Vermont Clean Water Initiative
2022 Performance Report

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

Looking Ahead to Cleaner Water

CLAIRE MADDEN

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

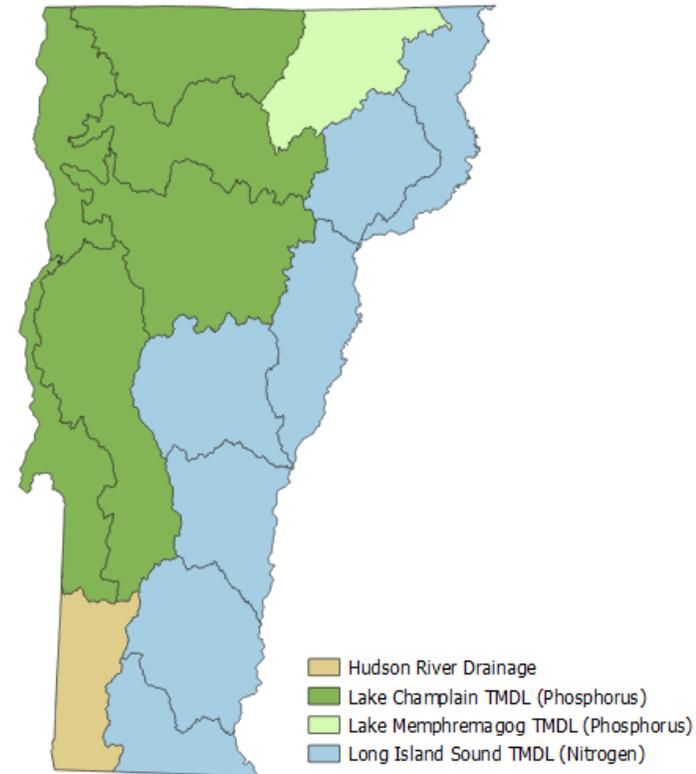CLEAN WATER INITIATIVE PROGRAM

Presentation Outline

- Water quality in Vermont
- Clean water projects
- Clean Water Initiative 2022 Performance Report
- How do we measure progress?
  - Investments
  - Education and outreach
  - Project outputs
  - Phosphorus reductions
  - TMDL progress projections
- Clean Water Interactive Dashboard

Water Quality in Vermont

- Overall, we enjoy very high-quality waters in Vermont.

- In some areas, excess nutrient and sediment pollution can create imbalances that can lead to water quality impacts, including harmful cyanobacteria blooms.

- Clean water restoration plans – Total Maximum Daily Loads (TMDLs) – identify the maximum amount of pollutant a water can receive and still meet Vermont water quality standards.

Hudson River Drainage
Lake Champlain TMDL (Phosphorus)
Lake Memphremagog TMDL (Phosphorus)
Long Island Sound TMDL (Nitrogen)

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Clean Water Projects

| Land Use	Clean Water Project Objectives
AGRICULTURE	Addresses runoff and soil erosion from farm production areas and farm fields.
NATURAL RESOURCES	Restores functions of "natural infrastructure" — river channels, floodplains, lakeshores, and wetlands
ROADS STORMWATER **DEVELOPED LANDS**	Addresses stormwater runoff from developed lands, such as parking lots, sidewalks, rooftops, and roads
WASTEWATER	Decreases nutrients (phosphorus and nitrogen) through enhanced wastewater treatment and addresses aging infrastructure

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Agriculture

Natural Resources

Stormwater

Vermont Clean Water Initiative Annual Performance Report

- Highlights Vermont's clean water efforts and demonstrates how investments, educational programs, and regulatory programs are contributing to cleaner waters in Vermont

- Summarizes state clean water investments and outputs since State Fiscal Year 2016

- Illustrates how state funding programs, federal funding programs, and regulatory programs are contributing to progress towards achieving the Lake Champlain and Lake Memphremagog TMDLs phosphorus reduction targets
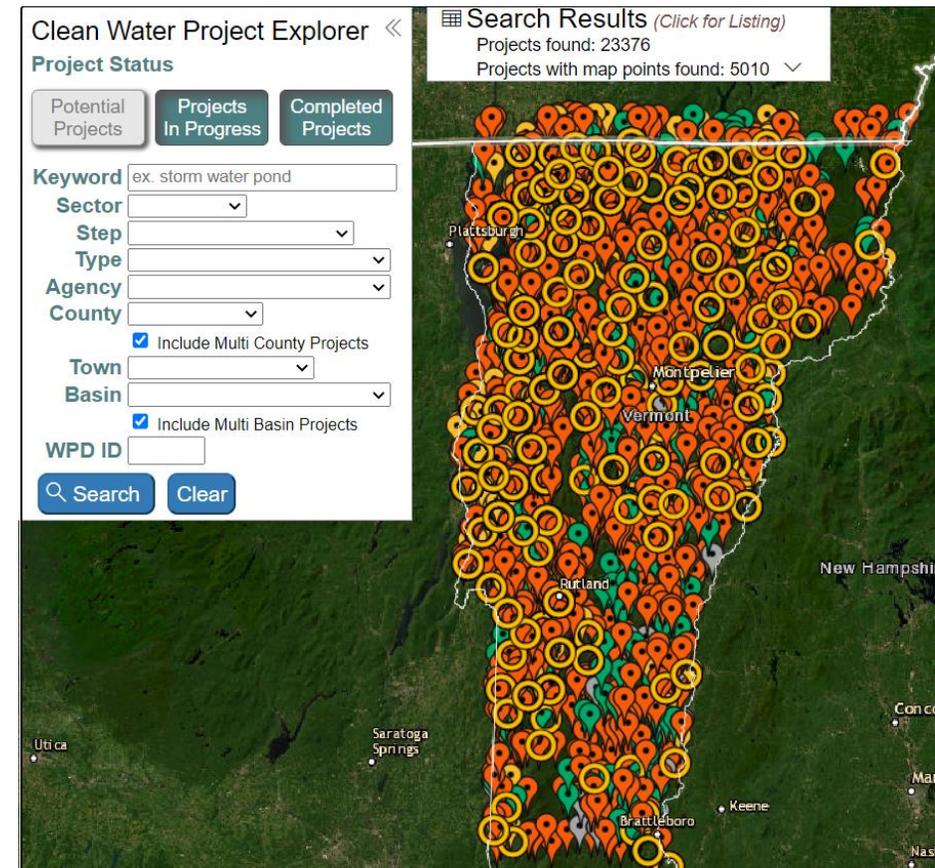
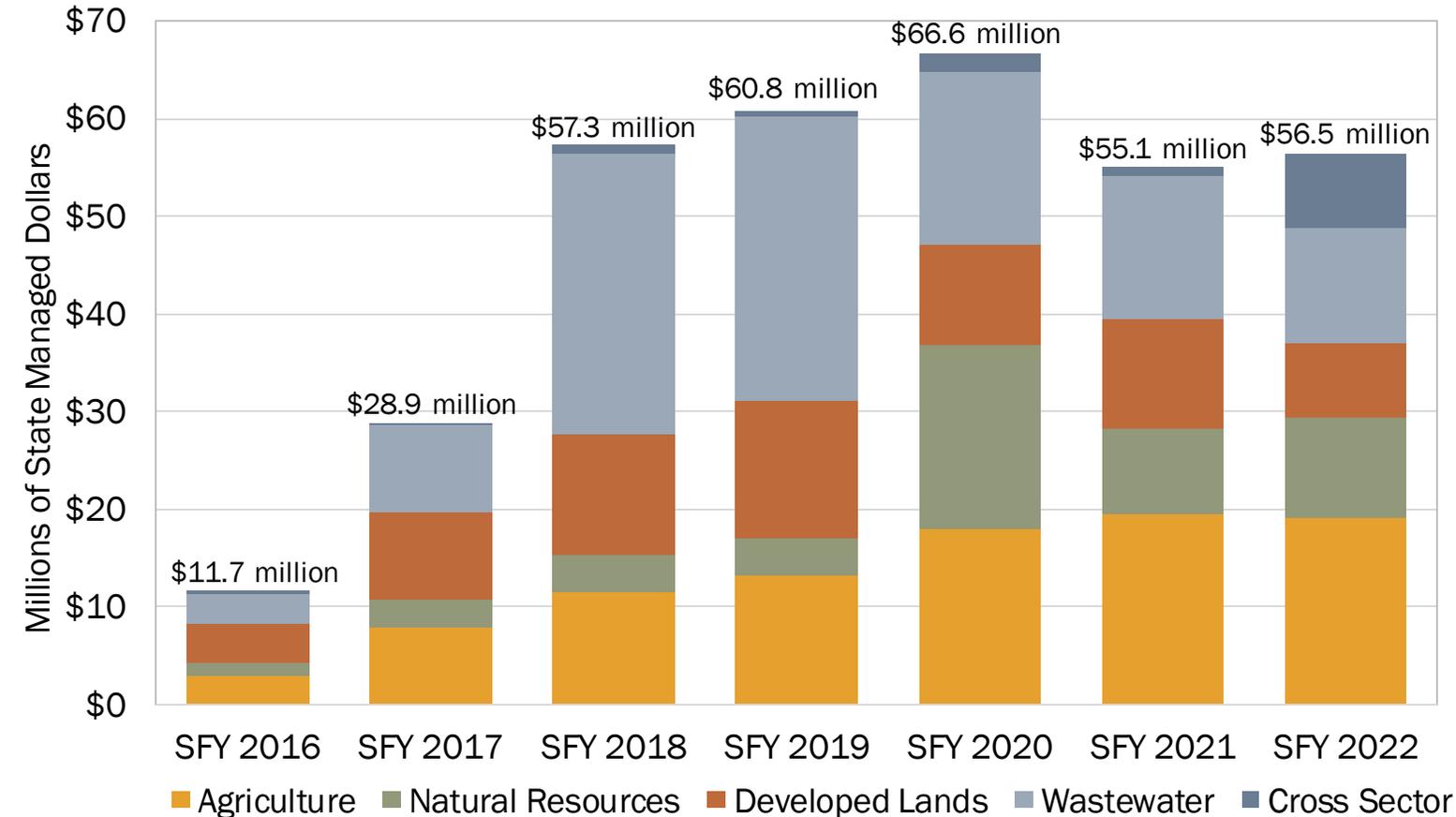# How do we measure progress?

Investments   Education   Project Outputs   Pollutant Reduction

State Investments in Clean Water

Millions of State Managed Dollars

| SFY 2016 | SFY 2017 | SFY 2018 | SFY 2019 | SFY 2020 | SFY 2021 | SFY 2022 |
| $11.7 million | $28.9 million | $57.3 million | $60.8 million | $66.6 million | $55.1 million | $56.5 million |

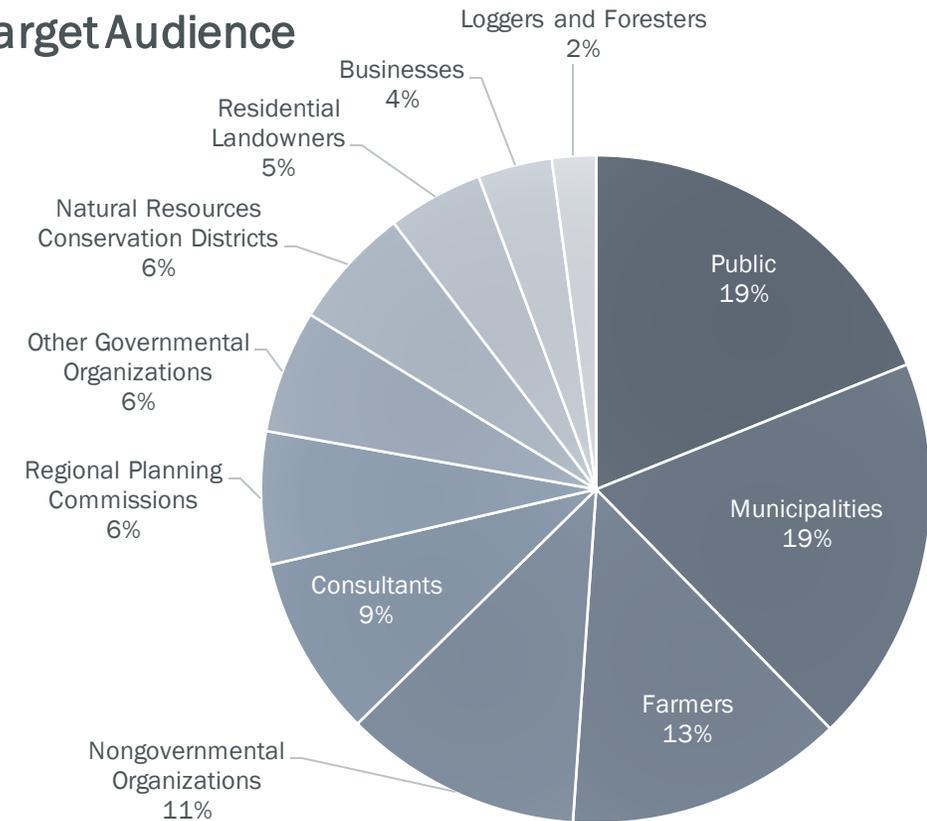Agriculture · Natural Resources · Developed Lands · Wastewater · Cross Sector

- Nearly $337 million of state funding invested in clean water work since SFY 2016

- Investments made across land use sectors; annual variation resulting from project readiness and capacity

- Over 80% of investments have been used towards project implementation and construction

- State investment leveraged nearly $225 million in federal and local contributions to further clean water results

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Education and Outreach

- 2,803 outreach events

- Over 86,200 participants

- Provided more than 324,000 hours of education and outreach

- Events hosted/funded by a wide range of outreach organizations including state agencies, regional planning commissions, agricultural associations, natural resource conservation districts, watershed organizations, and more!
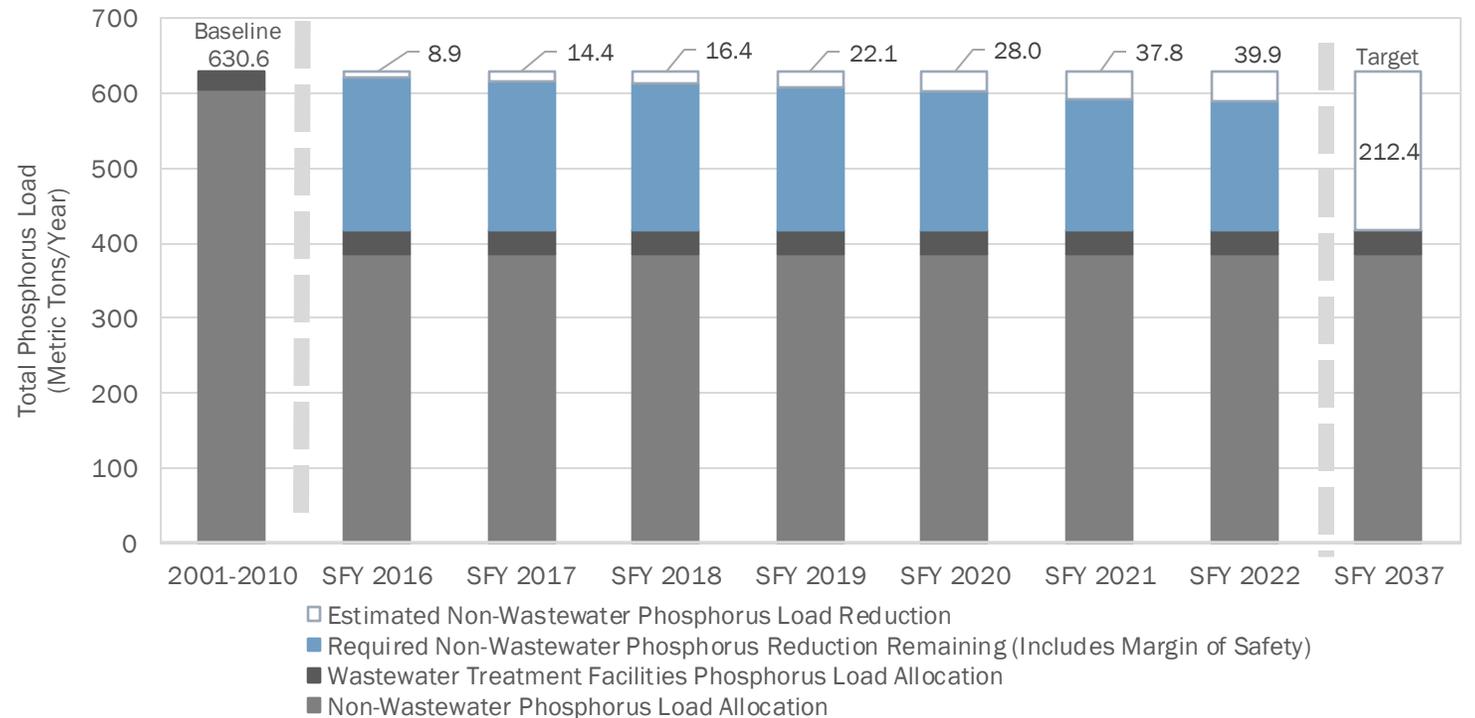
Target Audience

- Loggers and Foresters 2%
- Businesses 4%
- Residential Landowners 5%
- Natural Resources Conservation Districts 6%
- Other Governmental Organizations 6%
- Regional Planning Commissions 6%
- Public 19%
- Municipalities 19%
- Farmers 13%
- Nongovernmental Organizations 11%
- Consultants 9%

Project Outputs

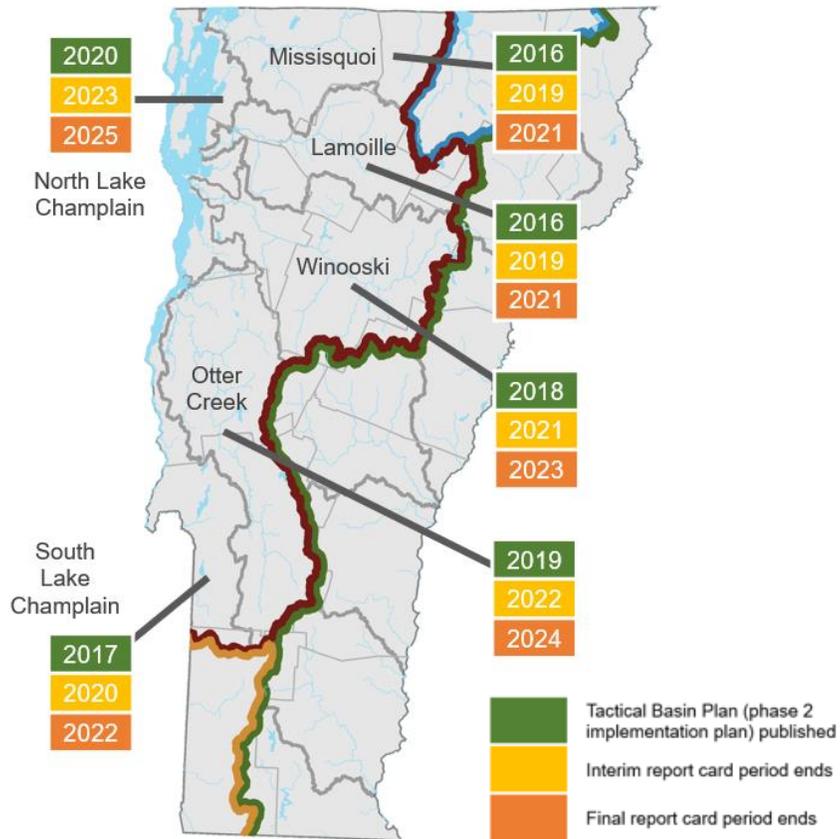| Land Use	Cumulative Project Outputs SFY 2016-2022 by Land Use Sector
Agriculture	• Over **335,000 acres** of agricultural conservation practices implemented on fields and pastures • Over **4,500 structural practices** installed in barnyards/production areas
Natural Resources	• Over **470 riparian acres** (adjacent to rivers, lakes, and wetlands) actively restored through buffer planting and floodplain and lakeshore restoration • Over **2,600 riparian acres** passively restored through river corridor and wetland easements
Developed Lands	• Over **340 municipal road miles** improved through drainage and erosion control best practices • Over **1,000 acres** of existing impervious/hard surfaces treated by stormwater practices
Wastewater	• 21 wastewater treatment **facility upgrades** and refurbishments completed • 6 combined sewer **overflow abatements** completed

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Phosphorus Reductions – Lake Champlain
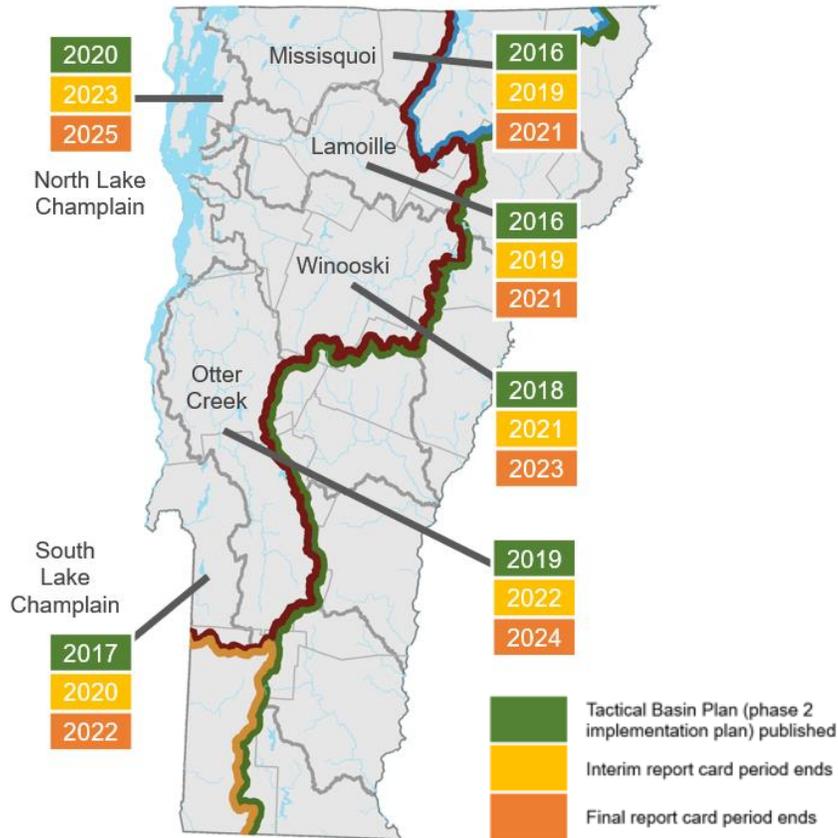
The Lake Champlain TMDL holds the state accountable by requiring reasonable assurances that phosphorus reductions will be achieved

Map labels:
- Missisquoi: 2016, 2019, 2021
- North Lake Champlain: 2020, 2023, 2025
- Lamoille
- Winooski: 2016, 2019, 2021
- Otter Creek: 2018, 2021, 2023
- South Lake Champlain: 2017, 2020, 2022
- (Otter Creek area): 2019, 2022, 2024

Legend:
- Tactical Basin Plan (phase 2 implementation plan) published
- Interim report card period ends
- Final report card period ends

Chart (Total Phosphorus Load, Metric Tons/Year):
- 2001-2010: Baseline 630.6
- SFY 2016: 8.9
- SFY 2017: 14.4
- SFY 2018: 16.4
- SFY 2019: 22.1
- SFY 2020: 28.0
- SFY 2021: 37.8
- SFY 2022: 39.9
- SFY 2037: Target 212.4

Chart legend:
- ☐ Estimated Non-Wastewater Phosphorus Load Reduction
- Required Non-Wastewater Phosphorus Reduction Remaining (Includes Margin of Safety)
- Wastewater Treatment Facilities Phosphorus Load Allocation
- Non-Wastewater Phosphorus Load Allocation
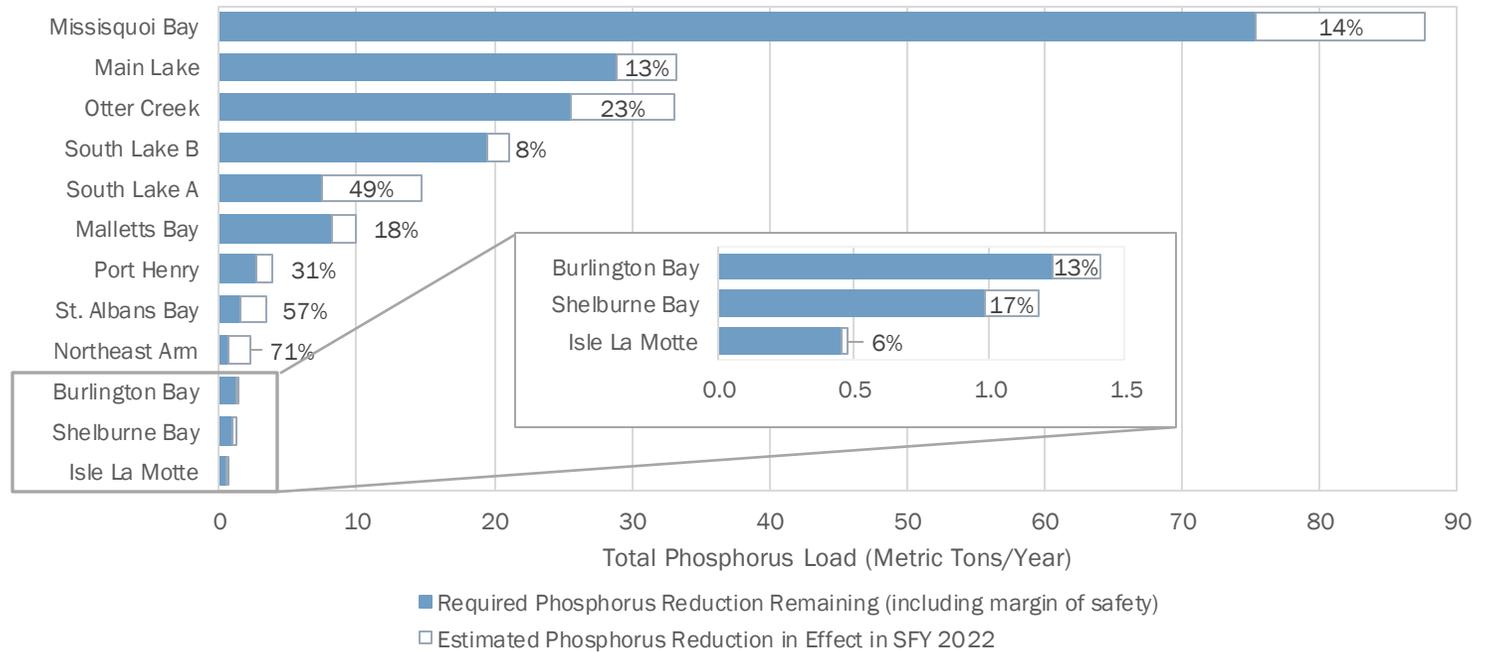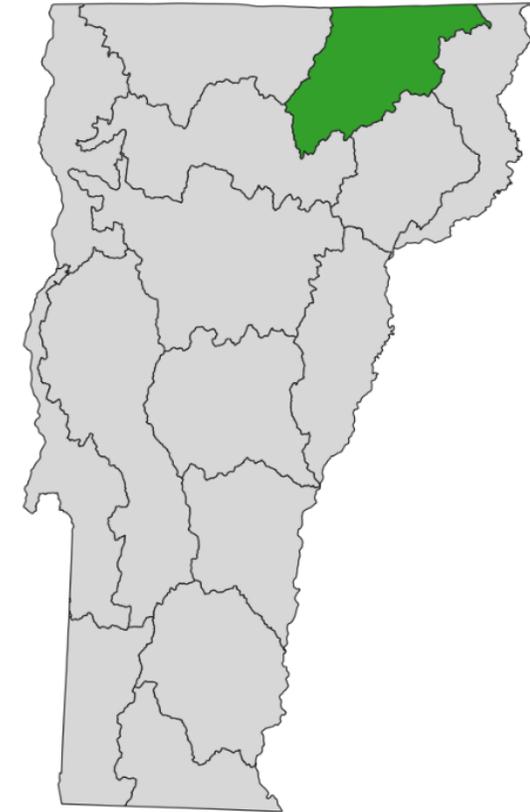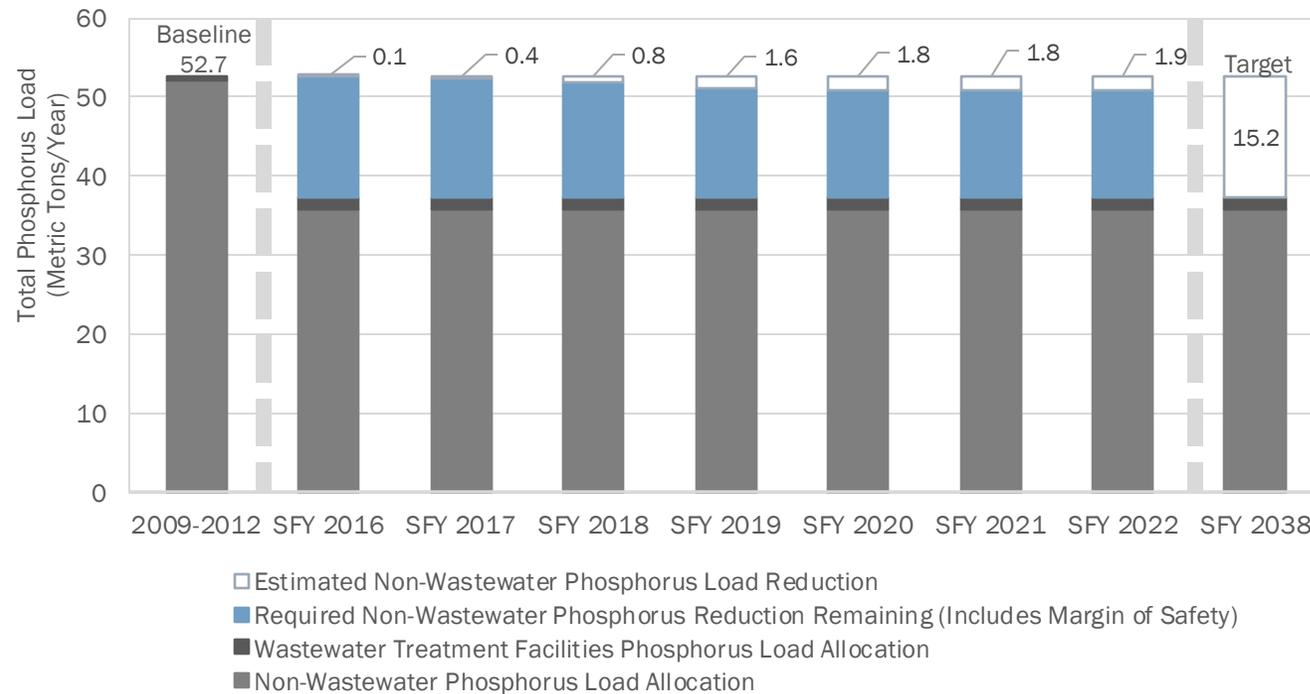
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Phosphorus Reductions – Lake Champlain

Progress towards TMDL targets varies by lake segment as a result of baseline loading, investment focus areas, and sector specific accounting

Map labels:
- Missisquoi: 2020, 2023, 2025 (left); 2016, 2019, 2021 (right)
- North Lake Champlain
- Lamoille
- Winooski: 2016, 2019, 2021 (right)
- Otter Creek: 2018, 2021, 2023 (right)
- South Lake Champlain: 2017, 2020, 2022 (left); 2019, 2022, 2024 (right)

Legend:
- Tactical Basin Plan (phase 2 implementation plan) published
- Interim report card period ends
- Final report card period ends

Chart: Total Phosphorus Load (Metric Tons/Year)

Segment	Estimated Phosphorus Reduction in Effect in SFY 2022
Missisquoi Bay	14%
Main Lake	13%
Otter Creek	23%
South Lake B	8%
South Lake A	49%
Malletts Bay	18%
Port Henry	31%
St. Albans Bay	57%
Northeast Arm	71%
Burlington Bay	13%
Shelburne Bay	17%
Isle La Motte	6%

- ■ Required Phosphorus Reduction Remaining (including margin of safety)
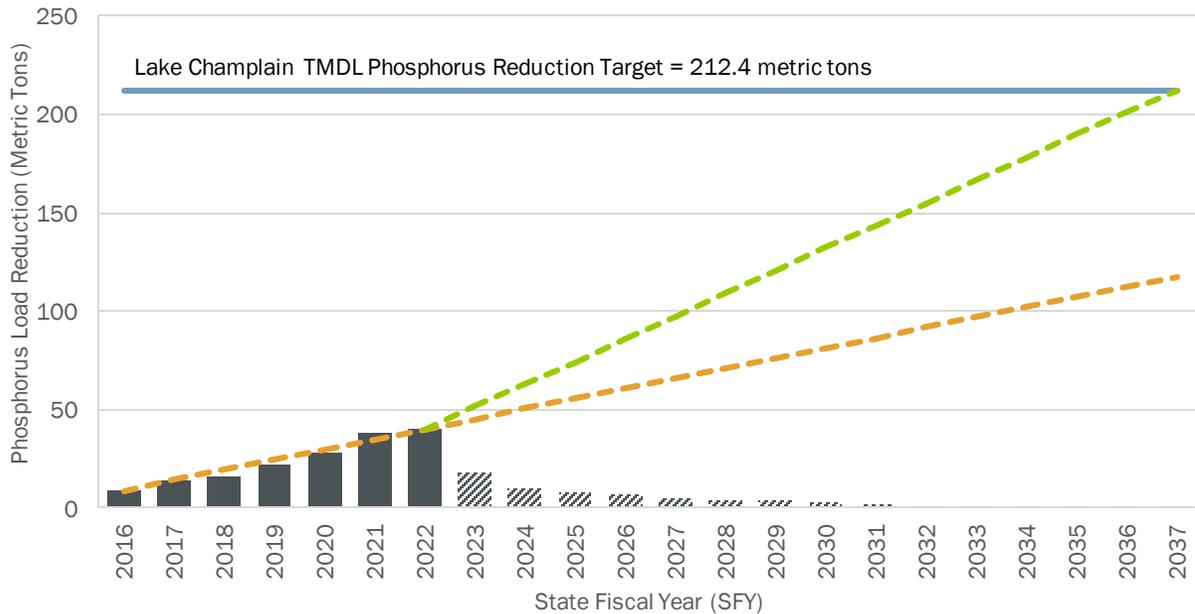- □ Estimated Phosphorus Reduction in Effect in SFY 2022

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Phosphorus Reductions – Lake Memphremagog

The Lake Memphremagog TMDL sets a water quality target to reduce phosphorus reaching the lake by 29% or ~33,500 lbs


Chart — Total Phosphorus Load (Metric Tons/Year):

Year	Value label
2009-2012	Baseline 52.7
SFY 2016	0.1
SFY 2017	0.4
SFY 2018	0.8
SFY 2019	1.6
SFY 2020	1.8
SFY 2021	1.8
SFY 2022	1.9
SFY 2038	Target 15.2

Legend:
- ☐ Estimated Non-Wastewater Phosphorus Load Reduction
- ■ Required Non-Wastewater Phosphorus Reduction Remaining (Includes Margin of Safety)
- ■ Wastewater Treatment Facilities Phosphorus Load Allocation
- ■ Non-Wastewater Phosphorus Load Allocation

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TMDL Progress and Projections

Lake Champlain TMDL Phosphorus Reduction Target = 212.4 metric tons

Lake Memphremagog TMDL Phosphorus Reduction Target = 15.2 metric tons

Legend (left chart):
- Estimated Total Annual Phosphorus Reduction Achieved in the Lake Champlain Basin (SFY 2016 - 2022)
- Lake Champlain TMDL Phosphorus Reduction Target
- Estimated Total Annual Phosphorus Reduction Trend based on Projects Implemented (SFY 2016 - 2022)
- Estimated Total Annual Phosphorus Reduction Trend Necessary to Meet TMDL Target (SFY 2023 - 2037)
- Projected Total Annual Phosphorus Reduction Based on Anticipated Lifespan of Projects Completed (SFY 2016 - 2022)
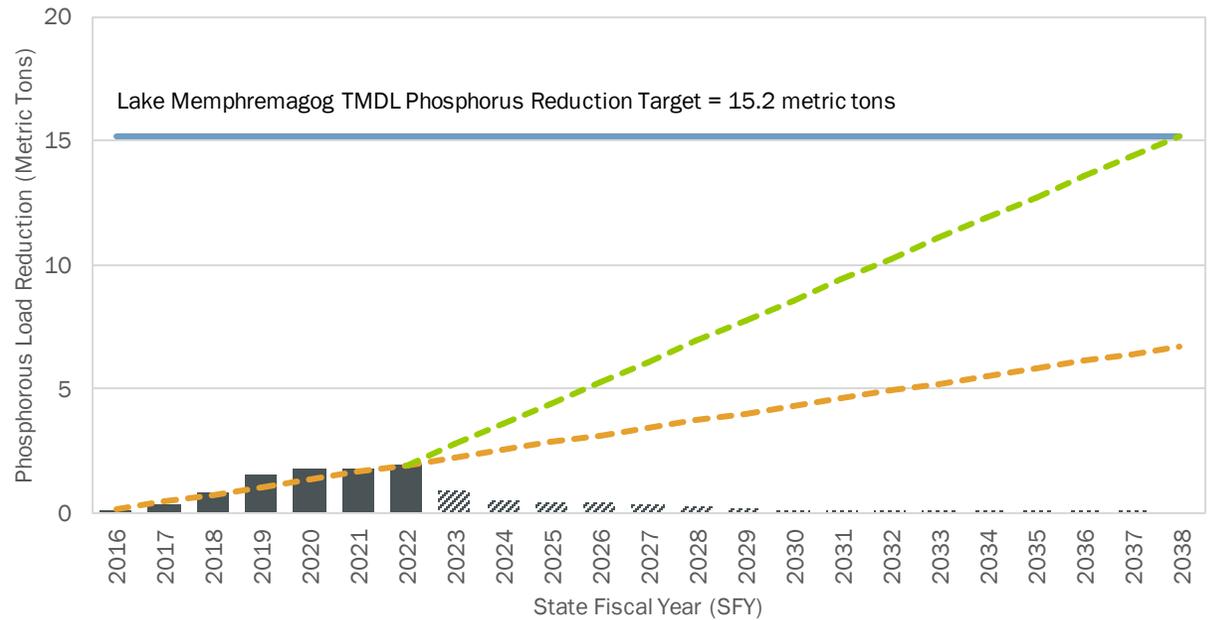
Legend (right chart):
- Estimated Total Annual Phosphorus Reduction Achieved in the Lake Memphremagog Basin (SFY 2016 - 2022)
- Lake Memphremagog TMDL Phosphorus Reduction Target
- Estimated Total Annual Phosphorus Reduction Trend based on Projects Implemented (SFY 2016 - 2022)
- Estimated Total Annual Phosphorus Reduction Trend Necessary to Meet TMDL Target (SFY 2023 - 2038)
- Projected Total Annual Phosphorus Reduction Based on Anticipated Lifespan of Projects Completed (SFY 2016 - 2022)

Clean Water Interactive Dashboard

Looking Ahead to Cleaner Water

- The State of Vermont has made substantial investments in clean water work that have resulted in real progress towards reaching clean water goals statewide over the last seven years.

- Foundational elements are in place to support continued expansion and sustained impact of clean water work.

- To realize the full potential of our collective work will require continued effort, investment, coordination, and capacity development.
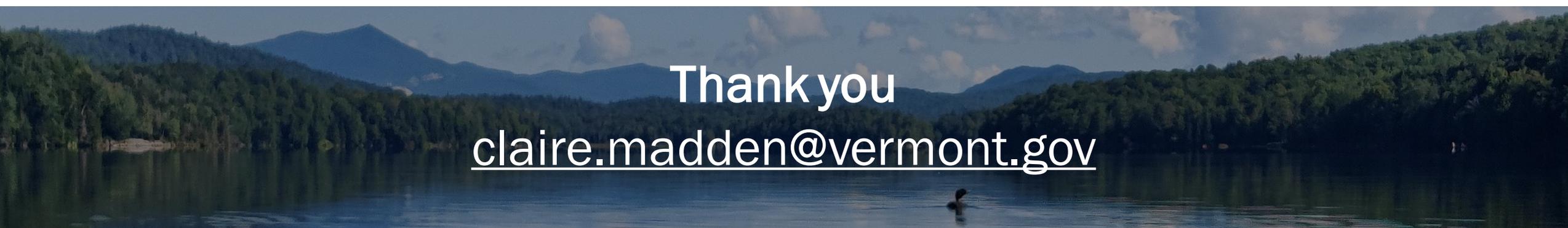
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This report was prepared by the Clean Water Initiative Program on behalf of the Vermont Secretary of Administration with assistance from partner agencies:

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Thank you
claire.madden@vermont.gov