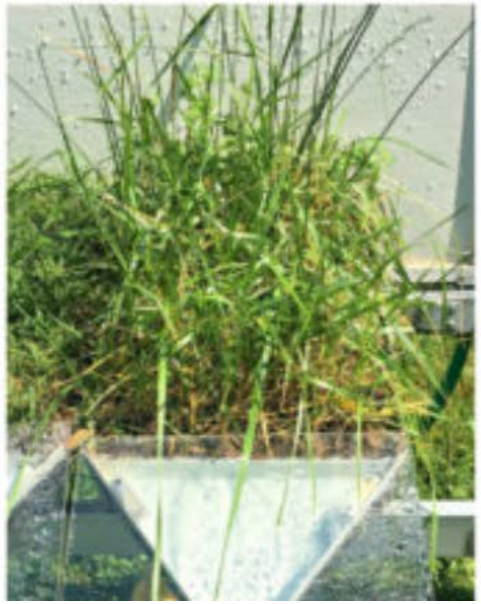
Source: USDA NRCS

Why Soil Health is Important

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

Continuously Grazed Pasture

Rotationally Grazed Pasture



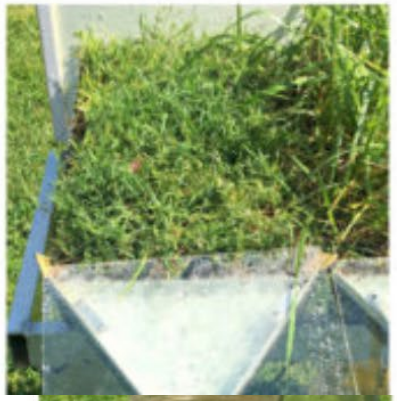
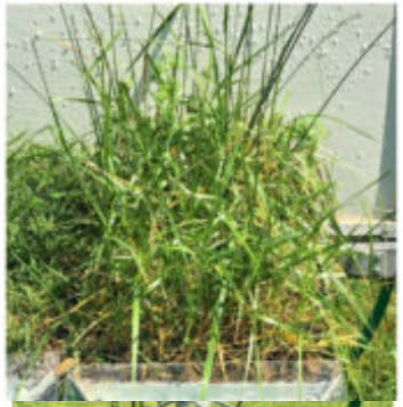
Tilled Soil

Multi-species Covercrop

Source: USDA NRCS

Why Soil Health is Important

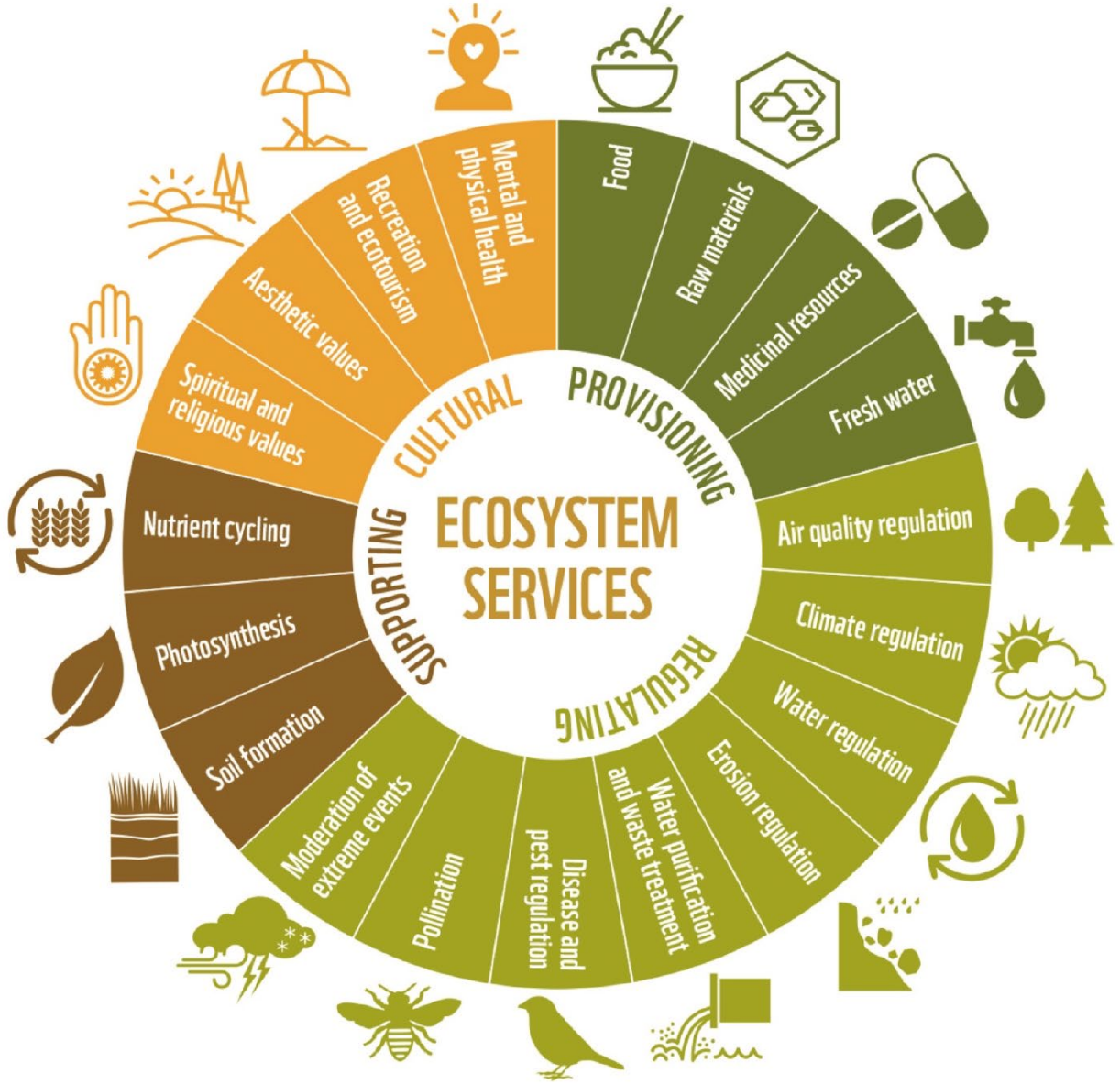
VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
UALITY DIVISION

Continuously Grazed Pasture	Rotationally Grazed Pasture	Tilled Soil	Multi-species Covercrop
			
			
Runoff from continuously grazed pasture	Runoff from rotationally grazed pasture	Runoff from tilled soil	Runoff from multi-species cover crop

Source: USDA NRCS

Ecosystem Services

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION



Source: Taylor Ricketts, Gund Institute, UVM

State of Vermont Payment for Ecosystem Services Working Group

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

* * * Soil Conservation * * *

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

Economic Development

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.

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

ambitious goal is to remove 1 trillion tons of carbon dioxid

Successful Farming

WEATHER MACHINERY CROPS TECHNOLOGY FARM MANAGEMENT LIVESTOCK FAMILY SUBSCRIBE

DAY
t Cover Crops this

Online Indonesia

Home ▸ News ▸ Business News

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.

NO-TILL FARMER
The No-Till Authority Since 1972

NEWS & NOTES RESOURCES NO-TILLAGE CONFERENCE COVER CROP SUMMIT DRYLAND NO-TILLER

FFAR Joins Consortium to Establish Ecosystem Markets for Agriculture

November 19, 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.

State of Vermont Payment for Ecosystem Services Working Group

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

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

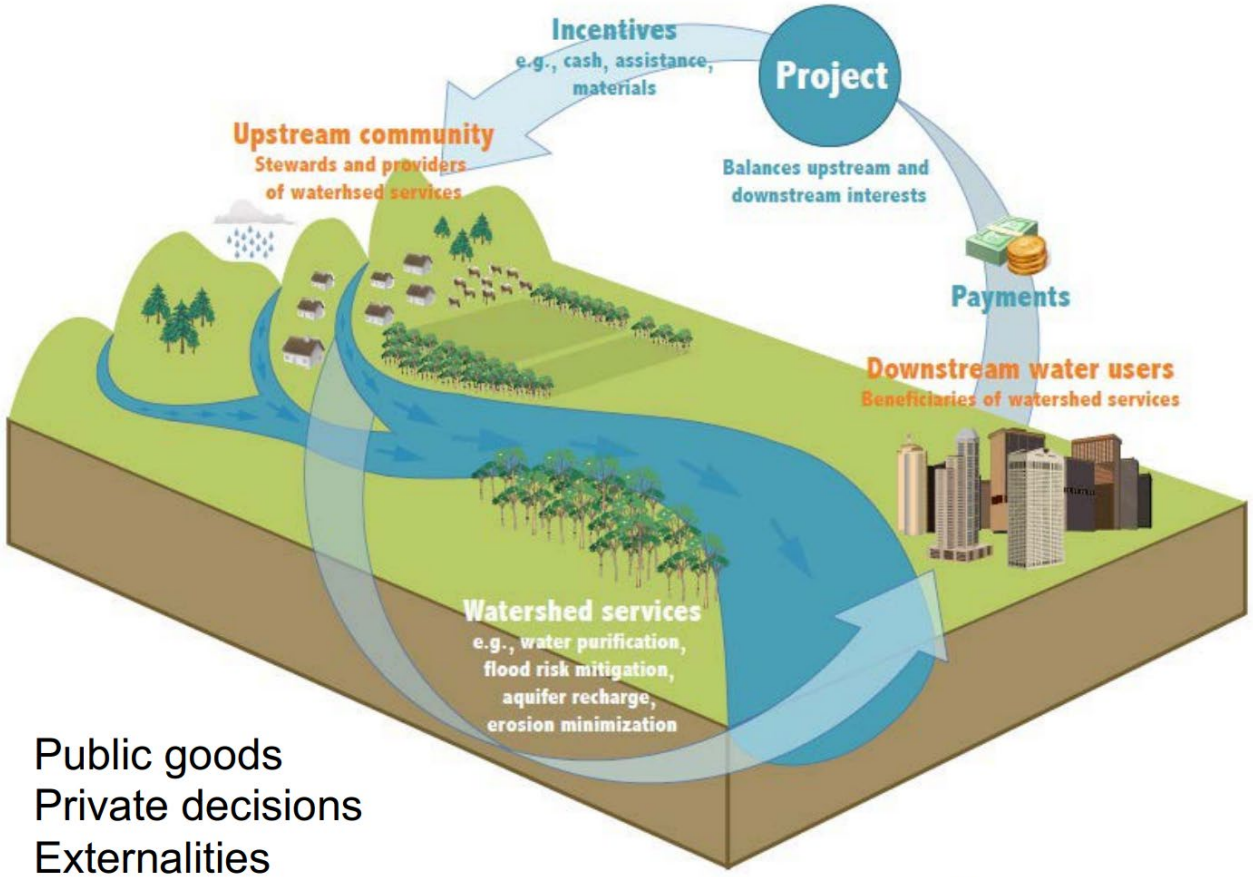
Taylor Ricketts, Gund Institute for Environment - The University of Vermo

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



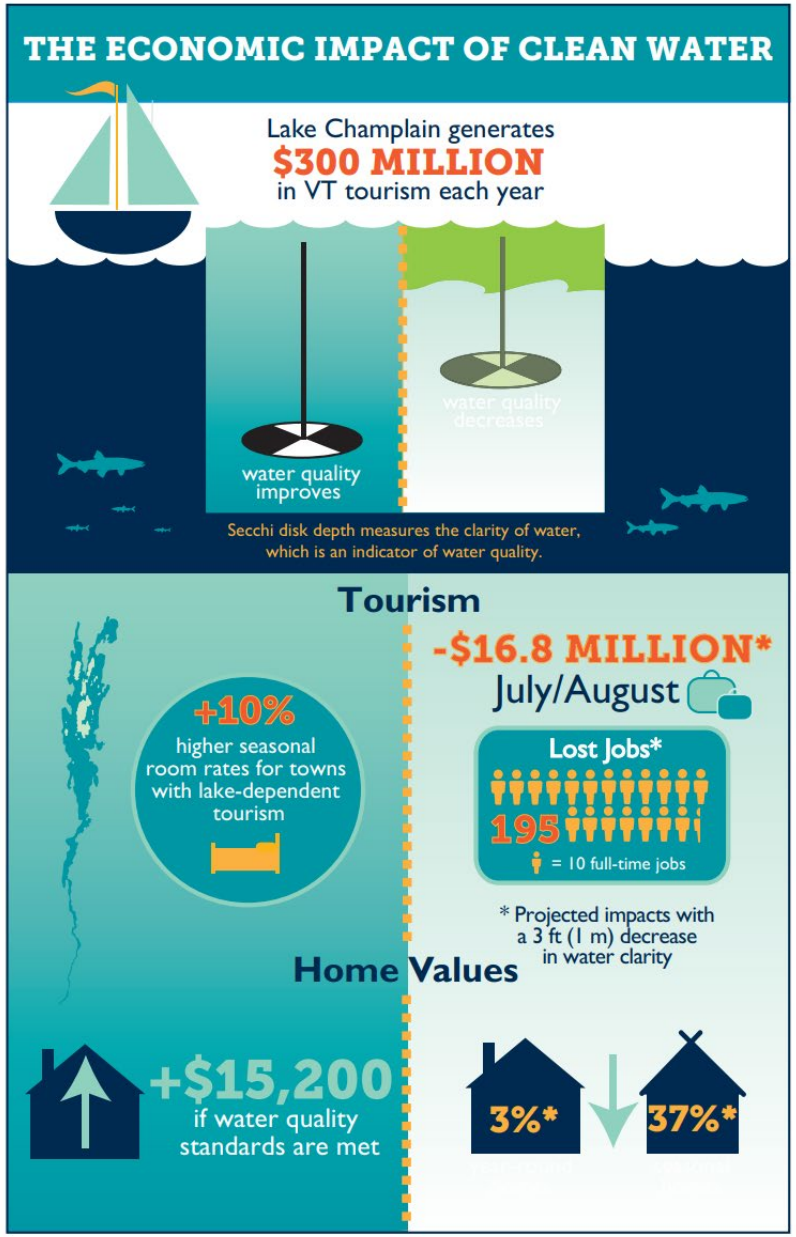
Public goods
Private decisions
Externalities

Mongabay.com

The Working Group developed a collective view of the future:

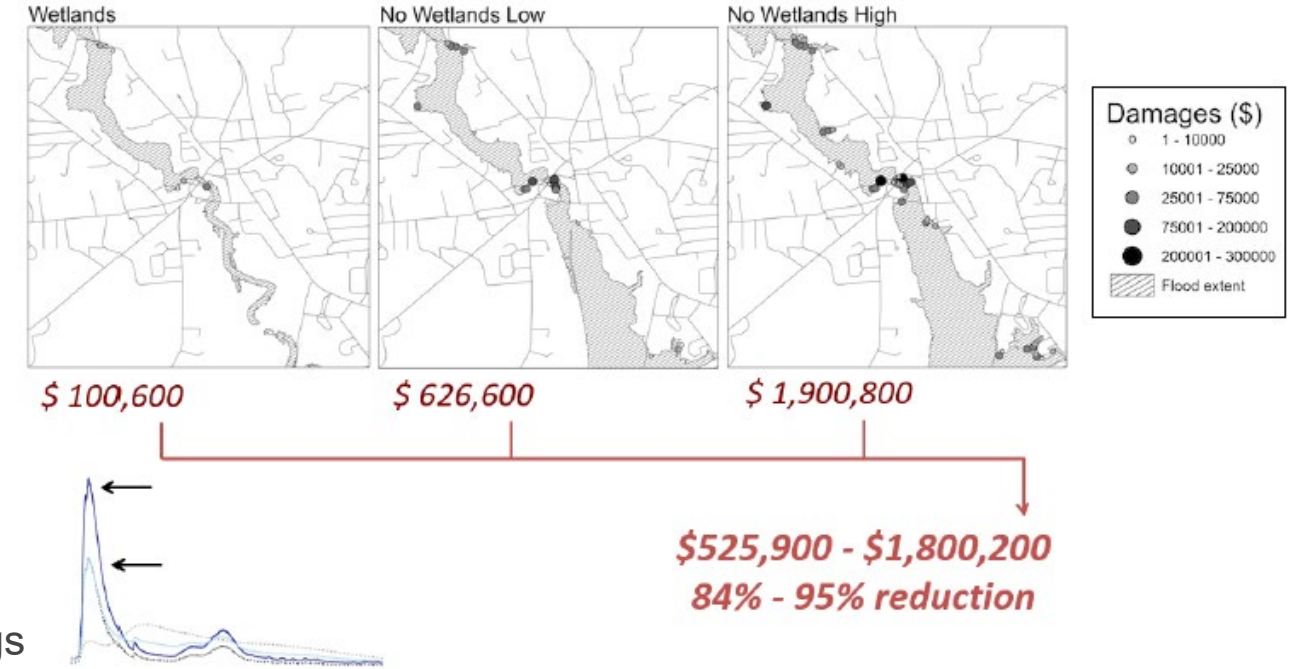
The Working Group envisions a system in which farmers are hired to use their ingenuity and know-how in caring for the land to rebuild Vermont's natural capital.

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.



DATA SOURCE: *An Assessment of the Economic Value of Clean Water in Lake Champlain*. Brian Voigt, Julia Lees, Jon Erickson, University of Vermont, Gund Institute for Ecological Economics. September 2015.

Middlebury - economic damages



Key findings

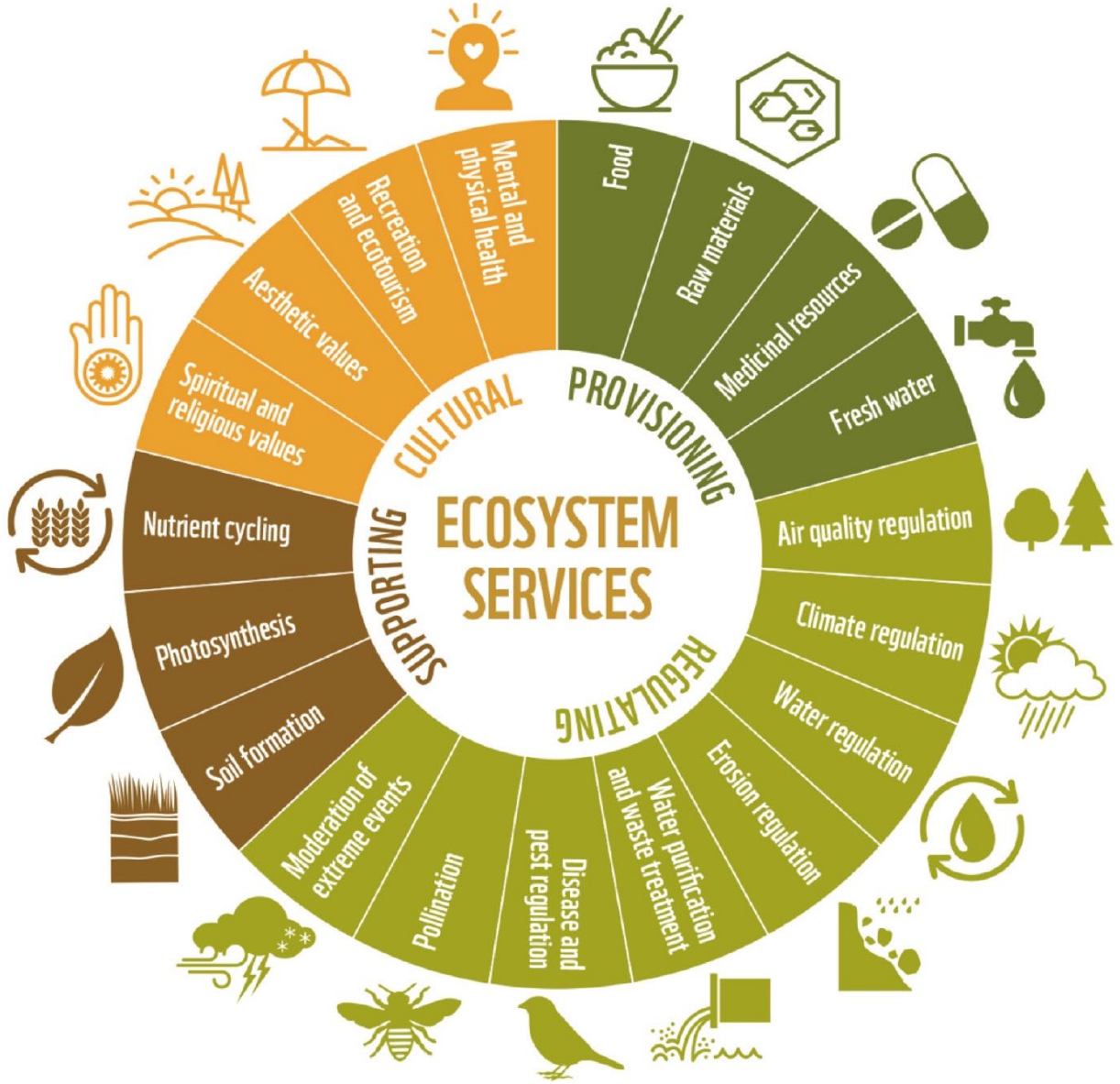
•During Tropical Storm Irene in 2011, floodplains and wetlands diminished damages in Middlebury, VT, by 84 to 95 percent – saving potentially as much as $1.8 million in flood damages.

•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

Ecosystem Services

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

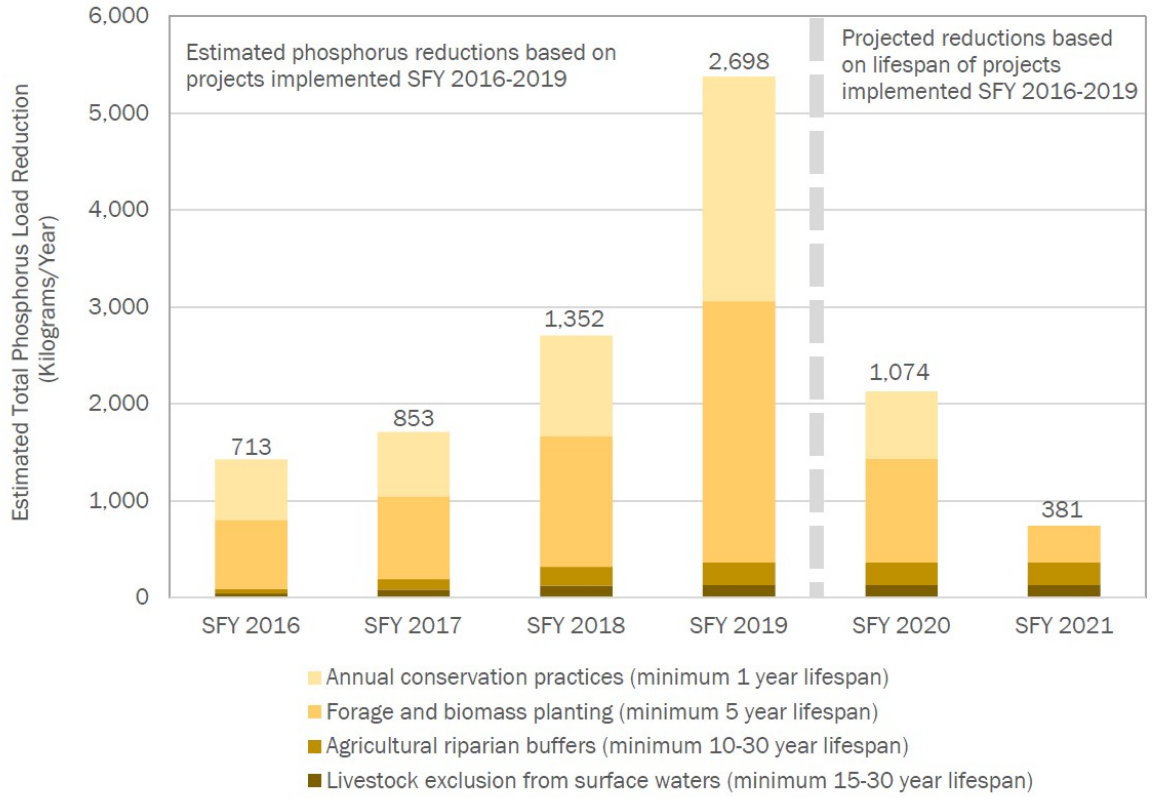


Source: Taylor Ricketts, Gund Institute, UVM

Pay For Practice

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

AGRICULTURE PROJECT OUTPUTS	2016	2017	2018	2019	TOTAL
Acres of agricultural land treated by conservation practices	5,466	3,261	7,908	10,678	27,313
Acres of agricultural land treated by forest and grass buffers	258	200	228	–	686
Acres of pasture with livestock excluded from surface waters	258	117	97	–	472
Number of barnyard and production area practices installed	57	90	85	52	284
Acres of water quality protections within newly conserved agricultural lands	–	116	200	482	798
Estimated acres of agricultural land treated through equipment	–	2,043	6,594	7,765	16,402
AGRICULTURE POLLUTANT REDUCTION	**2016**	**2017**	**2018**	**2019**	
Total phosphorus load reduction (kilograms per year)	713	853	1,352	2,698	



Vermont Clean Water Initiative 2019 Performance Report, Page 7, 28, 29,31: https://dec.vermont.gov/sites/dec/files/2020-01-14_CleanWaterPerformanceReport_SFY2019-FINAL.pdf

VPFP Vermont Pay-For-Phosphorus Program

USDA NRCS Awarded $7million in 2020 to VAAFM to implement the VPFP Program

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS

Vermont Agency of Agriculture, Food & Markets
Water Quality Division

USDA
Program funded by
United States Department of Agriculture
Natural Resources Conservation Service

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).

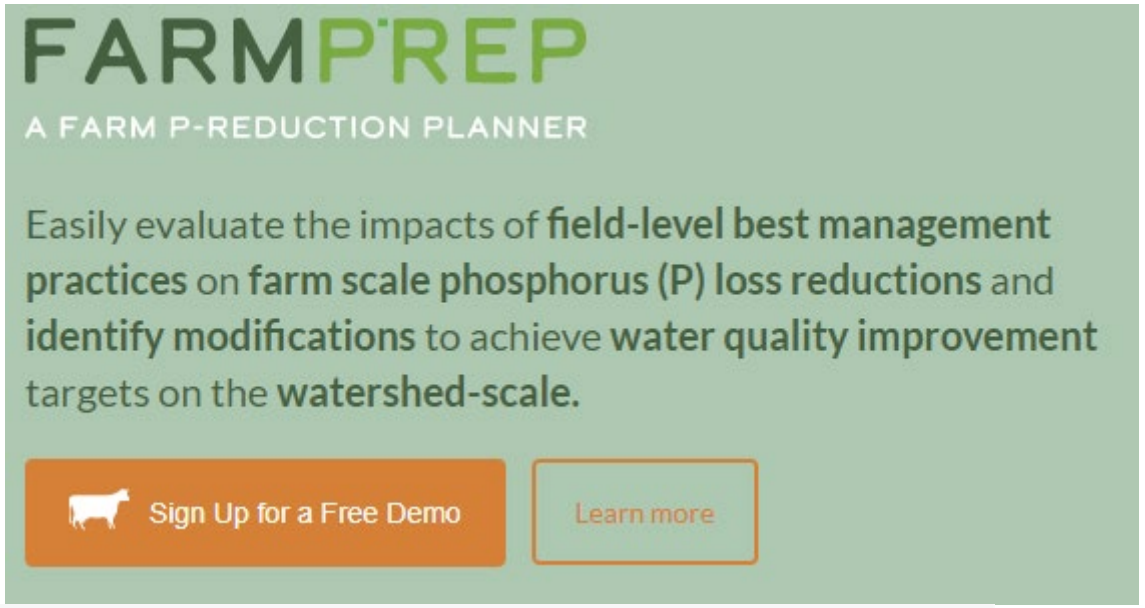
- **Sufficiency of payment**
  - Payment level will be sufficient to compensate farmers both for their stewardship and for their efforts to gather data and input it into the system.
  - Payment schedule will be fair, reduce risk to both the funder and the farmer, and acknowledge the upfront effort/costs of participation and the length of outcome benefits.

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

Lake Champlain Basin Program

TECHNICAL REPORT NO. 97

Implementation of a Farm Phosphorus ManagementOptimization Web-based Tool inthe Vermont Portion of the Lake Champlain Basin

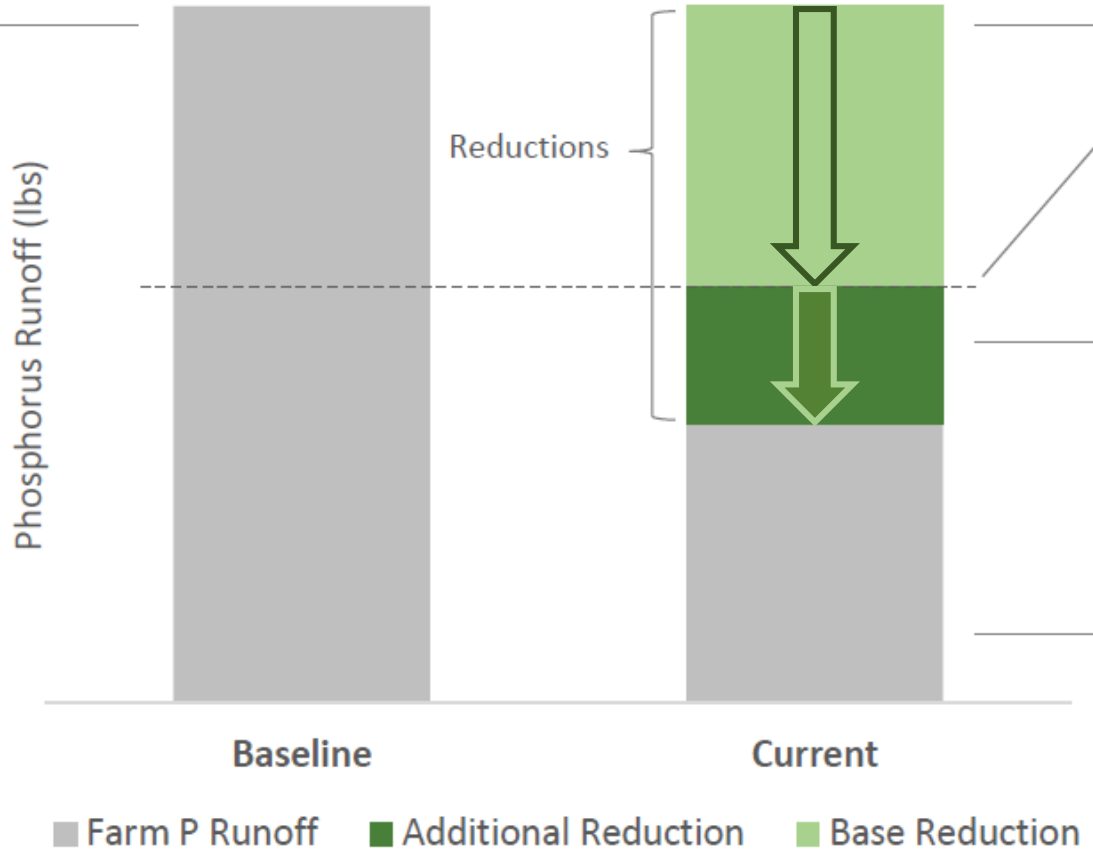


Farm Practices Scenario	Total P Reduction from Baseline (%)	Total P Reduction from Current (%)	Total P (lbs/ac)	Soluble P (lbs/ac)	Sediment P (lbs/ac)	Tile P (lbs/ac)	P Input Reduction (%)	Compare
Baseline:			2.67	1.92	0.75	0	0	
Current:	7.24		2.48	1.76	0.72	0	0	

	Total P Reduction from Baseline (%)	Total P Reduction from Current (%)	Total P (lbs/ac)	Soluble P (lbs/ac)	Sediment P (lbs/ac)	Tile P (lbs/ac)	P Input Reduction (%)
F1_Corn	13.76		4.01	2.52	1.49	0	0
F2_Corn	0		3.55	2.71	0.85	0	0
F3_Hay	0		0.49	0.36	0.13	0	0
F4_CornHay	0		1.62	1.39	0.22	0	0
F5_CornHay	0		1.62	1.3	0.32	0	0

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.

VERMONT
AGENCY OF AGRICULTURE, FOOD & MARKETS
WATER QUALITY DIVISION

FARMPREP

CurrentConditions Results /P Reduction Target: 0%

EastMontpelierFarm Results Guide

Download CSVs Return home

Farm Practices Scenario	Total P Reduction from Baseline (%)	Total P Reduction from Current (%)	Total P (lbs/ac)	Soluble P (lbs/ac)	Sediment P (lbs/ac)	Tile P (lbs/ac)	P Input Reduction (%)	Compare
Baseline:			3.35	1.97	1.38	0	0	✓
Current:	18.95		2.71	1.55	1.16	0	0	

	Total P Reduction from Baseline (%)	Total P Reduction from Current (%)	Total P (lbs/ac)	Soluble P (lbs/ac)	Sediment P (lbs/ac)	Tile P (lbs/ac)	P Input Reduction (%)
F1_Corn	15.62		9.83	5.4	4.43	0	0
F2_Corn	30.15		0.95	0.57	0.38	0	0
F3_CornHay	28.13		0.46	0.36	0.1	0	0
F4_CornHay	28.05		0.59	0.42	0.17	0	0

Soils

Soil Type	Hydrologic Soil Group	Slope (%)	Slope Length (ft)	Modified Morgans Soil P (ppm)	pH	Al (ppm)	Tile Drainage
Dummerston	B	4.8	150	5	5.5	50	

Crops/Tillage/Manure

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:

Ryan Patch | VAAFM Water Quality Division Assistant Director

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