

# Pathways for Adaptation and Building Resilience in Natural and Working Lands

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**Yellow Highlight** = Term should be included in glossary

**Green Highlight** = Cross-reference to other chapters needed

**Blue Highlight** = Questions for Climate Council discussion

**Overview:** Protecting and enhancing Vermont’s **working and natural lands**<sup>1</sup> provides a critical climate mitigation, adaptation and resilience opportunity. The “green hills and silver waters” referenced in Vermont’s state song represent a widely shared image of the Vermont landscape, with walkable and livable communities surrounded by farm fields and forests, all bounded by Lake Champlain and the Connecticut River. This image represents not just a shared sense of the past, but of the future, and represents a way of living on the land that is deeply embedded in Vermont’s cultural heritage and way of life. Today’s Vermonters are just the most recent group of people to have taken on the responsibility for stewarding a landscape that has supported humans since time immemorial. Protecting and enhancing these landscape features, including farms and working forests as well as our wild and open spaces and the rich diversity of life within this landscape, is necessary to life here for generations to come and is critical to achieving the climate mitigation, and adaptation and resilience benefits described in legislative findings of the Global Warming Solutions Act.

**Rationale:** The northeastern region of the United States is already experiencing and increase in extreme weather as a result of climate change, including severe storms, winter storms, drought,

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<sup>1</sup> For the purposes of this document, we use the language “working and natural lands” as described and used in the GWSA Statute, a usage that denotes a distinction between lands used to produce food and fiber for human consumption, and lands that are left in a natural state. We note, however, that natural lands do work through providing ecosystem goods and services such as wildlife habitat, water quality, forage, shelter, spiritual sustenance, aesthetic value and many others. Further, working lands have natural features that provide these same benefits.

25 flooding, wildfires, temperature extremes, and localized wind.<sup>2</sup> Among a range of impacts on  
26 Vermont’s communities, such as public health, energy, transportation, recreation and tourism,  
27 and community development, climate change is also driving changes and disruptions in our  
28 forests, water resources, fish and wildlife, and agriculture and food systems - the very systems  
29 that are also vital to our mitigation, and adaptation and resilience strategies.<sup>3</sup>

30 Vermont’s forests and farms, **wetlands**, connected **floodplains** and **river corridors** can all  
31 absorb excess water and reduce high, erosive energy during flooding events. All of these  
32 landscape features can also, when properly stewarded, serve as a buffer against droughts and  
33 other disruptions. In addition, protecting and enhancing our natural and working lands will also  
34 provide critical habitat for the plants and animals which need **refugia** from the changes to their  
35 habitat resulting from climate change. The benefits to plants and wildlife resulting from  
36 protecting and enhancing natural and working lands will, in turn, return benefits to Vermont’s  
37 agricultural and forestry sectors. Finally, supporting our natural and working lands will also  
38 increase protection for the built environment in our communities and provide public health  
39 benefits.<sup>4</sup>

40 Climate change adaptation efforts focused on protecting and enhancing natural and  
41 working lands, requires significant investments, but climate experts agree that the long-term  
42 savings justify these investments, given the rapidly increasing cost of climate change impacts.<sup>5</sup>  
43 Beyond economic returns, adaptation efforts yield myriad **co-benefits** – from building  
44 community resilience to sequestering and storing carbon, improving soil health to maintaining  
45 **habitat connectivity**, and more.<sup>6</sup> The recommendations in this section aim to increase the  
46 adaptive capacity of Vermont’s natural and working lands and waters, as well as enhance the  
47 resilience of our natural and human systems to a changing climate, through science-based,  
48 technical, and traditional knowledge. The increased incidence of drought, extreme precipitation  
49 events, and changes in temperature patterns associated with climate change in Vermont have  
50 already begun to negatively impact our natural and human communities and systems. At the

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<sup>2</sup> Vermont 2021 Climate Assessment: <https://www.uvm.edu/gund/news/vermont-getting-warmer-and-wetter-climate-change-study/>; National Climate Assessment: <https://nca2023.globalchange.gov/>

<sup>3</sup> Id.

<sup>4</sup> Find Vermont cite for this section

<sup>5</sup> IPCC Sixth Assessment Report, “AR6 Synthesis Report: Climate Change 2023”, <https://www.ipcc.ch/report/sixth-assessment-report-cycle/>; Economics of Adaptation, Chapter 17, [https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap17\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap17_FINAL.pdf)

<sup>6</sup> Id.

51 same time, features of Vermont’s natural and working landscapes have absorbed, buffered and  
52 reduced climate risks, such as the impacts of extreme precipitation and associated floods.

53 Broadly, the strategies that the State of Vermont must take to secure the health, resilience,  
54 and benefits of climate adaptation in natural and working lands include critical investments in

- 55 • supporting climate-smart farming and forest management,
- 56 • protecting Vermont’s supply and access to food and fiber,
- 57 • engaging and supporting indigenous communities in the work of protecting and enhancing  
58 natural and working lands,
- 59 • engaging and supporting communities of color in the work of protecting and enhancing  
60 natural and working lands,
- 61 • supporting investments in renewable energy in developed areas to reduce pressures to site  
62 projects on forests and farms,
- 63 • evaluating the role of biomass as part of Vermont’s energy future,
- 64 • statewide planning and programs to promote landscape connectivity and durable land  
65 conservation strategies,
- 66 • incentivizing the use of nature-based solutions and traditional ecological knowledge,
- 67 • promoting healthy and connected river corridors, floodplains, and wetlands, and
- 68 • enhancing education, outreach, research, and technical assistance programming to encourage  
69 climate smart strategies by land and water managers.

70

71 **Inter Connections:** Vermont has historically invested heavily in policies and practices that  
72 protect its forests, farms and open spaces as well as the rich mix of wetlands, floodplains,  
73 streams, rivers, lakes and ponds that are vital to managing the increased threats of extreme  
74 weather, including flooding and drought, associated with climate disruption. The  
75 recommendations in this chapter should be seen as complementary to the array of existing  
76 statutes, policies, and programs that are already playing a central role in protecting and  
77 enhancing both the ecological and aesthetic qualities of our landscape through a mix of  
78 environmental and land use regulations, tax incentives, and education and outreach.<sup>7</sup> The

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<sup>7</sup> Provide notable examples: Act 250, Section 248, state water quality and wetlands protections, local land use plans and regulations,

79 recommendations in this Chapter also assume continued and increased investment in the  
80 foundational programs established to support the investments of individual Vermont landowners,  
81 businesses and organizations who seek to steward their privately owned land through sustainable  
82 management or permanent conservation.<sup>8</sup>

83 In addition, ongoing initiatives such as the Vermont Conservation Strategy Initiative<sup>9</sup>,  
84 Vermont Forest Futures Strategic Roadmap<sup>10</sup> and the work of the Governor’s Commission on  
85 the Future of Agriculture<sup>11</sup> include ideas that will support and complement the strategies  
86 described in this Chapter. It is critical that a diversity of communities across the state continue to  
87 engage actively in defining and supporting the proposals that result from these efforts.

88 Finally, while the recommendations of this Chapter are focused on adaptation and  
89 resilience, these recommendations should not be viewed through only through that lens.  
90 Protecting and enhancing our natural environment and working lands also provides direct carbon  
91 storage sequestration opportunities so is tied to mitigation.<sup>12</sup> These same strategies are also  
92 inextricably linked to the design and investment in building resilient, walkable, and livable  
93 communities.<sup>13</sup>

94 **Summary of Priority Actions:** [Editor’s comment: the following is copied verbatim from the  
95 Ag and Ecosystems priority action report. The comments in blue are mine]

96 **Support adaptation, viability, recovery, economies and workforce**

- 97 • Develop and fund climate adaptation planning and training for all farmers and foresters.  
98 [Comment: Should this be broadened to include other land management professionals  
99 including loggers?]
- 100 • Dedicate funds to support Vermont Natural Resources Conservation Districts and farmer  
101 watershed organizations with the specific objective of allowing them to reach other farmers  
102 and do farmer-to-farmer education about improved soil and manure management. [Comment:  
103 Should there also be a parallel recommendation supporting peer-to-peer education for forest  
104 management professionals?]

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<sup>8</sup> Provide examples – VHCF, working lands enterprise initiative, land trusts, landowner outreach and support

<sup>9</sup> <https://vhcb.org/our-programs/VCSI>

<sup>10</sup> <https://fpr.vermont.gov/forest-future-strategic-roadmap>

<sup>11</sup> <https://agriculture.vermont.gov/administration/governors-commission-future-vermont-agriculture>

<sup>12</sup> Cross-reference section of report describing relevant mitigation strategies

<sup>13</sup> Cross-reference section of report describing relevant rural resilience and cross-cutting strategies

- 105 • Investigate innovative funding mechanisms for assisting with the implementation of climate  
106 smart agriculture practices, crop insurance for diversified Vermont-scale farms, and  
107 emergency recovery following extreme weather events to better respond when climate  
108 change-related events occur.
- 109 • Support robust funding for supply chain resilience and state food security, including  
110 significant investment in storage, processing, distribution infrastructure, and food assistance  
111 programs. Prioritize investments in farm and food businesses that have climate resilience and  
112 mitigation goals. Funding would include minimum base funding for the **Working Lands**  
113 **Enterprise Initiative** of \$1.5 million and \$6 million for the **Agriculture Development Grant**  
114 program for the next three years (i.e., \$18 million over three years). **[Comment: Should there**  
115 **be a similar recommendation related to the forest and fiber products sector?]**
- 116 • Uplift and resource the work of the **Vermont Abenaki and other Indigenous Peoples in the**  
117 **State, Vermont Environmental Justice Network, Vermont Releaf Collective**, and other Black,  
118 Indigenous, People of Color (BIPOC) peoples and organizations in Vermont
- 119 • Work to adopt state and regional level policies, procedures, and plans to ensure that the  
120 Vermont food supply is sufficient to withstand global or national food supply chain  
121 disruptions caused by climate change and other disasters (as written in the 2021-2030 F2P  
122 Strategic Plan pg. 3) **[Comment: Should there be a parallel recommendation for Vermont's**  
123 **forest products supply – firewood, lumber, etc?]**

#### 124 **Incentivize Climate-Resilient Land Use Practices**

- 125 • State agencies shall utilize financial incentives, siting policies, rules, and regulations to  
126 motivate solar and wind energy capacity on new buildings, parking lots (by installing solar  
127 roofs), in compact settlement areas (including renewable energy and charging facilities at  
128 rental housing) as well as in previously-disturbed/developed areas and using disincentives to  
129 avoid or minimize forest clearing and use of agricultural land (particularly prime agricultural  
130 land) for renewable development.
- 131 • **Most members of the Agriculture and Ecosystem Subcommittee felt represented by the**  
132 **following recommendation on biomass:**
  - 133 ○ **Fund and undertake, as soon as possible, the study requested by the Climate Council in**  
134 **its biomass addendum. And in the meantime, enact a moratorium on approvals of new**  
135 **biomass utility-scale electric energy facilities.**

136 • Other subcommittee members felt more represented by one of these other recommendations,  
137 reflecting a diversity of views on the subcommittee:

138 ○ State agencies shall eliminate biomass as a utility-scale energy source and stop referring  
139 to it as renewable energy.

140 ○ Fund and undertake the study as soon as possible, the study recommended by the  
141 Council, along with the guidance to the Public Utilities Commission contained in the  
142 Council biomass addendum.

143 [Climate Council should decide which path to take]

144 • State agencies shall work with partners to promote strategic and equitable statewide  
145 landscape connectivity and forest block conservation planning and implementation toward 30  
146 x 30 goals in state program prioritization frameworks using the best available data and  
147 mapping, including Vermont Conservation Design braiding in traditional ecological  
148 knowledge/Indigenous knowledge. This conservation planning and implementation will  
149 allow at least 9% of Vermont's forest to become (or be maintained as) old forest, specifically  
150 targeting 15% of the matrix forest within the highest priority forest blocks, including  
151 National Forests, to achieve this condition and ensure protection of sacred sites.

152 • State agencies shall prioritize and incentivize (through various financial mechanisms) nature-  
153 based solutions and traditional ecological knowledge/Indigenous knowledge for addressing  
154 climate change impacts through state regulatory processes, assessments, planning,  
155 prioritization frameworks, and funding programs.

156 • State land management agencies shall adapt their management of lands using nature-based  
157 solutions to address climate impacts, increase ecosystem resilience, enhance biological  
158 diversity, and improve water quality. State land management agencies shall enhance  
159 resilience funds to support the financial capacity of other land and water caretakers to  
160 achieve these goals.

161 • State agencies and the legislature shall promote healthy, connected river corridors,  
162 floodplains, and wetlands, prioritize restoration and conservation, and incentivize water  
163 storage in headwaters and natural areas to promote flood resilience and biodiversity through  
164 expansion of wetland, floodplain, riparian forest and/or river corridor easements that better  
165 compensate land and water caretakers for restoring, managing and conserving these natural  
166 water storage areas (including opportunities presented by Act 121).

167 **Shared Priority Action**

- 168 • Enhance education, outreach, research, and technical assistance programming to encourage  
169 the adoption of strategies that increase climate mitigation, adaptation, and resilience by  
170 farmers, foresters and other land and water caretakers. State agencies shall work with and  
171 fund partners and higher education, such as UVM Extension. These efforts should be  
172 incorporated into current programs, developed using braided Western science and Traditional  
173 Ecological Knowledge/Indigenous Knowledge (TEK/IK), and designed to represent diverse  
174 perspectives while addressing a diversity of audiences and age groups.

175 **Recommended Priority Actions from Other Chapters that Support Natural and Working**

176 **Lands:** [If included, the section below would only include cross-references, not the actual  
177 language copied here so I have not included in word count estimate]

178 **Mitigation Priority Strategies Supporting Natural and Working Lands:**

- 179 • Increase funding, enhance, and adapt existing State of Vermont programs that support GHG  
180 emissions reductions, soil carbon sequestration, and/or climate adaptation and resiliency on  
181 working lands. Enhance and adapt programs to better incorporate climate mitigation,  
182 adaptation, resilience, nature-based solutions, and traditional ecological  
183 knowledge/indigenous knowledge. Example State programs include, but are not limited to:  
184 Clean Water Initiative Program (CWIP), Best Management Practice Program (BMP), Capital  
185 Equipment Assistance Program (CEAP), Conservation Reserve Enhancement Program  
186 (CREP), Farm Agronomic Practices Program (FAP), Grassed Waterway and Filter  
187 Strip/Seeding and Filtering Strip, Pasture and Surface Water Fencing (PSWF), Vermont Pay  
188 for Performance Program (VPPFP), Vermont Farmers Ecosystem Stewardship Program  
189 (VFESP); land acquisition, river corridor easements, wetland conservation, County Forester  
190 Program, Maintaining and Creating Resilient Forests. Coordinate with USDA Natural  
191 Resources Conservation Service-VT programming to accelerate implementation of federally  
192 funded climate mitigation and resilience practices in Vermont
- 193 • Update the Vermont Greenhouse Gas Emission Inventory to account for both carbon  
194 sequestration and emission reduction benefits from agriculture.
- 195 • Protect farmland and managed forestlands from development through land conservation and  
196 protection programs so these land uses can continue to provide climate mitigation,

197 adaptation, and resilience benefits. Enhance existing State land use protection programs, such  
198 as the Vermont Farmland Conservation Program and Forest Conservation Easements, to  
199 improve farmland access and protection of agricultural soils and working forests.

200 • Invest in Vermont’s land owners, managers, and caretakers to enhance farm and forest  
201 viability and to support their informed decisions to increase their operation’s resilience and  
202 adaptation to climate change.

203 • Fund and implement Payment for Ecosystem Services (PES) program(s) for lands to  
204 encourage landowners/managers to implement practices that improve soil health, crop and  
205 forest resilience, increase carbon storage, increase stormwater storage capacity, and reduce  
206 runoff. Fund existing agricultural PES programs (Agency of Agriculture, Food and Markets’  
207 VFESP and VPFP) and expand to include or develop new programs for forestry. (PES is  
208 payment/compensation for increasing ecosystem services/environmental stewardship  
209 achieved through better land management by farmers and loggers and does not include  
210 carbon trading or markets, which is not recommended by this subcommittee).

211 **Cross-cutting Priority Strategies Supporting Natural and Working Lands:**

212 • workforce development targeted to agriculture and working lands sectors (workforce  
213 pathway – long-term workforce development – action 3(d));

214 • education programs targeted to strengthen the workforce pipeline for agriculture and  
215 conservation (education pathway, funding the CTE’s, post-secondary education such as  
216 apprenticeships – action 2);

217 • investing in walkable/livable communities (priority actions 1-3)(necessary to reduce  
218 development pressures on open agricultural and forest land)

219 **Rural Resilience and Adaptation:**

220 • Full integration of conservation, working lands, and development planning to effect  
221 climate resilience and adaptation.