

1 Pathways for Adaptation and Building Resilience in Natural and 2 Working¹ Lands

3 In Sections 11 and 14 of this Climate Action Plan, means to mitigate the effects of climate
4 change are recommended through both emissions reductions efforts as well as carbon
5 sequestration and storage initiatives, respectively. Given best available data², the global
6 community recognizes the need to aggressively reduce the amount of greenhouse gases in the
7 atmosphere, and Vermont, via the Global Warming Solutions Act, has established state-level
8 reduction requirements for 2025, 2030, and 2050. These efforts, critical as they are, are intended
9 to slow the speed of climate change in the decades ahead – to course correct for future
10 generations – but will not mitigate climate change as we experience it today³.

11
12 The impacts of a changing climate to both our natural and built environments are widely studied,
13 from changes that have already been observed, to those that are being modeled by climatologists
14 across the world⁴ and here in Vermont⁵. In order to create a habitable, resilient present and
15 future, climate change adaptation efforts are essential. In the previous Section (12), strategies and
16 actions to build resilience in the built environment are proposed. This section will focus on the
17 role that Vermont’s natural and working lands and waters can play, both in helping our
18 ecosystems and agricultural and forested land adapt to a changing climate, as well as leveraging
19 their inherent ability to offer adaptation and resilience value to our communities, often referred
20 to as nature-based solutions (NbS), or through practicing traditional ecological knowledge
21 (TEK).

22
23 Current models suggest that the northeastern region of the United States will see an increase in
24 annual precipitation, and that the increase will most likely come in the form of more high

¹ For the purposes of this document we use the language “working and natural lands” as described and used in the GWSA Statute, but note that this terminology should be further considered since all lands in fact “do work” including but not limited to forage, shelter, wildlife habitat, water quality, spiritual sustenance, and many other ecosystem goods and services.

² https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf

³ <https://nca2018.globalchange.gov/chapter/28/>

⁴ https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

⁵ Vermont Climate Assessment. 2021. Due to be publicly released in Nov of this year. Lead authors are Galford, Faulkner & Dupigny-Giroux

25 precipitation events and not simply more days with rain each year⁶. Vermont’s forests can retain
26 significant water loads via headwater storage, just as intact, connected floodplains and river
27 corridors can absorb excess water and reduce high, erosive energy during flooding events. Our
28 wetlands can act as a sponge for additional rainfall, while also providing critical habitat for fish
29 and wildlife. Water storage potential is also critical for the natural and working lands economy,
30 which can be impacted not only by flooding, but also during periods of drought. Protecting and
31 enhancing biodiversity will support Vermont’s agricultural and forestry sectors and improve
32 public health. In short, the Agriculture & Ecosystems Subcommittee recognizes that supporting
33 our natural systems will, in turn, empower them to support our human infrastructure – our
34 communities, our economy, our built environment – restoring a balance in our shared
35 ecosystems.

36
37 Climate change adaptation efforts, especially those that employ NbS and TEK, require upfront
38 investments, but economists agree that the long-term savings are vast, given the rapidly
39 increasing cost of climate change impacts⁷. Beyond economic returns, adaptation efforts yield
40 myriad co-benefits – from building rural economic resilience to sequestering and storing carbon,
41 improving soil health to maintaining habitat connectivity, and more.

42
43 The recommendations in this section aim to increase the adaptive capacity of Vermont’s natural
44 and working lands and waters, as well as enhance the resilience of our natural and human
45 systems to a changing climate, through science-based, technical and traditional knowledge. The
46 increased incidence of drought, extreme precipitation events, and changes in temperature
47 patterns associated with climate change in Vermont have already begun to negatively impact our
48 natural and human communities and systems. At the same time, features of Vermont’s natural
49 and working landscapes have absorbed and reduced climate risks, such as the impacts of extreme
50 precipitation and associated floods. Broadly, the strategies that the State of Vermont must take to
51 secure the health, resilience, and benefits of climate adaptation in natural and working lands
52 include critical investments in the upfront costs of proactive implementation of adaptation
53 practices, implementation of land use policies that support both appropriate, resilient

⁶ <https://nca2018.globalchange.gov/chapter/18/>

⁷ https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap17_FINAL.pdf

54 development and natural resource conservation and protection, research and training to support
55 land managers in making climate-informed plans and decisions, active integration of traditional
56 ecological knowledge with science-based knowledge, innovative funding mechanisms to enable
57 adaptation and resilience, greater support for floodplain and riparian restoration efforts, and
58 enhanced protections of biodiversity.
59

60 **Draft: Pathway: Adaptation: Sustain, restore, and enhance the health and**
61 **function of Vermont's lands and water to help both natural and human**
62 **communities adapt to climate change**

63 This pathway includes strategies and actions that apply science-based, technical and traditional
64 ecological knowledge (TEK) to the management of natural and working land that supports its
65 capacity to absorb and recover from the impacts of climate change. In Vermont, climate change
66 has already begun to negatively impact farms, forests, lands and waters through more frequent
67 droughts, heavier rainfall events, and changes in temperature patterns. At the same time, features
68 of Vermont's lands and waters have absorbed and reduced climate-risks, such as the impacts of
69 extreme precipitation and associated floods.

70

71 **Key Strategies & actions:**

72 **1. Increase technical assistance, capacity, education, and resources to support private and**
73 **municipal farm and forestland owners, planners and managers for climate change**

74 **adaptation.** Farms and forests are already experiencing the impacts of shifting seasons,
75 altered weather patterns, and increasingly extreme weather associated with a changing
76 climate, and though the majority of Vermont farmers understand their vulnerability to
77 extreme weather associated with climate change, they report a lack of financial capacity and
78 technical skills to adequately address climate-related risks and invest in adaptation⁸.

79 Outreach, education, and technical assistance will enable Vermont's land managers to better
80 anticipate, prepare for, respond to, and recover from the impacts of climate change. Farmers
81 and foresters already seek out this kind of advice from UVM Extension, other Vermont
82 institutions of higher education, and other technical service providers, but climate
83 programming is often soft-funded and dependent on competition with national grant
84 opportunities. To meet the needs of Vermont's land managers in adapting to the impacts of

⁸ White, A., J. Faulkner, S. Sims, P. Tucker, and K. Weatherhogg. "Report of the 2017–2018 New England Adaptation Survey for Vegetable and Fruit Growers." *Department of Plant and Soil Science, University of Vermont, Burlington* (2018).

85 climate change, dedicated funding to provide consistent expertise, education and assistance is
86 essential.

- 87 a. Enhance and support funding for technical assistance to farmers (e.g. fully fund UVM
88 Extension to support climate adaptation training for agriculture and support other
89 institutions of higher education in this endeavor), landowners (e.g. fund climate
90 adaptation training through FPR's Forests & Climate program), and municipalities
91 (e.g. fully implement Act 171)
- 92 b. Increase funding to Regional Planning Commissions (RPCs) to hire and support
93 natural resource staff, potentially through Natural Resource Conservation districts.
- 94 c. Develop & fund climate adaptation planning and training for all farmers and
95 foresters.

<i>Preliminary Assessment of Strategy against Criteria</i>
<i>Impact:</i> Education and training for farmers and foresters will have a significant positive impact on adoption of climate adaptation practices and planning among land manager.
<i>Equity:</i> To enhance equity of this strategy, traditionally underserved and impacted communities will be identified. Then they will be included as subject matter experts during the design of trainings, and targeted programming must be developed to meet their contextually specific needs.
<i>Cost-effectiveness:</i> Proactively investing in climate adaptation on Vermont's lands costs far less than the cost of recovering and rebuilding from climate-related damages and is extremely cost effective.
<i>Co-Benefits:</i> This strategy is primarily focused on resilience and adaptation but will have mitigation benefits of carbon sequestration, as well as biodiversity, water quality, soil conservation, buffering damage to downstream built communities; create jobs in rural communities; enhance sustainability of rural and working livelihoods; and reach impacted communities.
<i>Technical Feasibility:</i> Yes

96

97 **2. Promote and incentivize Climate Adaptation forest management practices.** Integrating
98 climate change adaptation considerations into planning and forest management can help
99 reduce climate-related risks, such as declines in forest productivity, losses in forest cover and
100 biodiversity, and disruptions to ecological processes. However, Vermont’s forest managers
101 need to know what those options are, how to implement them, and how to evaluate success,
102 as well as to have the financial capacity to adopt new techniques. Resources on climate
103 adaptation for northern forests have already been developed in part by regional efforts such
104 as the Northern Institute of Applied Climate Science⁹ and the USDA Climate Hubs¹⁰ which
105 can be used to create locally-specific guidance. Practice-based cost-share incentive programs
106 are needed to enable land managers to make changes and adopt new practices.

- 107 a. Develop education/outreach materials and training regarding climate adaptation
108 forestry specific for Vermont forest types and conditions.
- 109 b. Where appropriate, promote planting future climate adapted tree and crop species
- 110 c. Make the state guide to maintaining and creating resilient forests more usable¹¹
- 111 d. Develop a ‘pay-for-practice’ incentive program and explore state tax policy
112 incentives for forest landowners to adopt climate-adaptive management practices.

113

<i>Preliminary Assessment of <u>Strategy</u> against Criteria</i>
<i>Impact:</i> Education and support for foresters will have a significant positive impact on adoption of climate adaptation practices and planning in forests.
<i>Equity:</i> To enhance equity of this strategy, traditionally underserved and impacted communities will be identified. Then they will be included during the design of trainings, and targeted programming must be developed to meet their contextually specific needs. Incentive programs must offer differentiated rates, incentives and enrollment preference to address equity.

⁹ Northern Institute for Applied Climate Science (NIACS). Climate Change Response Framework.
<https://forestadaptation.org/>

¹⁰https://www.climatehubs.usda.gov/sites/default/files/USDA%20FS_2016%20Forest%20Adaptation%20Resources_GTR_NRS87-2.pdf

¹¹https://fpr.vermont.gov/sites/fpr/files/Forest_and_Forestry/Forest_Health/Library/Climate%20change%20report_final_v6-18-15a.pdf

<p><i>Cost-effectiveness:</i> Proactively investing in climate adaptation on our lands costs far less than the cost of recovering and rebuilding from climate damage and is extremely cost effective. The cost effectiveness comes also from the protection of critical ecosystem services, e.g. if forests degrade from climate change, we will have to bear higher costs for water quality clean up, etc.</p>
<p><i>Co-Benefits:</i> This strategy is primary focused on increasing the resilience and adaptation of forests but will have mitigation benefits of carbon sequestration and storage, as well as biodiversity, water quality, soil conservation, buffering damage to downstream built communities, create jobs in rural communities, enhance sustainability of rural and working livelihoods, and reach impacted communities.</p>
<p><i>Technical Feasibility:</i> Yes</p>

114

115 **3. Promote funding for nature-based solutions and traditional ecological knowledge**
 116 **efforts and incorporate into state funding and planning efforts.** Nature-based solutions
 117 (NbS) and traditional ecological knowledge (TEK) systems are knowledge domains that are
 118 leveraged to address climate change adaptation around the world. Integrating this expertise
 119 will have a positive impact on climate adaptation and resilience in Vermont. Nature-based
 120 solutions¹² include actions like ecological restoration projects, which protect, sustainably
 121 manage, and restore natural and modified ecosystems in ways that simultaneously address
 122 climate change, protect biodiversity and support human well-being. Traditional ecological
 123 knowledge¹³ is defined as ‘a cumulative body of Indigenous knowledge, practice, and belief,
 124 evolving by adaptive processes and handed down through generations by cultural
 125 transmission, about the relationship of living beings (including humans) with one another and
 126 with their environment.’ TEK plays an important and sometimes central role in climate
 127 adaptation initiatives and can support detection of environmental changes, the development
 128 of adaptation strategies, and offer guidance or inspiration for cultural and psychological
 129 shifts in how society relates to nature. Investment in NbS and TEK efforts at both the funding

¹² <https://www.iucn.org/theme/nature-based-solutions>

¹³ https://www.fs.fed.us/pnw/pubs/pnw_gtr879.pdf

130 and planning levels, will be invaluable in leveraging the role that our lands and waters can
131 play in creating a resilient, climate-adapted future.

- 132 a. Complete a statewide audit of technical assistance, funding, and regulatory programs
133 to review support for NBS and TEK and assess the degree to which they support or
134 hinder climate adaptation, and use the findings to create planning and/or funding
135 prioritization criteria that better align state programs.
- 136 b. Develop financial mechanisms (e.g. a revolving loan fund, green bank, loan
137 guarantees, pension fund investments, etc.) to de-risk capital investment in and
138 support for NBS and TEK projects.
- 139 c. Elevate the role TEK plays in climate adaptation and resilience and incorporate TEK
140 into state-led climate assessments, planning efforts, and prioritization frameworks,
- 141 d. Incentivize nature-based solutions(NBS) and traditional ecological knowledge (TEK)
142 in state regulatory processes and funding programs,
- 143 e. Include local Indigenous people knowledgeable in TEK and Vermont’s youth in state,
144 regional and municipal resource management planning.

<i>Preliminary Assessment of <u>Strategy</u> against Criteria</i>
<i>Impact:</i> Investments in NBS and TEK can have a significant positive impact on both the climate resilience of our communities and infrastructure and the adaptation of both aquatic and terrestrial species and natural communities.
<i>Equity:</i> Local Indigenous experts must be included as content experts and be compensated for consulting the state on a process for integration of TEK. The way TEK is integrated will need to be approached with community directed, culturally sensitive methods to knowledge exchange and communication.
<i>Cost-effectiveness:</i> Mitigating major flood damage and losses of biodiversity through investment in natural solutions and TEK is extremely cost effective.
<i>Co-Benefits:</i> This strategy is primarily focused on resilience and adaptation in forests but will have mitigation benefits of carbon sequestration, as well as biodiversity, water quality, soil conservation, buffering damage to downstream built communities, create jobs

in rural communities, enhance sustainability of rural and working livelihoods, and reach impacted communities

Technical Feasibility: Yes

145

146 **4. Manage natural and working lands for biodiversity, forest health, and climate**

147 **resilience.** The reality of a changing climate and a changing world means our lands and
148 waters' biodiversity, forest health, and climate resilience is something that must be actively
149 managed for, protected, and cultivated. Enhancements in soil health and increases in
150 vegetative cover will slow the flow of water over land and increase filtration into the soil
151 therefore mitigating downstream flood surges and improve water quality. While some
152 management practices are well understood in their ability to enhance resilience, research is
153 needed on new and emerging climate adaptation practices in our lands and waters. The cost
154 of implementation of adaptation practices limits the degree to which land managers can make
155 the necessary changes to promote biodiversity and climate resilience. The impacts of severe
156 weather events have already proved devastating to farms, and Vermont farmers report a lack
157 of financial capacity to adequately address climate-related risks and invest in adaptation¹⁴.
158 The same is true for Vermont forest managers, many of whom are also farmers. Resilience
159 funds have been identified as helpful for recovery, but they are currently underdeveloped and
160 under-resourced. Phenological variability and increased ground disturbance is altering
161 Vermont's biodiversity, creating imbalance in Vermont's ecosystems.

- 162 a. Fund increased investment in healthy soils education and implementation of
163 practices.
- 164 b. Enhance resilience funds to support the financial capacity of land managers to
165 respond and adapt to natural hazard and climate impacts.
- 166 c. Fund support for local academic institutions, researchers, and applied research to
167 evaluate best climate management practices for our lands.

¹⁴ White, A., J. Faulkner, S. Sims, P. Tucker, and K. Weatherhogg. "Report of the 2017–2018 New England Adaptation Survey for Vegetable and Fruit Growers." *Department of Plant and Soil Science, University of Vermont, Burlington* (2018).

- 168 d. Support research efforts to better understand forest ecosystems, local climate change,
 169 and impacts to farms, wetlands, forests and ecosystem services.
- 170 e. Incentivize and provide appropriate support for invasive species control efforts,
 171 specifically where populations threaten ecosystem function and processes.
- 172 f. Through direction to VT Fish & Wildlife and VT Forests, Parks and Recreation,
 173 establish primary land management objectives of protecting and improving forest
 174 health and biodiversity on state lands, municipal lands, and private lands enrolled in
 175 UVA.

<i>Preliminary Assessment of <u>Strategy</u> against Criteria</i>
<i>Impact:</i> Investing in the management of natural and working lands for climate resilience will have significant climate adaptation and resilience benefits to both landscapes and downstream built communities.
<i>Equity:</i> Traditionally underserved and impacted communities will first be identified for all actions. They will be included during the design of targeted programming to meet the contextually specific needs of these stakeholders. Impacted communities will be consulted during the development of programs and RFPs. Incentive programs will offer differentiated rates and enrollment preference to address equity.
<i>Cost-effectiveness:</i> Mitigating flood damage, irreparable biodiversity loss, and farm closures through proactive investment in natural solutions is extremely cost effective when compared to the cost of doing nothing.
<i>Co-Benefits:</i> This strategy is primary focused on resilience and adaptation but will have mitigation benefits of carbon sequestration, as well as biodiversity, water quality, soil conservation, buffering damage to downstream built communities, create jobs in rural communities, enhance sustainability of rural and working livelihoods, and reach impacted communities.
<i>Technical Feasibility:</i> Yes

- 176
- 177 5. **Plan and regulate for climate resilience and adaptation.** The integration of a ‘climate
 178 lens’ across existing state, regional, and municipal planning efforts and regulations can help
 179 meet the GWSA’s resilience and adaptation goals via existing efforts. Likewise, increasing

180 an awareness of other climate change efforts and climate action across state agencies and
181 employees and creating power-balanced spaces for communication among staff from
182 multiple levels could increase synergy among goals, education, and work across the State of
183 Vermont agencies who will implement the recommendations of the Climate Action Plan.

- 184 a. Establish "climate resilience zones" informed by existing data, bolstered with new
185 research/science, to identify locations that have high resilience potential for both the
186 natural and built environments and use to inform land use development and
187 regulations
- 188 b. Per the formula in statute, fully fund Regional Planning Commissions (RPCs) to
189 ensure sufficient capacity necessary to address climate change in regional and
190 municipal plans.
- 191 c. Direct the Legislature to authorize development and implementation of a Statewide
192 Land Use Plan. In doing so, the Legislature should clarify how and if a State Land
193 Use Plan informs or directs land use planning, policy and regulation at the local,
194 regional, and state level.
- 195 d. If a State Land Use Plan is authorized, explore creation of a State Planning Office
196 and/or other potential structures within the executive branch to implement the Plan at
197 the state level.
- 198 e. Create a mechanism, position or body within the Executive Branch to ensure
199 coordinated climate action across state government *with just transitions and*
200 *environmental justice expertise*. This inter-agency body or mechanism is intended to
201 connect actions *beyond the scope* of the Climate Action Plan implementation, with a
202 goal of ensuring effective communication across agencies that work together to
203 promote climate change mitigation/adaptation/resilience and adding a consistent
204 climate lens to the myriad of regulatory and funding programs.

<i>Preliminary Assessment of <u>Strategy</u> against Criteria</i>
<i>Impact:</i> Identifying and protecting resilience zones will have significant climate adaptation and resilience benefits to both landscapes and downstream built communities.

Greater climate awareness and coordination among agency staff may have impacts on climate adaptation and mitigation efforts
<i>Equity:</i> Inclusion of more voices and paying attention to power dynamics in the implementation of climate policy and programs embodies procedural equity. Impacted and historically underserved communities will be identified, and then seats for their voices will be included in all councils and committees that make decisions impacting these communities. Representatives from impacted communities will be compensated for their time to participate in meetings, and facilitators will be tasked with ensuring these voices not be marginalized by the group dynamic, overtly or through micro-aggressions.
<i>Cost-effectiveness:</i> This strategy has the potential to be very cost effective, in that it draws on exiting efforts and structures, and may create synergy and efficiency through better government coordination on climate change, and climate informed planning.
<i>Co-Benefits:</i> Equity, resilience, education, potentially others
<i>Technical Feasibility:</i> Yes

206

207 **6. Increase flood resilience of the natural and built environments.** Because of Vermont’s
 208 topography, the state has always experienced flooding in low-lying areas; however, in recent
 209 years these events have become more common, more widespread, and more severe due to
 210 climate change. The 2010s saw a three-fold increase in federally-declared disasters from the
 211 previous decade, the majority of which were due to flooding. Climate modeling suggests that
 212 these trends will continue¹⁵, and so Vermont must plan to promote flood-resilient human and
 213 natural communities and invest in and maintain our intact landscape to leverage nature-based
 214 solutions that can help mitigate the impacts of severe flooding.

215

- 216 a. Incentivize water storage in natural areas to promote flood resilience and
- 217 biodiversity through expansion of wetland, floodplain, and/or river corridor
- 218 easements that better compensate landowners/managers.

¹⁵ <https://nca2018.globalchange.gov/chapter/18/>

- 219 b. Ensure opportunities for floodplain reconnection and nature-based solutions are
 220 considered a high priority in the Statewide Conservation & Buyout Program
 221 through incorporation of multi-stakeholder developed prioritization criteria.
 222 c. Invest transportation funding in improving flood resilience and aquatic and
 223 terrestrial connectivity.
 224

<i>Preliminary Assessment of Strategy against Criteria</i>
<i>Impact:</i> Increasing flood resilience through investments in nature-based solutions can have a significant positive impact on both the climate resilience of our communities and infrastructure and the adaption of both aquatic and terrestrial species and natural communities.
<i>Equity:</i> Impacted communities will be identified and compensated for consulting on implementation of these recommendations. This can be an equitable strategy provided investments are made where there is a willing landowner who is compensated fairly.
<i>Cost-effectiveness:</i> Mitigating major flood damage on Vermont’s built environment and natural communities through investment in natural solutions is extremely cost effective.
<i>Co-Benefits:</i> This strategy is primary focused on resilience and adaptation but will often have mitigation benefits, especially when areas are maintained or restored to a natural condition where trees, shrubs and other vegetation can sequester and store carbon at a higher rate than the baseline.
<i>Technical Feasibility:</i> Yes

225

226 **7. Promote healthy, connected river corridors, floodplains and wetlands.** River
 227 corridors, floodplain, riparian and wetland ecosystems support critical ecosystem functions
 228 that are foundational to biodiversity, ecosystem resilience, habitat, flood surge regulation,
 229 erosion mitigation, carbon storage, and climate adaptation of natural communities. A river
 230 corridor is the land area adjacent to a river that is required to accommodate the dimensions,

231 slope, planform, and buffer of the naturally stable channel and that is necessary for the
232 natural maintenance or natural restoration of a dynamic equilibrium condition and for
233 minimization of fluvial erosion hazards.¹⁶ Floodplains are the areas adjacent to rivers where
234 inundation flooding occurs during high flow events, which are increasing in frequency and
235 intensity due to climate change. Both the inundation flooding of floodplains and the dynamic,
236 erosive flooding associated with river corridors pose a risk to health and safety when homes,
237 transportation corridors or other permanent infrastructure are sited too closely to a river.
238 Minimizing new encroachments in these areas helps to maintain adequate connections
239 between a river and its floodplain and sufficient room for river corridors to meander
240 overtime, without resulting in costly and potentially life-threatening impacts. Riparian areas
241 are the areas between aquatic (water) and terrestrial (land) ecosystems. Riparian areas can be
242 found along streams, rivers, lakes, wetlands and other waterbodies¹⁷. These areas have
243 critical ecological functions that connect the aquatic and terrestrial ecosystems, thereby
244 supporting unique habitats, natural communities, and high biological diversity^{9, 18, 19}.
245 Riparian areas maintain high quality aquatic habitat by protecting water quality and by
246 providing shade, organic matter, and structure necessary for healthy aquatic systems.
247 Vegetated riparian areas also create bank stability, which reduces erosion during high
248 precipitation events and in turn reduces impacts to water quality. They also help to physically
249 protect our farms and towns by reducing flood surges. Riparian areas function as terrestrial
250 wildlife habitat and travel corridors connecting larger areas of intact habitat and are critical
251 for the species migration that climate adaptation necessitates. Wetlands are important and
252 valuable ecosystems for Indigenous activities. The Carbon Budget²⁰ developed for the
253 Vermont Climate Council confirms wetlands are a net carbon sink. In addition to these
254 mitigation benefits, wetlands absorb storm water during high precipitation events, are a
255 critical source of water during periods of drought and provide critical habitat for a range of

¹⁶ https://floodready.vermont.gov/flood_protection/river_corridors_floodplains/river_corridors

¹⁷ Riparian Science Technical Committee (RSTC). 2007. Analysis of the Current Science Behind Riparian Issues. Report to the Minnesota Forest Resources Council

¹⁸ https://vtfishandwildlife.com/sites/fishandwildlife/files/documents/Conserve/RegulatoryReview/Guidelines/Riparian_Management_Guidelines_ANR_Lands_2015.pdf

¹⁹ Vermont Agency of Natural Resources (VT ANR). 2005. Riparian buffers and corridors: technical papers. Waterbury, VT. <http://www.anr.state.vt.us/site/html/buff/buffer-tech-final.pdf>

²⁰ Galford G, Darby H, Hall F, and Kosiba AMK. 2021. A Carbon Budget for Vermont.

256 species adapting to climate change. A UVM study, following Tropical Storm Irene, found
257 that intact wetlands and floodplains have the ability to reduce flood damages by 54-78%²¹. In
258 Vermont, wetlands enjoy significant regulatory protection and benefit from a host of
259 conservation programs; however, opportunities exist to do more.

- 260 a. Support and fund research and design to strategically invest in floodplain and
261 river corridor reforestation efforts. Specifically, develop an inventory of
262 priority/critical headwater and floodplain storage areas, prioritize investments for
263 restoration and protection in these areas, and use to inform Compact Settlement
264 planning efforts.
- 265 b. Expand support for riparian buffer enhancements to easements with a goal of
266 increasing the amount of vegetation and biodiversity in riparian areas.
- 267 c. Increase support for wetland restoration and protection.

268

Preliminary Assessment of Strategy against Criteria

Impact: Maintaining or increasing the functions and values of riparian areas across the state leading to a more resilient and adaptive landscape for a wide range of species. Identifying areas with critical floodplain and river corridor function to inform land use planning, conservation and regulatory efforts can result in river systems that have the room to safely flood and meander, reducing impacts on homes, infrastructure and other costly investments, resulting in a more resilient landscape. Wetlands are highly protected but expanded conservation and restoration efforts will yield increased impacts over the baseline.

Equity: If the identification of critical areas ultimately results in a loss of certain land use or development rights, landowners will need to be compensated in a fair and equitable manner. Impacted communities will be identified and compensated for consulting on implementation of this recommendation. Can provide additional funding for landowners interested in protecting riparian areas but may result in some loss of use by other landowners in riparian areas. Generally wetland areas have low commercial potential and are valued for their ecological, recreation and aesthetic qualities, so expanded protections are likely equitable.

²¹ <https://www.sciencedirect.com/science/article/abs/pii/S092180091630595X>

Cost-effectiveness: Identification of these critical areas through remote sensing and analysis is relatively cost-effective, but will require some investment in state agencies, universities or consultants to conduct the work. Site specific analysis will be more costly. However, if inundation flooding or significant fluvial erosion can be avoided through this strategy, the magnitude of savings to the state and individual landowners far exceeds the cost. Wetland protection and restoration is generally a cost-effective endeavor. The additive cost of riparian provisions in easements and the cost of riparian restoration is relatively low and the benefits can be great.

Co-Benefits: This strategy primarily has resilience and adaptation benefits, but if critical areas are identified and retained in a natural condition, they may reforest or otherwise see an increase in carbon sequestration and storage resulting in mitigation benefits. Vegetated riparian areas enable ecological adaptation to climate change, improve the resilience of our communities, and provide some mitigation benefits through the growth and maintenance of trees, shrubs and plants; there are also water quality benefits. Wetlands support climate mitigation, adaptation and resilience.

Technical Feasibility: Yes

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272 **Glossary of Terms**

273 **Adaptation:** Adaptation refers to action to prepare for and adjust to new conditions, thereby
274 reducing harm or taking advantage of new opportunities.²²

275 **Resilience:** A capability to anticipate, prepare for, respond to, and recover from significant
276 multi-hazard threats with minimum damage to social well-being, the economy, and the
277 environment.²³

278 **Traditional ecological knowledge:** A cumulative body of knowledge, practice, and belief,
279 evolving by adaptive processes and handed down through generations by cultural transmission,

²² Bierbaum et al. 2014 . Third National Climate Assessment
<https://nca2014.globalchange.gov/report/response-strategies/adaptation>

²³ USGCRP. Glossary. <https://www.globalchange.gov/climate-change/glossary>

280 about the relationship of living beings (including humans) with one another and with their
281 environment ²⁴

282 **Nature-based solutions:** actions to protect, sustainably manage, and restore natural and
283 modified ecosystems that address societal challenges effectively and adaptively, simultaneously
284 providing human well-being and biodiversity benefits²⁵.
285

²⁴ Fikret Berkes, resilience scholar. See https://www.fs.fed.us/pnw/pubs/pnw_gtr879.pdf

²⁵ <https://www.iucn.org/theme/nature-based-solutions>

286 ***Draft Pathway: Viability: Support and empower Vermont’s natural and***
287 ***working lands owners, managers, and caretakers to enhance farm and forest***
288 ***viability and to make informed decisions to increase resilience and adaptation***
289 ***to climate change.***

290 The actions under this pathway have a fundamental foundation in education, incentivization and
291 economic stimulation which will support and empower farmers, foresters and land managers, and
292 enhance local markets with a positive focus on greenhouse gas emissions mitigation and climate
293 change resilience benefits. Adaptation and resiliency to climate change will require investments
294 of resources and technical knowledge to ensure the implementation needed to address climate
295 concerns, but the success of this effort is dependent on the ongoing viability and sustainability of
296 those who own and manage the land on which these changes will be made. Without solid
297 technical and financial support, landowners cannot learn about new technologies and practice
298 changes, implement them accurately or maintain them for long-term impact, and fundamental to
299 all of this is the ability for these changes to continue to support the functions of our natural lands
300 and the livelihood and success of our land managers.

301 Actions that foster partnerships at all levels are essential to developing strategies that empower
302 all of Vermont’s working landowners to address climate change. State, federal and local partners
303 provide ongoing education and support for new advances and best practices as well as additional
304 financial resources, and these partnerships must grow to meet the demands of our changing
305 climate and the need to address equity for beginning and socially disadvantaged landowners,
306 those with less access to technical and financial resources, BIPOC and other marginalized
307 communities or individuals. New equity models for land access and ownership should be
308 created and expanded. In addition, creative land ownership, leasing or land access models that
309 might include multiple users of large tracts of land, where feasible, should be researched.

310 Currently, farmers and foresters must navigate a complex maze of regulatory and permitting
311 frameworks in addition to state and federal funding opportunities; these systems will need to be
312 assessed for equity and efficiency in order to streamline the process both for the benefit of the
313 practitioners and for our lands and waters.

314

315 **KEY STRATEGIES AND ACTIONS**

316 **1. Support and enhance local food markets for greater viability, mitigation, and**
317 **resilience benefits:** The Vermont Farm To Plate (F2P) strategic plan states that Vermont
318 will face considerable disruption to the local food system and farm viability because of
319 climate change. Increasing in-state and regional markets will reduce the risk to large
320 food system disruptions while addressing the needs of lower income communities.
321 Implementation of the priorities in the F2P strategic plan is recommended.

322

<i>Preliminary assessment</i>
<i>Impact:</i> Providing farmers and producers of natural resource products with local outlets for their products increases resiliency to changes in climate, disruptions to the national food system and inequitable impacts on marginalized communities and individuals. Local markets also decrease transportation impacts and fuel usage.
<i>Equity:</i> Increasing local markets addresses inequities among income levels in accessibility to sufficient, nutritious local food.
<i>Cost-effectiveness:</i> Increasing economic viability by ensuring markets is one of the most cost-effective ways to address climate resilience.
<i>Co-Benefits:</i> Having a viable local market helps to enhance the rural economy and increase landowner economic ability to address other natural resource needs such as water quality.
<i>Technical Feasibility:</i> Yes

323

324 **2. Foster partnerships at all levels (state, federal, nonprofit, and private sector):**
325 **essential to recognizing, capacitating, and building strategies for landowners to**
326 **address climate change and enhance community resilience:** Vermont’s small size and
327 community-based collaborations and networking have long enabled state and federal
328 partners to support and assist landowners in the best methods for mitigating natural
329 resource impacts. With the additional climate concerns, these partnerships must not only
330 be maintained but strengthened to ensure the most efficient and effective means for
331 maximizing opportunities for co-benefits of all programs.

- 332 a. Dedicate funds to support Vermont Natural Resources Conservation Districts and
 333 farmer watershed organizations with the specific objective of allowing them to
 334 reach other farmers, foresters and landowners, with education about climate
 335 resilient practice implementation.
- 336 b. Maintain the Ag & Ecosystems Subcommittee through development and
 337 implementation of the Global Warming Solutions Act (GWSA) and the Climate
 338 Action Plan (CAP) to cultivate, build and reinforce state, federal, nonprofit, and
 339 private sector collaborations.
- 340 c. Fund a research project to fully understand household food insecurity in Vermont
 341 and how to invest in its elimination. The design and implementation of the
 342 research project should engage academics, advocacy groups, and impacted
 343 individuals, and include research on geographic spread, root causes, and costs to
 344 the health care, educational, and emergency response systems (as written in the
 345 2021-2030 F2P Strategic Plan pg. 158). (Collaborate with Hunger Free Vermont,
 346 Vermont Foodbank, VT Releaf Collective).
- 347 d. Work closely with USDA NRCS’s 2021 Action Plan for Climate Adaptation and
 348 Resilience to leverage resources and increase efficiencies of practice education
 349 and implementation. Coordinate with NRCS Ecosystem Restoration Program to
 350 make it more efficacious and accessible for Vermont in the wake of disasters.
 351

<i>Preliminary assessment</i>
<i>Impact:</i> Providing technical assistance and education has long-proven broad positive impacts across the agriculture, forestry and natural resource sectors.
<i>Equity:</i> Increased partnerships and collaborations will provide access across communities and individuals with synergistic positive results.
<i>Cost-effectiveness:</i> Partnerships and collaborations have already proven that a modest outlay of financial support provides considerable payoffs.
<i>Co-Benefits:</i> Broader partnerships through a wide sector of the agricultural community benefits additional farmers, land managers, and landowners and provides opportunities for evaluating co-benefits of practice changes for the highest economic and environmental value.

Technical Feasibility: Yes

- 352 3. **Expand funding for existing programs dedicated to farmland access, forestland**
353 **ownership and conservation, and leverage this funding to increase land access**
354 **through flexible and new ownership financing mechanisms, policies, and models:**
355 Innovative financing is going to be critical to successfully expanding funding and
356 resources needed to support climate change adaptation and resilience (e.g., performance
357 mortgages, shared equity models, ground leases, appropriation of \$3 million in low-cost
358 capital to a Community Development Financial Institution or other lender, policy
359 incentives to encourage multiple tenants or owners on larger tracts of land, and low-cost
360 and long-term farm leasing on publicly held lands). A particular emphasis on the needs of
361 beginning, socially disadvantaged, and Black, Indigenous, and People Of Color (BIPOC)
362 farmers (as written in the 2021-2030 F2P Strategic Plan pg. 30) is critical, especially
363 education and support for navigating the financing, permitting and funding to ensure all
364 landowners have access to the same resources and opportunities.
- 365 a. Investigate innovative funding mechanisms which increase farmland access,
366 **forestland ownership** and conservation and will assist with implementation of
367 climate smart agricultural practices, crop insurance for diversified Vermont-scale
368 farms, and emergency recovery following extreme weather events, to better
369 respond when climate change related events occur.
 - 370 b. Assist food, forest product and farm businesses with navigation of municipal and
371 state permit requirements and regulations. This will create a more supportive
372 environment for business growth and diversification, especially as it relates to
373 forest products processing and distribution, on-farm accessory businesses, farm
374 employee housing, and development of off-farm distribution, and storage
375 infrastructure (as written in the 2021-2030 F2P Strategic Plan pg. 33).
- 376

Preliminary assessment

Impact: Equal access to land, through conservation and other land access programs, for agricultural and forestry activities is critical and has high positive impact for climate resilience and adaptation.

Equity: For too long, the lack of access to land and the tools (such as capital) to operate that land have been negative strikes against our society. Managing this issue fairly and equitably is vital to our future success for managing our climate.

Cost-effectiveness: Very cost effective, to support and expand existing successful programs.

Co-Benefits: Multiple co-benefits to farm transition, when engaged and productive land managers produce high quality products in a way that increases climate adaptation and resilience.

Technical Feasibility: Yes

377

378

379 ***Draft PATHWAY – Economies: Grow and connect local and sustainable***
380 ***natural and working lands’ economies, markets, and food systems while***
381 ***ensuring and providing equitable access to said economies, markets, and food***
382 ***systems for Vermont's people.***

383
384 A clear co-benefit of thriving and resilient natural and working lands is our ability as citizens to
385 benefit in reciprocal ways from sustainable stewardship. Protecting our natural environment for
386 its social benefits of climate adaptation as well as flood resilience, water quality and food
387 security does not mean a resulting negative economic impact. Improving and protecting our
388 natural systems brings new opportunities for economic development, while addressing the
389 untenable food insecurity issues faced by many Vermont citizens.

390
391 The Ag and Ecosystem subcommittee benefited greatly from the recent extensive process of
392 developing the Vermont Farm to Plate Strategic Plan: 2021 – 2030. This is a valuable resource
393 from a multi-stakeholder lens regarding how we might move forward to pursue a just and
394 equitable agricultural economy. All three of the legislative directives for the strategic plan goals
395 (increasing economic development and jobs; improving resilience of the working landscape in
396 face of climate change; and improving access to healthy local foods for all Vermonters) directly
397 support the work included in the strategies and actions below. The F2P plan also confirms the
398 need to prioritize our agricultural land base, infrastructure, and food security in order to increase
399 Vermont farm and food system resilience to the impacts of climate change ²⁶. To that end you
400 will find that we have pulled multiple actions from the F2P plan into our work that we felt
401 complimented or elevated our pathways and strategies.

402
403 In our current frameworks, economies tend to trump all to the detriment of our natural resources.
404 We instead choose to envision a future with a sustainable and robust working lands economy due
405 to practices, harvesting, and methodologies rooted in the Indigenous values of reciprocity,
406 responsibility, respect, reverence, and relationships. In layman’s terms, if we take care of nature,

²⁶ Farm to Plate Strategic Plan - <https://www.vtfarmtoplate.com/assets/resource/files/Vermont%20Agriculture%20and%20Food%20System%20Strategic%20Plan%202021-2030.pdf>. P. 9

407 nature will take care of us. Recognition of the intersection of the natural landscape and its
408 benefits to our environmental and climate goals, to the well-being and security of Vermonters is
409 the overarching priority of the strategies below.

410

411 **KEY STRATEGIES AND ACTIONS**

412 **1. Develop, expand, and sustain local markets specifically for food, agricultural, and forest** 413 **products in ways that ensure food sovereignty and security and provide for all**

414 **Vermont’s peoples.** The further development, expansion, and creation of robust and
415 innovative local markets has both the potential to reduce GHG emissions from food waste
416 and food miles, as well as build out more just and sustainable livelihoods for those living and
417 working within our farm and forest sectors. For our natural lands to continue to provide us
418 with climate adaptation and resilience benefits, our landowners, managers and citizens who
419 support this work must also be supported. Additionally, ensuring food security for all
420 Vermonters is not just a co-benefit of related climate actions but is a valuable strategy of its
421 own. “Sustainable development meets the needs of the present without compromising the
422 ability of future generations to meet their own needs. It is development that achieves
423 economic viability, environmental sustainability, and social equity and well-being”²⁷.

424

425 It is critical moving forward to take the time to fully understand where we are and where we
426 wish to go. We see the 2021-2030 Farm to Plate Strategic Plan as a good starting place and
427 highly recommend the development of an equivalent forest sector strategic plan and the
428 mapping of Vermont’s agricultural land base and production capacity to better understand
429 where we are and how we build just and equitable policies moving forward.

- 430 a. Support robust funding for Working Lands Enterprise Initiative and prioritize funding
431 to businesses that have climate/low carbon goals.
- 432 b. Develop a strategic plan for the forest economy, modeled on the Farm-to-Plate
433 strategic plan but improved to better incorporate impacted stakeholders and principles
434 of equity, as well as examining our current language and approach to forest
435 management.
- 436 c. Develop supply chain substitutions which better support local products.

²⁷ Farm to Plate Strategic Plan,

- 437 d. Support research and development efforts, and expansion of new markets and
438 opportunities for local wood products processing and manufacturing in Vermont.
- 439 e. Develop alternative markets for low-grade wood, focusing on cellulose insulation,
440 bioplastic composites, or biofuels.
- 441 f. Research the efficacy of food hubs as public infrastructure (e.g libraries and public
442 infrastructure).
- 443 g. Map Vermont’s agricultural land base and production capacity, including geographic
444 data about predicted climate change impacts, aggregation and distribution
445 infrastructure, and regional dietary needs (as written in the 2021-2030 F2P Strategic
446 Plan pg. 32).
- 447 h. Provide additional support for critical programs that help Vermont’s agricultural
448 sustainability and ability to address climate issues including:
- 449 Support the growth of VAAFMM Meat Inspection and Agricultural
450 Development programs, which will help expand Vermont products into the
451 regional marketplace and develop consumer education and public awareness
452 campaigns around the steps involved in getting meat products from farm to
453 table;
- 454 Fund a pilot aggregation and sales system that effectively serves both the
455 charitable food system and institutional and other market channels, through a
456 structured partnership among established processors, aggregators, and
457 gleaners. The pilot would include data collection on specific marketable
458 surplus food products;
- 459 Support the Vermont Farm to School Network;
- 460 Support organizations in the charitable food system to source food directly
461 from Vermont farmers;
- 462 Create a Local Food Access Funding Program;
- 463 Develop a distribution and logistics infrastructure investment plan to guide
464 strategic transportation investments with the express purpose of improving the
465 efficiency and cost-effectiveness of in-state and regional food distribution.
- 466 Include a business plan analysis for a public/private Vermont wholesale

467 terminal market that would provide cross-docking, cold storage, and logistical
 468 service between Vermont producers and regional wholesale buyers;
 469 Using the infrastructure study as a guide, increase public-private investment in
 470 intermediated market distributors to improve operational efficiencies and
 471 overall sales through improved marketing, infrastructure, route optimization
 472 and shared transportation-management software, and access to logistics
 473 professional development and consulting.
 474

<i>Preliminary Assessment of <u>Strategy</u> against Criteria</i>
<i>Impact:</i> High impact, potential to reach entirety of state
<i>Equity:</i> Were the true language of food sovereignty applied as we move forward, positive implications for a more just and equitable future are huge. Within the context of funding, TA access, market, food, and land access there are massive amounts of work necessary to repair the damage of historic and present-day harms to our most impacted communities.
<i>Cost-effectiveness:</i> Moderate. Similarly, to the necessary transitions in the energy sector, the upfront cost is more, but the benefits in the long term pay for themselves.
<i>Co-Benefits:</i> High. Both from a mitigation and adaptation/resilience standpoint investing in this strategy could advance numerous components of broader societal benefit; public health, equity, economic prosperity, carbon storage and sequestration and workforce opportunities.
<i>Technical Feasibility:</i> Yes

475
 476
 477 **2. Promote workforce development in all working lands sector along all points of the**
 478 **supply chain:** So often in our quest for farm or forest business viability we are pursuing
 479 infrastructure investments. We need our focus to shift slightly: from *farm* and forest viability
 480 to *farmer* and forester/logger viability, business viability to land, water, and forest viability.
 481 As we have observed, public investment in infrastructure (manure pits, water quality
 482 projects) without an equal investment in farmers and farmworkers does not adequately

483 support farmers, limiting their ability to support the needs of the climate crisis. When farms
484 go out of business, we run the risk of losing the value that land brings to climate resilience.

485
486 Our current workforce is ready to rise to the challenge but needs support in developing a
487 business system where becoming a farmer or farmworker, a forester, a logger, a logistics
488 manager at a food hub, is a viable career path that supports the natural lands enterprises that
489 research consistently shows are essential to address our climate adaptation strategies,
490 immediately and into the future.

- 491 a. Develop, endorse and implement fair trade and equitable labor practices and just
492 livelihoods for the natural and working lands sector
- 493 b. Better resource state programs to support landowners' personal and professional
494 development, and where needed, develop additional affordable and accessible
495 training programs such as apprenticeships, certificates, stackable credentials, and
496 concurrent degrees. Provide training to natural land managers in securing, retaining
497 and supporting employees.

498

<i>Preliminary Assessment of Strategy against Criteria</i>
<i>Impact:</i> This strategy could have a high impact, particularly in our rural communities and natural communities. Resourced people are able to care for our natural and working lands far better. Additionally as a state we all benefit from increased clean water efforts, food security, and more circular local economies.
<i>Equity:</i> A well-resourced workforce well equipped to steward our lands into the future will be critical. Particularly given costs of higher education, building out options to “earn while you learn” offer new pipelines to education and viable careers. Any new policies implemented should be created using the Just Transitions <i>Guiding Principles</i> and equity screening rubric.
<i>Cost-effectiveness:</i> Though it will require investment, existing revenue streams could be redirected and prioritized differently, with a climate resilience and equity lens to accomplish some of these goals.
<i>Co-Benefits:</i> Immense. A state where the working lands economy sustained just livelihoods would result in massive net benefits for all; could provide for an entirely

reinvigorated work force, enhanced circular economies, keeping more dollars in state, and the enhanced resilience of our natural and working lands and therefore our people.

Technical Feasibility: Yes

499

500

501 3. **Strengthen all aspects of working lands’ supply chains and the associated infrastructure**

502 **to support them:** Similar to above but focused on the necessary infrastructure investments

503 and upgrades that will allow our working lands’ sector to build out their production,

504 distribution, and logistical capacity. Again, as we determine our methodologies for siting and

505 development, we need to be transparent about potential impacts and harms and frame our

506 new projects within the *Guiding Principles*.

507 a. Make significant investment in storage, processing, and distribution infrastructure in
508 order to enhance product innovation and quality across all Vermont food and forest
509 products.

510 b. Support product-specific value chain development through facilitation of producer,
511 distributor and buyer matchups and supporting producer-driven aggregation,
512 distribution, and marketing enterprises.

Preliminary Assessment of Strategy against Criteria

Impact: Moderate to High.

*Equity: Though siting and development of infrastructure/processing would need to be implemented using the *Guiding Principles* equity screening rubric, building out our local supply chains and distribution cuts down on our upstream emissions and inequitable impacts in other places in the globe. The more we can source here, the less we emit, the less we degrade the environment’s resources in other places though clearly our regulations a*

Cost-effectiveness: Moderate. Initial costs are high, but long-term benefits equate to overall cost-effectiveness. Development of supportive and creative infrastructure is essential to the success of agricultural and forestry sustainability through market development.

<i>Co-Benefits:</i> If build out utilizing the <i>Guiding Principles</i> the co-benefits of these investments are high.
<i>Technical Feasibility:</i> Yes

- 513 4. **Ensure equitable access to local foods, culturally relevant foods, land, funds, grants,**
514 **and technical assistance for people who have been historically marginalized and come**
515 **from impacted communities:** The reality of Vermont is no different than anywhere else in
516 the United States. The land we now know as Vermont is the ancestral and unceded
517 homelands of the Abenaki and Mohican peoples that were appropriated by Europeans and
518 their descendants. A Additionally, redlining and inequity that denies our BIPOC,
519 LGBTQIA+, disabled, migrant worker and low-income communities from accessing land,
520 homes, loans, technical assistance, culturally relevant foods and access to just and dignified
521 lives. Equitable access to all communities increases our ability to creatively and sustainably
522 support our working lands economies and the related climate benefits.
- 523 a. Build out and utilize TEK to build out connections to our Tribal and Indigenous
524 communities in the development and utilization of traditional products, e.g. birch
525 syrup, sumac spices, etc.
 - 526 b. Uplift and resource the work of the Vermont Releaf Collective and other BIPOC led
527 organizations
 - 528 c. Improve funding opportunities and create equitable access for BIPOC organizations
529 and BIPOC owned businesses by developing multi-year, unrestricted BIPOC centered
530 grants and loan programs.
 - 531 d. Build out and utilize TEK to build out connections to our Tribal and Indigenous
532 communities in the development and utilization of traditional products, e.g. birch
533 syrup, sumac spices, etc.
 - 534 e. Uplift and resource the work of the Vermont Releaf Collective and other BIPOC led
535 organizations
 - 536 f. Improve funding opportunities and create equitable access for BIPOC organizations
537 and BIPOC owned businesses by developing multi-year, unrestricted BIPOC centered
538 grants and loan programs.

<i>Preliminary Assessment of <u>Strategy</u> against Criteria</i>

<p><i>Impact:</i> High. The ability of all of Vermont’s people to become resilient and adaptive is imperative to our shared future. Additionally, so many of the practices and tenants that we embrace as regenerative, organic, or sustainable can be directly attributed to global Indigenous traditions and it is incumbent upon us to restore both the appropriate attribution of these practices and the ability of our BIPOC communities to practice them.</p>
<p><i>Equity:</i> Any endeavors that are pursued must be done so as directed and informed by the communities for whom they are created. Our typical power dynamics and structures must be flipped and the sovereignty of our BIPOC communities to self-determine the direction with which they nourish themselves, their land, and their communities must be the goal.</p>
<p><i>Cost-effectiveness:</i> Moderate – High.</p>
<p><i>Co-Benefits:</i> Repairs harms, sustains lands and communities, heals trauma and builds deeper connections for communities to land and their ability to sustain.</p>
<p><i>Technical Feasibility:</i> Yes</p>

540

541

542 **5. Develop a Vermont food security and sovereignty plan, centered around a thriving food**
543 **system, and inspired by community-based responses to food insecurity and disruptive**

544 **events:** 1 in 3 Vermonters are food insecure and additionally we know that many of our
545 frontline and impacted communities face massive barriers to access when trying to sustain
546 themselves and their families, including many of the very people who produce food for
547 others. As was witnessed during COVID the brittleness of our food systems impacts our
548 people quickly. The ability of our state to feed its people will be imperative as climate
549 change and its realities take further hold.

- 550 a. Involve food insecure individuals as well as farmers in the planning, and investigate
551 questions including, but not limited to, affordable housing, health care, transportation,
552 siting of retail grocery stores, food distribution, and ensuring the continued
553 production of food in Vermont to increase resilience and adaptation for all.

554 b. Work to adopt state and regional level policies, procedures, and plans to ensure that
 555 the Vermont food supply is sufficient to withstand global or national food supply
 556 chain disruptions caused by climate change and other disasters.

557
 558

<i>Preliminary Assessment of Strategy against Criteria</i>
<i>Impact:</i> Substantial, particularly for our most vulnerable communities.
<i>Equity:</i> Actions in this realm must be undertaken utilizing the <i>Guiding Principles</i> . The traditional power dynamics and control must give way to the voices of those who are most impacted by food insecurity and disruptive events. Community engagement will be paramount and the needs expressed will need to be addressed vs. our more traditional pejorative approach. How do communities wish to access food? What do they need? Where do they want it? These questions apply to Strategy 4 as well.
<i>Cost-effectiveness:</i> Could be done in very cost-effective ways, but would need funding for compensation for community members asked to participate and lend their expertise.
<i>Co-Benefits:</i> Food is a fundamental right, ensuring Vermonters are fed, particularly our children, is a moral obligation.
<i>Technical Feasibility:</i> Yes

559
 560

561 ***Draft* PATHWAY – Land use: Shape land use and development that support**
562 **carbon sequestration and storage, climate resilience and adaptation, and**
563 **natural and human communities for a sustainable and equitable future**

564

565 The way in which Vermonters live on and interact with the land will directly affect our ability to
566 meet our goals to reduce greenhouse gas emissions, sequester and store carbon, and adapt and
567 build resilience to the impacts of climate change. Further, the climate crisis is exacerbating other
568 crises, including a shortage of housing, as more people move to Vermont to escape the impacts
569 of harsher climates and harsh climate events elsewhere. Similarly, along with the climate crisis,
570 we also have a biodiversity crisis. Past land use decisions have resulted in declines in the number
571 of species, reductions in the size of populations, and losses of habitats across Vermont. It is
572 critical that we use this opportunity to address all climate-related crises and create thoughtful
573 land use planning for Vermont that helps to increase biodiversity and resilience to climate
574 change, while accommodating the need for more housing and new sources of energy.

575

576 To meet these goals, we need policies and programs that protect our forests and fields, both those
577 that are wild and unmanaged and those that are actively managed. Similarly, we need policies
578 and programs to protect and restore our wetlands, floodplains, rivers, and lakes. At the same
579 time, we need policies and programs that encourage the development of walkable and livable
580 villages, town centers, and downtowns, along with complementary policies and programs that
581 discourage the development of our remaining open spaces in the form of sprawl. Finally, we
582 need policies and programs that guide decisions to help us appropriately site renewable energy
583 projects and other components of the low-carbon energy infrastructure of the future so critical to
584 our success in achieving our climate goals, while avoiding and minimizing impacts to our lands
585 and waters.

586

587 This kind of work, developing policies and programs to protect our land, is not new to
588 Vermonters. We have a structure of governance, laws, policies, and programs that further many
589 of these goals already. Vermont has recognized that the maintenance of the ecological functions
590 of the land and all the amazing diversity of living creatures is critical to our future prosperity and
591 maintenance of our quality of life. This future depends upon protecting this landscape while

592 continuing to draw sustenance from it. We also know that there are gaps in this system and that
593 many people have not shared in the environmental, economic and other benefits associated with
594 our state’s lands, our green hills and silver waters. We also worry that many people who now
595 depend upon the land for their livelihood may get left behind.

596

597 To ensure a just transition to a system that fully realizes the potential of the land to sustain
598 Vermont’s communities into the future, we need an inclusive and transparent planning process
599 that uses science to inform our decisions and does not place the needs of any one group of
600 Vermonters over another. We also need to provide present and future landowners the information
601 and tools they need to help us meet our climate goals while still making a living. To achieve our
602 goals, we need to invite all Vermonters to understand, be part of and benefit from this transition.
603 Finally, we need a system of accountability that ensures that we are all abiding by the plans and
604 shared expectations that we establish for how we live on the land.

605

606 The following recommendations are intended to provide important steps towards this shared
607 vision for Vermont.

608

609 **KEY STRATEGIES AND ACTIONS**

610 **1. Promote and incentivize compact settlement and reduce forest fragmentation:**

611 Effective land use in Vermont requires understanding both sides of the land use coin –
612 Vermonters need walkable and livable communities with sufficient housing and places to
613 work and shop. We also need healthy forests, farms, fields, and waters. Our challenge is
614 to plan for and guide development to the places where we already have or want to
615 construct the necessary infrastructure for transportation, energy, communications, and
616 human services, and away from the open spaces so critical to both our ecological and
617 economic health. The Agriculture & Ecosystems subcommittee recognizes the value and
618 importance of investing in and planning for compact settlement as a key strategy for
619 conserving Vermont’s natural and working lands and waters. Given the cross-cutting
620 nature of compact settlement, which supports not only conservation, but also resilient,
621 affordable housing, efficient transportation networks that reduce emissions, and more, the

622 actions developed by this subcommittee have been captured in Section 15, under
 623 Compact Settlement.

624 a. Provide enhanced technical assistance and support to municipalities and regions,
 625 including outreach and education for landowners and community members, to
 626 develop and implement town plans intended to maintain forest blocks and connecting
 627 habitat as authorized by Act 171, and effective zoning and subdivision bylaws to
 628 maintain forest blocks and connecting habitat.

629 b. Develop required climate-based framework and/or criteria for state grant and
 630 regulatory programs.

631

Ltr.	Action and Timeline	Criteria
a.	Provide enhanced technical assistance and support to municipalities and regions, including outreach and education for landowners and community members, to develop and implement town plans intended to maintain forest blocks and connecting habitat as authorized by Act 171, and effective zoning and subdivision bylaws to maintain forest blocks and connecting habitat.	<i>Impact:</i> Local and regional plans, and landowner understanding of and compliance with those plans, are foundational to making informed land use decisions
		<i>Equity:</i> Transparent and inclusive planning processes are essential to ensuring that all Vermonters have a voice in determining an equitable balance of land uses
		<i>Cost-effectiveness:</i> Investing in planning, plan implementation, and plan communications and outreach are among the most cost-effective means of

		informing and guiding development decisions.
	Can be implemented in the near term	<i>Co-Benefits:</i> Making smart land use decisions, informed by science and robust public process will provide a full array of community and environmental benefits in addition to supporting our climate goals.
		<i>Technical Feasibility:</i> Yes
b.	Update Act 250 to include criteria that better address climate change, forest fragmentation and forest loss, to incentivize growth in the state’s designated centers and better address the specific challenges to working lands enterprises; revise Act 250 governance, staffing, public engagement, and the role of State Agency permits in the Act 250 process to create the enterprise capacity necessary to implement new climate related criteria and respond to future land use pressure from climate change and in-migration of climate refugees.	<i>Impact:</i> Improved land use decisions, both in the Act 250 permitting process, and also by developers and landowners as they contemplate significant land development projects.
		<i>Equity:</i> Reinforcing land use patterns that prioritize development in settled areas and protect open spaces and working lands has the dual benefit of providing housing in walkable and livable communities, while protecting open spaces and supporting rural communities. Improving the governance and decision-making process of Act 250 could increase the

		transparency, predictability, and effectiveness of the decision-making process, including making the citizen engagement and appeal process more accessible.
		<i>Cost Effectiveness:</i> These changes will require only modest state investment in the state agencies tasked with implementing Act 250, and will provide greater predictability and efficiency of decisions regarding land use development.
	Can be implemented in the near term	<i>Co-Benefits:</i> Making smart land use decisions, informed by science and robust public process will provide a full array of community and environmental benefits in addition to supporting our climate goals.
		<i>Technical Feasibility:</i> Yes
c.	Amend Act 250 to encourage housing development within certain state designated centers in order to incentivize compact, dense settlement in areas with adequate local land use laws and existing infrastructure, reducing development pressures on open spaces such as greenfields and forested locations.	<i>Impact:</i> See (b) above.
		<i>Equity:</i> See (b) above.
		<i>Cost Effectiveness:</i> See (b) above.
	Can be implemented in the near term	<i>Co-Benefits:</i> See (b) above.
		<i>Technical Feasibility:</i> See (b) above.
d.	Reduce regulation of development in downtowns and village centers to cluster	<i>Impact:</i> See (b) above.

	development. Address barriers to clustered development (i.e., Act 250, local zoning, aging infrastructure, etc.), provide statewide guidance, and incentivize housing in village centers and existing built areas to encourage development away from open fields and forests, and river corridors.	
		<i>Equity:</i> See (b) above.
		<i>Cost Effectiveness:</i> See (b) above.
	Can be implemented in the near term	<i>Co-Benefits:</i> See (b) above.
		<i>Technical Feasibility:</i> See (b) above.
e.	Incentivize, prioritize, and/or require development in growth areas and town centers to achieve compact settlement (must include investment in water/wastewater infrastructure planning and siting).	<i>Impact:</i> See (b) above.
		<i>Equity:</i> See (b) above.
		<i>Cost Effectiveness:</i> See (b) above.
	Can be implemented in the near term	<i>Co-Benefits:</i> See (b) above.
		<i>Technical Feasibility:</i> See (b) above.
f.	Develop required climate-based framework and/or criteria for state grant and regulatory programs.	<i>Impact:</i> State agencies make a multitude of decisions that affect the way in which Vermonters live on and interact with the land. Leveraging funding and regulatory programs through incorporating climate change criteria can enable a significant collective impact
		<i>Equity:</i> The climate-based framework should also include elements that address

		equity in order to ensure that the benefits of the decisions are equitably distributed, and that the process used to reach those decisions are inclusive and transparent
	Can be implemented in the near-term	<i>Cost Effectiveness:</i> The time and expense of developing and implementing the framework across state government will need additional funding from the General Assembly
		<i>Co-Benefits:</i> Due to the breadth and scope of state decisions impacting the environment, it is difficult to speak with precision about the nature of the co-benefits, but the framework should be designed with the goal of optimizing co-benefits
		<i>Technical Feasibility:</i> Yes

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2. Include biodiversity and resilience goals in the planning and management of natural and working lands (both public and private). Through careful study, monitoring, and planning, we can develop a shared understanding of how to optimize the many benefits of Vermont’s lands and waters while making significant progress towards our climate goals. These plans need the support of strong policies and programs that provide both restrictions and incentives to guide land use in order to be effective.

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a. Improve statewide forest planning efforts on State and Federal Lands, including development of an action plan by ANR for how State Lands will help accomplish Vermont Conservation Design targets by 2030 and 2050, and collaborate with the U.S. Forest Service (Green Mountain National Forest) planners for more unified forest planning across the state.

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- 645 b. Support efforts to research, educate about, and implement practices informed by
646 traditional ecological knowledge such as using fire to promote regeneration and
647 coppicing, where appropriate for Vermont’s forests and ecosystems.
- 648 c. Adopt a state policy of no net-loss of natural and working lands (including active and
649 passively managed forests, agricultural lands, and wetlands) accounting for the
650 transitions of lands within and between these conditions, with aspiration for a net
651 gain. (1) As part of this effort, track land use trends to quantify degree of no net-loss,
652 including aggregating data on subdivision, land transfers, and the loss and/or
653 fragmentation of forests, agricultural lands and wetlands to inform progress and state
654 policy. (2) Develop a strategy to increase the area of land in functioning wetlands,
655 with an initial focus on protecting and recovering the highest quality wetlands (“Class
656 I Wetlands” in ANR’s wetlands rules), consistent with the goal of ensuring no net
657 loss of other categories of natural and working lands.
- 658 d. Amend the Use Value Appraisal (UVA) program to allow for
659 (1) greater development of old forest structure as articulated in the targets of Vermont
660 Conservation Design;
661 (2) the enrollment of wildland reserves under the existing forestland category where
662 conditions and eligibility criteria are met as defined by Forest Parks and
663 Recreation, facilitating the development of old forest conditions through active
664 restoration and/or passive management as a means of enrollment in the Old Forest
665 ESTA (ecologically significant treatment area) category;
666 (3) privately held parcels with 'Forever Wild' easements on them, held by a qualified
667 501c(3), to be enrolled in the UVA Program in the Conservation Category; and
668 (4) the potential for, and implications of, developing a new category of enrollment for
669 land in UVA which allows for passive management modeled on the ‘open-space’
670 designation included in similar programs elsewhere in New England.
- 671 e. Identify lands needing conservation because they are in or adjacent to the built
672 environment that have large impact to human health, wellbeing, and equity.
- 673 f. Revise the Flood Hazard Area & River Corridor (FHARC) rule to incorporate
674 statewide jurisdiction and permitting authority for river corridors for all kinds of
675 development.

Ltr.	Action and Timeline	Criteria
a.	Improve statewide forest planning efforts on State and Federal Lands, including development of an action plan by ANR for how State Lands will help accomplish Vermont Conservation Design targets by 2030 and 2050, and collaborate with the U.S. Forest Service (Green Mountain National Forest) planners for more unified forest planning across the state.	<i>Impact:</i> Through taking actions to implement the Vermont Conservation Design goals, and coordinating with the U.S. Forest Service regarding forest management in the Green Mountain National Forest, Vermont will increase the amount of old forest, protect biodiversity, and work to advance resilience to climate change
		<i>Equity:</i> Taking action to protect the mix and range of principles reflected in the Vermont Conservation Design goals, and goals for the Green Mountain National Forest, and through engaging in a transparent and inclusive planning process, Vermont can ensure that all voices are heard and considered in the decisions affecting the predominant land use type in Vermont
		<i>Cost Effectiveness:</i> The State of Vermont will need additional capacity to fully support and realize the actions needed to meet Vermont Conservation Design goals
	Can be implemented in the near term	<i>Co-Benefits:</i> Protecting forests through an inclusive planning process will ensure that we optimize the ecological, and other intangible benefits of Vermont's forests
		<i>Technical Feasibility:</i> Yes

b.	Support efforts to research and implement practices informed by traditional ecological knowledge such as using fire to promote regeneration and coppicing, where appropriate for Vermont’s forests and ecosystems.	<i>Impact:</i> Increasing the use of forest management methods that reflect traditional ecological knowledge, and that mimic natural disturbance can have a variety of benefits and should be both encouraged and evaluated
		<i>Equity:</i> Using traditional ecological knowledge is both respectful of the Western Abenaki and Mohican traditions and provides an opportunity to learn from the experiences of the people who have inhabited and sustained the land in Vermont since time immemorial
		<i>Cost Effectiveness:</i> The state will need to invest in developing the experience and tools to use and understand these methods which have not been commonly or sustainably applied in the past two centuries in Vermont
	Can be implemented in the near term	<i>Co-Benefits:</i> The co-benefits of sustainably managed forests include the full array of benefits associated with keeping land open and usable In addition, there may be benefits not fully understood such as control of introduced species and pests, or improved regeneration of native species dependent upon natural disturbances.
		<i>Technical Feasibility:</i> Yes
c.	Adopt a state policy, and associated monitoring and enforcement, of no net-loss	<i>Impact:</i> Maintaining the amount of land in working or natural status is essential to

	<p>of natural and working lands (including active and passively managed forests, agricultural lands, and wetlands) accounting for the transitions of lands within and between these conditions, with aspiration for a net gain. (1) As part of this effort, track land use trends to quantify degree of no net-loss, including aggregating data on subdivision, land transfers, and the loss and/or fragmentation of forests, agricultural lands and wetlands to inform progress and state policy. (2) Develop a strategy to increase the area of land in functioning wetlands, with an initial focus on protecting and recovering the highest quality wetlands (“Class I Wetlands” in ANR’s wetlands rules), consistent with the goal of ensuring no net loss of other categories of natural and working lands.</p>	<p>ensuring that Vermont can sequester and store the carbon necessary to meet its overall climate goals and can steward those lands to optimize climate benefits. Restoring the natural functions of even greater amounts of land provides a significant opportunity to grow those climate benefits. The intent of this recommendation is to ensure that there is no net loss within each natural and working lands category. Further, the aspiration for a net gain in these categories is not intended to result in policies to shift land out of one natural and working lands category into another, but instead for policies that increase the areas of land in all categories. These policies, if successful, will mean that there is less land available for development and will require more effective and efficient use of lands that are already developed.</p>
		<p><i>Equity:</i> Through adopting this policy and taking actions to increase access to the benefits of natural and working lands for all, Vermont has an opportunity to address inequities in patterns of land use ownership and access</p>
		<p><i>Cost Effectiveness:</i> The costs of achieving this goal are associated with a number of related actions including land conservation and restoration programs,</p>

		<p>improved regulatory oversight, and additional landowner education and technical assistance. This recommendation should be read in parallel to the recommendation to encourage more walkable and livable communities. This development pattern, keeping open land open and focusing new housing and businesses in areas already developed, is more cost effective for municipal and state government, and for individuals and businesses, given the greater efficiencies associated with relying on existing infrastructure, and access to private and public services.</p>
	Can be implemented in the near to medium term.	<p><i>Co-Benefits:</i> Through adopting and taking actions to implement this policy, Vermont can realize a broad array of co-benefits beyond carbon storage and climate resilience, including clean water, wildlife habitat, biodiversity, public health and wellbeing, open space, and vibrant, prosperous rural communities</p>
		<p><i>Technical Feasibility:</i> Yes</p>
d.	<p>Amend the Use Value Appraisal (UVA) program to allow for</p> <p>(1) greater development of old forest structure as articulated in the targets of Vermont Conservation Design;</p>	<p><i>Impact:</i> The current use or UVA program has provided a substantial incentive over the past 50 years for private landowners to avoid developing their land, while supporting rural communities. Through adapting this program to consider the an array of public benefits including those</p>

	<p>(2) the enrollment of wildland reserves under the existing forestland category where conditions and eligibility criteria are met as defined by Forest Parks and Recreation, facilitating the development of old forest conditions through active restoration and/or passive management as a means of enrollment in the Old Forest ESTA (ecologically significant treatment area) category;</p> <p>(3) privately held parcels with 'Forever Wild' easements on them, held by a qualified 501c(3), to be enrolled in the UVA Program in the Conservation Category; and</p> <p>(4) the potential for, and implications of, developing a new category of enrollment for land in UVA which allows for passive management modeled on the 'open-space' designation included in similar programs elsewhere in New England.</p>	<p>relating to climate change, we will both incentivize management practices that continue to support rural communities dependent upon the production of food, timber, and fiber from the land, while enhancing non-extractive uses which also support rural communities such as outdoor recreation and wildlife viewing</p>
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		<p><i>Equity:</i> This recommendation most directly benefits current landowners and, given inequities in land ownership patterns, should be coupled with other policies that increase access to land ownership for people historically and disproportionately precluded from the same level of access to land ownership. We also need to consider the impacts of any changes on the people who depend upon forest management for their livelihood and enact policies to ensure that they can transition to this new vision for forest management.</p>
		<p><i>Cost Effectiveness:</i> Depending on how these changes are structured, there could be a significant increase in the state resources needed to sustain the investment in the benefits of incentivizing landowners to keep their land undeveloped</p>
	Can be implemented in the near to medium term.	<p><i>Co-Benefits:</i> Keeping land open and undeveloped brings with it the full panoply of environmental, economic, and community benefits associated with our working lands.</p>
		<p><i>Technical Feasibility:</i> Yes</p>
e.	Identify Natural and Working Lands (NWL) for conservation in or adjacent to the built environment that have large impact to human health, wellbeing, and equity.	<p><i>Impact:</i> In addition to the climate benefits of conserving more rural or remote lands that provide wildlife habitat and other purposes, due their remoteness from human populations, we will also realize</p>

		climate benefits from conserving lands that are closer to developed lands and the most at risk for being converted to housing and commercial development.
		<i>Equity:</i> There is a substantial equity benefit of increasing the access of people living in developed areas to open and natural lands
		<i>Cost Effectiveness:</i> This recommendation alone will not hold a significant cost, but will require a targeted application of other conservation strategies on this list that will have costs in terms of the expense of building state capacity to administer the programs, and to pay for land acquired or conserved through those programs
		<i>Co-Benefits:</i> While the benefits to wildlife may not be as substantial as protecting larger blocks of land remote from population centers and the built environment, there will be benefits to species of insects, including pollinators, amphibians, reptiles, birds and mammals that tolerate proximity to humans, as well as to migratory wildlife such as birds that need food and shelter. Further, some of the most imperiled, and unique, natural communities are located in areas of significant development pressure such as the Champlain Valley.
		<i>Technical Feasibility:</i> Yes

f.	Revise the Flood Hazard Area & River Corridor (FHARC) rule to incorporate statewide jurisdiction and permitting authority for river corridors for all kinds of development.	<p><i>Impact:</i> Functioning floodplains are one of Vermont’s greatest assets in responding to the increase in the frequency and intensity of flood events caused by climate change. Local governments frequently lack the expertise and resources to implement floodplain and river corridor protections at a watershed scale as needed to achieve healthy ecosystems and flood resilient communities. Enhanced statewide oversight of development within floodplains and river corridors is a critical step for Vermont to be able to realize the opportunity to better protect floodplains and river corridors from development, and allowing those intact systems to, in turn, protect communities from flood-related impacts</p>
		<p><i>Equity:</i> Communities that have been underserved and people in a lower income bracket frequently find housing in flood-prone areas. Regulating development in these areas both prevents housing from being developed where it is in harm’s way, protects lives, and also reduces downstream flood damage. Further, because under-resourced towns often are unable to appropriately regulate development and navigate cumbersome federal regulations through the National Flood Insurance Program, communities</p>

		less resourced to respond to flood-related disasters are more likely to allow development in those hazardous locations. This recommendation provides statewide consistency and equity in providing for Vermonters’ safety.
		<i>Cost Effectiveness:</i> The state will need to incur the cost of building the additional capacity necessary to administer an expanded regulatory program, including improved guidance and technical assistance. The state will also reduce the costs of responding to and recovering from flood-related disasters.
		<i>Co-Benefits:</i> Floodplain forests are an important carbon sink in addition to providing climate resilience, are critical to protect water quality, and frequently provide important community natural space
		<i>Technical Feasibility:</i> Yes

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3. Invest in strategic conservation in order to increase the pace of permanent conservation towards 30x30 targets (described in federal report “[Conserving and Restoring America the Beautiful](#)”), with Vermont Conservation Design acting as the guiding plan for prioritization of efforts. One of Vermont’s great achievements over the past fifty years has been its investment in permanent land conservation, such as protecting natural and working lands from development through public ownership or purchasing development rights to be held by land trusts. We recommend taking advantage of the strong programs and Vermont’s experience in doing this important work

687 by increasing our conservation investments, with special attention and focus to those
 688 lands that best serve our climate goals, while also addressing the longstanding inequities
 689 present in our current patterns of land ownership.

- 690 a. Expand use of the Water Infrastructure Sponsorship Program (WISPr) to improve
 691 accessibility and use for restoration projects.
- 692 b. Promote statewide landscape connectivity and forest blocks conservation planning
 693 through robust support of the Staying Connective Initiative and use of Vermont
 694 Conservation Design and TNC’s Resilient and Connected Landscape in state
 695 program prioritization frameworks.
- 696 c. Through permanent conservation coupled with both active and passive restoration
 697 efforts on both public and private lands, allow approximately 9% of Vermont's
 698 forest to become (or be maintained as) old forest, specifically targeting 15% of the
 699 matrix forest within the highest priority forest blocks identified in Vermont
 700 Conservation Design to achieve this condition.
- 701 d. Create a statewide environmental justice policy.
- 702 e. Per the formula in statute, fully fund the Vermont Housing & Conservation Board
 703 (VHCB); including \$3M for the Farm & Forest Viability Program and increase
 704 annual VHCB funding above the statutory amount by 15%, targeting those funds
 705 for implementation of conservation actions recommended in CAP, especially
 706 those related to forests.
- 707 f. Identify and protect climate refugia.
- 708 g. Use best available data and mapping to analyze existing portfolio of conserved
 709 agricultural lands to identify forest, wetland and natural community restoration
 710 opportunities and prioritize funding for these projects.
- 711 h. Maintain a suite of Farmland Conservation & Protection tools ranging from
 712 voluntary, regulatory and planning (e.g. easements, Act 250, planning, zoning).

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Ltr.	Action and Timeline	Criteria
a.	Expand use of the Water Infrastructure Sponsorship Program (WISPr) to improve	<i>Impact:</i> Through innovative financing, local governments can support ecological restoration that provides important

	accessibility and use for restoration projects.	ecosystem services and reduced flood damage, while also using methods that sequester and store carbon
		<i>Equity:</i> If implemented in a manner that promotes natural climate solutions and green infrastructure in developed areas, this program has the potential to benefit people in communities with less access to green or natural space. Given the current complexity and design of this program, accessibility for under-resourced municipalities is a concern, so revising the program would create greater access and ensure that public funding is being equitably dispersed.
		<i>Cost Effectiveness:</i> This program provides a cost-effective means of using bonds and state financing to support projects that are less expensive than traditional water infrastructure projects
	Can be implemented in the near term	<i>Co-Benefits:</i> Restoration projects funded through WISPr include benefits to wildlife, access to open and green space in communities, as well as a primary purpose to protect water quality
		<i>Technical Feasibility:</i> Yes
b.	Promote statewide landscape connectivity and forest blocks conservation planning through robust support of the Staying Connective Initiative and use of Vermont Conservation Design and TNC’s Resilient	<i>Impact:</i> Through strategically conserving forestland, Vermont will increase the amount of carbon sequestered and stored in our forests as well as allow for wildlife and plant movement across the landscape,

	and Connected Landscape in state program prioritization frameworks.	protect biodiversity, protect climate refugia, increase resilience to extreme weather and improve water quality.
		<i>Equity:</i> Taking action to conserve forests, and through engaging in a transparent and inclusive planning process, Vermont can ensure that all voices are heard and considered in the decisions affecting the predominant land use type in Vermont.
		<i>Cost Effectiveness:</i> The State of Vermont will need additional capacity to fully support and realize the actions needed to meet these conservation goals
	Can be implemented in the near term	<i>Co-Benefits:</i> Protecting forests through an inclusive planning process will ensure that we optimize the ecological, economic and other intangible benefits of Vermont's forests
		<i>Technical Feasibility:</i> Yes
c.	Through permanent conservation coupled with both active and passive restoration efforts on both public and private lands, allow approximately 9% of Vermont's forest to become (or be maintained as) old forest, specifically targeting 15% of the matrix forest within the highest priority forest blocks identified in Vermont Conservation Design to achieve this condition.	<i>Impact:</i> See 3.b. above
		<i>Equity:</i> See 3.b. above
		<i>Cost Effectiveness:</i> See 3.b. above

		<i>Co-Benefits:</i> See 3.b. above
		<i>Technical Feasibility:</i> See 3.b. above
d.	Create a statewide environmental justice policy.	<i>Impact:</i> By ensuring that the various programs proposed to address climate change in this report are evaluated in light of environmental and climate justice concerns, the state will ensure that a broader range of the public benefit from and support the actions taken under this plan, ensuring the long-term stability of programs that need to continue for decades in order to be effective.
		<i>Equity:</i> By definition, the creation of an environmental justice policy will further equity.
		<i>Cost Effectiveness:</i> The cost of this recommendation is the time and effort of state agency staff and leadership who will develop and adopt this policy across all relevant state programs. The benefits in terms of achieving a broader and more equitable distribution of the benefits of environmental protection and conservation will easily exceed those costs.
		<i>Co-Benefits:</i> A central benefit of pursuing environmental justice is the engagement of all Vermonters in the critical work of taking actions to address climate change.
		<i>Technical Feasibility:</i> Yes.

e.	Per the formula in statute, fully fund the Vermont Housing & Conservation Board (VHCB); including \$3M for the Farm & Forest Viability Program and increase annual VHCB funding above the statutory amount by 15%, targeting those funds for implementation of conservation actions recommended in CAP, especially those related to forests.	<i>Impact:</i> Through conserving forest and farmland, Vermont will increase the amount of carbon sequestered and stored in our forests and farms, as well as an array of other environmental and economic benefits described above, and prevent the conversion of those lands to development, with the added benefit of preventing sprawl and carbon intensive development patterns and creating the space for the natural and working lands economy and those that depend on it to continue to steward their land sustainably.
		<i>Equity:</i> Taking action to conserve forests and farms, and through engaging in a transparent and inclusive public funding process, Vermont can ensure that all voices are heard and considered in the decisions affecting the working and natural lands in Vermont
		<i>Cost Effectiveness:</i> The State of Vermont will need to increase funding for this purpose over the long-term, as well as to invest in building the additional state and non-profit land trust capacity to fully support and realize the actions needed to meet these conservation goals
		<i>Co-Benefits:</i> Protecting forests and farms will ensure that we optimize the ecological, economic and other intangible benefits of Vermont’s forests

		<i>Technical Feasibility: Yes</i>
f.	Identify and protect climate refugia.	<i>Impact:</i> Vermont’s plants and wildlife will be impacted by climate change, as will plants and wildlife throughout the region and the nation. Protecting natural and open working lands and waters in Vermont may be one of the only hopes for many species
		<i>Equity:</i> People need the same benefits provided by open and natural lands as plants and wildlife – increasing investments in the places our wild flora and fauna need to thrive is an investment in the same places that people need to thrive
		<i>Cost Effectiveness:</i> The cost of implementing this action is tied to the other related proposed actions to conserve and protect natural lands
		<i>Co-Benefits:</i> The ecosystem services of the land we protect as climate refugia will provide community benefits such non-material benefits like outdoor recreation, clean water, and flood resilience
		<i>Technical Feasibility: Yes</i>
g.	Use best available data and mapping to analyze existing portfolio of conserved agricultural lands to identify forest, wetland and natural community restoration opportunities and prioritize funding for these projects	<i>Impact:</i> Through careful analysis and prioritization, Vermont will be able to optimize the use of public funds to have the greatest impact at a landscape scale

		<i>Equity:</i> Taking action to prioritize the land we conserve will provide an important opportunity to also consider historic inequities related to access to open and natural spaces for underserved communities.
		<i>Cost Effectiveness:</i> The cost of carefully analyzing and evaluating data about land conservation will be outweighed by the ability to focus public resources where they will have the greatest impact
		<i>Co-Benefits:</i> Ensuring land conservation programs to have the greatest climate benefits will also ensure that we optimize the ecological, economic and other intangible benefits of Vermont’s natural and working lands
		<i>Technical Feasibility:</i> Yes
h.	Maintain a suite of Farmland Conservation & Protection tools ranging from voluntary, regulatory and planning (e.g. easements, Act 250, planning, zoning).	<i>Impact:</i> See 3.e. above
		<i>Equity:</i> See 3.e. above
		<i>Cost Effectiveness:</i> See 3.e. above
		<i>Co-Benefits:</i> See 3.e. above
		<i>Technical Feasibility:</i> See 3.e. above

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- 4. Increase technical assistance, capacity, education, and resources to support private farm and forest land owners in addressing the trends relating to intergenerational transfer.** The vast majority of Vermont’s natural and working lands are privately owned.

719 Currently, Vermont is facing a significant demographic shift in land ownership, including
 720 working forests and farms, with the risk of a concurrent shift in the use of these lands
 721 from forests and farms to development. Providing present and future landowners with the
 722 tools to manage this transition will help ensure that we protect our lands and waters and
 723 that we proactively and appropriately resource the next generation of forest and farm
 724 landowners and managers.

- 725 a. Support forestland succession/estate planning efforts to reduce forest parcelization
 726 and fragmentation through implementation of the Act 171 'Intergenerational
 727 Transfer of Forestland Working Group Recommendations' of 2017.
- 728 b. Develop and implement a farmer retirement program to facilitate the transfer of
 729 intact farmland.

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Ltr.	Action and Timeline	Criteria
a.	Support forestland succession/estate planning efforts to reduce forest parcelization and fragmentation through implementation of the Act 171 'Intergenerational Transfer of Forestland Working Group Recommendations' of 2017.	<i>Impact:</i> Keeping forests as forests, with all of the ecosystem services that forests provide including climate mitigation and adaptation benefits associated with forests, requires that the many and private forest landowners have access to the technical and legal resources necessary to keep those forest parcels intact
		<i>Equity:</i> Managing through this demographic shift in land ownership patterns creates opportunities to enhance the access of people traditionally excluded from land ownership in Vermont
		<i>Cost Effectiveness:</i> Support and technical assistance to private landowners requires resources and capacity. The state can

		invest in expanding existing programs within FPR, VHCB and other non-profit organizations to provide these services at a reasonable cost, with significant public benefits
	Can be implemented in the near term	<i>Co-Benefits:</i> At the same time that this program provides helpful information to landowners about succession planning, these interactions will build trust and the opportunity to educate landowners about the best conservation practices to manage forests sustainably
		<i>Technical Feasibility:</i> Yes
b.	Develop and implement a farmer retirement program to facilitate the transfer of intact farmland	<i>Impact:</i> Keeping farms as farms, with all of the ecosystem services, including climate mitigation and adaptation benefits, associated with farms, requires that farmers have access to the technical and legal resources necessary to keep their farms from being sold for development
		<i>Equity:</i> Managing through this demographic shift in land ownership patterns creates opportunities to enhance the access of people traditionally excluded from land ownership opportunities in Vermont
		<i>Cost Effectiveness:</i> Support and technical assistance to farmers requires resources and capacity. The state can invest in expanding existing programs within AAFM, VHCB and other non-profit

		organizations to provide these services at a reasonable cost, with significant public benefits
		<i>Co-Benefits:</i> At the same time that this program provides helpful information to farmers about succession planning, these interactions will build trust and the opportunity to educate landowners about the best conservation practices to manage these lands sustainably
		<i>Technical Feasibility:</i> Yes

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5. Avoid, minimize, and mitigate the negative impacts of renewable energy generation

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on natural and working lands. Vermont’s transition to a future in which renewable

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energy is a major source of energy is necessary to achieve our greenhouse emission

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goals. At the same time, to date, that transition has been a bumpy one, with significant

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controversies over the places if and where biomass, wind, hydropower, and solar projects

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will be located, and a long-standing controversy over the use of electricity generated from

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nuclear and from hydro outside the state, such as in northern Quebec on Indigenous land.

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Critically, new renewable generation infrastructure must avoid and minimize to the

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greatest extent possible impacts on Vermont’s forests, which support a range of

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ecological services critical for climate resilience and adaptation and provide the single

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largest source of carbon sequestration and storage in the state. Analysis conducted for

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the VCC by Cadmus indicates that Vermont has seen a steady decline in sequestration. If

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that historic trend continues the state will not meet the GWSA’s 2050 net zero target,

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even if the 2025 and 2030 emission reduction targets are achieved. The Cadmus analysis

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indicates Vermont must maintain sequestration at or above projected 2035 levels in order

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to be net zero by 2050 – since forests provide by far the greatest share of the state’s

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sequestration, all efforts should be made to locate new renewable energy infrastructure

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outside of forests and minimize tree clearing associated with new plants. To achieve this

753 goal, we must do the heavy lifting of engaging at the local, state, and regional level to
 754 establish a process, guidelines, and expectations for how we plan for, design, and
 755 transition to a low-carbon energy future, while simultaneously reducing impacts to our
 756 natural and working lands and waters. Work by Regional Planning Commissions to
 757 inventory potential renewable energy sites as part of their Regional Enhanced Energy
 758 Plans is an important step. We need to evaluate the effectiveness of these planning
 759 efforts. In addition, an underutilized strategy is to use a combination of siting
 760 requirements and incentives to encourage the development of renewable energy projects
 761 in areas that are already developed, like buildings and parking lots.

- 762 a. Evaluate the effectiveness of the program of Regional Enhanced Energy Plans
 763 and the application of these plans to decisions by the PUC in terms of their ability
 764 to direct the siting of renewable energy projects in a manner that avoids the
 765 conversion of working and natural lands and the loss of the carbon storage and
 766 sequestration, climate resilience, and other co-benefits that are associated with
 767 those lands. If the process of developing and implementing the system of
 768 Regional Enhanced Energy Plans is not achieving this goal, then adjust the laws
 769 and regulations applicable to renewable energy siting to ensure the effectiveness
 770 of the plans.
- 771 b. Incentivize or carefully consider mandating solar and wind capacity on new
 772 buildings as well as in previously-disturbed/developed areas and avoid and
 773 minimize forest clearing for renewables through incentives and other siting
 774 polices, rules, and regulations.
- 775 c. Consider the need for incentives to site new renewable energy generation on
 776 parking lots, rooftops, and already altered locations. And discourage and penalize
 777 siting of new renewable energy generation on intact ecosystems, forests, and
 778 natural land.

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Ltr.	Action and Timeline	Criteria
a.	Evaluate the effectiveness of the program of Regional Enhanced Energy Plans and the application of these plans to decisions	<i>Impact:</i> Engaging local governments at a regional level to evaluate and prioritize locations for siting renewable energy

	<p>by the PUC in terms of their ability to direct the siting of renewable energy projects in a manner that avoids the conversion of working and natural lands and the loss of the carbon storage and sequestration, climate resilience, and other co-benefits that are associated with those lands. If the process of developing and implementing the system of Regional Enhanced Energy Plans is not achieving this goal, then adjust the laws and regulations applicable to renewable energy siting to ensure the effectiveness of the plans.</p>	<p>projects will provide greater clarity for renewable energy project developers and reduce conflicts when projects are proposed. An effective planning process will also provide useful information to assist decision-makers ensure that renewable energy projects are consistent with state, regional and local goals for the conservation of natural and working lands.</p>
		<p><i>Equity:</i> Taking action to site renewable energy projects in a manner that avoids or minimizes the impact on natural and working lands, and through engaging in a transparent and inclusive planning process, Vermont can ensure that all voices are heard and considered in the decisions affecting land use decisions in Vermont.</p>
		<p><i>Cost-effectiveness:</i> Community engagement and planning requires resources for regional planning commissions, local governments and state agencies including ANR, PSD and PUC. At the same time, resolving conflicts in advance through a planning process can</p>

		avoid the costs of delay and conflict associated with contested siting decisions.
		<i>Co-benefits:</i> Vermont needs to grow the renewable energy capacity in the state significantly in order to meet greenhouse gas emissions targets. Vermont also needs to invest in the conservation lands in order to maximize carbon storage and adapt to the impacts of climate change. The balancing of these two climate priorities will continue to increase pressure on local and state agencies to make decisions that are informed both by community interests and by an accurate assessment of the impact that those projects could have on natural and working lands if not carefully sited.
		<i>Technical Feasibility:</i> Yes.
b.	Incentivize or mandate solar and wind capacity on new buildings as well as in previously-disturbed/developed areas and avoid and minimize forest clearing for renewables through incentives and other siting polices, rules, and regulations.	<i>Impact:</i> Increasing the amount of renewable energy developed in harder-to-develop locations will result in reduced market pressures to develop those projects on open and undeveloped land that is providing important ecosystem services, including the storage and sequestration of carbon
		<i>Equity:</i> Reducing barriers to accessing renewable energy resources in more intensively developed areas, including multi-family housing, will extend the

		benefits of renewable energy to people who might not otherwise have access
		<i>Cost Effectiveness:</i> A central barrier to the development of renewable energy projects in already developed areas are the costs. The state will have to consider a combination of greater incentives for renewable energy installation, and increased restrictions on projects on undeveloped land, both of which will have real economic costs. At the same time, extending the benefits of renewable energy to more people in more densely populated areas has the potential to become more efficient and effective once the necessary investments in technology and infrastructure are made
	Can be implemented in the near term	<i>Co-Benefits:</i> Keeping natural and working lands open and undeveloped provide a much greater degree of environmental co-benefits including clean water and wildlife habitat than when developed
		<i>Technical Feasibility:</i> Yes.
c.	Require incentives to site new renewable energy generation on parking lots, rooftops, and already altered locations. And discourage and penalize siting of new renewable energy generation on intact ecosystems, forests, and natural land.	<i>Impact:</i> See 5.b. above.
		<i>Equity:</i> See 5.b. above.
		<i>Cost Effectiveness:</i> See 5.b. above.

		<i>Co-Benefits: See 5.b. above.</i>
		<i>Technical Feasibility: Yes.</i>

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