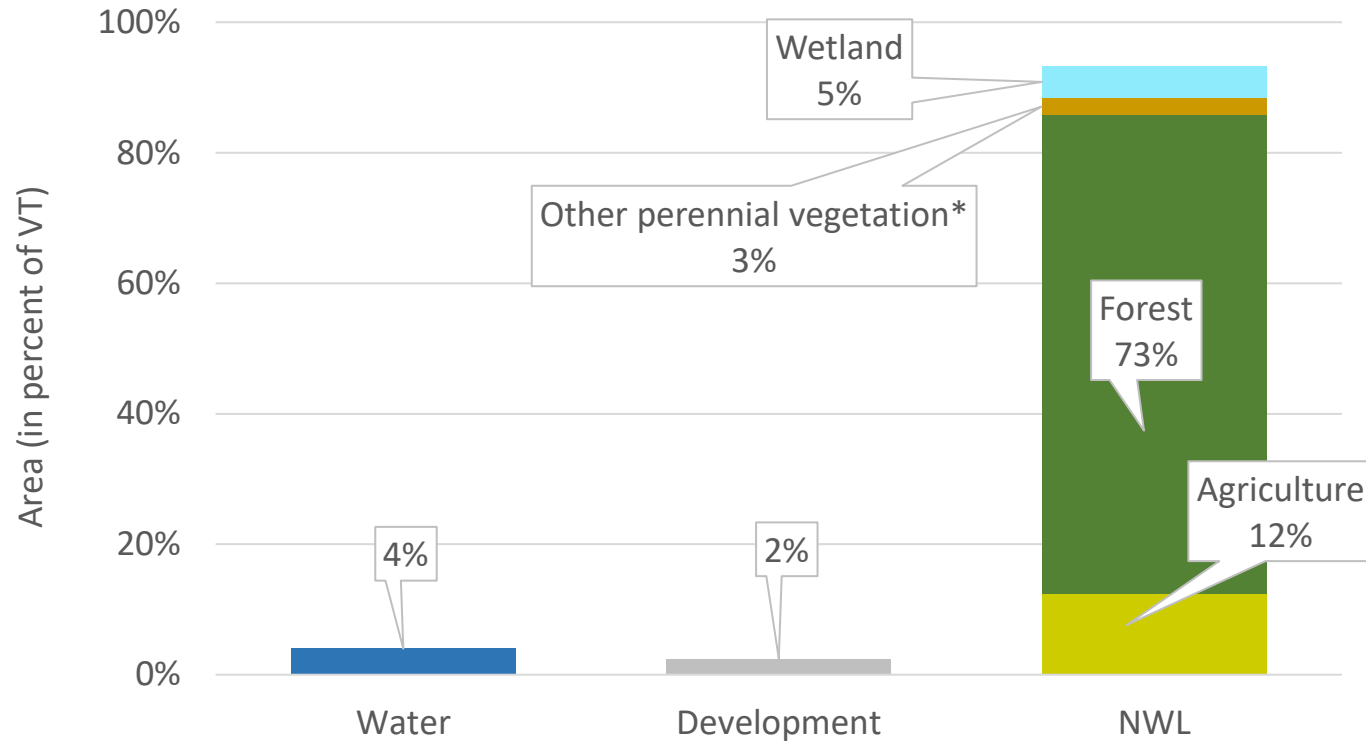


Initial VT Climate Action Plan & Dairy Farmers

Ryan Patch
Agriculture Climate and Land Use Policy Manager
Vermont Agency of Agriculture, Food and Markets
'Farm Show' Dairy Update
February 10, 2022

Natural & Working Lands (NWL) cover 94% of Vermont



*Other perennial vegetation includes grasslands, shrub/scrublands, and turf


Section 11.4: Agricultural Pathways for Mitigation (19 pages)

Section 13: Pathways for Adaptation and Building Resilience in Natural and Working Lands (38 pages)

Section 14: Pathways for Sequestration and Storing Carbon (13 pages)



INITIAL VERMONT CLIMATE
ACTION PLAN



Vermont Climate Council
DECEMBER 2021

Vermont is Getting Warmer and Wetter: Climate Change Study

The Green Mountain State has warmed nearly 2°F, with a 21% jump in precipitation

Key findings



Climate change is here – and impacting communities across Vermont.



Vermont is getting warmer. Winters are warming more quickly. Snow season is getting shorter.



Vermont is getting wetter. Heavy rain events happen more often, contributing more flooding and water quality problems.



Multiple, complex impacts could lead to surprises.



Climate impacts and risks will increase without action.



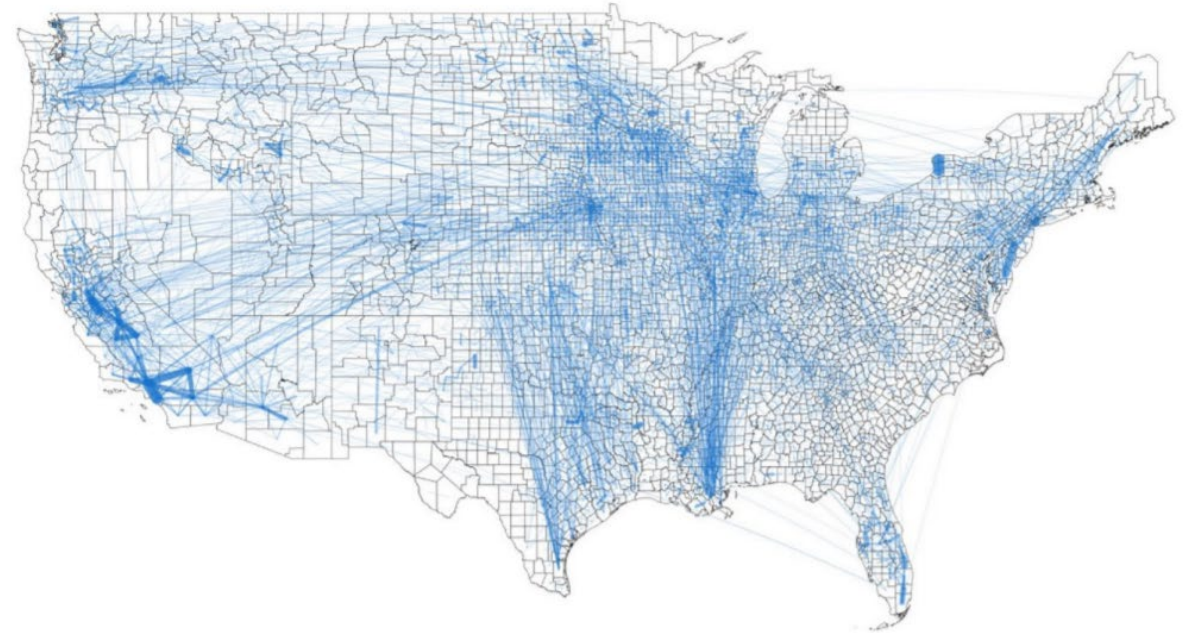
[Dig in to learn more...](#)

What to call climate change where you live

Intensity shows risk level from low (lighter) to very high (darker)

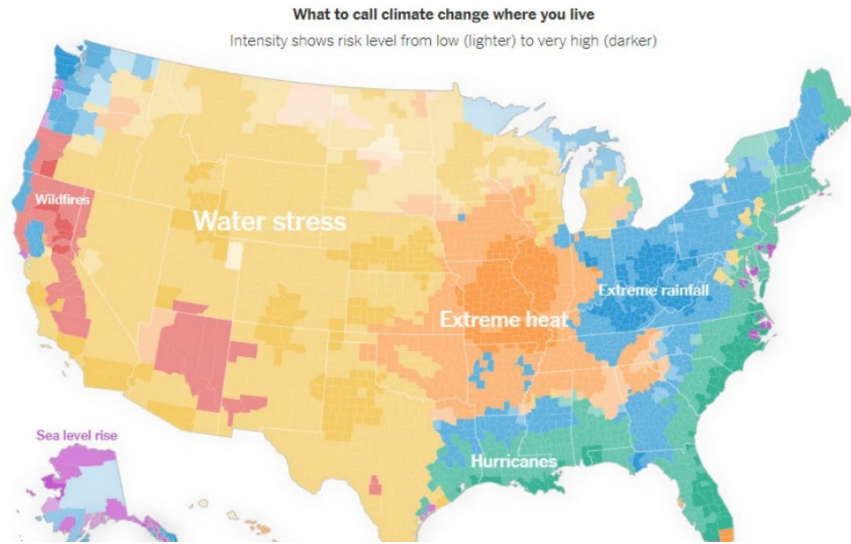


Food Flows: Downscaled to All Counties



Source: Ellen Kahler, VSJF Presentation to House Agriculture:

<https://legislature.vermont.gov/Documents/2022/WorkGroups/House%20Agriculture/Food%20Security/W~Ellen%20Kahler~New%20England%20Feeding%20New%20England-%20Cultivating%20a%20Reliable%20Food%20Supply~1-26-2021.pdf>



Food Flows: Downscaled to All Counties

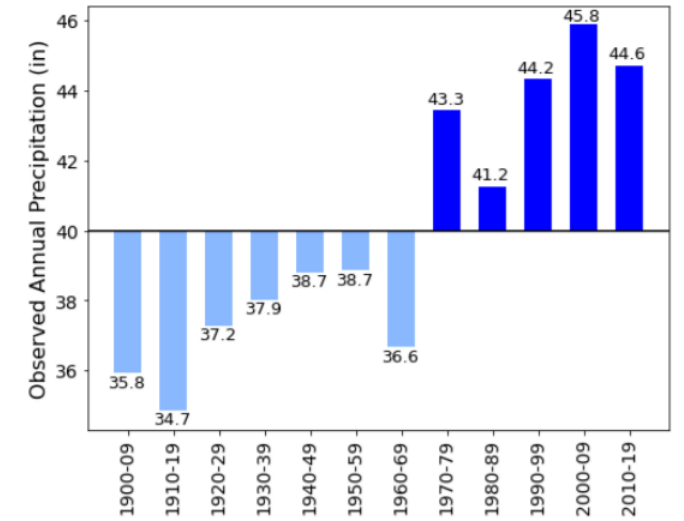
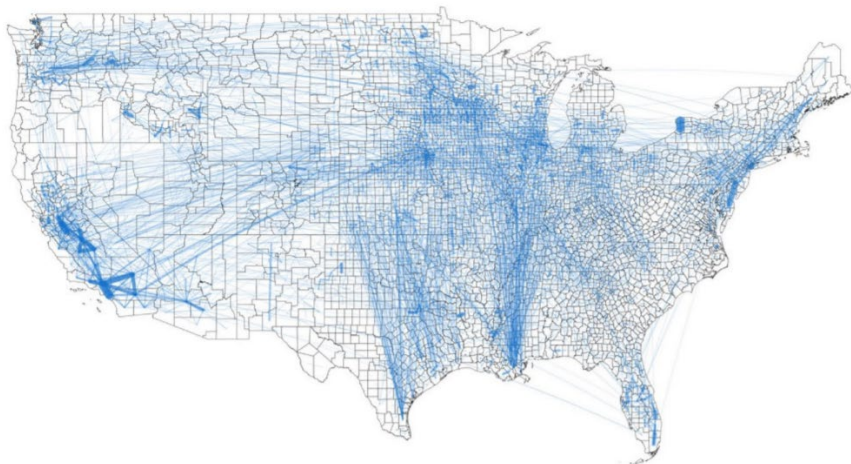


Figure 1-8: Decadal averages of observed annual precipitation in Vermont

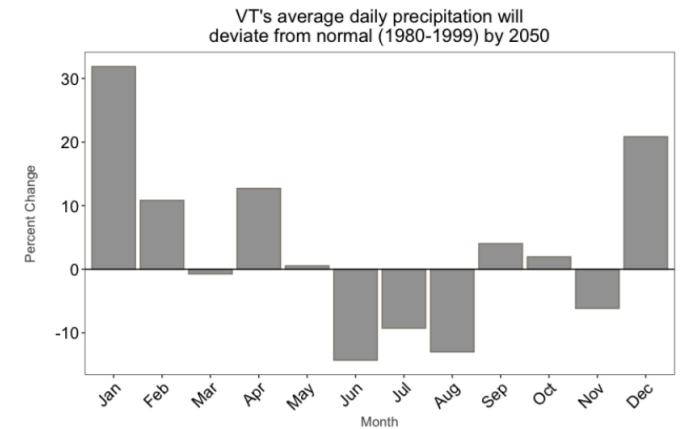


Figure 5-5: Projected daily mean precipitation in 2050 as percent deviation relative to 1980s–1990s shows lower summer growing season precipitation (USGS, 2021a)

USDA-NRCS SOIL HEALTH INFOGRAPHIC SERIES #002



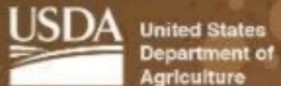
what's underneath

healthy soil has amazing water-retention capacity.



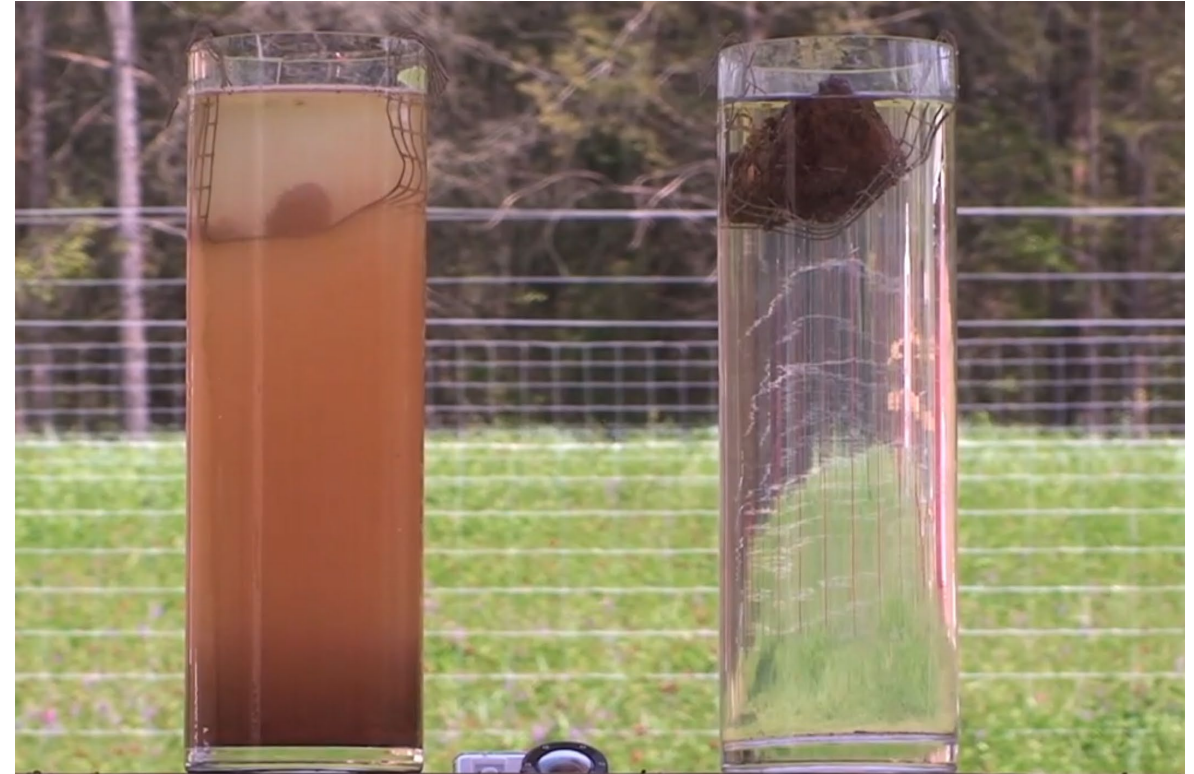
Every **1%** increase in organic matter results in as much as **25,000** gal of available soil water per acre.

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



Want more soil secrets?
Check out www.nrcs.usda.gov

USDA is an equal opportunity provider and employer.



USDA-NRCS SOIL HEALTH INFOGRAPHIC SERIES #002

what's underneath

unlock the SECRETS in the SOIL

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

USDA United States Department of Agriculture

Want more soil secrets? Check out www.nrcs.usda.gov

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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



Source: USDA NRCS

Vermont Climate Action Plan & Agriculture

Mitigation

- Reduction of GHG Emissions
- Sequestration and Storage of Carbon in Soils

Resilience

- Farms & Food Production
 - Viability
- Food System
- Watershed & Flood Resilience



Vermont Climate Action Plan & Agriculture

Mitigation

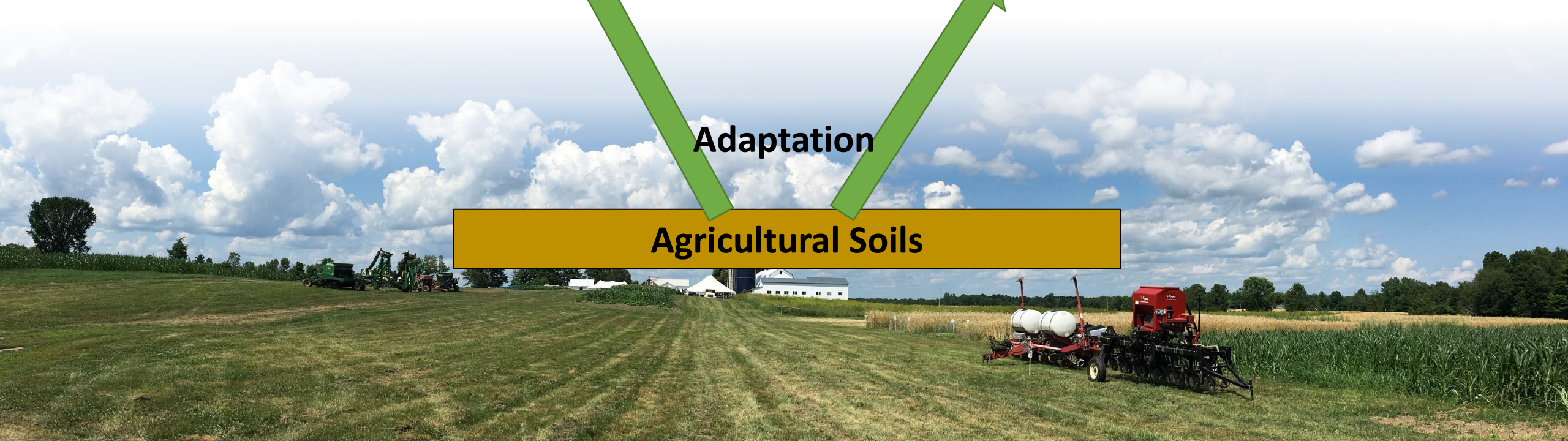
- Reduction of GHG Emissions
- Sequestration and Storage of Carbon in Soils

Resilience

- Food Security & Food Systems
- Farms & Food Production
 - Viability
- Watershed & Flood Resilience

Adaptation

Agricultural Soils



Vermont Climate Action Plan & Agriculture

Mitigation

- Reduction of GHG Emissions
- Sequestration and Storage of Carbon in Soils

- Reduces emissions
- Sequesters Carbon

Resilience

- Food Security & Food Systems
- Farms & Food Production
 - Viability
- Watershed & Flood Resilience

- Improve Drought & Flood Resilience
- Decrease input costs

Adaptation

Agricultural Soils

- Cover Crop
- Nutrient Management
- Conservation Tillage

- Conservation Crop Rotation
- Residue and Tillage Management, No Till
- Pasture and Hay Planting

- Precision Agriculture
- Prescribed Grazing
- Rotational Grazing

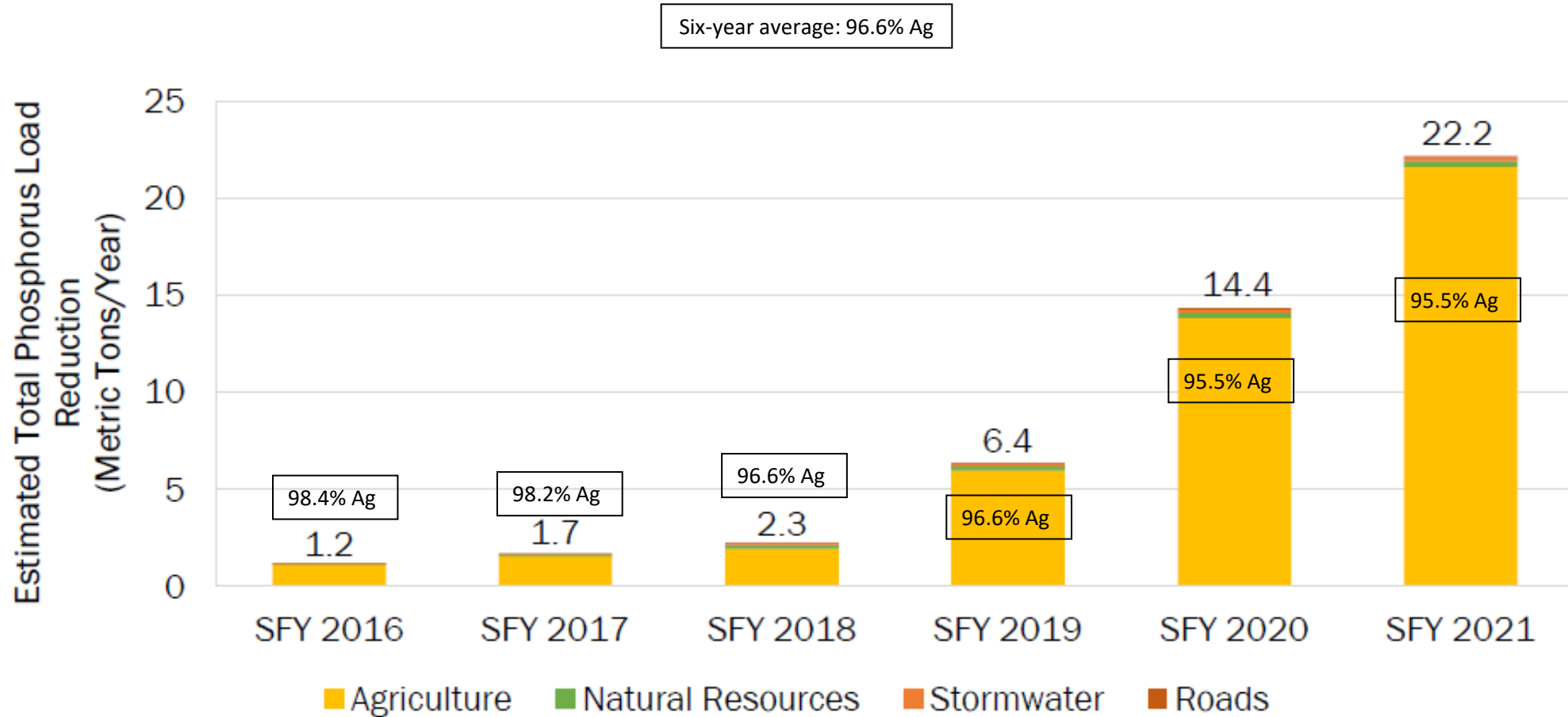


Figure 23. Annual estimated total phosphorus load reductions (metric tons per year) associated with state-funded clean water projects in the Lake Champlain and Lake Memphremagog basins by land use sector, SFY 2016-2021.²⁴

1. Develop a methodology and protocol for quantifying climate mitigation, resilience, and adaptation impacts of existing state and federal water quality implementation programs as reported through the annual Clean Water Initiative Performance Report.

							(Sorted by Acreage)	
Practice Code	Practice Name	TOTAL					Total	Average
		2016	2017	2018	2019	2020		
340	Cover Crop	28,381	23,408	29,615	24,114	36,885	142,404	28,481
590	Nutrient Management	12,992	10,012	9,792	8,051	14,545	55,393	11,079
345	Conservation Tillage	8,940	9,506	10,703	12,143	8,142	49,434	9,887
328	Conservation Crop Rotation	10,516	11,709	13,156	4,632	2,181	42,194	8,439
329	Residue and Tillage Management, No Till	2,963	2,900	3,098	6,322	3,275	18,559	3,712
512	Pasture and Hay Planting	2,080	1,713	2,450	1,455	1,917	9,613	1,923
913VTA	Precision Agriculture	0	0	0	4,041	4,297	8,338	1,668
528	Prescribed Grazing	1,808	1,224	1,472	1,826	1,074	7,404	1,481
901VTA	Manure Injection	0	0	0	2,247	3,787	6,034	1,207
911VTA	Rotational Grazing	0	0	0	2,889	2,563	5,452	1,090
902VTA	Aeration	433	475	2,023	572	1,797	5,300	1,060
314	Brush Management	708	782	1,058	1,219	1,450	5,217	1,043
633	Waste Recycling	2,220	1,181	548	0	92	4,041	808
PAC	Production Area Compliance	0	792	540	1,185	1,385	3,902	780

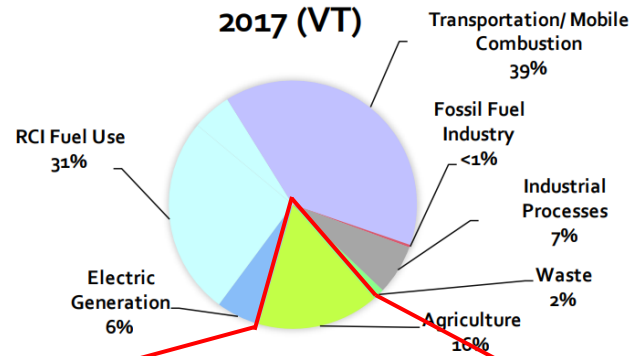
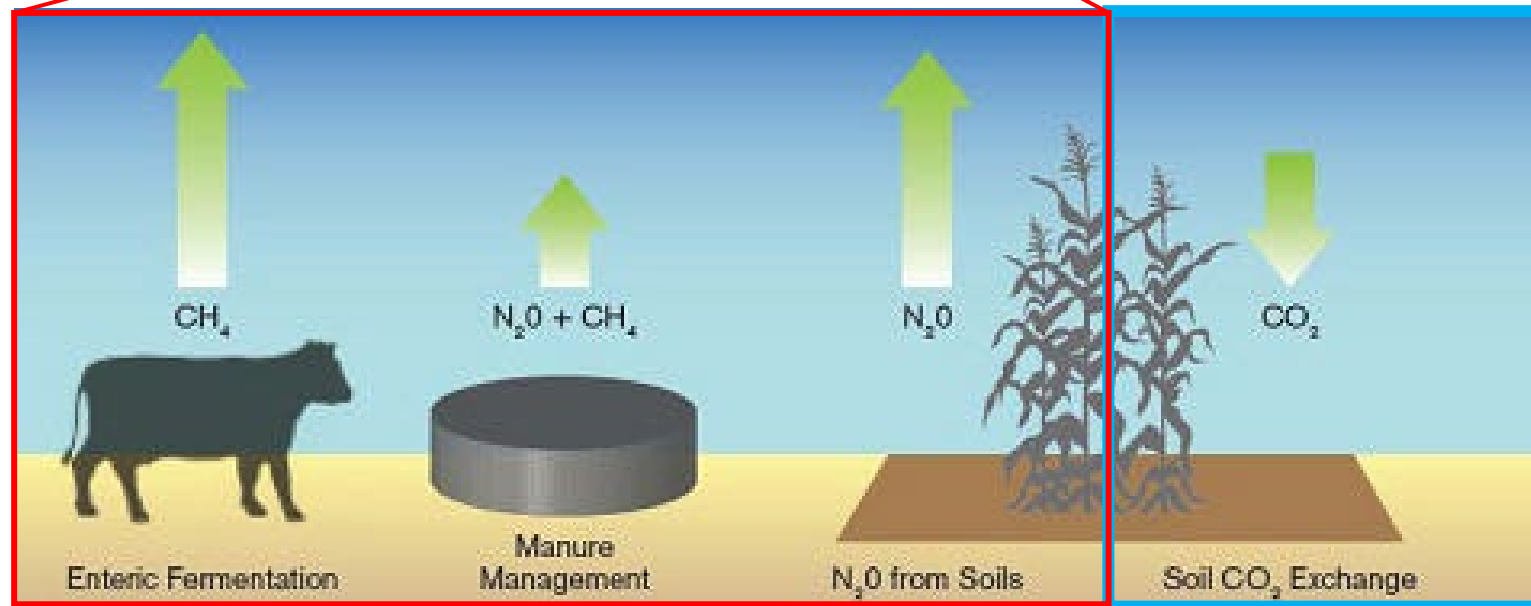


Figure 4: Vermont GHG percent contributions by sector.

GHG Emissions & Sequestration



Source: <https://www.agr.gc.ca/eng/agriculture-and-the-environment/agricultural-practices/climate-change-and-agriculture/greenhouse-gases-and-agriculture/?id=1329321969842>

Source: https://dec.vermont.gov/sites/dec/files/aqc/climate-change/documents/Vermont_Greenhouse_Gas_Emissions_Inventory_Update_1990-2017_Final.pdf



The United States of America Nationally Determined Contribution

Reducing Greenhouse Gases in the United States:
A 2030 Emissions Target

After a careful process involving analysis and consultation across the United States federal government and with leaders in state, local, and tribal governments, **the United States is setting an economy-wide target of reducing its net greenhouse gas emissions by 50-52 percent below 2005 levels in 2030.** The National Climate Advisor developed this NDC in consultation with the Special Presidential Envoy for Climate, and it was approved by President Joseph R. Biden Jr..

Beyond the energy sector, the United States will also **reduce emissions from forests and agriculture** and enhance carbon sinks through a range of programs and measures for ecosystems ranging from our forests and agricultural soils to our rivers and coasts. Actions to be pursued include, for example:

- **Agriculture and lands:** America's vast lands provide opportunities to **both reduce emissions, and sequester more carbon dioxide.** The United States will support scaling of climate smart agricultural practices (including, for example, cover crops), reforestation, rotational grazing, and nutrient management practices. In addition, federal and state governments will invest in forest protection and forest management, and engage in intensive efforts to reduce the scope and intensity of catastrophic wildfires, and to restore fire-damaged forest lands. Alongside these efforts, the United States will support nature-based coastal resilience projects including pre-disaster planning as well as efforts to increase sequestration in waterways and oceans by pursuing "blue carbon."



U.S. DEPARTMENT OF AGRICULTURE

PARTNERSHIPS FOR CLIMATE-SMART COMMODITIES



\$1 Billion Funding Opportunity to Pilot New Revenue Streams for America's Climate-Smart Farmers, Ranchers and Forest Landowners

Highly competitive projects will include agricultural and forestry practices or combinations of practices, and/or practice enhancements that provide GHG benefits and/or carbon sequestration, including but not limited to:

- ◆ Cover crops
- ◆ Low-till or no-till
- ◆ Nutrient management
- ◆ Enhanced efficiency fertilizers
- ◆ Manure management
- ◆ Feed management to reduce enteric emissions
- ◆ Buffers, wetland and grassland management, and tree planting on working lands

- ◆ Agroforestry and afforestation on working lands
- ◆ Afforestation/reforestation and sustainable forest management
- ◆ Planting for high carbon sequestration rate
- ◆ Maintaining and improving forest soil quality
- ◆ Increase on-site carbon storage through forest stand management
- ◆ Alternate wetting and drying on rice fields
- ◆ Climate-smart pasture practices, such as prescribed grazing or legume interseeding
- ◆ Soil amendments, like biochar

Enhancing Vermont's Natural and Working Lands Resilience to a Changing Climate

The Administration's budget will include funding from the American Rescue Plan Act (ARPA) to implement the following package of investments and initiatives:

- a) **Agronomic Practices**: Expand and leverage existing state funding for agronomic practice programs – such as cover cropping, conservation tillage – administered by the Agency of Agriculture, Food and Markets. These programs mitigate climate change by improving soil health and preventing emissions by conserving existing carbon pools in soils and vegetation, and are also supportive of state clean water goals. **(\$5,000,000)**

\$1,000,000 also proposed for Payment for Ecosystem Services and Soil Health Working Group