Agriculture & H.126

Ryan Patch
Agriculture Climate and Land Use Policy Manager
Vermont Agency of Agriculture, Food and Markets
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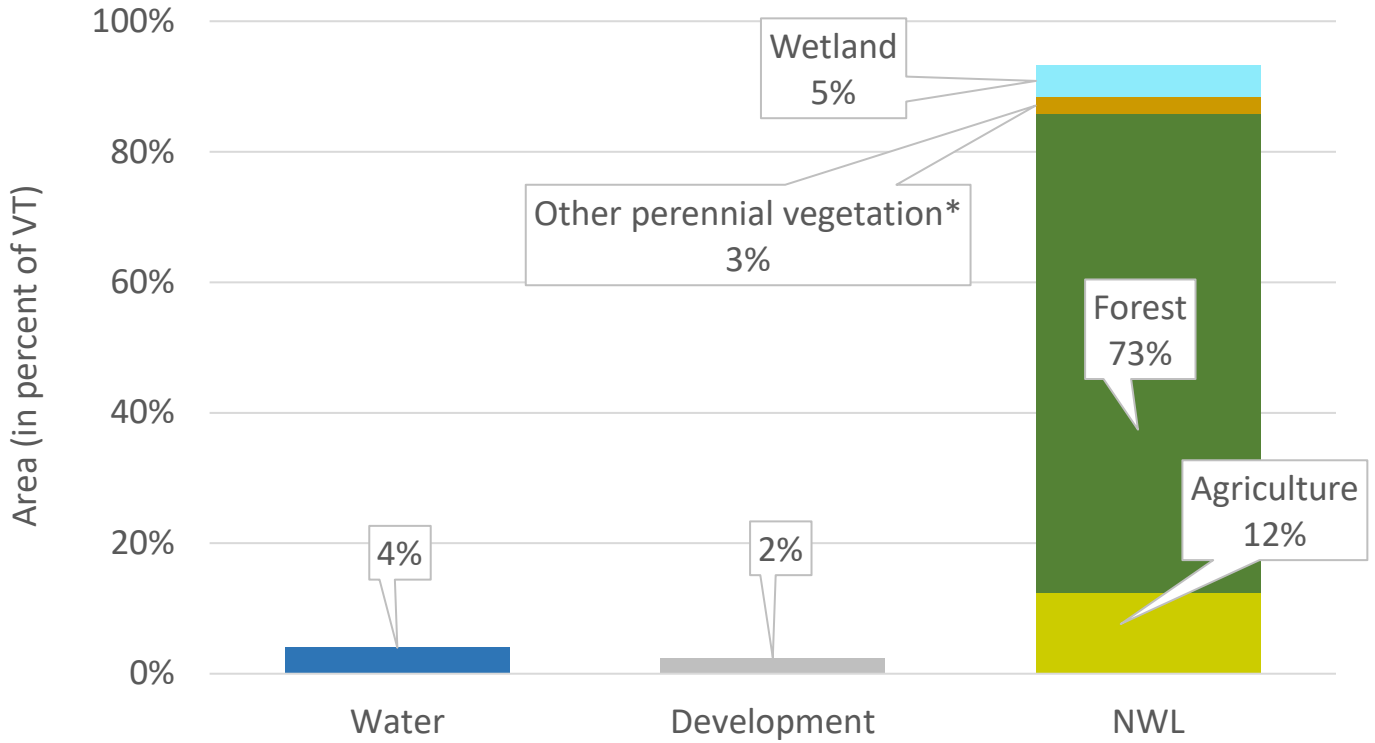
Natural & Working Lands (NWL) cover 94% of Vermont



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

Data source: 2016 National Land Cover Database; Images courtesy FPR

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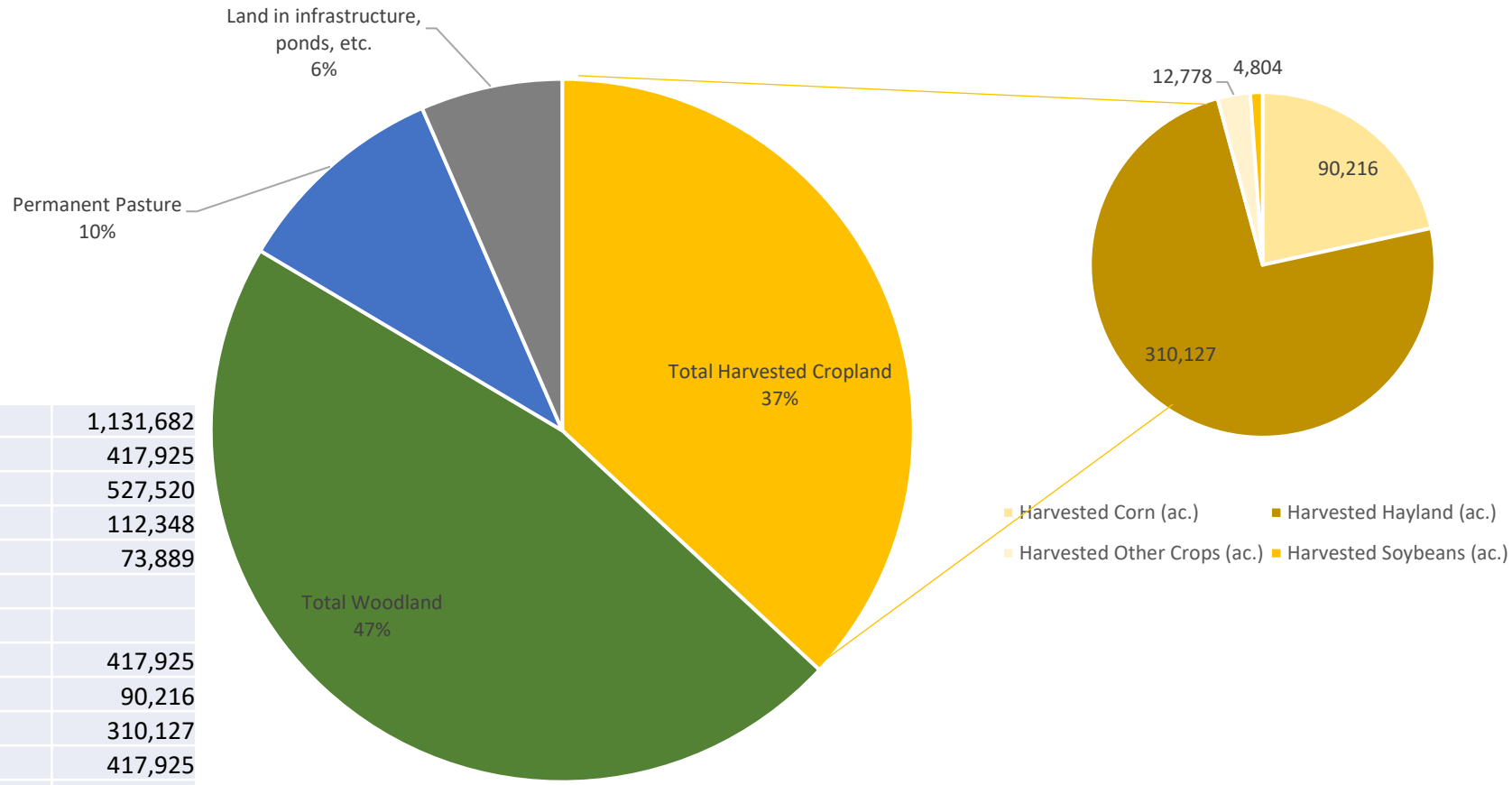
Land managed by farms in Vermont, 2017



Land in Farms	1,131,682
Total Harvested Cropland	417,925
Total Woodland	527,520
Permanent Pasture	112,348
Land in infrastructure, ponds, etc.	73,889
Total Cropland Harvested	417,925
Total Corn in VT	90,216
Total Hayland in VT	310,127
Total Other in VT	417,925
Total Soybeans	4,804

Source: 2017 USDA NASS Ag Census

Chapter 7

Agriculture, Forestry, and Other Land Use (AFOLU)

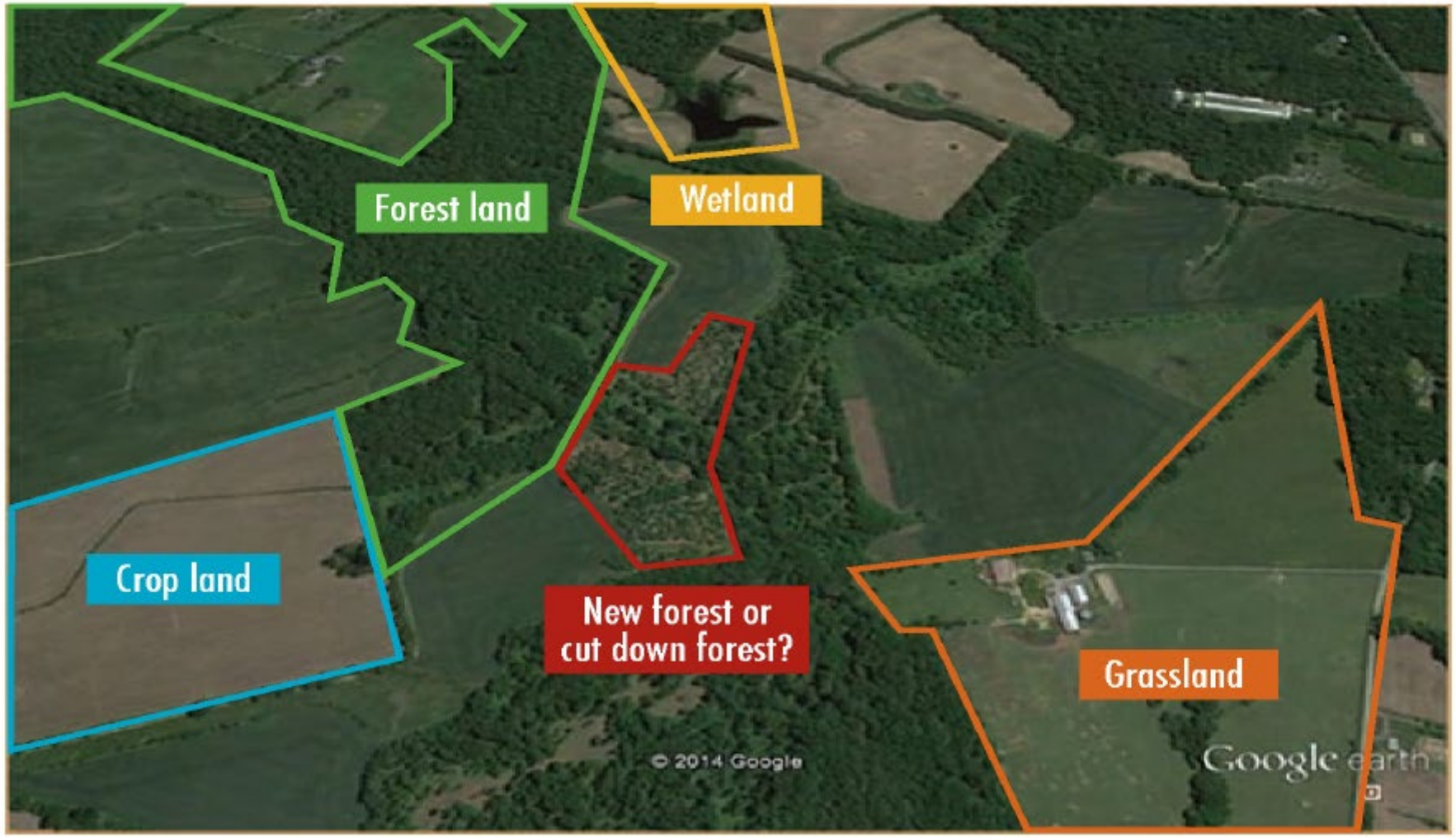
Executive Summary

The Agriculture, Forestry and Other Land Use[1] (AFOLU) sector encompasses managed ecosystems and offers significant mitigation opportunities while delivering food, wood and other renewable resources as well as biodiversity conservation, provided the sector adapts to climate change. Land-based mitigation measures represent some of the most important options currently available. They can both deliver carbon dioxide removal (CDR) and substitute for fossil fuels, thereby enabling emissions reductions in other sectors. The rapid deployment of AFOLU measures is essential in all pathways staying within the limits of the remaining budget for a 1.5°C target (*high confidence*). Where carefully and appropriately implemented, AFOLU mitigation measures are uniquely positioned to deliver substantial co-benefits and help address many of the wider challenges associated with land management. If AFOLU measures are deployed badly then, when taken together with the increasing need to produce sufficient food, feed, fuel and wood, they may exacerbate trade-offs with the conservation of habitats, adaptation, biodiversity and other services. At the same time the capacity of the land to support these functions may be threatened by climate change itself (*high confidence*). {IPCC AR6 WGI, Figure SPM.7; IPCC AR6 WGII, 7.1, 7.6}

The deployment of all land-based mitigation measures can provide multiple co-benefits, but there are also risks and trade-offs from misguided or inappropriate land management (*high confidence*). Such risks can best be managed if AFOLU mitigation is pursued in response to the needs and perspectives of multiple stakeholders to achieve outcomes that maximise synergies while limiting trade-offs (*medium confidence*). The results of implementing AFOLU measures are often variable and highly context specific. Depending on local conditions (e.g., ecosystem, climate, food system, land ownership) and management strategies (e.g., scale, method), mitigation measures have the potential to positively or negatively impact biodiversity, ecosystem functioning, air quality, water availability and quality, soil productivity, rights infringements, food security, and human well-being. Mitigation measures addressing GHGs may also affect other climate forcers such as albedo and evapotranspiration. Integrated responses that contribute to mitigation, adaptation, and other land challenges will have greater likelihood of being successful (*high confidence*); measures which provide additional benefits to biodiversity and human well-being are sometimes described as 'Nature-Based Solutions'. {7.1, 7.4, 7.6}

Source: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter07.pdf
Image Source: https://www.ipcc.ch/site/assets/uploads/2018/02/01_figure_11.1.png

Figure 1: Example of stratification of land into various land-use categories



Source: Iversen P., Lee D., and Rocha M., (2014) *Understanding Land Use in the UNFCCC*

IPCC: AR6 Climate Change 2022: Chapter 5: Food, Fibre and Other Ecosystem Products

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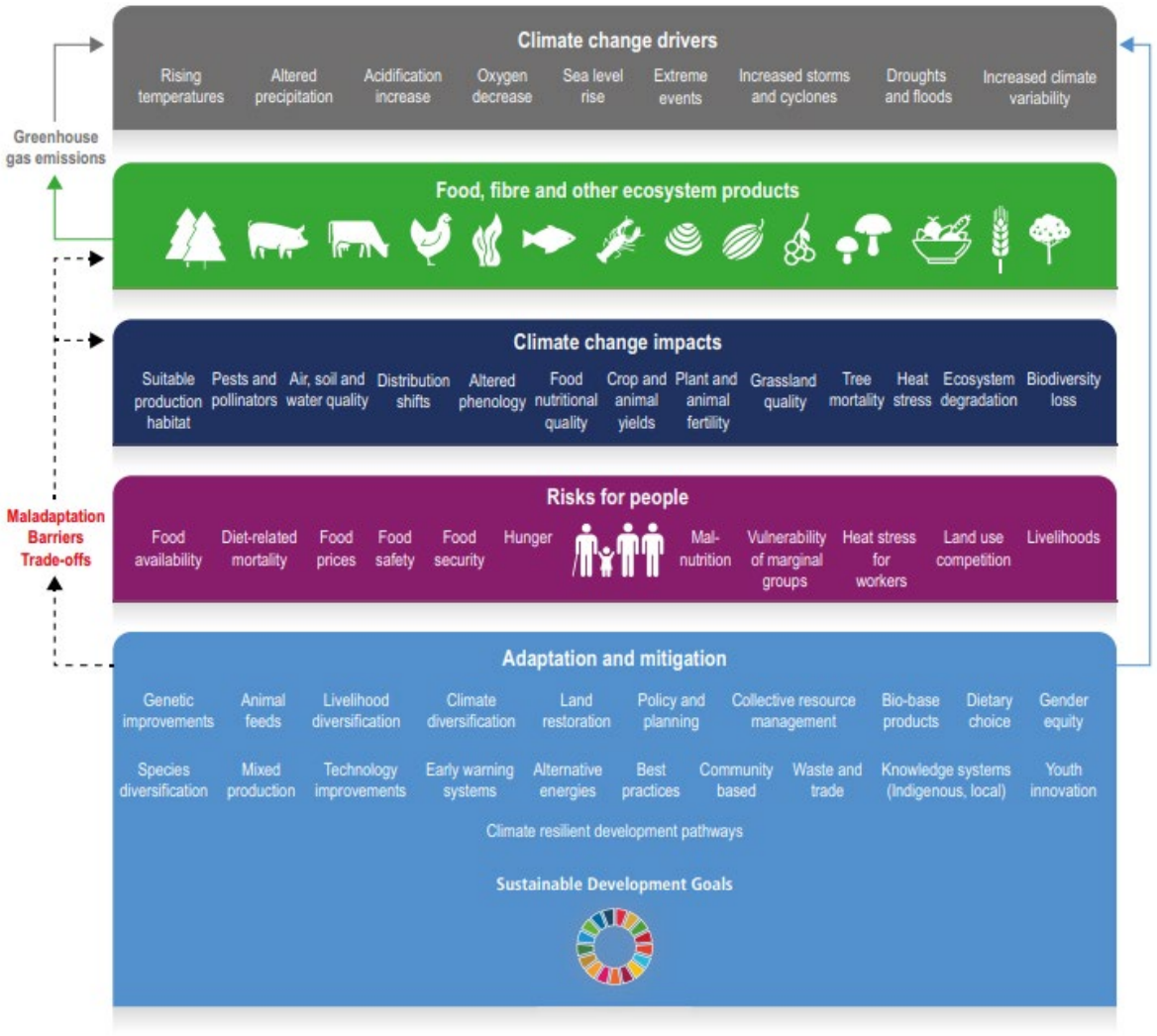
Conceptual framework of Chapter 5



Cascading impacts of climate hazards on food and nutrition

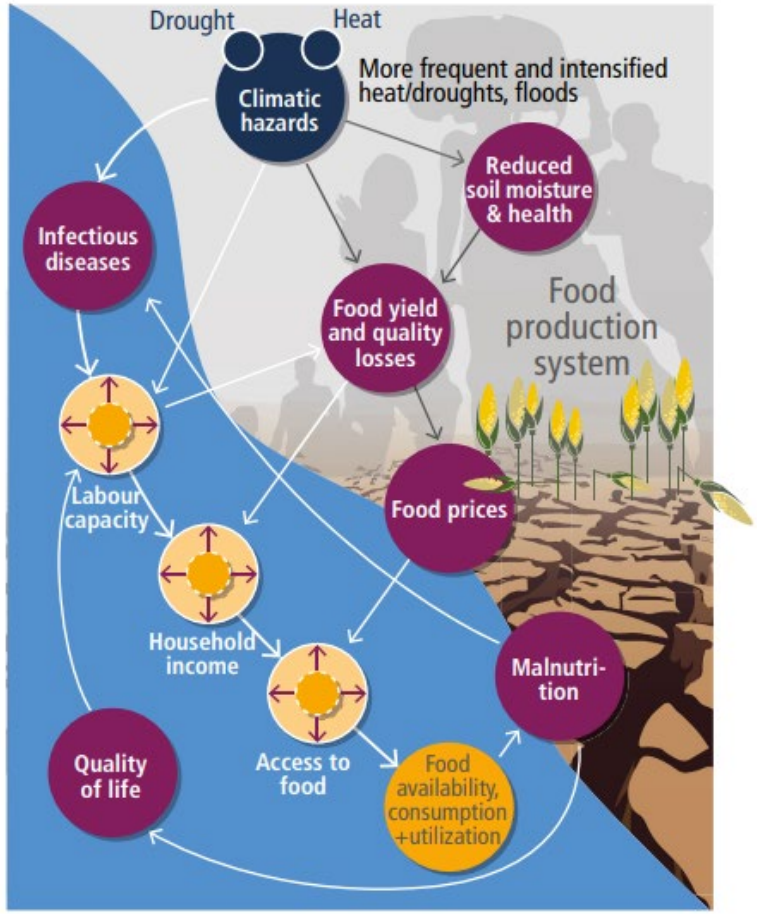


Figure 5.2 | Cascading impacts of climate hazards on food and nutrition. The factors involved the impacts on crop production and prices (black arrows) and interaction among food-health interaction (white arrows). Adapted and revised from (Phalkey et al., 2015).

Source: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter05.pdf

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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						
		2016	2017	2018	2019	2020	Total	Average
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
913VTAg	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
901VTAg	Manure Injection	0	0	0	2,247	3,787	6,034	1,207
911VTAg	Rotational Grazing	0	0	0	2,889	2,563	5,452	1,090
902VTAg	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

Source: https://dec.vermont.gov/water-investment/cwi/projects/clean-water-portal#Clean%20Water%20Interactive%20Dashboard

Subtask Group 5C Work & Resources

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Practice	NRCS Practice Code	NRCS Practice Physical Effects									
		Emissions + Sequestration + Storage	Emissions of GHGs	Organic Matter Depletio	Soil Organism Habitat Loss or Degradation	Aggregate Instability	Nutrients Transported to Surface Water	Ponding and Flooding	Terrestrial Habitat	Aquatic Habitat	TOTAL
		34	9	11	12	21	13	42	43	49	
Conservation Cover	327	9	4	5	2	2	4	1	5	1	80
Tree/Shrub Establishment	612	8	4	4	5	5	1	0	5	4	94
Windbreak-Shelterbelt Establishment (ft)	380	8	4	4	5	4	1	0	3	4	87
Riparian Forest Buffer	391	7	3	4	5	4	5	-1	5	5	96
Alley Cropping	311	7	2	5	5	4	3	1	3	2	90
Multi-Story Cropping	379	7	2	5	4	3	1	1	3	2	58
Cover Crop	340	6	4	2	2	2	2	2	1	0	61
No-Till	329	6	4	2	4	3	2	2	1	0	56
Nutrient Management	590	6	4	2	0	0	5	0	0	0	57
Nutrient Management	590	6	4	2	0	0	5	0	0	0	57
Prescribed/Rotational Grazing	528	6	2	4	2	2	1	1	2	0	72
Range Planting	550	6	2	4	3	3	1	0	0	0	73
Field Border	386	6	2	4	2	1	2	1	1	2	50
Riparian Herbaceous Cover	390	6	2	4	0	0	5	-3	2	0	73
Critical Area Planting	342	6	1	5	1	1	2	0	2	1	60
Forage & Biomass Planting (seed down)	512	5	4	1	3	3	1	1	4	0	39
Conservation/Reduced Tillage	345	5	3	2	3	2	2	1	0	0	44
Silvopasture	381	5	2	3	3	2	3	2	2	3	72
Conservation Crop Rotation	328	5	1	4	1	1	2	1	0	0	46
Filter Strip	393	5	1	4	1	1	5	1	1	4	57
Windbreak-Shelterbelt Renovation (ft)	650	5	1	4	5	4	1	0	3	4	80

Source: https://www.nrcs.usda.gov/resources/guides-and-instructions/conservation-practice-physical-effects

TNC Canada: N&WL GHG Mitigation Opportunities

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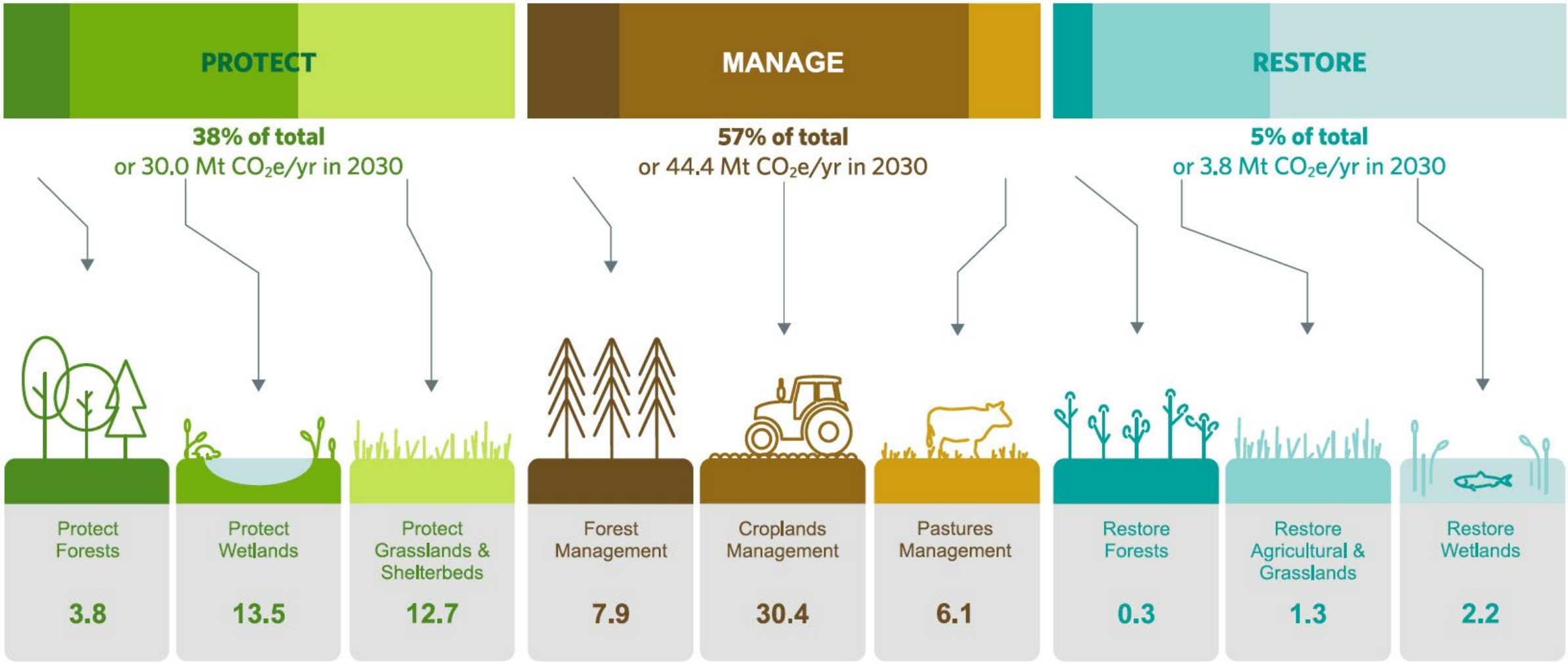

Source: https://www.natureunited.ca/content/dam/tnc/nature/en/documents/canada/natural-climate-solutions-infographic.pdf

TNC Canada: N&WL GHG Mitigation Opportunities

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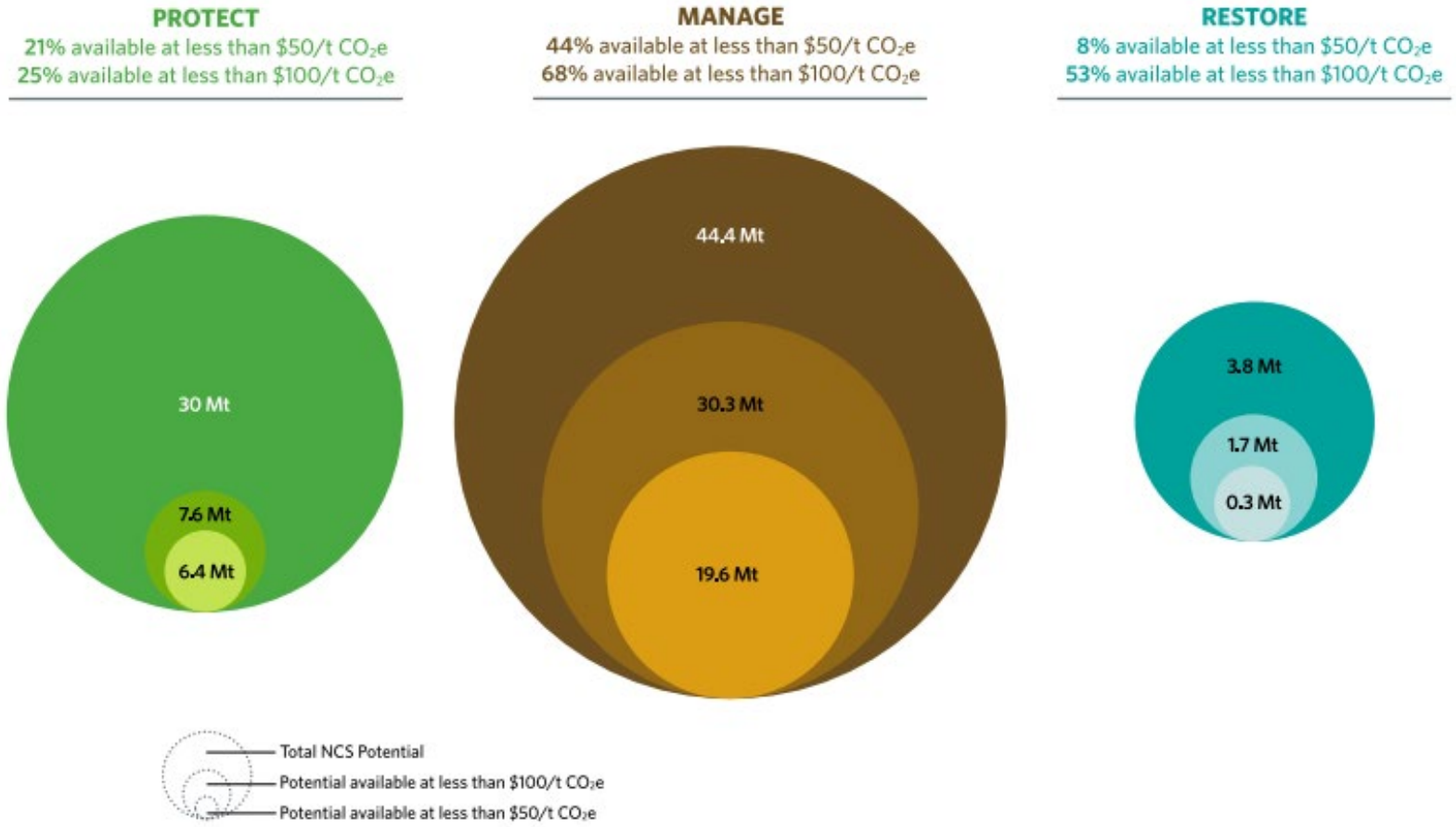
WATER QUALITY DIVISION

Powerful and Cost Effective

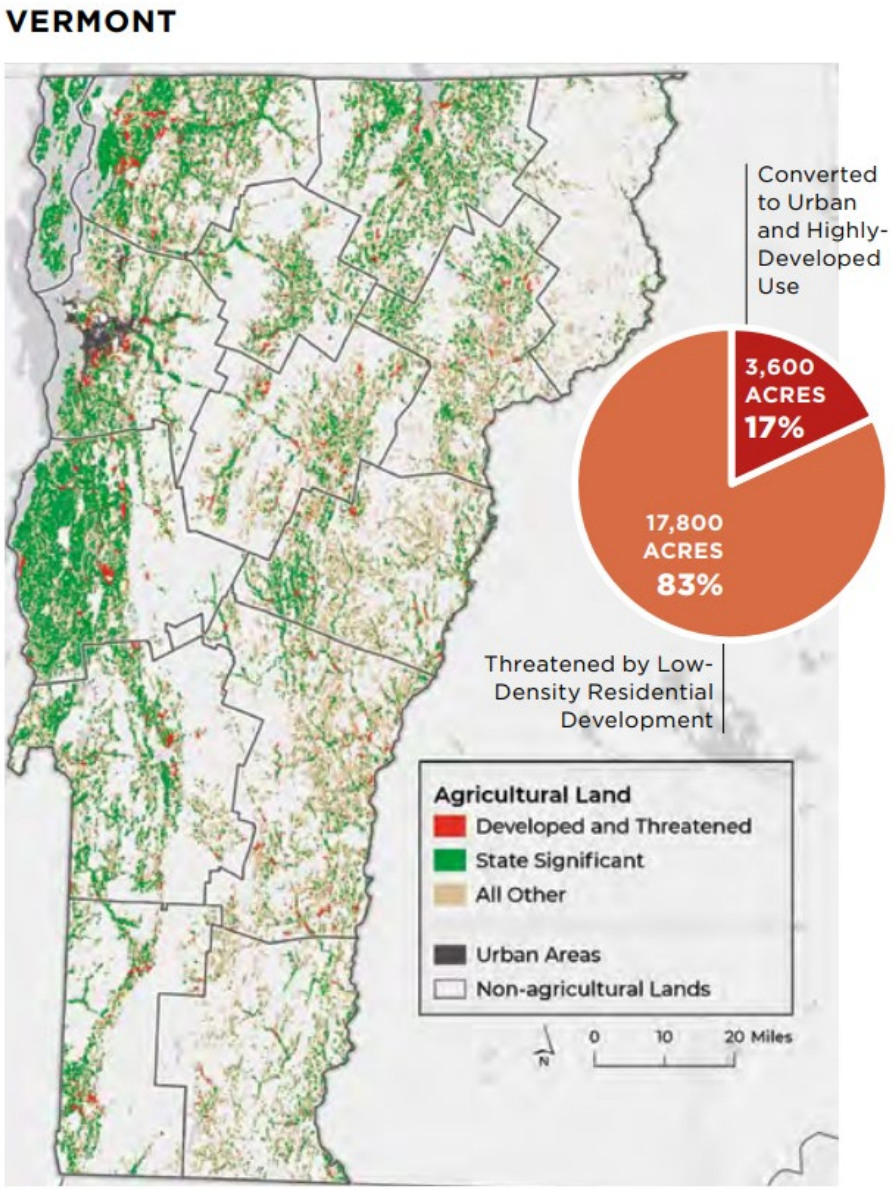
The study highlights actions that are cost effective with several of the pathways available at less than $50 per tonne of CO_2e. Many of these opportunities are also available now. Protection, restoration and management pathways would create new jobs and provide alternative revenue streams to farmers, ranchers, foresters, and Indigenous communities to help stimulate our economy.



Source: https://www.natureunited.ca/content/dam/tnc/nature/en/documents/canada/natural-climate-solutions-infographic.pdf

Since 1987, Vermont has lost 32% (or 228,290 ac.) of managed cropland

Census Category	1987	2017
Farms	5,877	6,808
Acres Land Managed by Farms	1,407,868	1,193,437
Total Cropland	707,970	479,680



Source: 2017 USDA NASS Ag Census
Source: https://s30428.pcdn.co/wp-content/uploads/sites/2/2020/10/AFT_NE_FUT-10_14_20_rev.pdf

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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 wett Heavy rain events happe more often, contributing more flooding and wate quality problems.

Multiple, complex impacts could lead to surprises.

Climate impacts and risks will increase without action.

Dig in to learn more...

Source: The Vermont Climate Assessment 2021. Burlington, Vermont: Gund Institute for Environment at the University of Vermont. On the web: https://vtclimate.org

National and Vermont Climate Impacts

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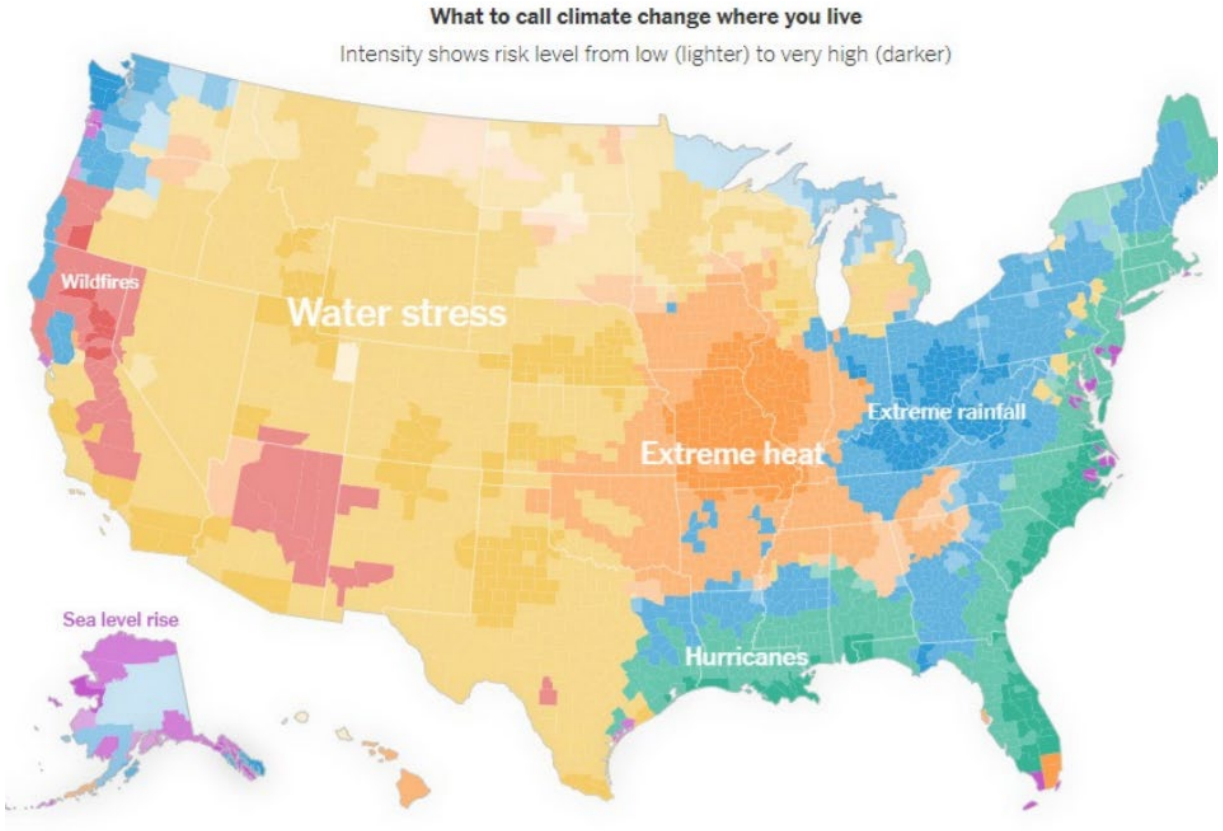

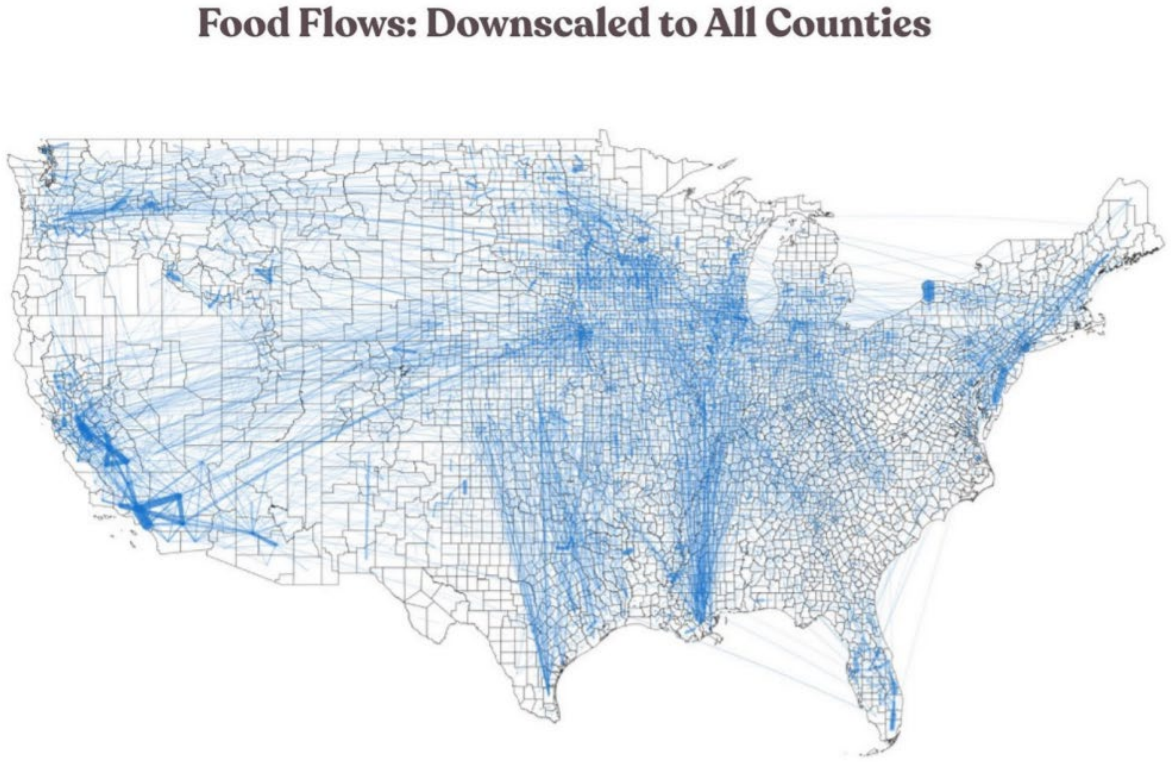

Source: Ellen Kahler, VSJF Presentation to House Agriculture:
https://legislature.vermont.gov/Documents/2022/WorkGroups/House%20Agriculture/Food%20Security/W~Ellen%20Kahler~New%20England%20Feeding%20New%20England-%20Cultivating%20a%20Reliable%20Food%20Supply~1-26-2021.pdf

Contact

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WATER QUALITY DIVISION

Ryan Patch
VAAFM
Ryan.Patch@vermont.gov
802-272-0323