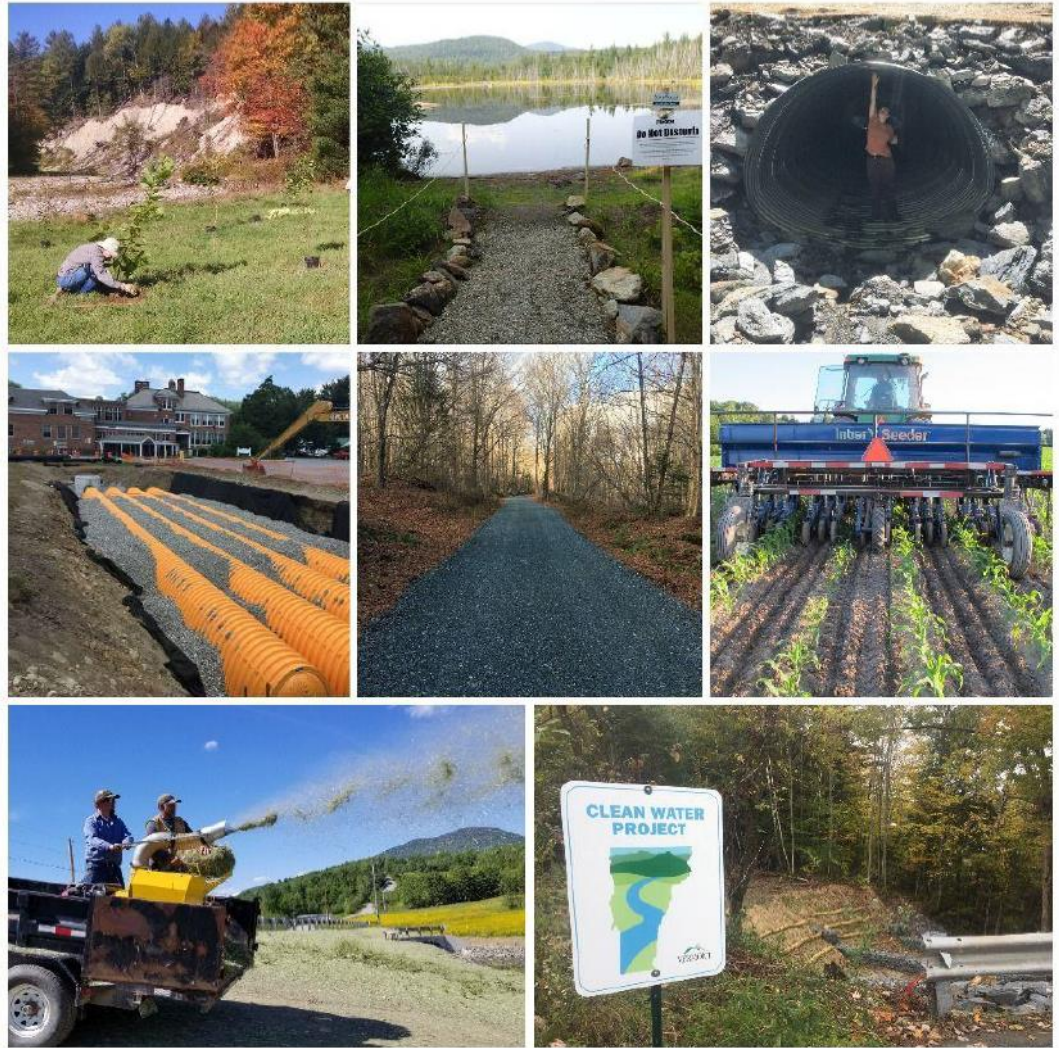


Clean Water Performance [Investment] Report

To: House Committee on Agriculture and Forestry

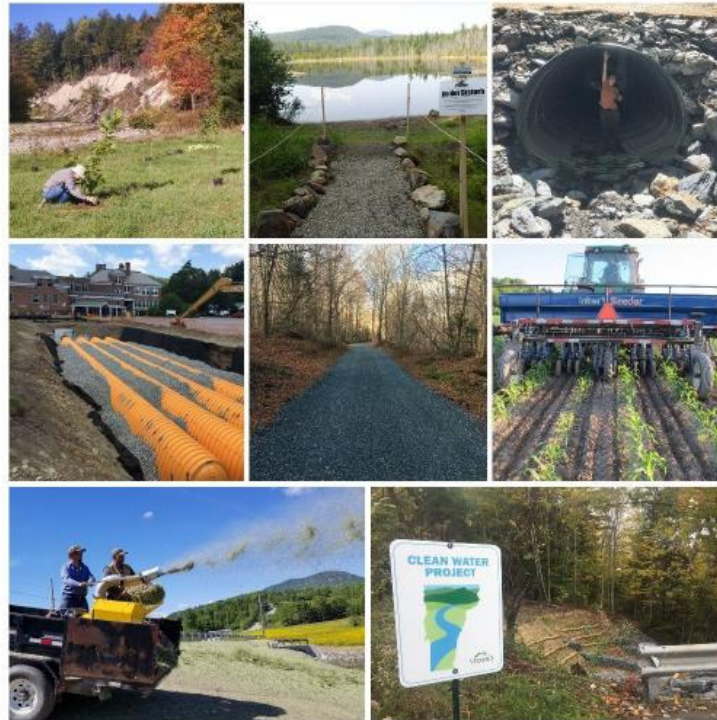
From: Emily Bird
Vermont Department of Environmental Conservation (DEC)

On: January 17, 2020













AGENCY OF ADMINISTRATION
AGENCY OF AGRICULTURE, FOOD & MARKETS
AGENCY OF COMMERCE & COMMUNITY DEVELOPMENT
AGENCY OF NATURAL RESOURCES
AGENCY OF TRANSPORTATION

VERMONT CLEAN WATER INITIATIVE 2019 PERFORMANCE REPORT



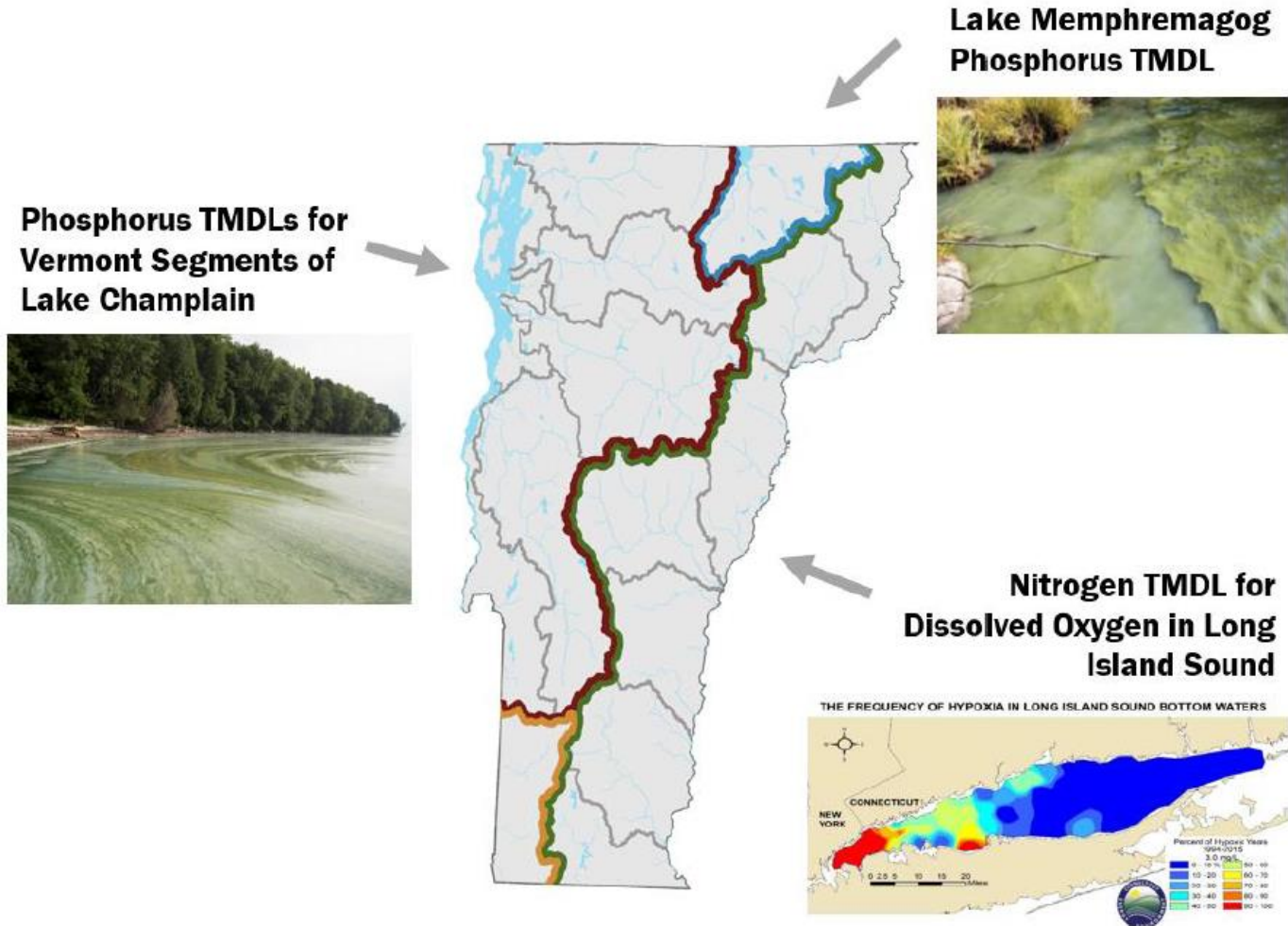
AGENCY OF ADMINISTRATION
AGENCY OF AGRICULTURE, FOOD & MARKETS
AGENCY OF COMMERCE & COMMUNITY DEVELOPMENT
AGENCY OF NATURAL RESOURCES
AGENCY OF TRANSPORTATION

What is a Clean Water Project?

Land Use	Clean Water Project Objectives and Example Project Images	Additional Benefits
 <p>AGRICULTURE</p>	<p>Addresses runoff and soil erosion from farm production areas and farm fields</p> 	<ul style="list-style-type: none"> • Supports Clean Water Act compliance • Cost-effective • Leverages federal funds • Supports agricultural economy
 <p>DEVELOPED LANDS</p>	<p>Addresses stormwater runoff from developed lands, such as parking lots, sidewalks, and rooftops</p> 	<ul style="list-style-type: none"> • Supports Clean Water Act compliance • Increases flood resilience • May enhance aesthetic appeal
 <p>NATURAL RESOURCES</p>	<p>Restores functions of “natural infrastructure”—river channels, floodplains, lakeshores, and wetlands</p> 	<ul style="list-style-type: none"> • Supports Clean Water Act compliance • Cost-effective • Increases flood resilience • Improves habitat • Enhances recreation
 <p>ROADS</p>	<p>Addresses stormwater runoff from roads</p> 	<ul style="list-style-type: none"> • Supports Clean Water Act compliance • Cost-effective • Increases flood resilience • Leverages federal funds • Reduces future road maintenance costs
 <p>WASTEWATER</p>	<p>Decreases nutrients (phosphorus and nitrogen) through enhanced wastewater treatment and addresses aging infrastructure</p> 	<ul style="list-style-type: none"> • Protects public health and safety • Supports Clean Water Act compliance • Leverages federal funds

What is a “Total Maximum Daily Load?”

Figure 2. Vermont’s large TMDLs that require nutrient pollutant reductions



Report Scope

Types of Measures Reported



Investment measures of how State of Vermont invests in clean water projects from planning to design and implementation



Project output measures that quantify the results of state-funded clean water projects



Education measures on outreach and technical assistance to support, identify, and develop clean water projects



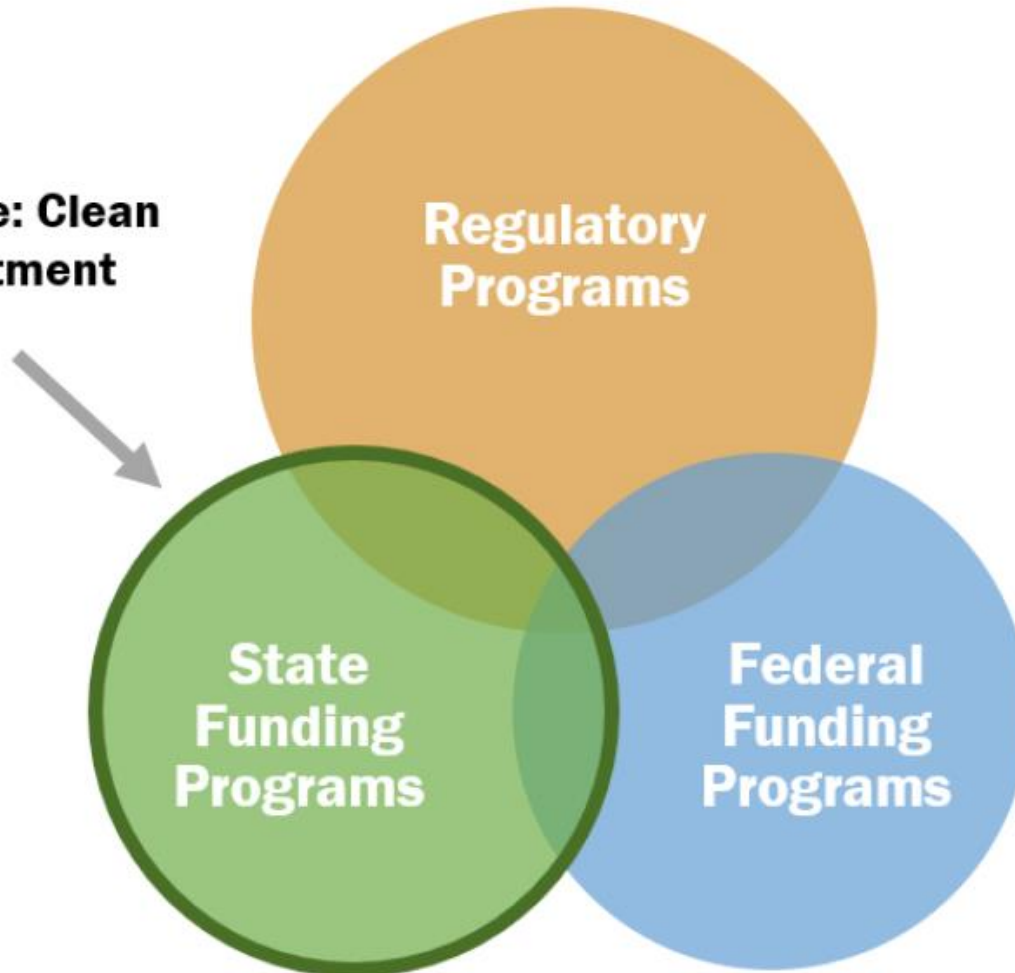
Pollutant reduction measures of estimated nutrient load reductions achieved by clean water projects

Report Scope

Part 1: Vermont Clean Water Investment Report

Target Audience: Vermont State Legislature

**Part 1 Scope: Clean
Water Investment
Report**

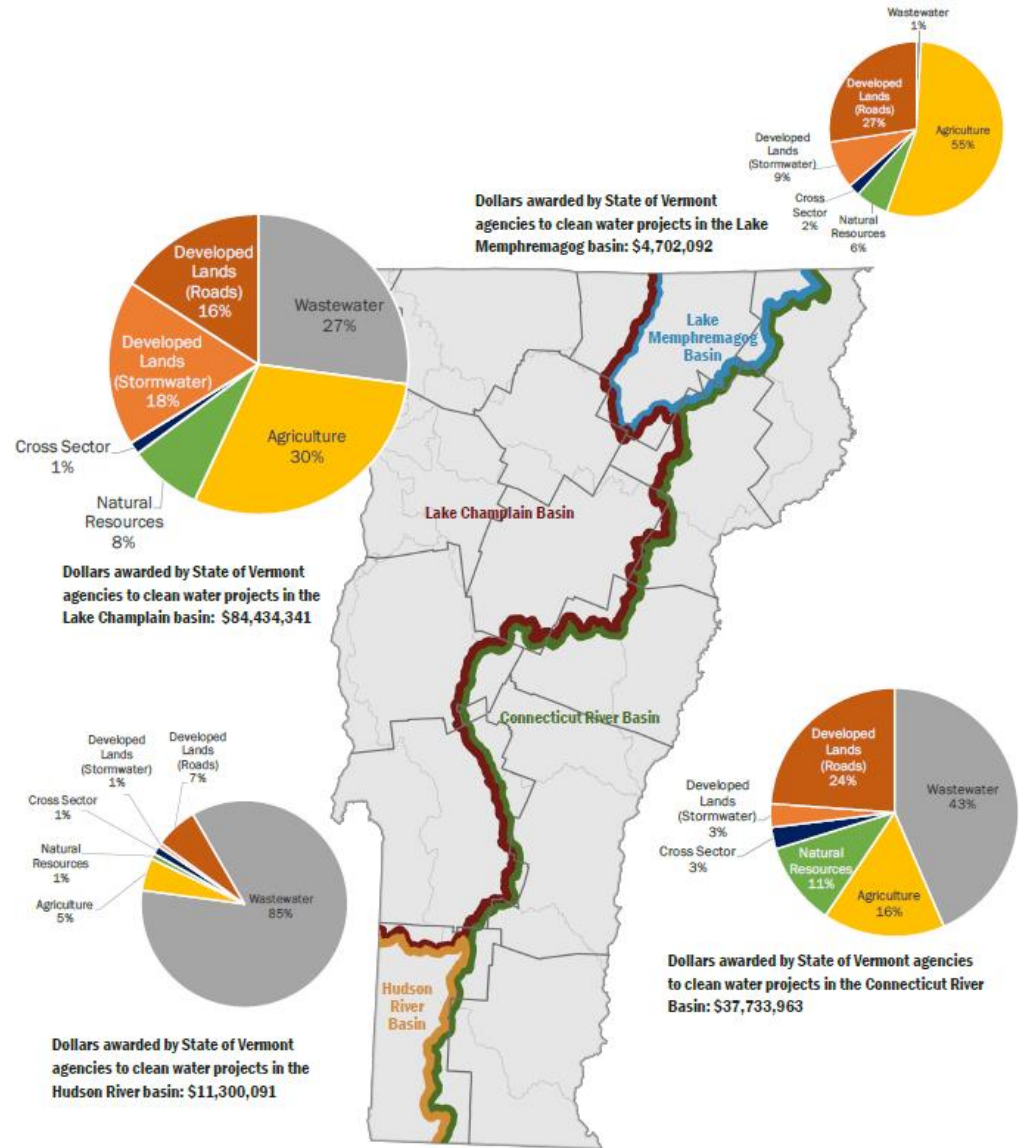


Vermont's Clean Water Investments



\$138 million

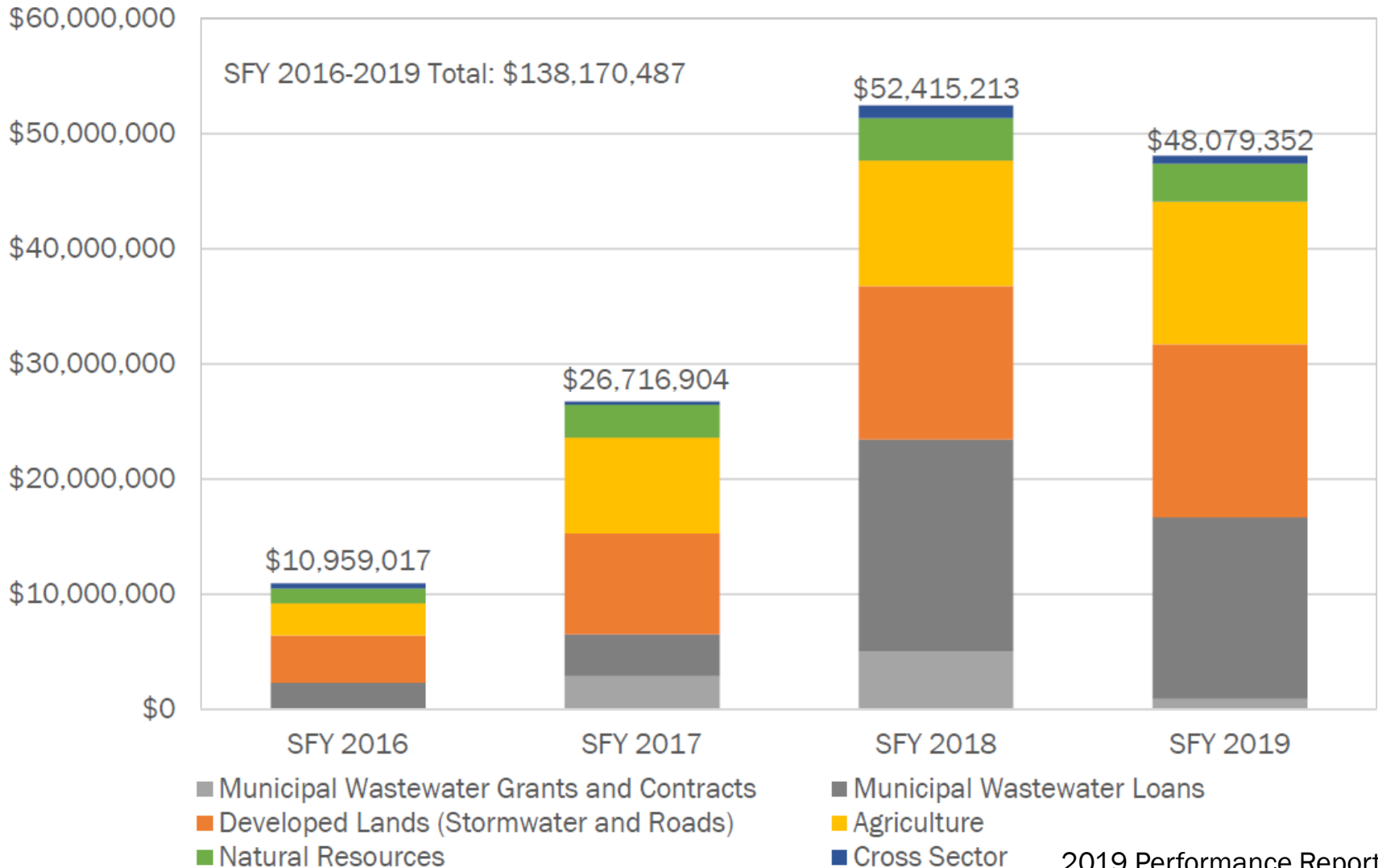
Awarded by State of Vermont agencies to clean water projects, SFY 2016-2019



Vermont's Clean Water Investments



Figure 7. Total dollars awarded to clean water projects through State of Vermont agencies, SFY 2016-2019 by land use sector⁵



Vermont's Clean Water Education



Table 3. State of Vermont regulatory oversight, technical assistance, and capacity building to support clean water improvements on agricultural lands, SFY 2016-2019

Technical Assistance Measures	2016	2017	2018	2019	Total
Number of water quality compliance farm visits conducted by AAFM to ensure compliance with RAPs and MFO and LFO Rules	186	352	675	614	1,827
Number of technical assistance visits conducted by AAFM to support implementation of conservation practices	594	348	592	550	2,084
Acres of production area inspected by AAFM for RAP compliance	--	1,200	670	1,445	3,315
Number of farmers directly assisted by partner organizations	--	--	--	145	145
Number of new or expanded partner-provided agricultural services	--	--	21	32	53



Figure 13. University of Vermont Extension staff educating farmers on water quality best practices through the Northwest Crops and Soils Program (Source: University of Vermont Extension)



Figure 14. Farmers create their own nutrient management plans with the assistance of the University of Vermont Extension and the Vermont Association of Conservation Districts Northwest Crops and Soils Program (Source: University of Vermont Extension)

Results of Vermont's Clean Water Investments



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	

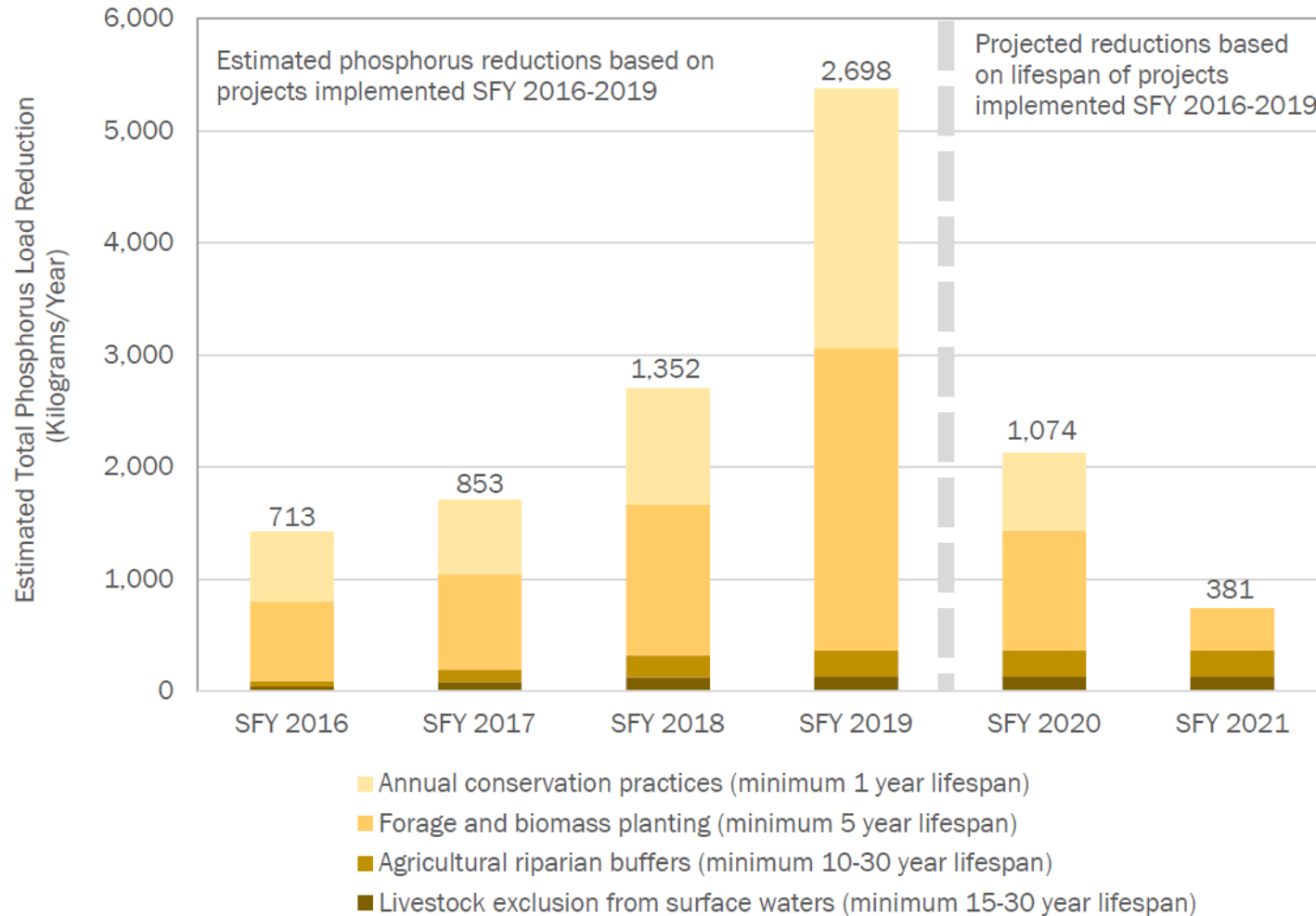
Figure 25. Before (left) and after (right) installation of a perennial vegetated filter strip in the Lake Memphremagog watershed to filter field runoff from the adjacent agricultural field, funded by the AAFM Best Management Practice Program; technical support for installation of the practice provided by the Vermont Association of Conservation Districts funded by AAFM Clean Water Fund Grants and Contracts (Source: AAFM)



Results of Vermont's Clean Water Investments



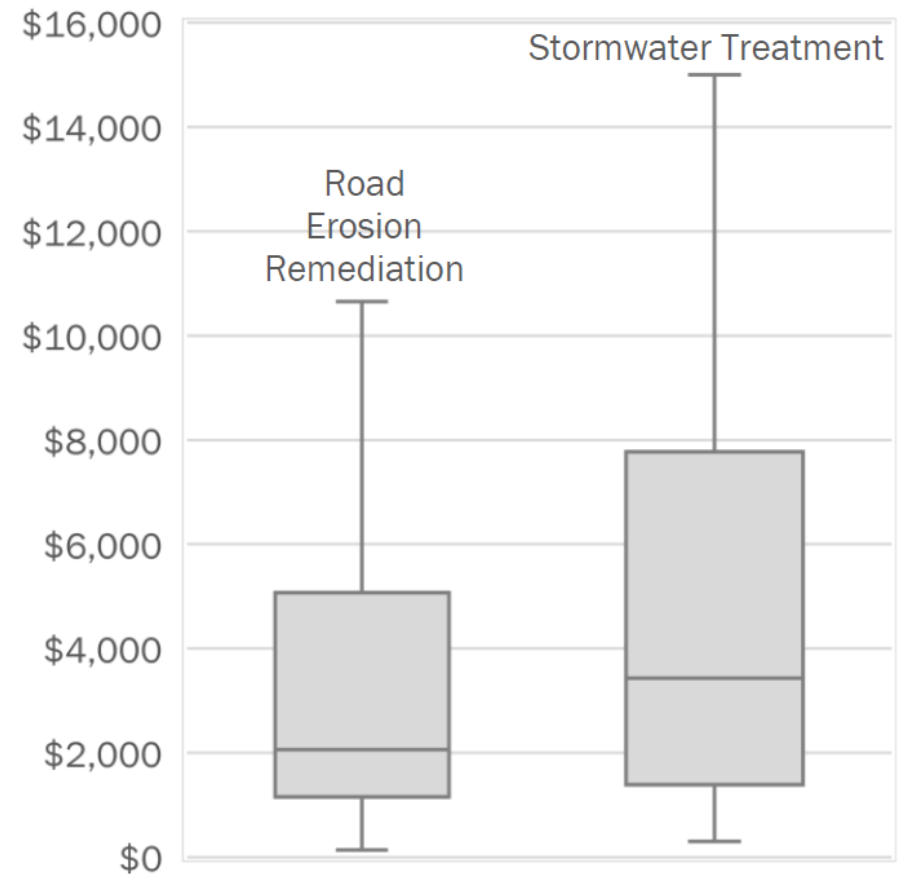
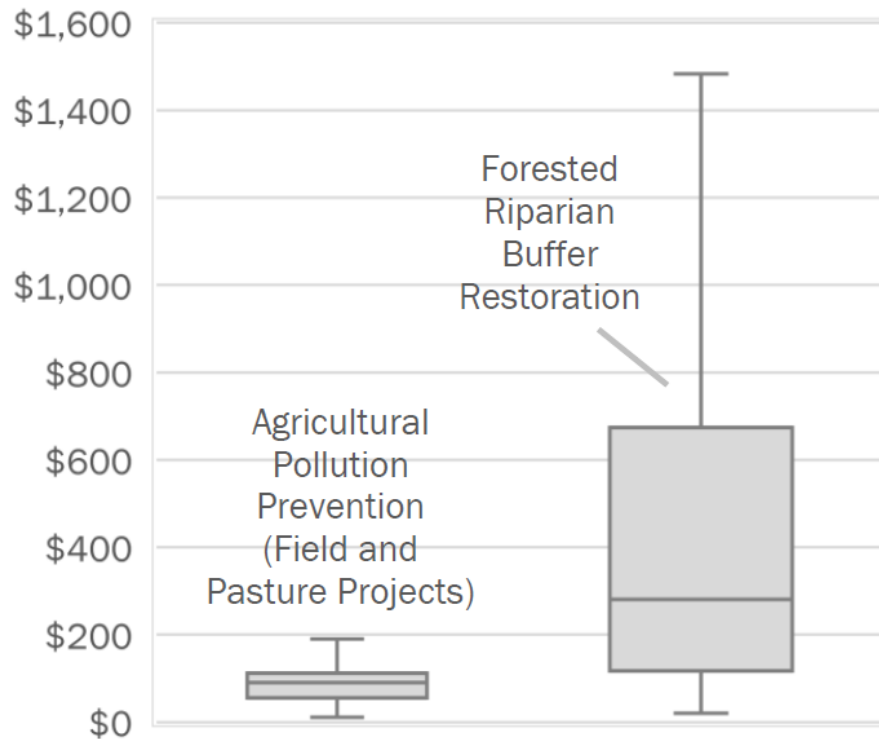
Figure 22. Annual estimated total phosphorus load reduction (kilograms per year) achieved by state-funded agricultural pollution prevention projects implemented SFY 2016-2019 (projected reductions are based on lifespan of projects completed SFY 2016-2019)



Cost Effectiveness of State Clean Water Investments

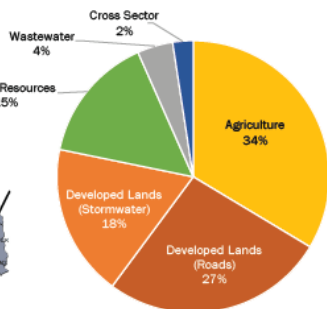
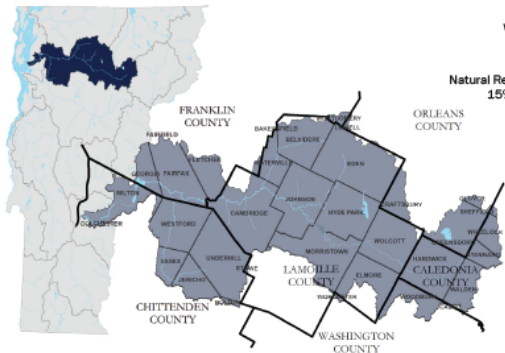
Figure 36. Estimated cost per kilogram of total phosphorus load reduced, based on clean water projects funded through State of Vermont agencies with estimated total phosphorus load reductions completed SFY 2016-2019 (project costs include local match/in-kind and federal match where reported)

Note difference in y-axis maximum values
Left at \$1,600 and right at \$16,000



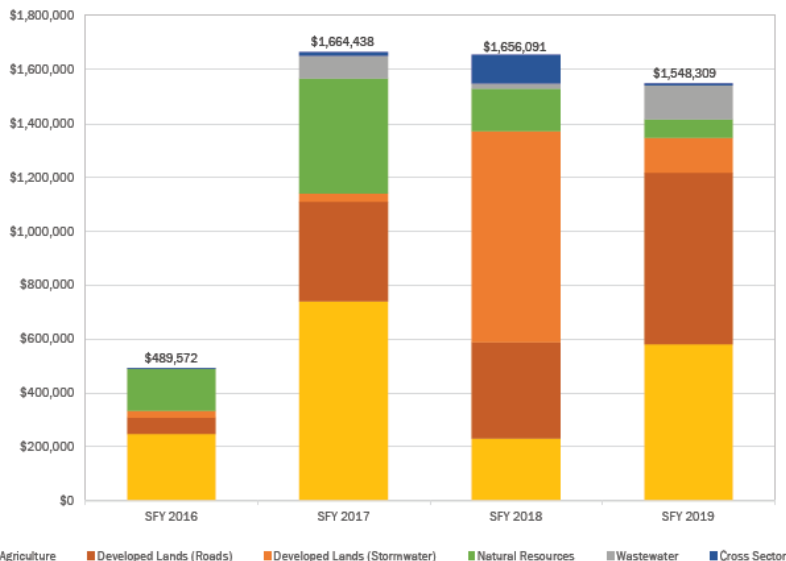
Watershed Summaries (Appendix A)

Lamoille River Watershed Investments



Dollars awarded by State of Vermont agencies to clean water projects in the Lamoille River watershed, SFY 2016-2019, by sector
Total: \$5,358,410

Dollars awarded by State of Vermont agencies to clean water projects in the Lamoille River watershed, by sector and State Fiscal Year.



Legend: Agriculture (Yellow), Developed Lands (Roads) (Orange), Developed Lands (Stormwater) (Red), Natural Resources (Green), Wastewater (Grey), Cross Sector (Blue)

Lamoille River Watershed Results



Results of clean water projects funded by State of Vermont agencies completed, SFY 2016-2019, by sector, in the Lamoille River watershed. Note: Does not include results of projects funded, but not yet completed. The Lamoille River Tactical Basin Plan is due for an interim report card as part of the Lake Champlain Progress Report this reporting period. Refer to Part 2 "Lake Champlain Progress Report" and Appendix B "Interim Lake Champlain TMDL Progress Report for Lamoille River" of this report for more information.



AGRICULTURE

AGRICULTURE PROJECT OUTPUTS	2016	2017	2018	2019	TOTAL
Acres of agricultural land treated by conservation practices	189	87	182	840	1,298
Acres of agricultural land treated by forest and grass buffers	-	14	100	-	114
Acres of pasture with livestock excluded from surface waters	-	9	27	-	36
Number of barnyard and production area practices installed	12	29	2	2	45
Acres of water quality protections within newly conserved agricultural lands	-	-	42	-	42
Estimated acres of agricultural land treated through equipment	-	153	2	104	259
AGRICULTURE POLLUTANT REDUCTION	2016	2017	2018	2019	TOTAL
Total phosphorus load reduction (kilograms per year)	29.6	34.3	86.9	243.0	



NATURAL RESOURCES

NATURAL RESOURCES PROJECT OUTPUTS	2016	2017	2018	2019	TOTAL
Acres of forested riparian buffer restored	1	1	0.9	8	11
Acres of riparian corridor conserved and restored through easements	21	35	35	-	91
Acres of floodplain restored	-	-	0.3	-	0.3
Acres of lakeshore restored	-	-	-	-	-
Stream miles reconnected for stream equilibrium/fish passage	-	-	-	-	-
Acres of wetland conserved and restored through easements	-	-	-	-	-
Acres of forestland conserved with water quality protections	-	15	15	-	30
Miles of forest road drainage and erosion control improvements	-	-	-	0.8	1
Number of stream crossings improved	-	-	-	2	2
Square feet of eroding gully remediated	-	-	-	27	27
NATURAL RESOURCES POLLUTANT REDUCTION	2016	2017	2018	2019	TOTAL
Total phosphorus load reduction (kilograms per year)	0.5	2.7	6.2	6.8	



DEVELOPED LANDS



ROADS

DEVELOPED LANDS AND ROADS PROJECT OUTPUTS	2016	2017	2018	2019	TOTAL
Acres of existing impervious surface treated by stormwater practices	-	4	10	3	17
Miles of municipal road drainage and erosion control improvements	-	0.7	7	4	12
Number of municipal road drainage and stream culverts replaced	-	1	32	11	44
Cubic yards of Class IV road gully erosion remediated	-	-	-	-	-
Cubic yards of catch basin outlet erosion remediated	-	-	-	-	-
Acres stabilized through use of hydroseeder/mulcher equipment per year	-	-	1	81	82
DEVELOPED LANDS AND ROADS POLLUTANT REDUCTION	2016	2017	2018	2019	TOTAL
Total phosphorus load reduction (kilograms per year)	-	3.9	30.9	48.5	



WASTEWATER

WASTEWATER PROJECT OUTPUTS	2016	2017	2018	2019	TOTAL
Number of combined sewer overflow abatements completed	-	-	-	-	-
Number of sewer extensions completed	-	-	-	-	-
Number of wastewater collection systems refurbished	-	-	-	-	-
Number of wastewater treatment facility refurbished	-	-	-	-	-
Number of wastewater treatment facility upgrades completed	-	-	-	-	-

Online Clean Water Projects Explorer

Clean Water Project Explorer <<

Project Status

Potential Projects | Projects In Progress | **Completed Projects**

Keyword:

Sector:

Step:

Type:

Agency:

County:

Include Multi County Projects

Town:

Basin:

Include Multi Basin Projects

WPD ID:

Search Results *(Click for Listing)*
Projects found: 806
Projects with map points found: 391

Map Key

- Agriculture
- Agriculture Approximate Location (HUC 12 Center)
- Developed Lands
- Natural Resources
- Other
- Wastewater

Cover Crop - Broadcast

Type: Agricultural Pollution Prevention - Implementation
Program: AAFM Farm Agronomic Practice Program
State Funds: \$5,000
Funded SFY: 2018
Completed SFY: 2018

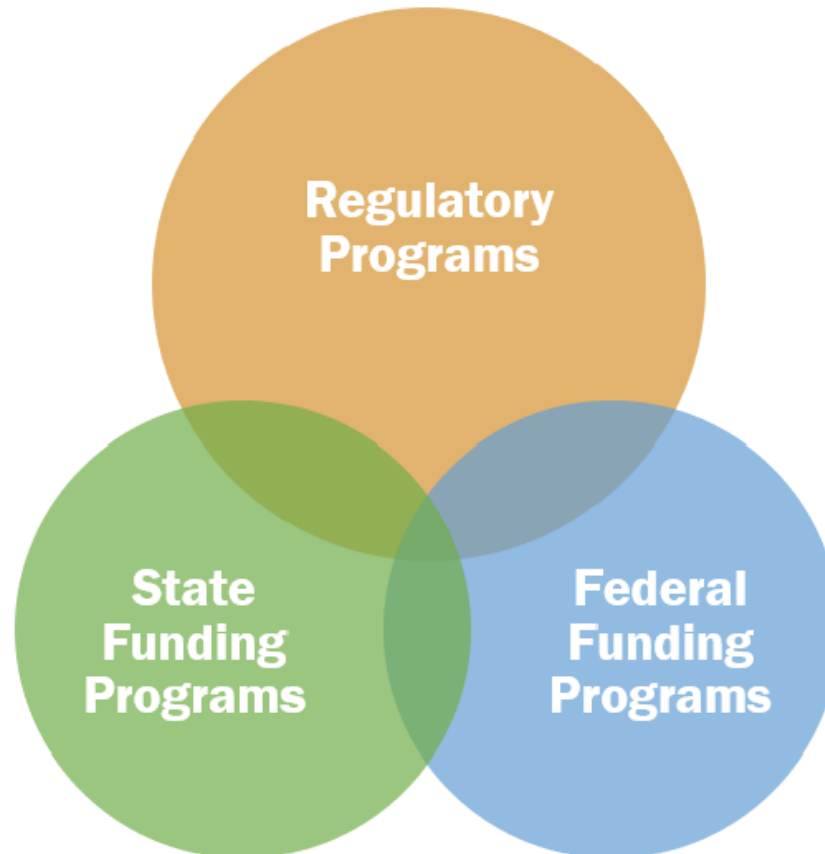
[Project Report](#)

Report Scope

Part 2: Lake Champlain Progress Report

Target Audience: U.S. Environmental Protection Agency

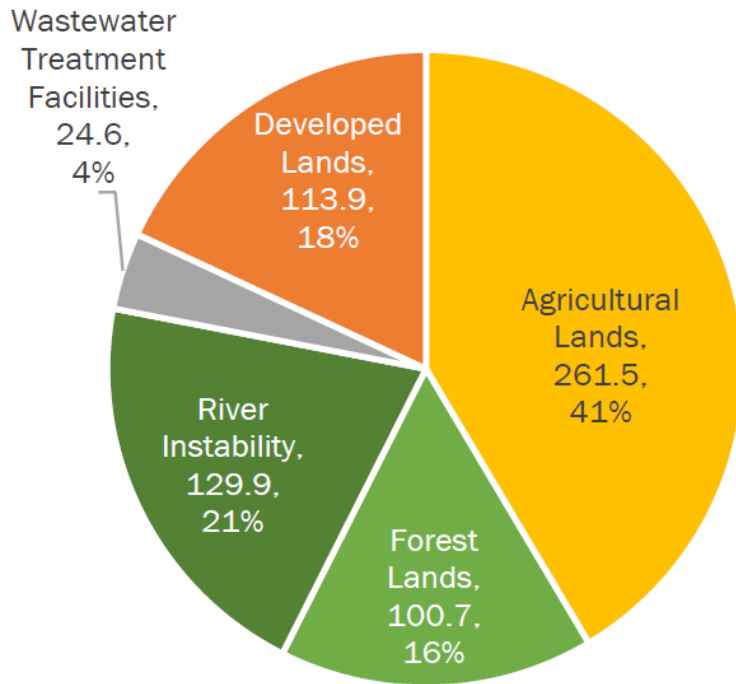
Part 2 Scope: Lake Champlain Progress Report



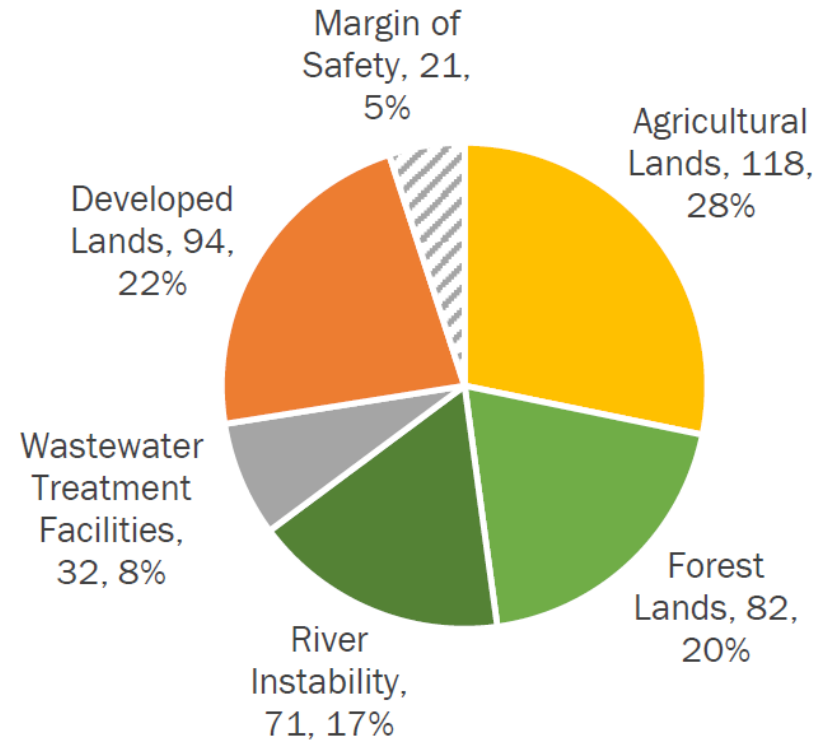
Part 2: Lake Champlain Progress Report

Figure 37. Lake Champlain TMDL baseline (left) and target (right) total phosphorus load in metric tons per year (requires a total reduction of 212.4 metric tons per year)¹²

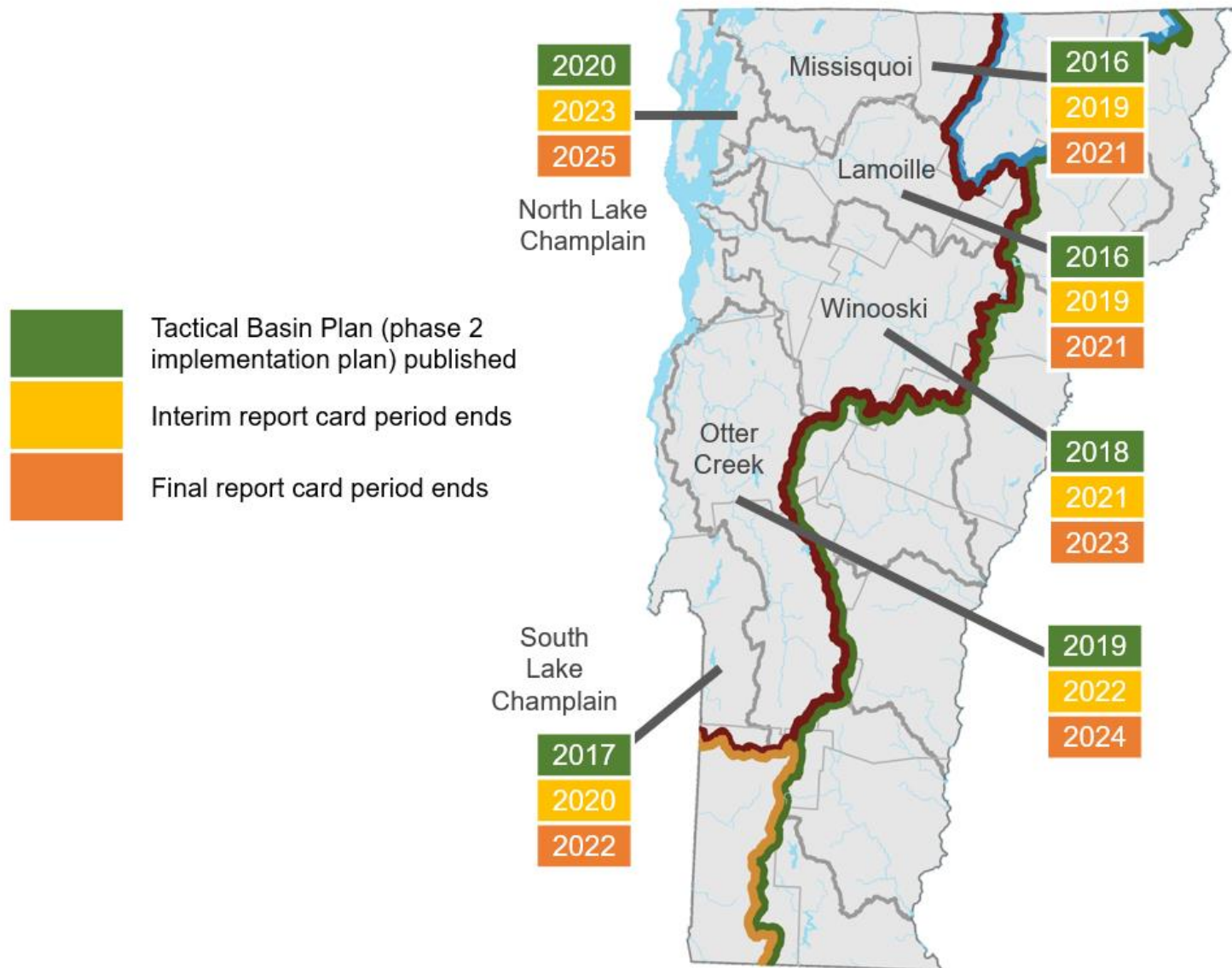
Baseline total phosphorus load
to Lake Champlain (average of 2001-2010):
631 metric tons per year



Target total phosphorus load
to Lake Champlain:
418 metric tons per year

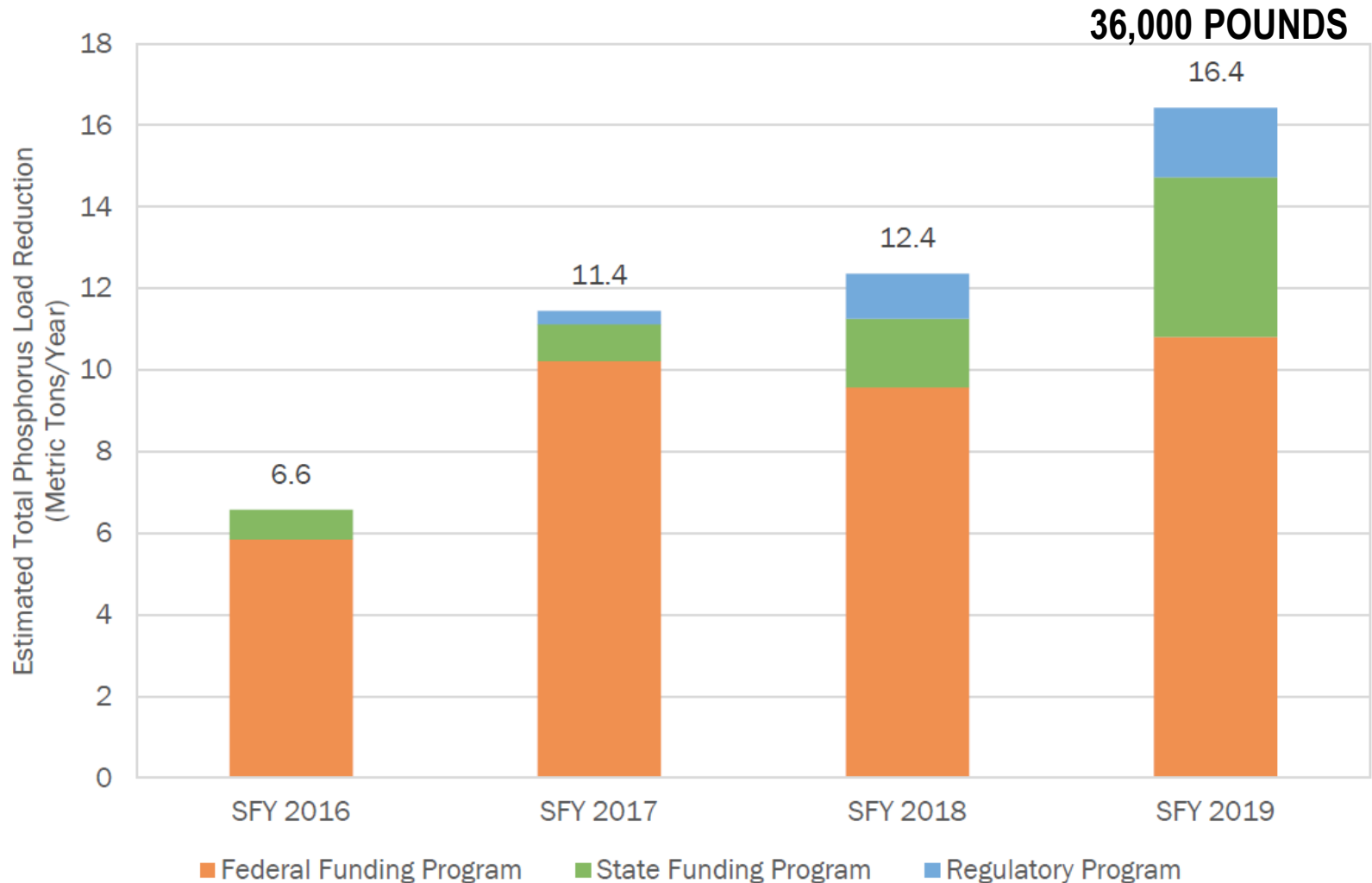


Part 2: Lake Champlain Progress Report



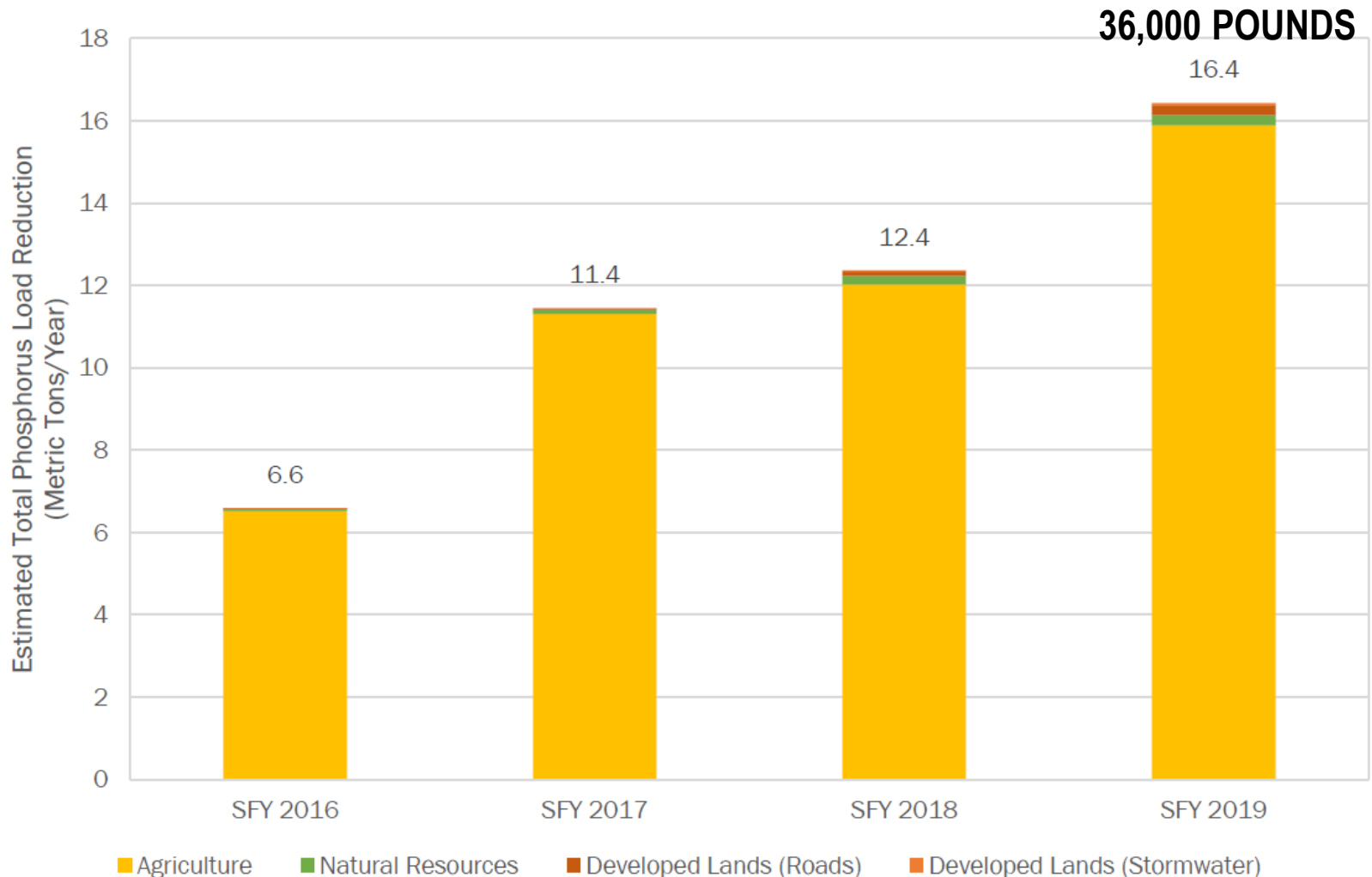
Part 2: Lake Champlain Progress Report

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 funding, state funding, and regulatory programs (top) and land use sector (bottom)¹⁴



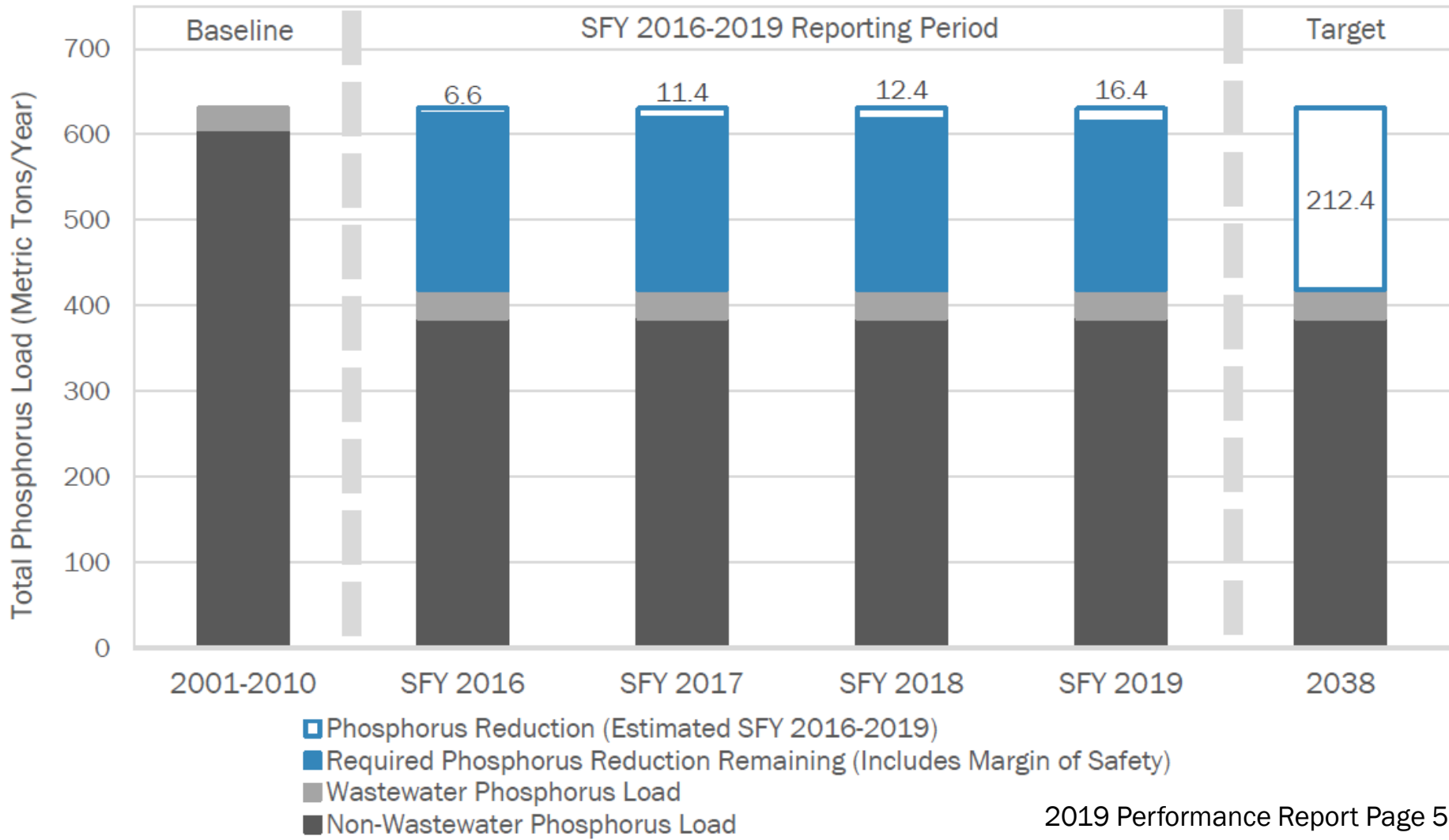
Part 2: Lake Champlain Progress Report

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 funding, state funding, and regulatory programs (top) and land use sector (bottom)¹⁴



Part 2: Lake Champlain Progress Report

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 year¹⁵



For more information:

Access reports and online tools: <https://dec.vermont.gov/water-investment/cwi/projects>

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emily.bird@vermont.gov 802-490-4083