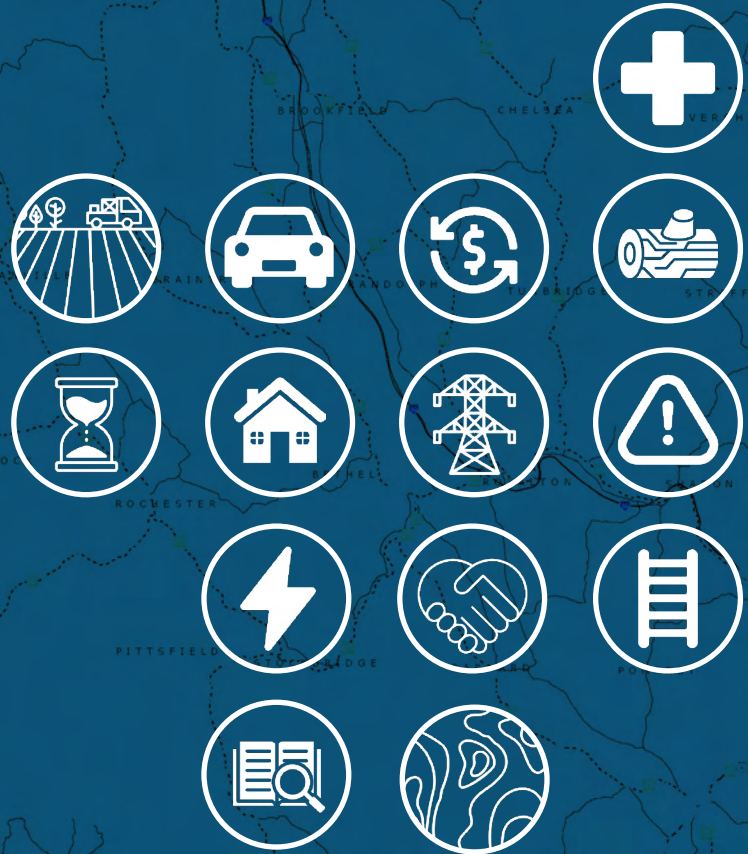


# REGIONAL PLAN



Adopted 2/26/25

# PLAN



# 2025



# TWO RIVERS-OTTAUQUECHEE REGIONAL PLAN

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**ADOPTED 2/26/2025**



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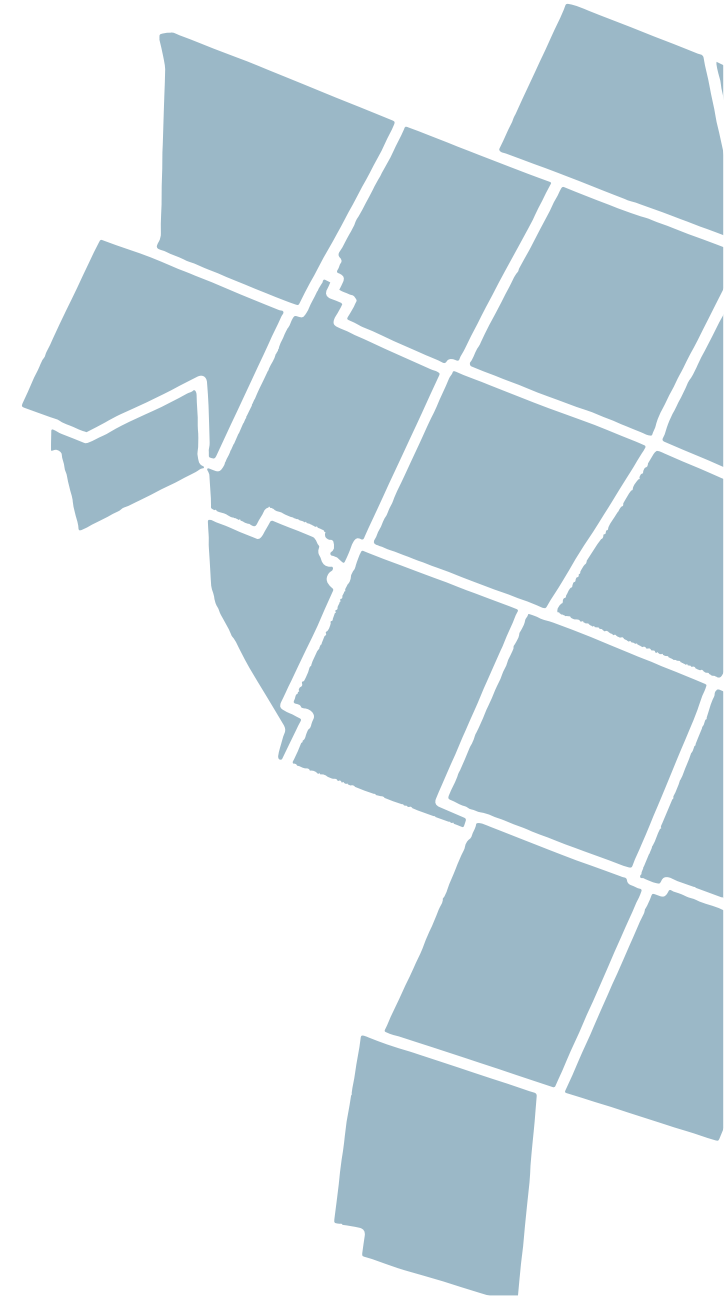
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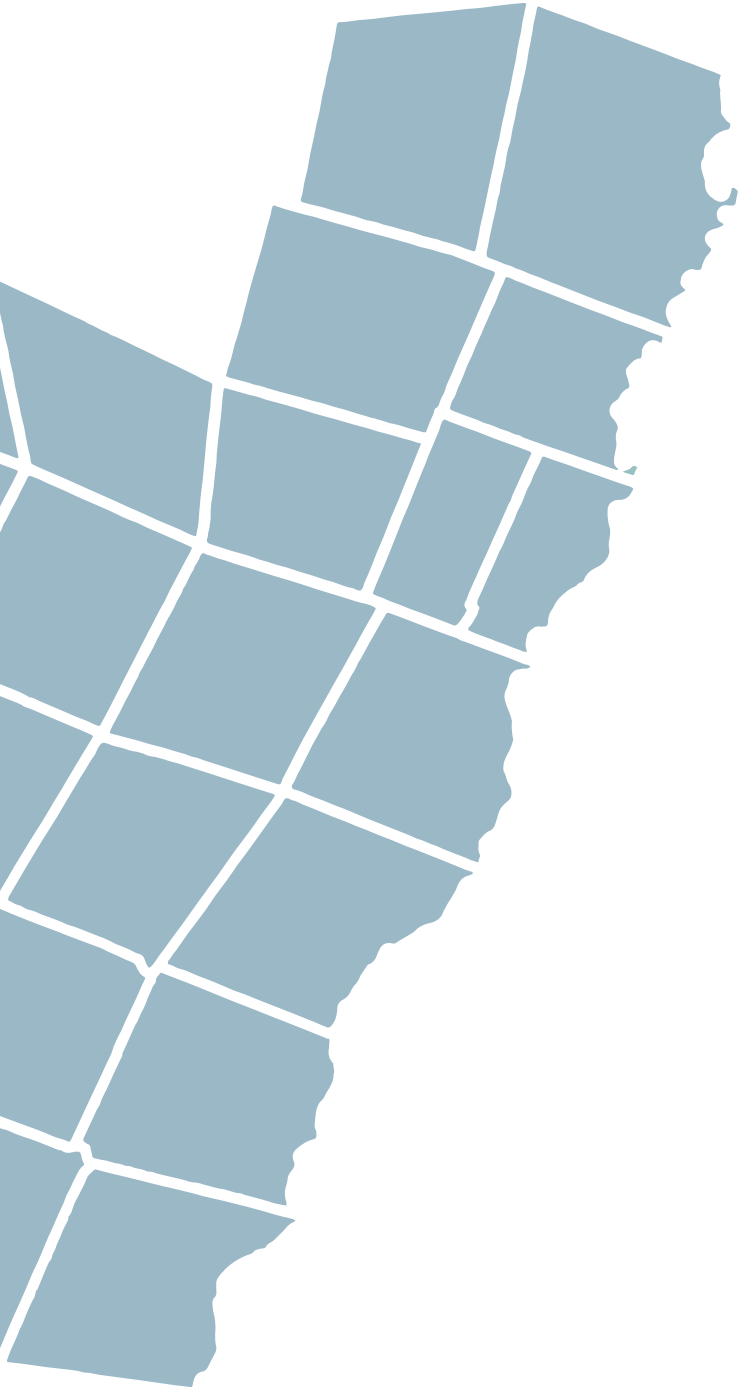
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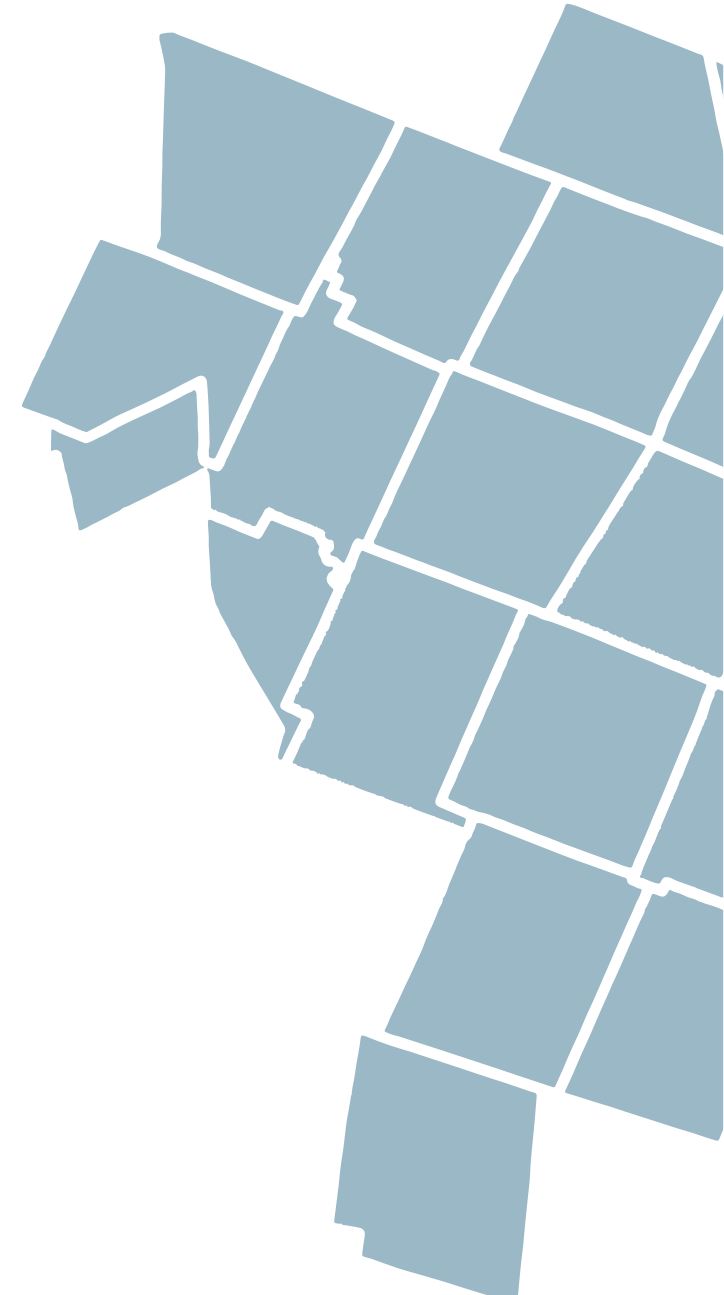




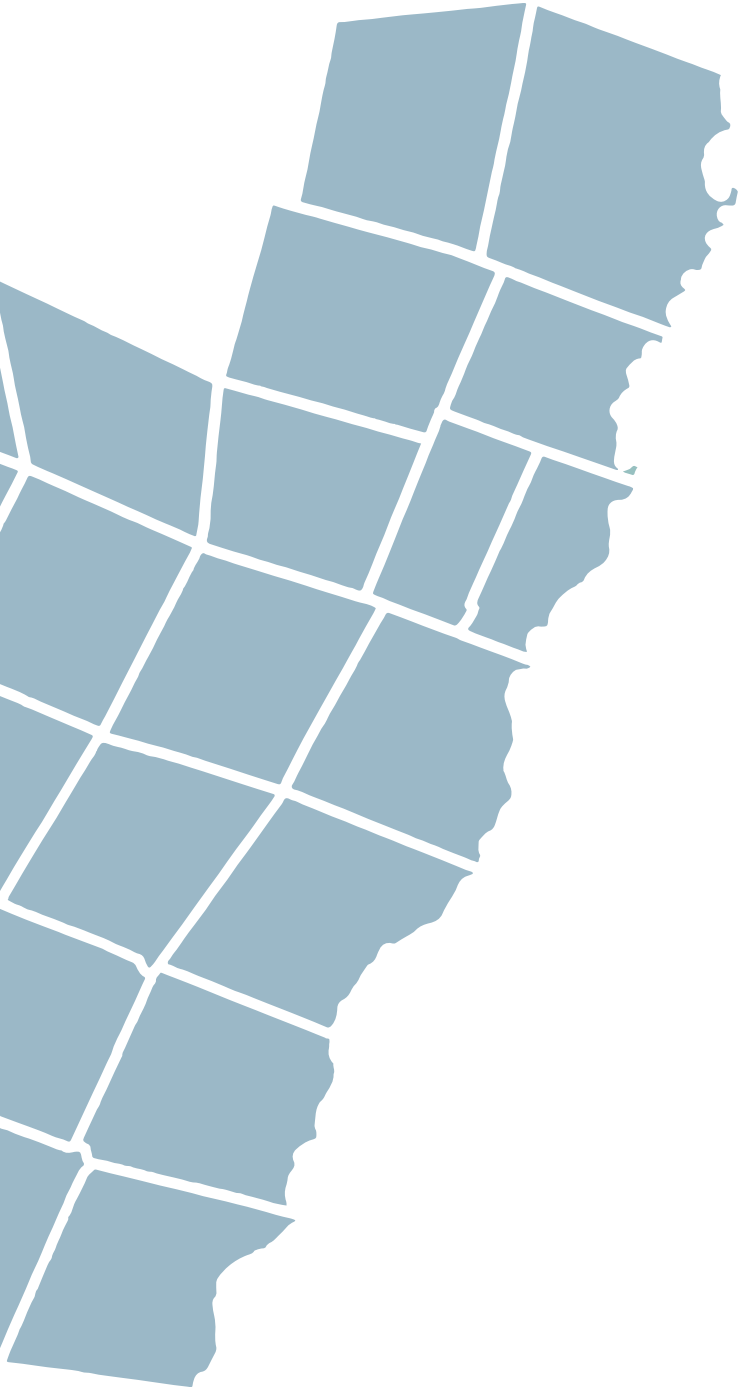
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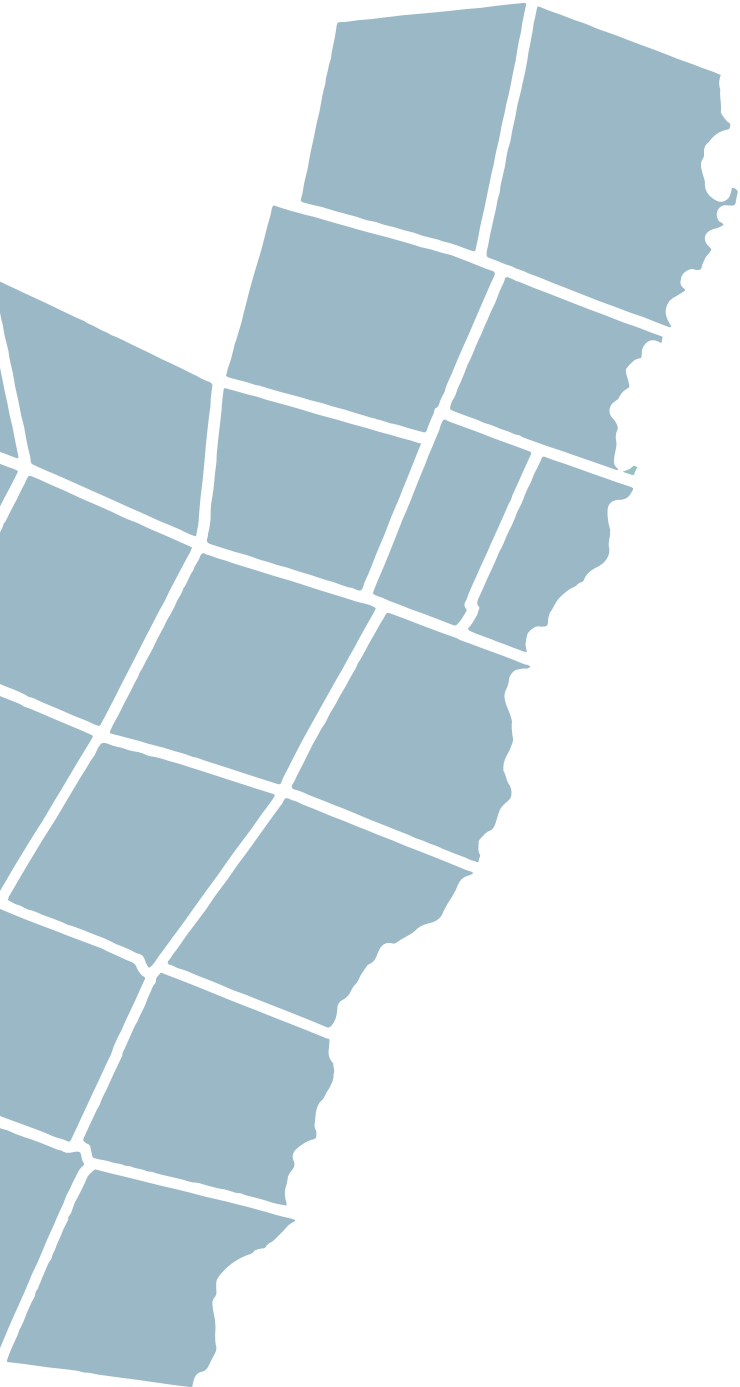
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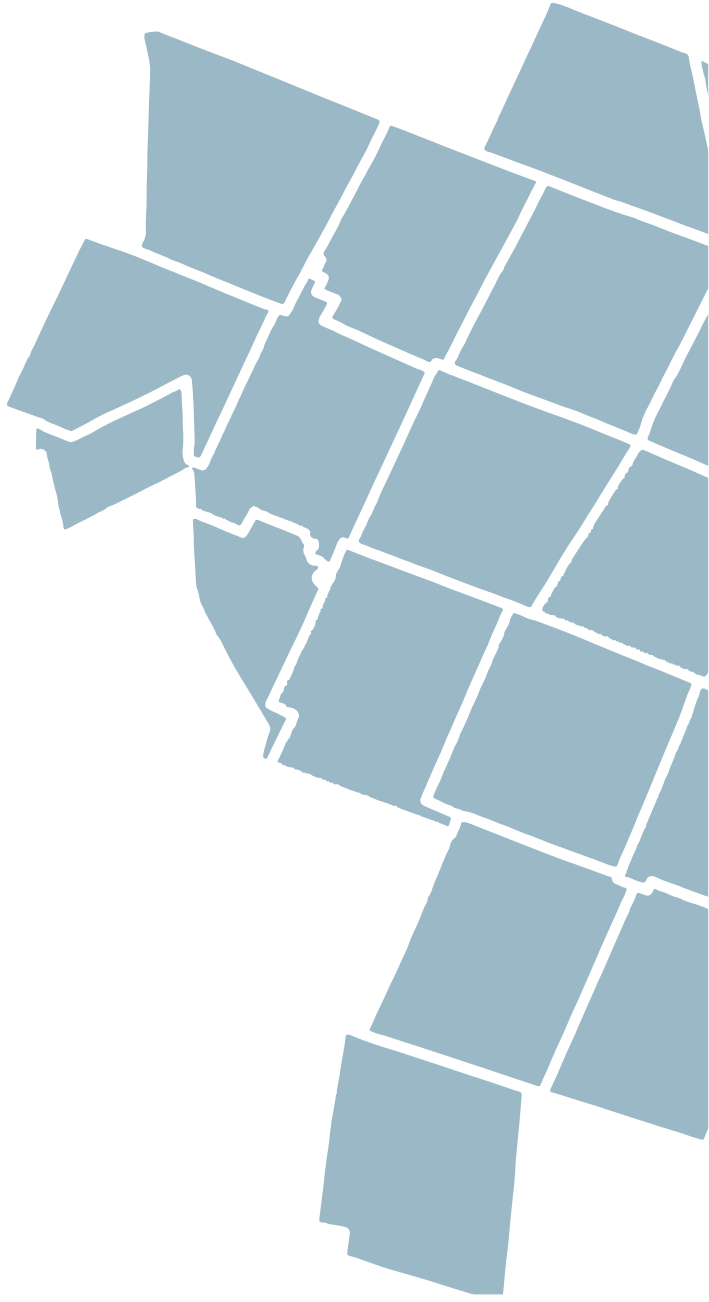
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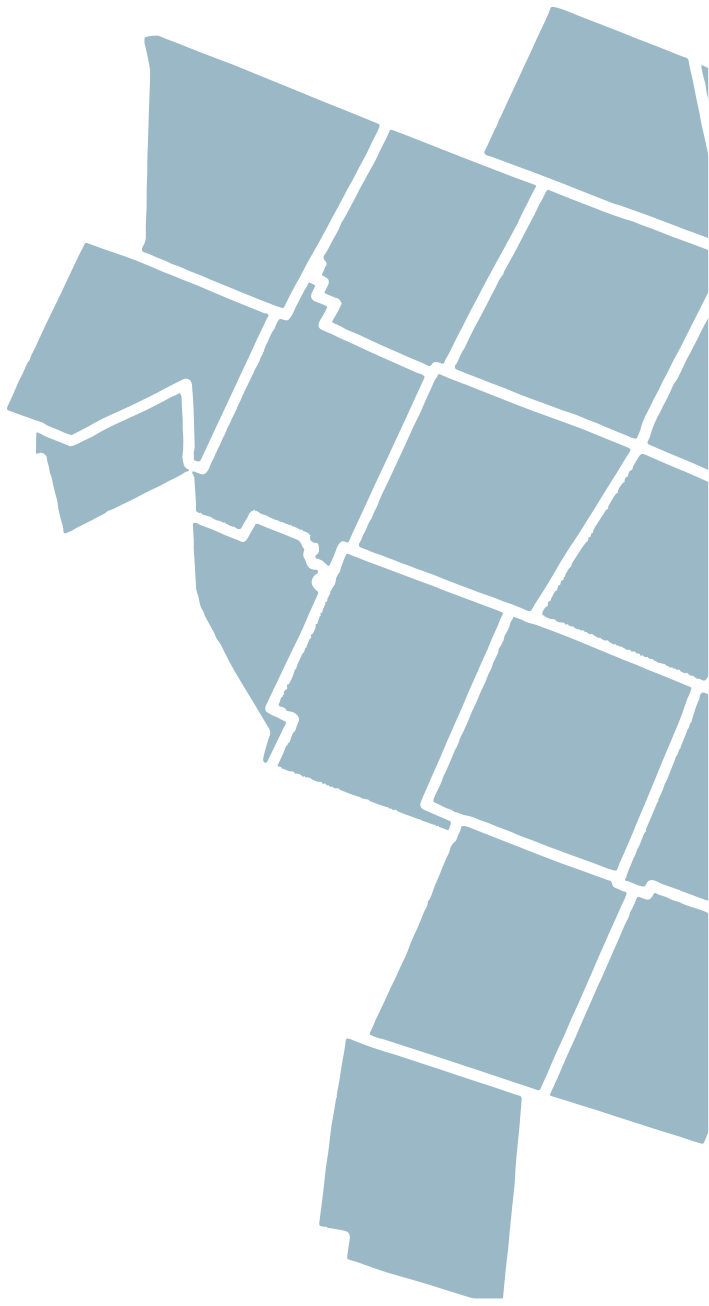
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# 01 | Introduction

Bethel | © John Knox

## A. TRORC and This Plan

This Regional Plan has been created by the Two Rivers-Ottawquechee Regional Commission ([TRORC](#)<sup>1</sup>), which is a regional planning commission covering thirty municipalities in east-central Vermont ([the Region](#)<sup>2</sup>). This Plan is a condensed understanding of conditions of the people and place in this area of Vermont, the context that connects our Region to surrounding areas and the greater world, a vision for what we want to achieve in the next eight years, and a set of policies and actions that move us toward that vision. It is not a static or inflexible document. TRORC, with the involvement and participation of

the public, will periodically review and update this Plan to reflect new conditions and needs.

TRORC is governed by [a board of representatives](#)<sup>3</sup>, each appointed by the respective selectboards from each of our member towns. This Plan has been adopted by that board after a series of informal working sessions, State agency reviews, public hearings and Board meetings. TRORC has a set of [statutory duties](#)<sup>4</sup>, but the simplest way to think of TRORC is that we help towns and the state achieve desired outcomes. The first step of that process, and one of our major statutory duties is creating this Plan.

## B. Plan Format

TRORC is required by [State law](#)<sup>5</sup> to prepare and adopt the Regional Plan.

All regional plans (and town plans) are required to be consistent with the [state planning goals](#)<sup>6</sup>. These goals don't cover *how* Vermont will achieve them, but rather what it wants to achieve. Vermont wants to have strong community core areas, protect fields and forests, keep waters clean, have a strong economy (with specific emphasis on farming and forestry), improve public health, keep infrastructure in good shape, enable multiple ways to travel (from walking to trains), use energy more





wisely and with less impact, provide housing for all safely and affordably, and other several other desires.

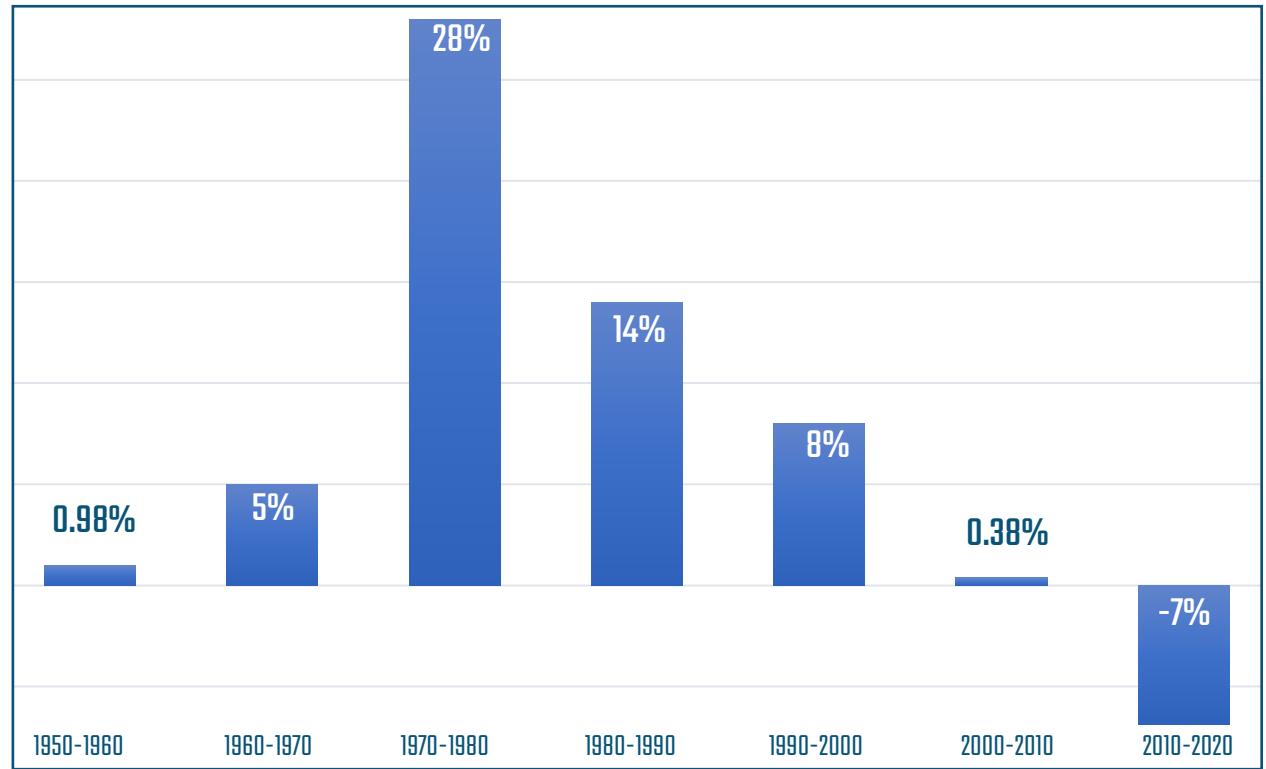
Regional and local planning must take place within the outlines of these goals, and tend to get progressively more detailed moving from the regional to the local level. This Plan must contain at a minimum [certain elements](#)<sup>7</sup> or sections dealing with land use, transportation, housing, economic development, energy, utilities and facilities, natural resources, flood resiliency, and implementation measures. Furthermore, the Plan must address how it relates to the development trends, needs, plans, and regional plans of adjacent municipalities and regions. The Regional Plan’s maps are also integral to this Plan.

In general, each of the required elements is addressed in a chapter of the Plan. There are two large topic areas that this Plan does not cover as a separate chapter, but that are addressed in parts woven throughout the plan – climate change and demographics.

The ever-growing calamity of climate change is upon us and must be planned for, but not as a single thing. It comes in heat waves, or floods, or species’ habitat shifting. Therefore, this Plan primarily deals with climate change in its chapters on emergency management and flood resiliency. Actions to avoid furthering even worse climate change are really actions to use energy and generate it differently, and so that shows up in our transportation, energy, and housing chapters.

The other huge driver of change in the Region is

**Figure 1-1: Rate of Population Change in Two Rivers-Ottauquechee (TRO) Towns**



our demographics – as a Region and state we are unusually old and getting older. Less kids result in school closings. An aging workforce threatens the viability of employers, and those same aging people place demands on our services and need different kinds of homes in different places. We are also overwhelmingly white in a nation that is less and less so. Lacking diversity threatens our economy. These issues play out in our policies in our chapters on health, education, economic development, and housing.

This Plan, by its nature, is broken down

into subject chapters, but these overlap. A recommendation on insulating homes is both a housing and energy solution. Sidewalks are transportation facilities and a precursor to healthy living. Preserving stretches of forest serves both economic interests in tourism and forest products, and natural resource needs for species and aquifer recharge.

The final chapter of the Plan discusses the various means and methods available to TRORC to implement goals and policies. Rough priorities, times, and costs for all actions are in the





implementation matrix. Additional funding for implementing Plan policies for all areas of the Plan is necessary.

### C. Plan Development and Adoption

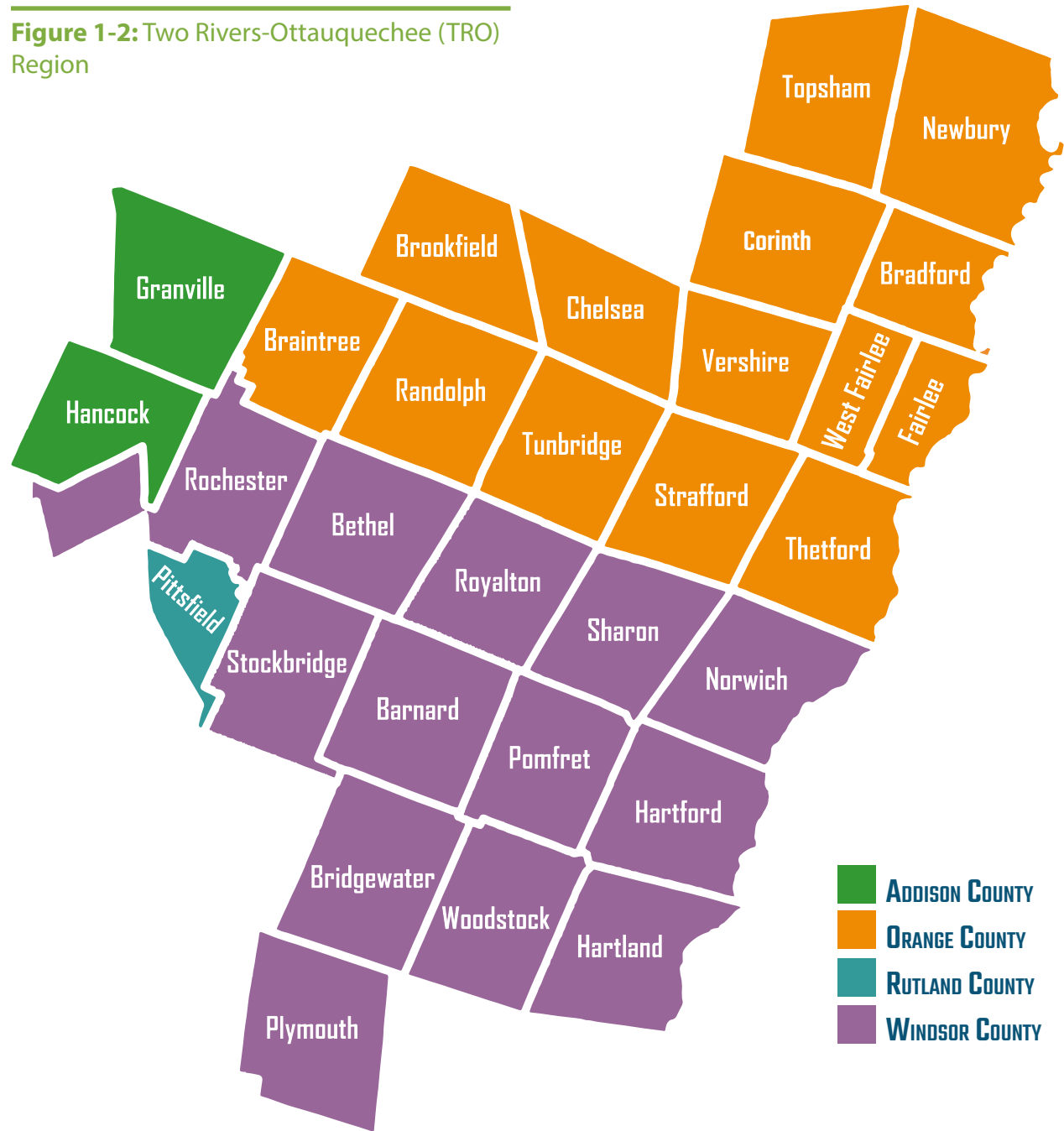
The Plan went through a lengthy [public process](#)<sup>8</sup> before adoption, including hearings, mailings to all member towns, and discussion at our Board meetings. This Regional Plan will expire eight years from its effective date in order for it to reflect changes going on in the world. However, TRORC’s practice has been to amend plans every three years or so to more quickly address emerging issues and trends.

### D. Use of the Plan

This Plan has many uses, most of them non-binding, because it is a *plan*. The Plan has goals, policies, and recommendations for action. A **goal** represents the desired future state of affairs that this Plan is intended to achieve, or a current state to maintain. A **policy** is an expression of how to meet a goal. A **recommendation** is a means by which to implement a policy through an action by a person or group. Actions for TRORC to do provide us guidance in structuring our work program. Actions for others are advisory.

The policies of the Plan and descriptions of future land use areas are generally *permissive*. For example, if the Plan states that warehouses are appropriate in an area, one can, but does not have to, build warehouses. Like most plans, this Plan is advisory, an idea of where we want to go, and consequently it uses advisory words such as

**Figure 1-2: Two Rivers-Ottauquechee (TRO) Region**

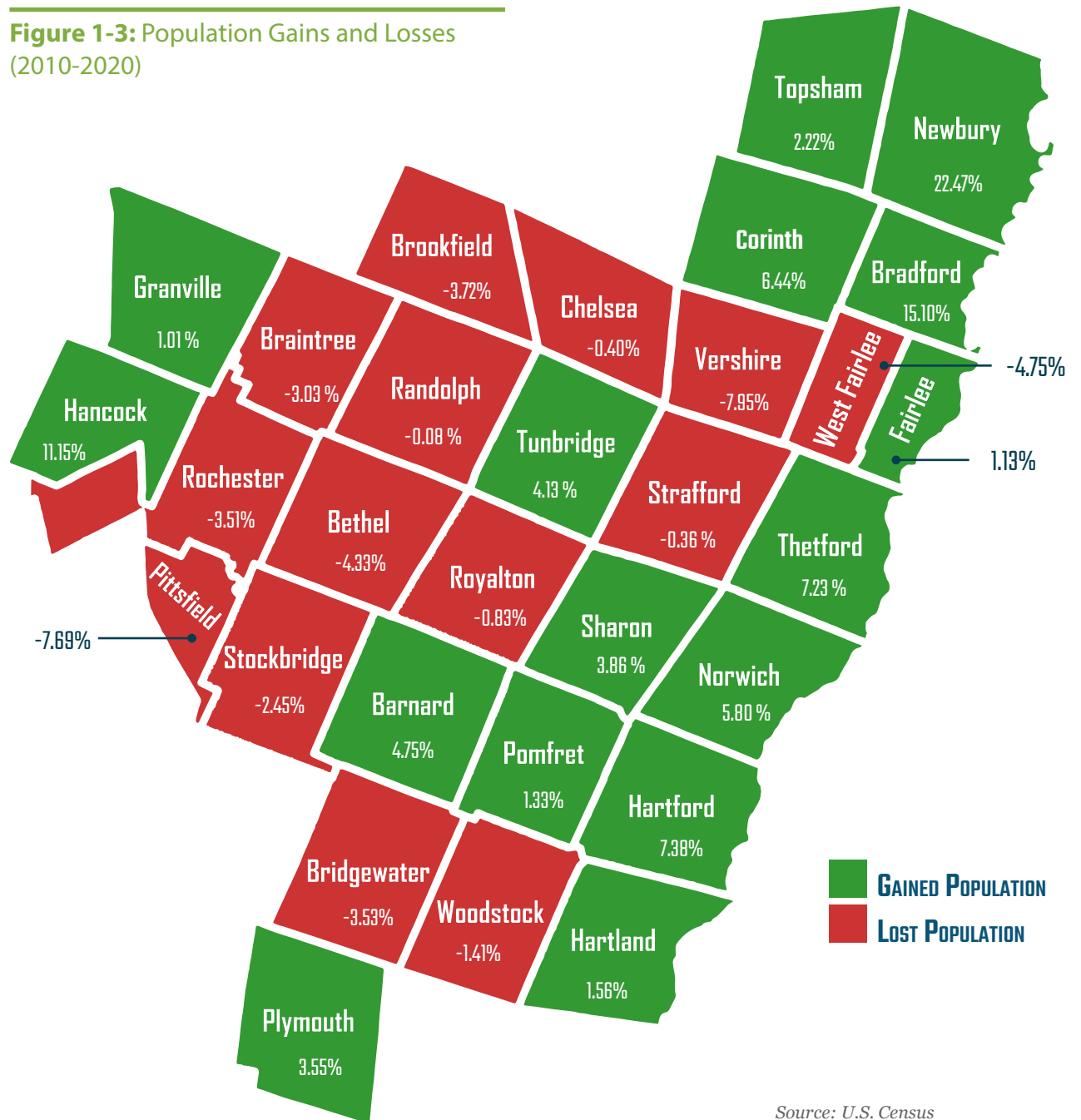


“should” and “encourage.” Where this Plan intends to be *prescriptive*, creating a mandatory limitation, it strives to be very clear on what is required by using words such as “shall” or “must.” All goals, policies, and recommendations of the Plan are clearly titled as such, while background materials lay the foundation for these but are not meant to be construed as policies. The policies contained in this Plan are advisory unless stated as mandatory. Even when this Plan uses mandatory language, conformance is only required in very limited cases, primarily Act 250.

The Plan contains many recommendations to ourselves about TRORC actions, serving as a reminder that focuses our projects. It also has recommendations about what towns, the state, and even the federal government *should* do that would bring the goals of this Plan to fruition. It is a regional policy document that exists on its own, but is also meant to inform local and state policy. This Plan has several maps that accompany the text, and the Future Land Use Map is the most important, as it is both a regional voice at what kinds of development should (and in a few cases must) go where, and a guide for more refined local planning. Lacking county government, it can take the place of what might be a county comprehensive plan, in other parts of the country, and can be used in federal planning efforts such as management of national forests or in federal dam relicensing.

Regional planning takes place above the town level for the same reason that town planning takes place above individual lands: because lands, roads, economies, waters and many other systems are connected. They simply do not function solely at

**Figure 1-3: Population Gains and Losses (2010-2020)**



Source: U.S. Census



a town level. What a town does next to a highway affects all the users of that highway, not just those that live in the town. What a town does that affects a river plays out upstream and downstream. If farms are developed, regional abilities to grow food change. If a forest is cut down species that range over many towns are affected.

No specific goal in the Plan shall be construed or applied in isolation from the other goals of the Plan. Each mandatory policy, however, does stand alone and must be followed in regulatory proceedings. Also, it should be recognized that there can be both redundancy and contradictions between goals. This does not reflect a failure to consider the full implications of each, but simply acknowledges the fact that the articulation of regional goals inevitably involves competing interests and compromise.

## E. Use of the Plan in Regulatory Proceedings

### Act 250

Act 250 permits are required for all major subdivision and development projects in Vermont. Prior to granting approval, a [District Environmental Commission](#)<sup>9</sup> must find that the proposed subdivision or development satisfies certain criteria or thresholds including water and air quality, erosion control, public services, wildlife habitats, aesthetics, public investments, historical preservation, and traffic.

In all cases, the District Environmental Commission is required to make findings that

the proposed development is in conformance with the goals and policies of town plans and this Plan before such a development can move forward. Though TRORC may participate in Act 250 cases, this Plan speaks for itself. It is not fair to developers to make up rules on the spot, and so decisions about what the state, region, or town want have to be made in advance. That is the essence of planning.

While the intent of this Plan is to be coordinated and reasonably consistent with local plans and vice versa, situations may arise where relevant goals or policies of the Plan and a town plan are in conflict. In Act 250 proceedings, the Environmental Court or District Environmental Commission is faced with determining which portions of a local or Regional Plan apply, and municipal conformance will override regional conformance in such cases, except for when projects defined by the TRORC are found by the District Environmental Commission as having “substantial regional impact”, in which case, the project must be in accord with the Regional Plan (see chapter 13 for definition of substantial regional impact). For more information about checking the compatibility between municipal and regional plans, please refer to our webpage on what it means for a town plan to be approved by a Regional Planning Commission ([link here](#)<sup>10</sup>).

Act 250 is entirely separate from any local zoning processes. Getting an Act 250 permit does not mean a project will get a local zoning permit, or vice versa, and the conditions for these separate permits are not required to be compatible. A proposed project with a valid local permit may

### Statutory definition from Title 24 Section 4302

All town plans and regional plans are required to be “consistent” with the state planning goals. Towns seeking regional approval must also have plans that are “compatible” with the regional plan. The law defines these two terms as follows:

- “Consistent with the goals” requires substantial progress toward attainment of the goals established in this section, unless the planning body determines that a particular goal is not relevant or attainable. If such a determination is made, the planning body shall identify the goal in the plan and describe the situation, explain why the goal is not relevant or attainable, and indicate what measures should be taken to mitigate any adverse effects of not making substantial progress toward that goal. The determination of relevance or attainability shall be subject to review as part of a consistency determination under this chapter.
- For one plan to be “compatible with” another, the plan in question, as implemented, will not significantly reduce the desired effect of the implementation of the other plan. If a plan, as implemented, will significantly reduce the desired effect of the other plan, the plan may be considered compatible if it includes the following:



### Statutory definition from Title 24 Section 4302 (continued)

- a statement that identifies the ways that it will significantly reduce the desired effect of the other plan;
- an explanation of why any incompatible portion of the plan in question is essential to the desired effect of the plan as a whole;
- an explanation of why, with respect to any incompatible portion of the plan in question, there is no reasonable alternative way to achieve the desired effect of the plan; and
- an explanation of how any incompatible portion of the plan in question has been structured to mitigate its detrimental effects on the implementation of the other plan.

fail to get an Act 250 permit due to a policy in the Regional Plan, just like a project with an Act 250 permit may fail to get a local permit. These are distinct processes with their own set of standards. The use of this Plan in Act 250 does not, nor could it, require that a town change its zoning. In no case can the Regional Plan invalidate local zoning.

#### Section 248 and 248a

The [Vermont Public Utility Commission \(PUC\)](#)<sup>11</sup> is the body that permits new electrical or gas transmission or generation facilities in the State ([30 VSA §248](#)<sup>12</sup>) as well as telecommunication facilities ([30 VSA §248a](#)<sup>13</sup>), through the issuance of Certificates of Public Good. Such proposals are

exempt from municipal zoning bylaws and Act 250, so it is important to reflect in municipal plans the interests of the municipality, and this Plan does so for the Region.

Prior to granting the Certificate, the PUC must find that the project meets specific criteria. One criterion establishes that the facility must be planned to not unduly interfere with the “orderly development of the Region” ([30 VSA §248b](#)<sup>14</sup>). These criteria also require that the PUC give “due consideration” to the recommendations of both municipal and regional planning commissions and their related plans, such as this Plan. For energy projects, where local and regional plans have been issued a Determination of Energy Compliance (this Plan has been written to garner such a determination), projects are held to a higher standard where such plans are given “substantial deference.” Thus, this Plan can have strong input into these proceedings, but is not as mandatory as in Act 250 proceedings.

It is the intent of TRORC, where necessary or appropriate, to appear as a party in an Act 250 or 248/248a proceeding affecting the Region and provide evidence concerning matters relevant to the Regional Plan. Furthermore, it is the intent of TRORC to coordinate its review of proposed developments with local officials.

### F. Ongoing Planning Activities

The basic assumption made in establishing the goals and policies of the Plan is that change and growth in the Region will continue. The reason for this is clear – the Region offers a quality of life that

is unparalleled in many parts of the nation. Despite continued pressures from urbanized areas, central Vermont contains natural resources of high quality within easy a day’s drive for over 40 million people. Finally, the urbanization of the Lebanon, Hanover, and Hartford area, with its availability of goods and services, makes the Region a major market and population center in Vermont.

### G. Plan Amendment

As stated above, the Plan is a dynamic document and represents a process just as much as it does a product. The nature of growth and change in the Region will require this Plan to be re-evaluated, as necessary. As member towns in the Region refine their plans and as new data or trends are identified, it will be necessary for TRORC to incorporate relevant goals and policies into its planning process. Furthermore, it should be emphasized that while TRORC is legally responsible for the preparation and adoption of the Plan, any individual or organization may request that TRORC modify or amend the Plan.





Introduction Endnotes

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- 1 <https://www.trorc.org/member-towns/>
- 2 <https://www.trorc.org/member-towns/>
- 3 <https://www.trorc.org/about/board-of-directors/>
- 4 <https://legislature.vermont.gov/statutes/section/24/117/04345a>
- 5 <https://legislature.vermont.gov/statutes/section/24/117/04345a>
- 6 <https://accd.vermont.gov/community-development/resources-rules/planning>
- 7 <https://legislature.vermont.gov/statutes/section/24/117/04348a>
- 8 <https://legislature.vermont.gov/statutes/section/24/117/04348>
- 9 <https://www.trorc.org/act-250-and-other-permitting/>
- 10 <https://www.trorc.org/member-towns/town-plan-approvals/>
- 11 <https://puc.vermont.gov/>
- 12 <https://legislature.vermont.gov/statutes/section/30/005/00248>
- 13 <https://legislature.vermont.gov/statutes/section/30/005/00248a>
- 14 <https://legislature.vermont.gov/statutes/section/30/005/00248b>





# 02 | Healthy Communities

*Farmers Market Exchange | © Erik Scheel*

## A. Introduction

Our health is profoundly influenced by the resources, services, social networks, and physical environments that are accessible to us. Consequently, the community has a role to play in ensuring that all community members have equitable opportunities that support health and wellbeing. For example, the built environment impacts a person's level of physical activity and the ways that they engage with others. If a public space is not accessible to those with disabilities or to those who do not own cars, then some residents will not be able to use it, and they will miss any community activities held there.

In many respects, the foundations of healthy communities are embedded in Vermont's land use planning and therefore are already included throughout the TRORC Regional Plan, especially in chapters on transportation, natural resources, and land use. Many town plans in the Region already include goals, policies, and recommendations that support healthy places. For example, many town plans include policies to improve infrastructure to support walking and bicycling, which bring many health benefits.

The American Planning Association has determined that including a specific chapter explicitly focused on public health ensures that a greater em-

phasis is placed on health throughout other chapter elements. TRORC has worked with public health partners to develop a [template for town plans](#)<sup>1</sup> on this important subject.

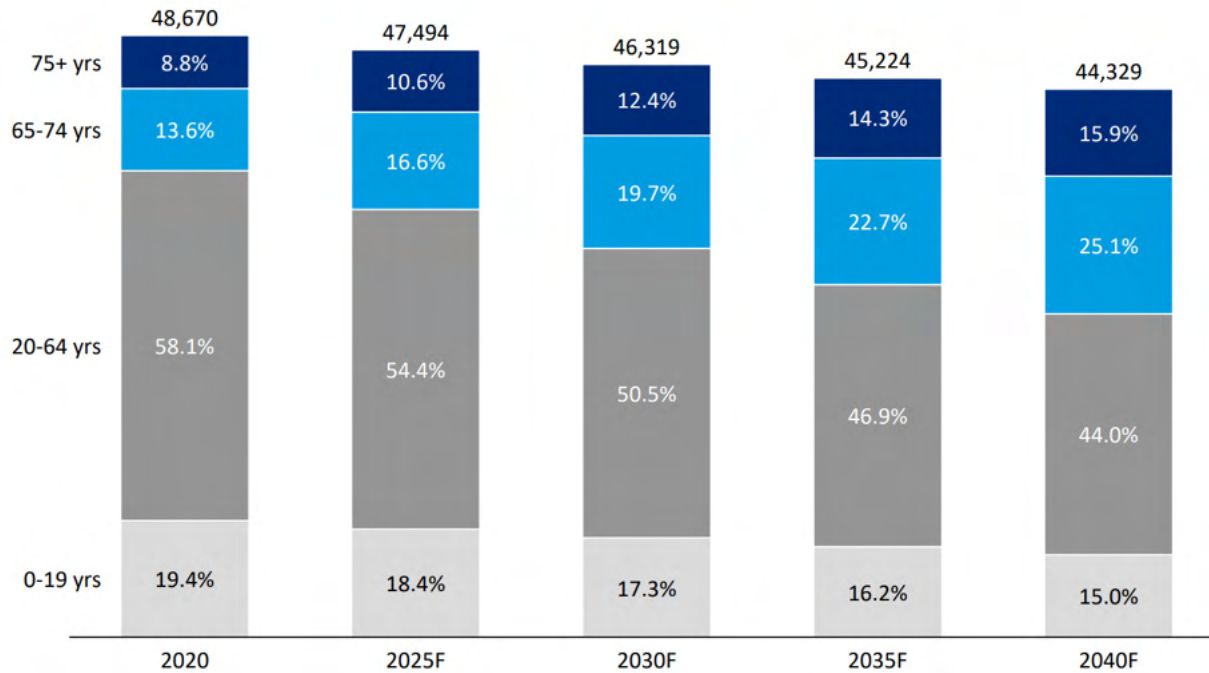
## B. Community Design, the Built Environment, and Healthy Food Access

### Addressing the Needs of an Aging Population

According to the US Census, the proportion of our Region's residents who are 60 years and older has grown more than any other age group. In 2012, this age group made up a quarter of the Region's



Figure 2-1: Projected White River Junction Population Breakdown, 2020-2040



Source: Oliver Wyman analysis | White River Junction Healthcare Community Meeting

population; by 2022, almost 28,000 out of 87,000 people (32%) were 60 years and older. The age group that has diminished the most is between the ages of 40 to 54 years old (they have not left so much as aged into the higher age bracket). Not only have we seen their ratio drop six percentage points within the past decade (24% in 2012; 18.2% in 2022), but there was also a decrease in their total number by 4,700 people (reflecting the smaller number of younger people available to age into this group). This alarming trend signals the need to accommodate not just the older generation, but also to fortify the younger ones. (Please refer to Chapter 5 to see how the aging population is

impacting our Region’s economic future).

For the older population, lifestyle and environmental factors [affect the incidence of age-related diseases and decline](#)<sup>2</sup> such as cancer, heart disease, and neurodegenerative diseases. Healthy lifestyle choices like partaking in moderate aerobic exercises and getting regular sleep [may increase cognitive function for older people](#)<sup>3</sup>. As for the environment, having a strong sense of integration within a community and having access to healthcare contribute to a longer lifespan by [promoting effective stress management and encouraging healthy behaviors](#)<sup>4</sup>.

Vermont places an emphasis (at least in policy) on promoting healthy living for seniors and those with disabilities. In 2020, the Vermont Legislature passed [Act 156](#)<sup>5</sup> (also known as the Older Vermonters Act), which initiated a process for different state agencies to plan for an age-friendly state. However, many towns in our Region still do not have adequate infrastructure or services to support aging in place and the needs of the disabled, and thousands of individuals face challenges in remaining in their homes. Thus, the current state-wide initiative to address the challenges associated with aging and disabilities is an important first step, but additional attention and more resources are needed. Independent living is an attractive option for seniors and those with disabilities who need minor accommodations, both financially and from the perspective of personal dignity (to read more on aging in place, please refer to Chapter 8).

In addition to accessible home environments, people who are aging in place require access to diverse social services. One approach that has been gaining traction across the nation, as well as in our Region, is to hire community health workers and/or community nurses who can visit people in their homes, learn about their needs, and help them access health care and other assistance. As these care coordinators typically reside in the communities that they serve, their personal connections and proximity to people who need assistance make them a critical asset to rural areas. Towns in the Region that currently have a community health worker or community nurse are Sharon, Thetford, Hartland, Norwich, Bradford,





Strafford, Tunbridge, and the greater Woodstock area (via the [Ottawaquechee Health Foundation/Mt. Ascutney Hospital Center](#)<sup>6</sup>).

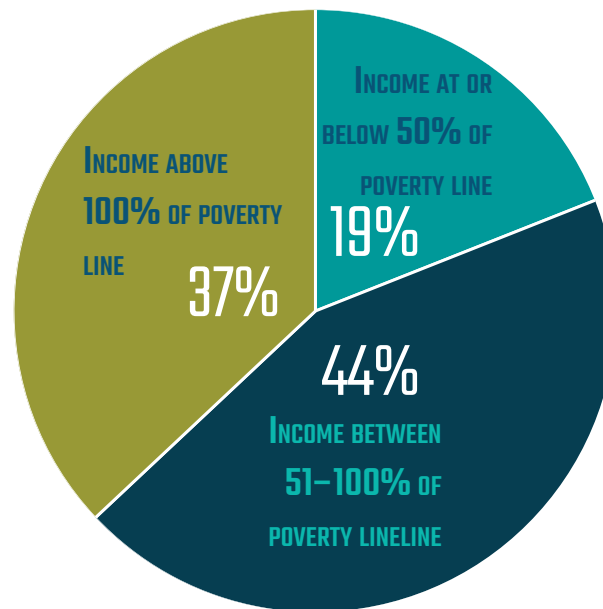
### Healthy Food Access and Security

Food insecurity is defined as not having access to adequate food for an active, healthy lifestyle. Key factors that contribute to food insecurity are unemployment, poverty, and financial shock. A survey done by the University of Vermont found that the percentage of Vermonters who are food insecure increased during the COVID-19 pandemic, and has remained higher than pre-pandemic levels. In 2021, there were approximately [7,000 people in our Region who were recognized as food insecure](#)<sup>7</sup> (8% of the total population). Among our region’s food insecure population, more than a third were eligible for Supplemental Nutrition Assistance Program (SNAP), and around two thirds of all food insecure people were eligible for other nutrition programs. To apply for Vermont’s SNAP program, [3SquaresVT](#)<sup>8</sup> applicants must match criteria based on household income, age, and disability. Beneficiaries of 3SquaresVT have additional benefits, such as dependents qualifying for free meals at schools and free employment training.

Obesity is a complex disease that impairs the health of many Americans, and it is caused by a combination of social, economic, and environmental factors that extend beyond a person’s control. Over the years, obesity has reached epidemic proportions in Vermont; in 2021, nearly a third of Vermont adults were reported being obese, [with two thirds of Vermonters being overweight or obese](#)<sup>9</sup>. While obesity levels vary

from region to region, the rate is higher in rural areas where affordable and healthy foods are harder to access. Research shows that one of the most effective ways to prevent obesity and improve outcomes for those who are overweight is to promote healthy eating options for everyone in the community.

**Figure 2-2: Share of Vermont SNAP Participants by Household Income**



Source: CBPP analysis of data from USDA Food and Nutrition Service, fiscal year 2020 (pre-pandemic period)

There are several community food security programs throughout the State that can aid in reducing the number of food insecure households. In our Region, there is a professional gleaning program (where fresh foods from farms are rescued from being wasted) called the [Vermont Gleaning](#)

[Collective](#)<sup>10</sup>. On a state-wide level, [The Vermont Food Security: Roadmap to 2025](#)<sup>11</sup> is an initiative guided by researchers and agricultural experts that provides policy recommendations to legislators to further Vermont’s path towards an equitable food system by 2025.

[Farm to school programs](#)<sup>12</sup> have been a successful venture in Vermont that connects farmers with schools to provide fresh, healthy foods while educating the students on where food comes from. Providing healthier meals at school is essential for the children of families that cannot afford high-quality foods at home. There are also other programs such as community gardens, regional food hubs, [farmers markets that accept Electronic Benefit Transfer \(EBT\) cards](#)<sup>13</sup>, and [new farms for new Americans](#)<sup>14</sup>. Communities in the Region can promote healthy food access by identifying locations for community gardens or farmers markets and helping to organize community groups to fight food insecurity and increase access to healthy foods.

Lack of transportation to a grocery store also presents a severe problem for many people in the Region; according to the U.S. Census, approximately four percent of households in Orange and Windsor Counties do not have a private vehicle. To resolve this issue, [Good News Garage](#)<sup>15</sup> is an organization that provides refurbished vehicles to individuals and families who are at risk of unemployment and do not have access to essential services, such as grocery stores.



## Healthy Places

On average, we spend nearly 90 percent of our time indoors. With nearly two thirds of our Region's homes built in 1979 and earlier, homeowners and renters living in our Region may be exposed to hazardous materials (such as Polychlorinated biphenyls (PCBs), lead paint, mold, and asbestos). Special attention should be paid to improving living space to protect vulnerable populations – such as children, older adults, and people with disabilities—who spend an especially large amount of time indoors. Additionally, hazardous materials are disproportionately found in low-income housing; poor-quality housing threatens the safety of lower income residents and exacerbates existing health disparities. Indoor pollutants are not just a factor in our homes, but also in where we work and go to school. Many of our workplaces are of similar age to our homes. Efforts in Vermont recently started to find and address lead in drinking water and PCBs in indoor air quality in schools.

Providing residents with nearby parks and greenspace not only beautifies communities but increases their well-being. Studies have shown that people who connect with nature often feel less isolated and can form connections with neighbors. Loss of trees negatively impacts our health in ways that are just being understood. Having shade trees keeps our neighborhoods cooler.

## Active Living and Transportation

Our Region's built environment is mostly car centric and does not always support diverse modes of active transportation. [Active transportation](#)<sup>16</sup> is any form of human-powered transportation

such as walking, cycling, using a wheelchair, in-line skating, or skateboarding. (Please refer to Chapter 4 for more information about our Region's transportation.)

By providing safe conditions for pedestrians and cyclists, a community can reduce the number of car collisions. The Vermont Agency of Transportation has developed a [bike comfort map](#)<sup>17</sup> for all state routes; this displays the difficulty level for different sections of roads based on biking experience. As a result of this project, TRORC has developed a similar map for all secondary and connector roads in the Region.

Walkable communities, as promoted by the [Vermont Complete Streets program](#)<sup>18</sup>, support active transportation and provide safe access to essential goods and services. The development of bicycle and pedestrian trails has been demonstrated to promote a healthy lifestyle. Biking and hiking trails can promote increased activity and can be created with smaller amounts of land

than large parks. They can often be created on lands that are either privately or publicly owned. Many back roads afford safe spaces for walking and biking as well (that do not necessarily warrant a Complete Streets concept).

Participating in outdoor activities may not be an option for everyone. Therefore, indoor recreational facilities (i.e. gyms) should be included in local planning. These facilities may be unaffordable for lower-income individuals, and access may prove difficult for the elderly. Locating services near housing and transportation options allows seniors, and those without reliable transportation, to live more independently. Parks and recreation facilities provide opportunities for physical activity and can help people of all ages lead more active lifestyles.

When designing for active living, older people and those with disabilities must be involved in assessing a community's strengths and deficiencies through community surveys and input from organizations servicing them. These residents can



South Royalton Business Block | © TRORC



speak to their own experience of the community's positive characteristics and barriers and promote much-needed changes in our built environment.

### Social Inclusion

Social inclusion represents a vision for a “society for all” in which every individual has rights, responsibilities, and an active role to play. Creating spaces for people young, old, and with varying abilities is imperative to form and sustain healthy communities.

Opportunities to participate in and make a positive contribution to community and society—no matter a person's age or abilities—are integral to dignity. Maintaining contact with family and friends, participating in cultural and community activities, and using skills all contribute to social inclusion.

Age discrimination can contribute to the social isolation of older people. The risk is greater for people living alone and the very elderly, and it can be increased by bereavement, loss of work, or poor health. Such isolation can contribute to the incidence of mental illness, particularly depression. Many social nets are in place, such as the Thompson Senior Center, Greater Randolph Senior Center, Bugbee Senior Center, Orange East Senior Center, Meals on Wheels, and Ottauquechee Health Center, which provide many types of services.

Many people with disabilities unnecessarily experience life quite differently. They may not have a sense of place or belonging in the community and may not have access to activities they prefer or desire. In 2022, about one out of six residents in our Region reported that they are disabled. Social

inclusion may also go a long way toward attracting and keeping a younger population who feel that they are welcome and heard.

### Substance Misuse Prevention

Vermont has the highest percentage of people who reported using cannabis of any state in the nation, a relatively high level of underage alcohol consumption and binge drinking, and widespread substance use disorder. Preventing substance use disorders and related problems (e.g., mental illness) in adolescents, young adults, and older adults is critical to our Region's physical and mental health.<sup>19</sup>

In Vermont, 12- to 17-year-olds and 18- to 25-year-olds have the highest marijuana use than any other age groups in the state (12% in VT; 9% in US). A survey put out by the Vermont Department of Health, Division of Substance Use Programs found that 18- to 25-year-olds in Vermont are 60 percent more likely to abuse alcohol or use drugs than the nationwide average of the same age group. For adults 65 and older, a quarter report at-risk drinking (having three or more drinks in one sitting), which is significantly more than the national average (19%). Unfortunately, our Region closely resembles Vermont's drug and substance use and abuse trends.

Mentoring programs represent one strategy for addressing young persons' early exposure to drug and alcohol use.

To address severe substance use disorders, people can participate in treatment and recovery support services. Treatment services have in-patient and

“In every community, property owners, advocates, code officials, public health leaders, and others are positioned to recognize and coordinate their shared missions of keeping people safe and healthy in the places they live.”

~National Center for Healthy Housing

outpatient options for members who are at the beginning stages of treating their drug addiction; recovery centers are for people continuing their lives after eradicating their drug dependency.

In our Region, we have three treatment centers, which are: [Clara Martin Center](#)<sup>20</sup>, [Valley Vista](#)<sup>21</sup>, and the [Health Care & Rehabilitation Services of Vermont](#)<sup>22</sup>. As for the recovery programs, we have the [Upper Valley Turning Point](#)<sup>23</sup>.

Successful implementation of these strategies involves many sectors of the community, including law enforcement, local officials (including town planners), businesses, faith-based organizations, schools, and residents, including parents and youth.

### Healthcare Facilities

Healthcare is critical for the residents of the Region. [Gifford Medical Center](#)<sup>24</sup> in Randolph and the White River Junction branch of the [Veteran's Affairs Medical Center](#)<sup>25</sup> are the largest medical facilities located in the Region. For more





major medical issues, residents in our Region use [Central Vermont Medical Center](#)<sup>26</sup> in Berlin, VT and [Dartmouth-Hitchcock Medical Center](#)<sup>27</sup> in Lebanon, NH, which includes a cancer center and a children's hospital. Most of our Region's medical needs are covered by smaller health clinics, which are part of a larger network. These facilities allow residents, including those on low or fixed incomes, direct access to day-to-day primary and family care services without requiring extensive travel (for more information about our Region's primary and family care services, please refer to Chapter 9).

Medical services are available to lower income residents in several locations in the Region. Gifford Medical Center in Randolph and the [Good Neighbor Health Clinic](#)<sup>28</sup> in White River Junction can provide free primary medical care to nearby residents whose household incomes are below the poverty level.

When older adults are less able to manage their home, they can turn to an elderly housing program. If health is an issue and constant care is required, seniors will need to enter a nursing home or a residential care facility. Data shows that there are limited options in our Region for all levels of care, in particular full-time residential care. Elderly residents in need of full-time care are often forced to move away from their community because local care facilities are unaffordable. This is a statewide problem, not just a regional issue.

The expansion of existing or development of new medical or elder care facilities has the potential to conflict with existing and future land use patterns. The most appropriate locations for these facilities



*Cornerschool Schoolhouse, Granville* | © Corner School Resource Center

are within community centers (villages and downtowns) because they are often walkable and have existing services and access to business-class Internet.

In locations outside of designated growth areas, new facilities are less desirable because they have a broader impact. In rural areas, these facilities may require the extension of existing water and wastewater systems, can negatively impact natural resources, and can create conditions that encourage sprawl and strip development.

Given the need for additional medical facilities that specialize in elderly care, efforts to encourage their growth and development at sustainable levels are

in the interests of the Region. Municipalities can support their growth by allowing for these facilities in their villages and downtowns, and by creating regulatory structures that balance issues like historic preservation with the public value these facilities provide.

Medical and elderly care facilities can generate significant economic benefits for the Region by providing workers with a livable wage and acting as stimulators of the local economy. The priority for future investments in the health of our Region should focus on care facilities and services for the elderly and other vulnerable populations. The first step in making these investments is to determine where they would be most practical.



Goal, Policies and Recommendations: **Community Design, the Built Environment, and Healthy Food Access**

**Goal**

1. The relationship between our Region's built environment and the health and wellness of our community is understood.

**Policies**

1. Communities need to be designed, in both physical form and services, to support physical and mental health.
2. Access to healthy foods must be increased, especially in more rural areas.
3. TRORC supports the Vermont Farm to School Network.

**Recommendations**

1. TRORC should organize and host a regional public health summit.
2. TRORC should partner with schools that have limited access to nutritious food and would like to partner with local farms.
3. Municipalities should connect with the Vermont Farm to Plate and Farm to School networks to see how they can best promote the consumption of locally grown foods by their residents.
4. TRORC and/or the State should create mapping resources, showing:
  - a. Locality of grocers, convenience stores (if healthy food options are offered), farmers markets, farms, agricultural institutions, community gardens, food banks, and food pantries.
  - b. Overlaying public transportation routes to food stores and shelves.
  - c. Location of low-income census tracts.
5. Municipalities should promote and expand farmers markets and community gardens by identifying locations for such activities and letting potential organizers know of these sites.
6. Municipalities should support the preservation of large and small blocks of productive agricultural land.
7. TRORC should conduct a food system analysis for the Region.
8. TRORC will support towns in establishing community nursing / community health worker services.
9. TRORC will support towns in planning for built environments that are ADA compliant.



Goal, Policy, and Recommendations: **Healthy Places**

**Goal**

1. The physical places in which we live and work contribute to our health.

**Policy**

1. Prioritize the development and maintenance of healthy, affordable, and energy efficient housing.

**Recommendations**

1. TRORC will encourage towns to implement greenhouse gas reduction strategies in their plans.
2. TRORC and municipalities should participate in health impact assessments for development projects.
3. TRORC should assist municipalities in assessing and remediating brownfields, especially those with hazardous building materials.
4. Municipalities should encourage the renovation of existing housing stock and development of new housing stock in compliance with healthy home and energy efficiency best practices.

Goal, Policy, and Recommendations: **Active Living and Transportation**

**Goal**

1. A balanced and equitable transportation system provides for the safety and mobility of pedestrians, bicyclists, strollers, and wheelchairs.

**Policy**

1. Incorporate active transportation features into new development projects.

**Recommendations**

1. When requested, the State and/or TRORC assist municipalities with mapping connectivity to essential services, walkable routes, recreation opportunities, and transportation options.
2. TRORC and municipalities should plan for bike-friendly state highways to connect village centers, if feasible.
3. Municipalities should conduct walkability and bikability assessments.
4. The State and TRORC will educate decision makers on links between safe streets and health.
5. TRORC will collaborate with local agencies and communities to explore Safe Routes to Schools programs and Vermont's Complete Streets program.
6. Municipalities should promote joint use of park and recreation facilities between communities and ensure that residents without cars have access to outdoor recreation opportunities.



## Goal, Policies and Recommendations: **Social Inclusion**

### **Goal**

1. All residents feel socially connected.

### **Policies**

1. TRORC promotes increased use of public space, walkable neighborhoods, and mixed-use development.
2. Increased affordable and reliable public transit options to essential services and recreational and social opportunities is encouraged.
3. Improved parks, recreational facilities, and open spaces for accessibility and community mingling is encouraged.
4. Towns should actively work to diversify the voices representing towns in local government, and promote equitable access to public meetings and events.

### **Recommendations**

1. Municipalities should evaluate how to make public gathering spaces more accessible and welcoming to people of all abilities and identities.
2. Public health professionals should educate decision makers on the link between social support and health.
3. TRORC will provide training for neighborhood residents to participate in boards and commissions.
4. Municipalities should support diversity, equity, inclusion, and justice initiatives such as audits or surveys, committees, celebration events, etc.

## Goal, Policies and Recommendations: **Substance Misuse Prevention**

### **Goal**

1. Drug addiction and misuse are eliminated in all segments of society.

### **Policies**

1. Concentrated exposure to alcohol, drugs, and tobacco should be reduced.
2. Opportunities for substance-free recreation and community involvement should be provided.

### **Recommendations**

1. With the help of public health professionals, municipalities should assess the types of substance use problems within their community.
2. Municipalities should continue to raise awareness of the nature and seriousness of health issues.
3. Municipalities should assess the community's readiness for prevention, review current programs already in place, and identify service gaps and barriers.



Goal, Policies and Recommendations: **Substance Misuse Prevention**

**Recommendations (continued)**

4. Municipalities should convene community organizations who serve youth and local leaders to capture ideas and resources to help implement and sustain research-based programs to promote clear expectations around substance use for youth.
5. Municipalities should provide plenty of substance-free recreational opportunities for youth and overall community participation. Municipalities should consider establishing substance-free public spaces, events, and buffer zones around sensitive areas (e.g., libraries, community centers, etc.) to reduce youth exposure and support those who are in recovery.

Goals, Policies and Recommendations: **Healthcare Facilities**

**Goals**

1. Healthcare coordinators are in all towns.
2. The availability of medical and elderly care services in the Region is for everyone.

**Policies**

1. All medical care facilities are encouraged to be located within or immediately adjacent to designated growth areas provided that they do not have an undue adverse impact on traffic or the character of the area.
2. TRORC supports efforts at the state and local levels to develop additional elderly care services and facilities.

**Recommendations**

1. TRORC and municipalities should evaluate and address barriers to health care access, including but not limited to transportation, service gaps and redundancy, education, language, cost of services, immigration status, and providers' competency and sensitivity in working with underserved populations.
2. TRORC should review local zoning and subdivision regulations to ensure that they do not prohibit healthcare facilities in appropriate areas and should assist with bylaw revisions as needed.
3. TRORC will provide support for the development of new facilities by reviewing any potential projects before they are submitted to the District Environmental Commission to reduce the possibility that a permit will be denied, delayed, or heavily conditioned.



Healthy Communities Endnotes

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1 <https://www.trorc.org/healthpolicyclearinghouse/template-town-plan-health-chapter/>  
2 <https://www.consumerreports.org/health/seniors-health/how-to-stay-healthy-longer-a1999397973/>  
3 [https://greatergood.berkeley.edu/article/item/five\\_ways\\_to\\_keep\\_your\\_brain\\_healthy\\_as\\_you\\_age](https://greatergood.berkeley.edu/article/item/five_ways_to_keep_your_brain_healthy_as_you_age)  
4 [https://myhealthmycommunity.org/wp-content/uploads/2019/05/MHMC\\_SocialConnections\\_web.pdf](https://myhealthmycommunity.org/wp-content/uploads/2019/05/MHMC_SocialConnections_web.pdf)  
5 <https://dail.vermont.gov/resources/legislative/older-vermonters-act>  
6 <https://www.mtascutneyhospital.org/locations-directions/ottauquechee-health-center>  
7 <https://map.feedingamerica.org/county/2021/overall/vermont>  
8 <https://dcf.vermont.gov/benefits/3SquaresVT/SNAP>  
9 [https://www.tfah.org/wp-content/uploads/2022/09/2022ObesityReport\\_FINAL3923.pdf](https://www.tfah.org/wp-content/uploads/2022/09/2022ObesityReport_FINAL3923.pdf)  
10 <https://www.vermontgleaningcollective.org/?C=N;O=D>  
11 <https://www.vtfarmtoplate.com/resources/vermont-food-security-roadmap-2035>  
12 <https://agriculture.vermont.gov/development/farm-school-early-childhood-and-institution/farm-school-resources>  
13 <https://www.vtfarmtoplate.com/resources/vermont-food-security-roadmap-2035>  
14 <https://www.aalv-vt.org/farms>  
15 <https://goodnewsgarage.org/programs/vermont/>  
16 <https://www.transportation.gov/mission/health/active-transportation>  
17 <https://vtrans.vermont.gov/planning/bikeplan>  
18 <https://vnrc.org/community-planning-toolbox/tools/complete-streets/>  
19 <https://www.samhsa.gov/sites/default/files/samhsa-strategic-plan.pdf>  
20 <https://www.claramartin.org/>  
21 <https://valleyvistarecovery.com/>  
22 <https://www.hcrs.org/>  
23 <https://www.uppervalleyturningpoint.org/>  
24 <https://giffordhealthcare.org/>  
25 <https://www.va.gov/white-river-junction-health-care/locations/white-river-junction-va-medical-center/>  
26 <https://www.cvmc.org/>  
27 <https://www.dartmouth-hitchcock.org/>  
28 <https://goodneighborhealthclinic.org/>







# 03 | Land Use

*Long View of Vermont State University, Randolph Campus* | Source: ©First Light Studios

***Disclaimer: This chapter has not been updated to incorporate changes enacted into law in 2024. The guidance on how to make land use changes is not yet available to TRORC. We will update this chapter when the guidance is made available, which will be ready by the 2025-2026 adoption process.***

## **A. Background Issues**

For almost two decades the TRO Region has been in a post-growth period following a time of rapid economic growth and profound changes to its landscape, spanning 30 years (1970-2000). During that time, planning focused on mitigating the impacts of growth. While managing the impacts of uncontrolled growth remains an important part of the TRORC Regional Plan, the key issues that must be considered when planning for the Region's future have changed.

As the Region looks to the future, it will need to adapt land use policy to the changing business environment by supporting existing businesses, encouraging entrepreneurial development, investing in our existing downtowns, improving infrastructure (particularly within our villages and downtowns), and strengthening those things that make Vermont unique (such as the arts and our forest-related, agricultural, and other value-added products). The impact of broadband and online sales is changing the way we access entertainment,

commute to work, buy goods, and even receive services. The generation of renewable energy and the coming electrification of our transportation and heat systems will engender new services and facilities.

With all of this change, we still hope to meet one of the fundamental guiding goals of state land use law, which is to further the traditional pattern of development so as to maintain the historic settlement pattern of compact village and urban centers





separated by rural countryside. While this model is greatly responsible for sustaining Vermont's rural character, it has its challenges as this pattern was built when Vermont's countryside had an agrarian lifestyle where residents did not travel much and did not have cars and commute. For many, the luxury of having a home in a rural setting is why we choose to live here. But our choice to live in more rural areas means that we must use cars and trucks to get to work, access goods and services, and be part of our communities. When we plan for our future, we will need to consider where we live and how it does, or does not, support our economy, reduce energy use, encourage a sense of community, and protect our natural resources.

As our Region's population ages, the appeal of owning a house in the country can change. For many, the cost and effort it takes to maintain a larger home or to travel to locations that offer goods and services can be a burden. We must recognize that, as we move forward, planning will need to provide a greater diversity of housing in areas that are affordable, walkable, and vibrant.

Our community cores and roads were built along, and sometimes in, streams, wetlands, and rivers because these are flat areas. This was practical in some ways, but ignored the fact that these are also areas prone to flooding, sometimes with disastrous results. As we have continued to build and create more impervious surfaces and the climate has shifted to one with more extreme rains, the specter of flooding now must be taken into account as we look at our compact centers and where they can safely grow.

Our forests are an important component of our Region. They represent a significant store of natural resources, are a driver for economic activity, and provide us with a backdrop that is distinctly rural. However, the landscape shift of open lands reverting to forest over the last century has ended, and we are now starting to lose forest again as a state, with 1,500 acres a year being converted to development or open land. We continue to fragment the forest we do have with subdivisions, reducing the natural functions of large, contiguous sections of forested land that are vital to many plant and animal species. In planning for the future, we need to consider the places where we have already impacted forest integrity beyond repair and the places where good forests remain.

These background issues have been considered as part of the development of this Plan. We continue to strive to move planning forward, to adapt to changes in the Region, and to support our communities while remaining consistent with Vermont's land use goals.



White River Junction | © Kevin Geiger

## B. Future Land Use Areas

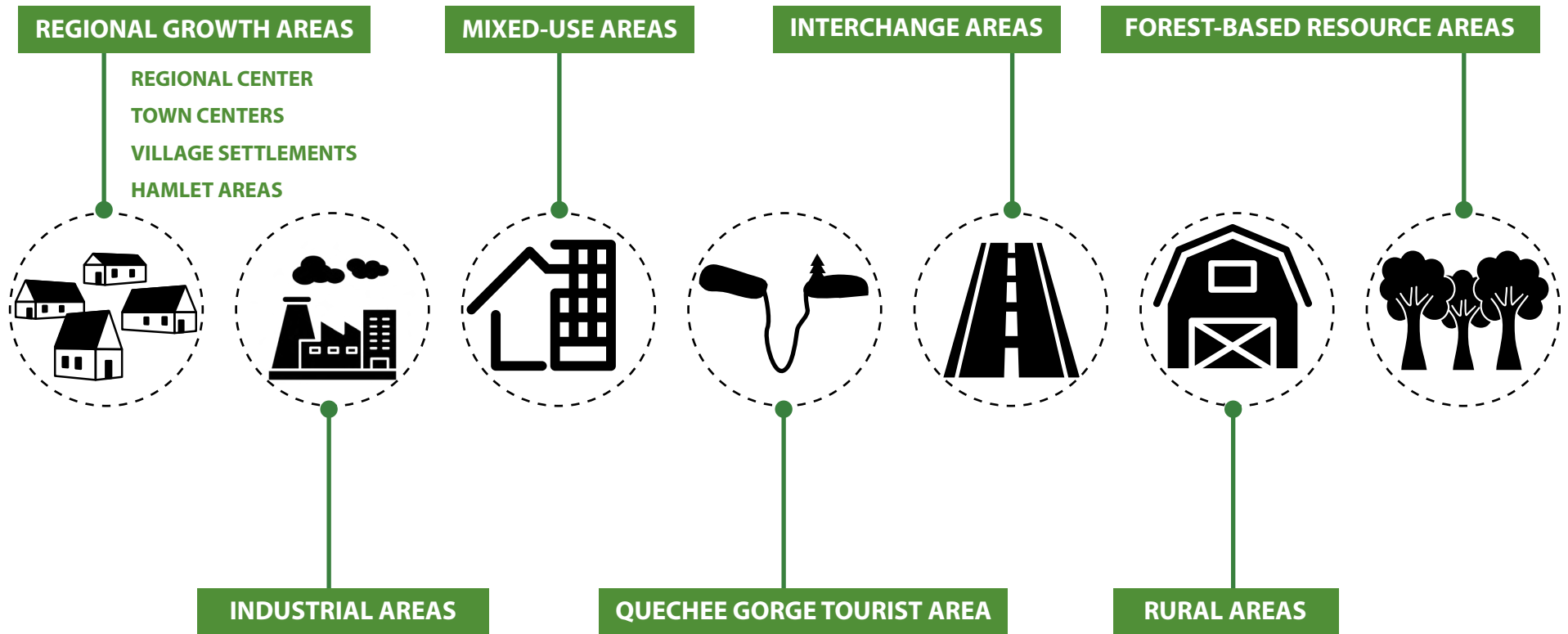
For the purposes of this Plan, seven types and four subtypes of Future Land Use Areas have been established and identified. These Areas have characteristics that identify them within the Region. They are designed to accommodate future growth based on the capacity of infrastructure and suitable land without threatening critical resources or creating sprawl. These Areas are:

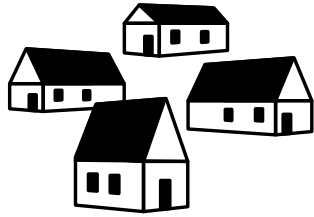
- Regional Growth Areas
  - Regional Center
  - Town Centers
  - Village Settlements
  - Hamlet Areas
- Industrial Areas
- Mixed-Use Areas
- Quechee Gorge Tourist Area
- Interchange Areas
- Rural Areas
- Forest-Based Resource Areas

The Region's Land Use Areas are depicted on Map 4, the Future Land Use Areas map that is included in this Plan. The Regional Center, Town Centers, Village Settlements, Forest-Based Resource Areas, Mixed-Use Areas, Industrial Areas, and Interchange Areas are identified by boundaries. Hamlet Areas are identified by center points; when making land use decisions using the policies in this Plan, Hamlet Areas must include the locally recognized extent of the hamlet as it is designated in the appropriate Town Plan. Rural Areas are the remaining lands in the Region.



Figure 3-1: Future Land Use Areas in the TRO Region





### Regional Growth Areas

Growth throughout the Region must be balanced with a respect for the traditional patterns of development that make our Region distinct (these patterns are supported by Vermont’s planning goals) and the need to adapt to an ever-changing world. To sustain both rural and more developed core areas, major growth or investments must be channeled into existing settlement centers or development immediately adjacent to such centers.

Regional Growth Areas represent areas of concentrated mixed use at varying scales and with differing mixes of uses. These areas are either served by public facilities (such as sewer, water, and public transit) or are potential locations for future infrastructure investments that will encourage growth and vitality. Depending on their scale and location, these areas generally include a diverse mix of services, businesses, and housing opportunities for our citizens.

Acknowledging that Regional Growth Areas range from urban to rural, the Regional Plan differentiates these areas into the four subtypes mentioned above and detailed below.

### **Regional Center**

Regional Centers are a region’s largest urban areas, where development is highly concentrated with a diverse mix of uses. They are areas where public sewer and water utilities exist, transportation infrastructure is capable of handling significant volumes of commuting and commercial traffic, a public transportation system provides options, and there are intermodal opportunities present. In order to achieve the level of density appropriate for a Regional Center, buildings are often multi-story, with mixed uses – particularly in the core of the area. People use Regional Centers for their variety of employment and business opportunities, governmental and judicial functions, hospitals, schools, and cultural and civic activities. White River Junction is the only Regional Center in our Region. Our only State Designated Growth Centers and a Designated Downtown are included in this land use area.

### **Town Centers**

Town Centers are less urban than Regional Centers but also contain a concentrated mix of uses at a high level of density. They are those areas where central public utilities for water and sewer are available and where there exists a central location for commercial activities, schools, and cultural and civic activities for the town and the surrounding communities. In our Region, Designated Downtowns, Designated Villages, and a Designated Growth Center are included in this land use area. Town Centers are found in Bethel, Bradford, Chelsea, Fairlee, Norwich, Randolph, Rochester, South Royalton, Wells River, Wilder, and Woodstock.

### **Village Settlements**

Village Settlements are the most common Regional Growth Areas in the TRO Region. Village Settlements normally consist of a mix of uses at medium to high densities. Density in Village Settlements varies based on the availability of municipal water and sewer. Those Village Settlements that do not have water or sewer are prime candidates for future infrastructure investments. Unlike Regional Centers and Town Centers, Village Settlements are not regional markets or trade centers and typically serve a local clientele. The Region’s Village Settlements are core areas in Barnard, Braintree, Bridgewater, East Corinth, East Randolph, East Thetford, East Topsham, Granville, Hancock, Hartford Village, Hartland Four Corners, Hartland Three Corners, Newbury, North Hartland, Pittsfield, Plymouth Union (Plymouth), Pond Village (Brookfield), Post Mills (Thetford), Quechee, Randolph Center, Royalton Village, Sharon, South Pomfret, South Strafford, South Woodstock, Stockbridge, Strafford, Taftsville, Thetford Center, Thetford Hill, Tunbridge, Tyson (Plymouth), Vershire, West Fairlee, and West Woodstock.

### **Hamlet Areas**

Hamlet Areas were significantly more prevalent throughout the communities in the TRO Region in the past. Presently those Hamlets that remain consist of groupings of buildings that are generally residential in nature. Hamlets are significantly smaller in scale than Village Settlements. They historically have served as the location for single-family homes, with a few stores and businesses supported primarily by local residents. Hamlets





are not regional markets or trade centers. These areas generally do not contain a community water supply or sewer system. Minor community facilities and services sometimes are located in these areas. Hamlet Areas in the Region are Bridgewater Center, Bridgewater Corners, Corinth, East Barnard, East Bethel, East Braintree, East Brookfield, East Granville, Gaysville (Stockbridge), Locust Creek, North Pomfret, North Thetford, North Tunbridge, Stockbridge Central School, Thetford Hill, Vershire, Vershire Center, Waits River (Topsham), West Braintree, West Bridgewater, West Brookfield, West Hartford, West Newbury, West Topsham, and areas immediately adjoining such areas.



### Industrial Areas

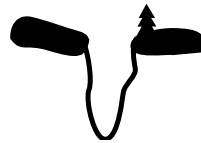
Industrial parks and districts are a way to encourage economic growth and high-wage businesses to locate in the Region without adversely affecting neighboring land uses. Industrial uses can produce off-site impacts, such as noise, that can be mitigated if these businesses are located in areas designated specifically for industrial development and job growth. Commonly, Industrial Areas are located where there is direct access to transportation via major roads and/or rail, three-phase power, and other municipal infrastructure. These areas may include other commercial uses, provided that those uses are not more appropriate within Regional Growth Areas.

There are Industrial Areas identified in seven communities in the TRO Region.



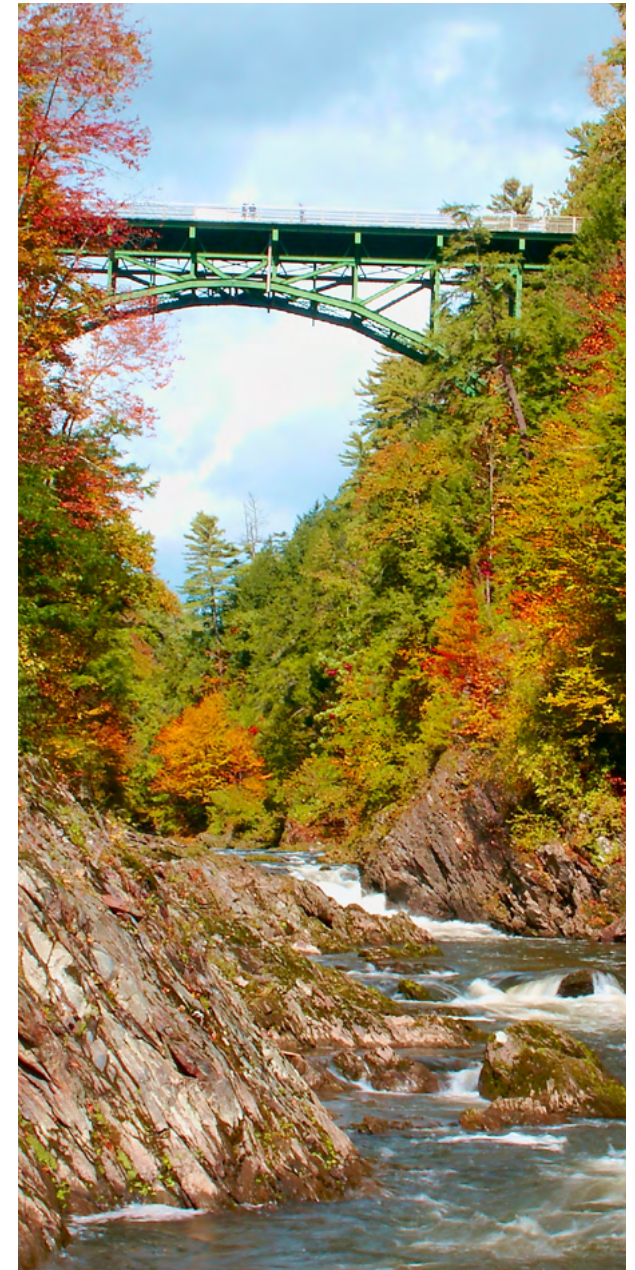
### Mixed-Use Areas

Given the regional need for increased housing and local needs for commercial establishments that are not best suited to core areas due to their impacts, low value, or large use of land, a Mixed-Use Area can supply needed space for such along state highways without creating sprawl.



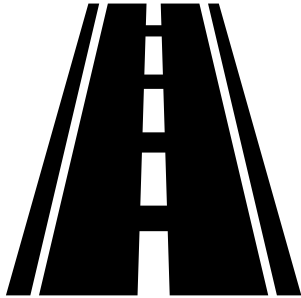
### Quechee Gorge Tourist Area

Quechee Gorge is a singular geological tourist destination in the Region of statewide significance. This land use area provides tourist services for travelers visiting this destination while maintaining the level of service on US 4, a major arterial on the Federal Highway system and the primary east-west route in the region. The Quechee Gorge Tourist Area includes privately owned properties as well as lands owned or controlled by the Army Corps of Engineers and the State of Vermont. The Quechee Gorge Tourist Area secondarily serves the local needs of the Quechee area in a manner that is not meant to supplant uses in existing village areas or to create regional destinations other than the Quechee Gorge itself.



Quechee Gorge Bridge | © John Knox





### Interchange Areas

Lands that are in close proximity to interstate interchanges are viewed as prime areas for development by some due principally to their ease of public access and favorable site conditions. In this Region, interstate interchanges are located in the towns of Bradford, Fairlee, Hartford, Hartland, Newbury, Norwich, Sharon, Randolph, Royalton, and Thetford. However, not all of these interchanges are designated as Interchange Areas as land use areas in this Plan.

Despite the benefits of interstate travel and the fact that the interchanges are important transfer points for traffic entering and exiting the Region, there are potential pitfalls to developing these areas. Increased traffic congestion and safety issues resulting from interchange developments can unacceptably decrease the level of service of roadways. One example, the Quechee interchange (I-89, Exit 1), contains acres of developable land located within a mile of the intersection of two interstate highways. This places this interchange at a high degree of vulnerability. Local development decisions made without adequate regard to

preserving mobility will degrade the functionality of the public investments. An illustration of this consequence is on Interstate 89 at Exit 20, a strip of commercial development in nearby West Lebanon, NH, where access on and off the interstate for traveler services has been negatively impacted due to traffic and over development. Other typical problems associated with improper traffic management and development at interchanges include:

1. The creation of numerous curb cuts (new driveways) surrounding the interchange to access new development that are permitted incrementally on a case-by-case basis without due regard to an overall plan for the area;
2. The eventual existence of high traffic generators in the immediate vicinity, which cause degradation of roadway intersections, the need for signalization, lower travel speeds, and extensive queuing of vehicles;
3. Inadequate planning for pedestrian accesses between developments and loss of significant farm land or access to such land;
4. Erosion of cultural, social, and economic values of the traditional town center or village settlement due to a dislocation or redistribution of key uses into the area;
5. Fragmentation of land parcels in such a manner as to preclude future access or interior roads to properties more removed from the right-of-way; and
6. Unnecessary loss of scenic qualities resulting from land development.

Lands at interchanges in Bradford, Fairlee, Newbury, Norwich, Sharon, and Hartford (White River Junction) are considered part of an existing Regional Center, Mixed-Use Area, or Village Settlement and are therefore not identified as separate Interchange Areas in this Plan. Lands at interchanges in Bradford, Newbury, and Royalton (in part) are located within Industrial Areas. Lands at interchanges in Thetford and Hartland are in Rural Areas. The interchanges in Quechee, Randolph, and Royalton are physically separate from a Regional Growth Area, being in some cases two or three miles away. Because this Plan and state planning policy affirm Regional Growth Areas as the principal areas for service, retail, civic, and institutional uses, it is in the interest of the Region for these areas to continue to serve these vital functions. Conversely, Interchange Area development, with its different focus, should not be promoted to the detriment of Regional Growth Areas or the public investments made therein.

TRORC respects the right of municipalities to plan for growth in these areas. At the same time, TRORC believes that given the considerable public investment in the interstate highway system and Regional Growth Areas, and the significant public exposure to such areas, these interchanges also need to be evaluated from a regional perspective. Land around interchanges and along highways leading to them are powerful magnets for non-residential uses, which often competes with and erodes the vitality of Regional Growth Areas; the proximity of large parking lots adjacent to high-volume highways is an attractive force to consumers and businesses.



### Interchange Area Policies - Specific

The characteristics of each of the three Interchange Areas designated in this Plan are not identical. While all of the Interchange Areas serve as transfer points between the interstate (limited-access roads) and state highways (connectors to villages and outlying countryside), the physical and economic landscapes for these areas is different. Some areas are largely undeveloped open spaces without public infrastructure, especially sewer or water. Other areas are situated at or near prominent vistas or scenic areas and are visually sensitive to certain types of development. Yet other interchanges are experiencing new commercial or industrial development on what is or was farmland. Some interchanges are relatively flat and have greater potential to accommodate appropriate development than others that are steep or have other physical development constraints such as aquifers and wetlands. Lastly, local community planning desires and attitudes suggest that not all land use goals and policies should be universally applied.

It is the finding of TRORC that in order for this Plan to address each Interchange Area specifically, supplemental policies have been developed for each of these interstate interchanges. The policies in each Interchange Area section apply specifically to the interchange indicated.

#### ***Quechee (Hartford) Interchange (I-89, Exit 1)***

Exit 1 of Interstate 89 accesses U.S. Route 4 and connects travelers and commerce west to Woodstock, Killington, Rutland, and beyond,

and east to White River Junction and Interstate 91. Route 4 is one of the few east/west highways spanning the narrower width of the State and therefore carries steady volumes of traffic. This interchange is located 1.5 miles from municipal sewer and water service; the residential wastewater system located to the west in Quechee is a shared leachfield system. The on- and off-ramps for the northbound and southbound lanes are located 0.5 miles apart. There are two different scenarios present at either end, with the northbound interchange leaving few opportunities for development due to the close proximity of 30-percent slopes and the interstate.

The southbound interchange is a sprawling commercial area with access roads intersecting the on- and off-ramps.

White River Junction—the Regional Center, a Vermont Designated Downtown, and a Designated Growth Center — is located 3.5 miles to the east. Development at this interchange should be of a type that does not displace the development and investment that has occurred in the Regional Center or in Quechee Village. In order to mitigate against the impacts of strip development and sprawl, and to ensure the vitality of Hartford’s Regional Center, Town Center, Village Center, and Hamlet Area, this interchange is not an appropriate location for principal retail establishments.

#### ***Randolph Interchange (I-89, Exit 4)***

The Exit 4 interchange on Interstate 89 is located in Randolph, 3 miles from the revitalized historic downtown and commercial district and 1 mile from historic Randolph Center, home

of Vermont Technical College (now Vermont State University). Exit 4 accesses Route 66, a two-lane connector road that runs in an east/west direction between the Village of Randolph, Randolph Center, East Randolph, and Route 14. This area is predominately open land, including farmland and woodland. The interchange area is known for panoramic and distant scenic vistas, particularly the mountain views to the west. There are several structures at the interchange, including a gas station and convenience store, a fast-food restaurant, professional offices, an auto service repair garage, a state highway facility, an industrial/office complex, and several single-family residences.

Presently there is no existing municipal water supply provided to the area, although there are water supply systems on the western edge of the area (Fish Hill) and eastern edge near Vermont State University. An existing sewer line passes through the area and conveys wastewater from Vermont State University down Route 66 to the municipal treatment facility. Annual average daily traffic (AADT) on Route 66 is estimated to increase with or without new development in the area.

Since 1998 the Town of Randolph has explored opportunities for development at the Exit 4 Interchange. The Randolph Town Plan reflects many of these efforts, dividing the Interchange Area into four quadrants and incorporating design and use standards for each quadrant into its land use regulations. Key components include the following:

1. Provide space for the development of





business parks with design guidelines to protect scenic values;

1. Provide open space for the conservation of wetlands, streams, steep slopes, other natural resources, and visual quality;
1. Limit or deny new curb cuts to maintain the carrying capacity of Route 66;
1. Provide space and opportunities for transitional/senior housing;
1. Provide for an improved park-and-ride commuter lot/Welcome Center; and
1. Consider land for an agricultural/cultural museum perhaps to be affiliated with other uses.

Further, the extensive study conducted by the community determined that retail development at the interchange was unsuitable for a combination of reasons, including traffic impacts on Route 66, visual sensitivity, and conflicts with downtown businesses. Moreover, standalone retail development at any scale or size was found to be incompatible with the community's values. However, there was one exception. Accessory uses of a retail nature were found acceptable.

### **Royalton Interchange (I-89, Exit 3)**

Exit 3 on Interstate 89 in Royalton accesses Route 107, which runs in an east/west direction, connecting to Bethel and Stockbridge and Routes 100 and 14. Route 107 is classified as a minor arterial road. It is a heavily traveled road and forms part of a major transportation corridor between I-89 and Rutland and points west. Forecasts reveal that traffic volume will continue to grow over the next 20 years.

Following the completion of I-89 56 years ago, several parcels of land near the interchange area have been developed. Primarily these changes in land use have been from rural residential and agricultural uses to industrial or commercial uses, but still much of the area remains undeveloped, consisting of farm and forestland. Several areas contribute to highly scenic vistas, particularly from I-89 and Route 107. Due to its prominent location, it is likely that new development at Exit 3 will continue. Solid transportation planning, coupled with sound land use planning principles, can minimize land use and traffic conflicts that have plagued many other Interchange Areas.

In 1999, the Town of Royalton conducted an extensive planning project in which the Royalton Planning Commission found the following values to be important to the area:

1. Provide space for future business growth, but only when it doesn't detract from Royalton's two villages;
2. Promote new development when plans are carefully laid out for safe access onto Routes 14 and 107;
3. Protect sensitive resource and scenic areas and encourage good design for new projects; and
4. Preserve the carrying capacity of Route 107 as a minor arterial road.

Given these values and an analysis of development suitability, nine future land use designations were recommended and depicted on a map. These included areas for industry, service and office type uses, residences, agriculture, and limited development. Goals and recommendations were

listed to help guide the community on the highest and best uses for each sub-area. TRORC accepts the findings and conclusions contained in the *Exit 3 Planning and Development Study* (September 2000), which has since been incorporated into the Royalton Town Plan, as the planning policies developed by the Town of Royalton for this area.



### **Rural Areas**

The vast majority of land in the Region lies outside any of the Regional Growth Areas identified in this Plan but is still not remote forest. These Rural Areas make up 51% of the Region and are where many of us live and most of our local food is grown, and they form the principal visual backdrop along most roads. While we each may have a picture in our minds of what "rural" is, for this plan "rural," and hence Rural Areas, means lands that consist of a low-density mixed pattern of land uses, primarily homes, interspersed with scattered small-scale businesses, resource-dependent or land-consumptive commercial operations, outdoor recreation, and natural resource uses. The land is predominantly covered by forest, active agricultural land, or fallow agricultural lands transitioning back to forest. Rural lands are largely remote and undeveloped, or developed enough to constitute an existing settlement. Development within these





Rural Areas has been largely constrained by on-site limitations, including soil composition, slope, and elevation; ease of access to highways; lot size minimums; and distance to community services.

Historically, a significant amount of the Region's growth over the past sixty years has taken place in the Rural Areas, primarily in the form of scattered residential development that has crept up hillsides, out into fields, and deeper into forests. As residents locate their homes farther from Regional Growth Areas, commercial businesses that serve those populations seek to locate closer to them, moving out of or away from traditional business centers. This pattern of growth in the Region is our version of sprawl and places land development pressures on Rural Areas, particularly in those communities that are nearest to major highways and serve larger populations.

Land-consumptive commercial uses are commercial operations that rely on large amounts of indoor or outdoor storage as the dominant use of space, and include sales lots and warehouses.

This development has brought new life back into many towns, but these land use changes have also gnawed away at rural landscapes despite local planning efforts and public investment strategies that give priority to new projects within defined growth areas. This incremental change is largely due to no regulation through Act 250 of small-

scale subdivisions, low regulation of residential development in those towns with zoning, and a general desire for "development" at the local level, as this is seen as helping a town in terms of tax revenue or increased vitality. This in no way means that all residential development in Rural Areas is bad, but such development comes with costs, too. New homes increase a town's tax base but the residents may require better road maintenance. Building on what were once farm fields offers farmers needed income but impairs the future of local farming. Higher property values increase a town's grand list but may also drive up taxes on current residents.

It is in the interest of the Region and in conformance with our towns' plans that scattered development not continue unabated so that the present land use features within Rural Areas can be maintained and remain dominant. State planning goals, to which the Regional Plan must be consistent, direct plans to "maintain the historic settlement pattern of compact village and urban centers separated by rural countryside... (and that) intensive residential development shall be encouraged primarily in areas related to community centers and that strip development along highways should be discouraged." Rural Areas in the Region can provide substantial amounts of new opportunities both to reuse existing structures and to locate new homes, home occupations, and small businesses. These lands often may be the cheapest land to put an affordable home on. But there are tradeoffs and the overall effect of unplanned growth in certain locations and at a certain scale in Rural Areas is in the process of transforming the landscape from

something recognizable as "rural" in Vermont into something that is not. Rural Areas are not simply suburbs waiting to be created; they are a valued land use to Vermonters in their own right, and can remain that way for a long time if we are careful in how we develop them.

Not all land within Rural Areas is similar, nor should it be treated the same when planning for development. Some land is steep, wet, prime agricultural soil, of special habitat value, adjacent to waterways, or subject to flooding, and should largely remain undeveloped for these reasons. However, these aspects are very site specific and are dealt with on a policy basis elsewhere in this Plan. This section of the Plan addresses those uses desired for Rural Areas in general and that complement the more developed parts of the Region.

One of the main land uses in the Rural Areas is agriculture, either in cropland or in pasture. These open lands are part of the aesthetic appeal of the

Resource-based commercial uses are such things as sawmills, quarries, and sandpits, outdoor recreation, nurseries, and agricultural product processing. These are dependent on resources at the site and may include retail of products produced on site.



Region, underlie an agrarian culture, and form the basis for a significant part of our economy. Forestry is another important use, though most larger forests are in the Forest-Based Resource Area. Agriculture and forestry and the land they depend on are addressed both in this chapter and in the Working Landscape chapter.

Regional land use policy elsewhere in this Plan focuses most business uses within or close to Regional Growth Areas. Rural Areas, however, can accommodate certain non-residential uses in ways that serve to maintain the vitality of more developed areas and that do not unduly compromise one of the principal objectives for these Areas—to retain rural character. For example, the Rural Areas are where many of the Region’s homes are, so naturally many home occupations are found there as well. Home occupations are allowed by right in local regulations in Vermont anywhere homes are allowed and are a way for people to earn a living with minimal land use impact. They must use less of the building than the home uses and can have a variety of small commercial operations.

Home enterprises are typically larger operations that are still on a residential lot but are allowed in many town zoning bylaws with some limitations on the number of people that can work there and on impacts such as traffic. Contractor’s yards are a common home enterprise. With appropriate review, Rural Areas can provide these land uses a good location.

Rural Areas have many older structures such as large farmhouses or barns that lend themselves

to adaptive reuses that can both preserve these visual assets and provide employment. Inns, small industrial operations, and multi-family dwellings are examples of uses that can keep these structures from becoming obsolete while not creating a major visual change to the rural landscape.

While commercial enterprises in the Rural Areas are smaller and scattered, there are two somewhat intensive commercial uses that make sense to locate in Rural Areas. These are either based on resources found there or are land-consumptive commercial uses. Resource-based commercial uses provide economic benefits and jobs that support the rural landscape, and they are uses that would largely detract from developed Regional Growth Areas if located within them. Such uses have a traditional rural role in Rural Areas.

Commercial land-consumptive uses that are not dependent on natural resources do not make the best use of the limited amount of land in Regional Growth Areas that have sewer and/or public water supply. Locating these immediately adjacent (within a quarter mile) to Regional Growth Areas along major roads can serve to protect the desired aspects of both rural and more urbanized areas.



### Forest-Based Resource Areas

The lands within the Forest-Based Resource Areas—primarily large blocks of unfragmented forest that are needed to sustain a forestry industry

and areas that contain critical wildlife habitat and allow safe wildlife movement—provide the Region with important services that cannot be replaced on other lands. Land with these characteristics is shrinking in both the State and the Region. The health of many natural communities and wildlife depend on these large, uninterrupted areas of forestland, commonly referred to as “forest blocks,” and these must be connected to each other through wildlife corridors.

The main threats to such areas and their functions are fragmentation and parcelization. Forest fragmentation is the division or conversion of forest blocks through the clearing of land, building of structures, and other activities associated with development (excluding recreational trails). Even the seemingly simple act of installing roads affects wildlife movement and increases invasive plants and pests. Development that causes forest fragmentation creates barriers which limit species movement over the landscape, interrupts ecological processes, and impacts genetic diversity. Parcelization, which is part of fragmentation, is the subdividing of forest parcels to smaller lots but does not necessarily involve further development. Parcelization makes continuing to manage forests for forestry or conservation more difficult or even impossible.

Both fragmentation and parcelization will impact the important functions we now enjoy from the large forest blocks in these areas, but unless lands are bought outright for conservation or have easements on them, some development is likely. How this development, from simple subdivision into lots to subsequent construction of roads and



buildings, takes place is a matter of public concern, as it can negatively affect forestry and the many species that depend on such areas, as well as generate off-site impacts, such as increased flood flows. Further development in remote areas would also create increased costs for towns to maintain or upgrade minor Class 3 or 4 roads and would work against regional energy goals as such development is much more reliant on single-occupant vehicle trips.

Such landscapes need to be addressed at the regional level. An individual landowner might be able to conserve a wooded wetland for salamanders or a small forest for deer habitat, but this would not be enough to meet all the needs of that species within the area. A large timber owner might conserve a sizable forest, but that does not support an industry. Even efforts at the town scale (though very important) do not contain enough land for many species' needs, which can be several hundred acres per individual among the larger animals.

The best available data on where the priority interior forest blocks, as well as priority wildlife corridors, exist (see maps below) has been produced by the Vermont Conservation Design (VCD) joint project of the Vermont Department of Fish and Wildlife, Vermont Department of Forests, Parks and Recreation, and the Vermont Land Trust. Wildlife corridors are critical to connect the large blocks so that populations do not become inbred, species can move as climate shifts, and isolated incidents such as blowdowns or timber harvesting do not threaten overall species health. Several wildlife species need habitat areas exceeding one square mile for

population health. As noted in the report *Vermont Conservation Design: Maintaining and Enhancing an Ecologically Functional Landscape*, if these landscapes are conserved on a large scale, then “most of the species they contain . . . will also be conserved.” There are no doubt additional locally significant lands that are not large enough to show up in this data that are still important.

While the Region looks well forested from the air, there are places in the Region where forest blocks and wildlife corridors are tenuous, particularly in the area that stretches from Barnard to Sharon. However, as the maps below show, for nearly half of the Region's towns, the entire town outside of small developed areas along roads is either a forest block or a wildlife corridor block.

It is not a regional goal, and certainly not a town goal, to have nearly entire towns developed at a very low density. Consequently, the VCD map of these areas was used as a *starting point* when developing the Forest-Based Resource Areas regional future land use area, and then it was modified based on town future land use maps, infrastructure, the amount of land that performs interior forest or habitat connector functions nearby, and adjacent conserved or public lands. This resulted in the final Forest-Based Resource Areas shown on the future land use map.

Allowing the lands in these Areas to remain largely undeveloped will maintain their ability to provide timber production, outdoor recreation, flood storage and aquifer recharge, scenic beauty, and wildlife habitat, and contribute to our economic well-being and quality of life. Allowing some

careful development in them will create income for landowners and address other regional goals, such as outdoor recreation and housing. It is not the intent of this Plan to create true wilderness areas, and the policies in the Plan reflect that. However, much of the Region's land that once provided large-scale wildlife habitat can no longer do so due to existing development, and therefore the remaining lands in some towns are more likely the *minimum* needed to fulfill these functions rather than the optimal amount.

Figure 3-1 shows VCD Forest Blocks, where the dark green areas are highest priority blocks and the light green are priority blocks. Figure 3-2 shows VCD Connectivity Blocks, where the dark blue are highest priority blocks and light blue are priority blocks.

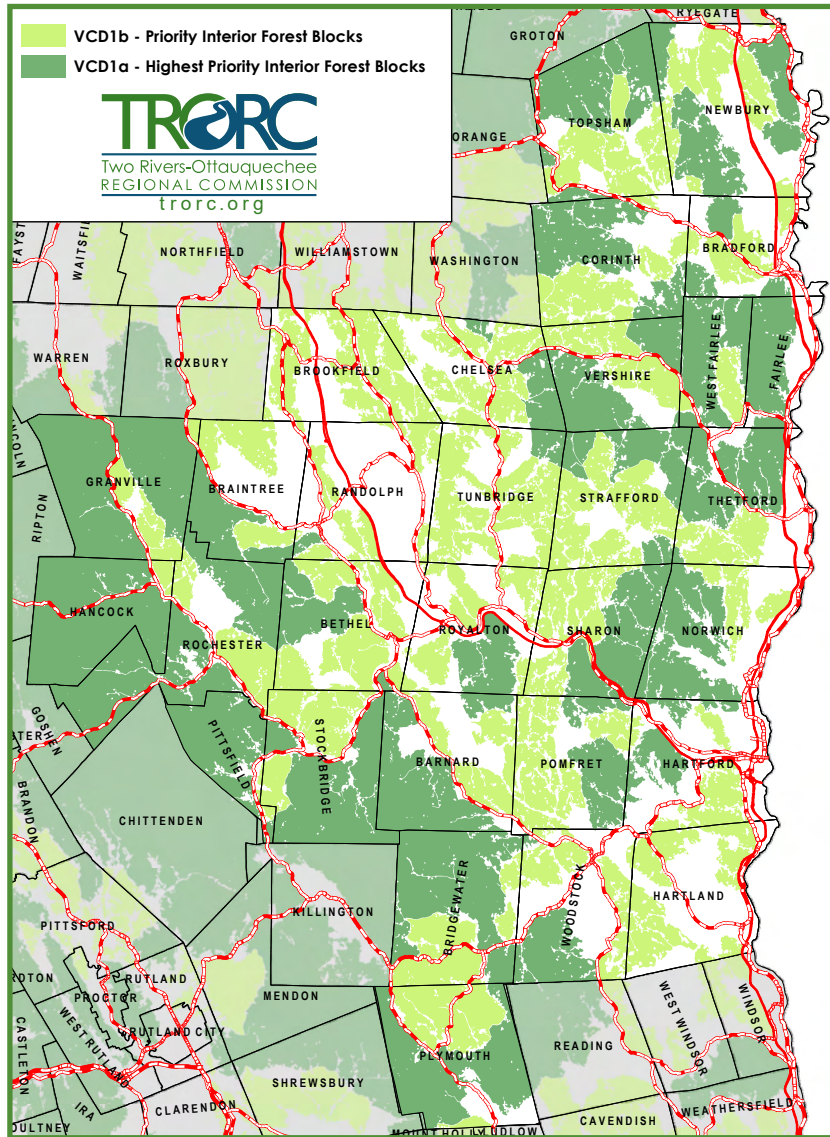
### ***Chateauguay No Town (CNT)***

A particularly large and coherent part of the Region that exemplifies the Forest-Based Resource Areas is what is known as the Chateauguay No Town (CNT) area. This is a remote upland wilderness area consisting of approximately 55,000 acres covering parts of the Towns of Barnard, Bridgewater, Stockbridge, and Killington. With limited exception, land parcels are large, ranging up to several thousand acres in size. Human settlement is sparse, year-round public access is practically non-existent for most of the area, and public services (such as electric or telephone) are very limited. Roads are relatively narrow and steep and are not designed to sustain heavy vehicles or high volumes of traffic. The few inhabitants living here mostly provide their own power and lighting and maintain and plow their own roads. Much of the CNT is

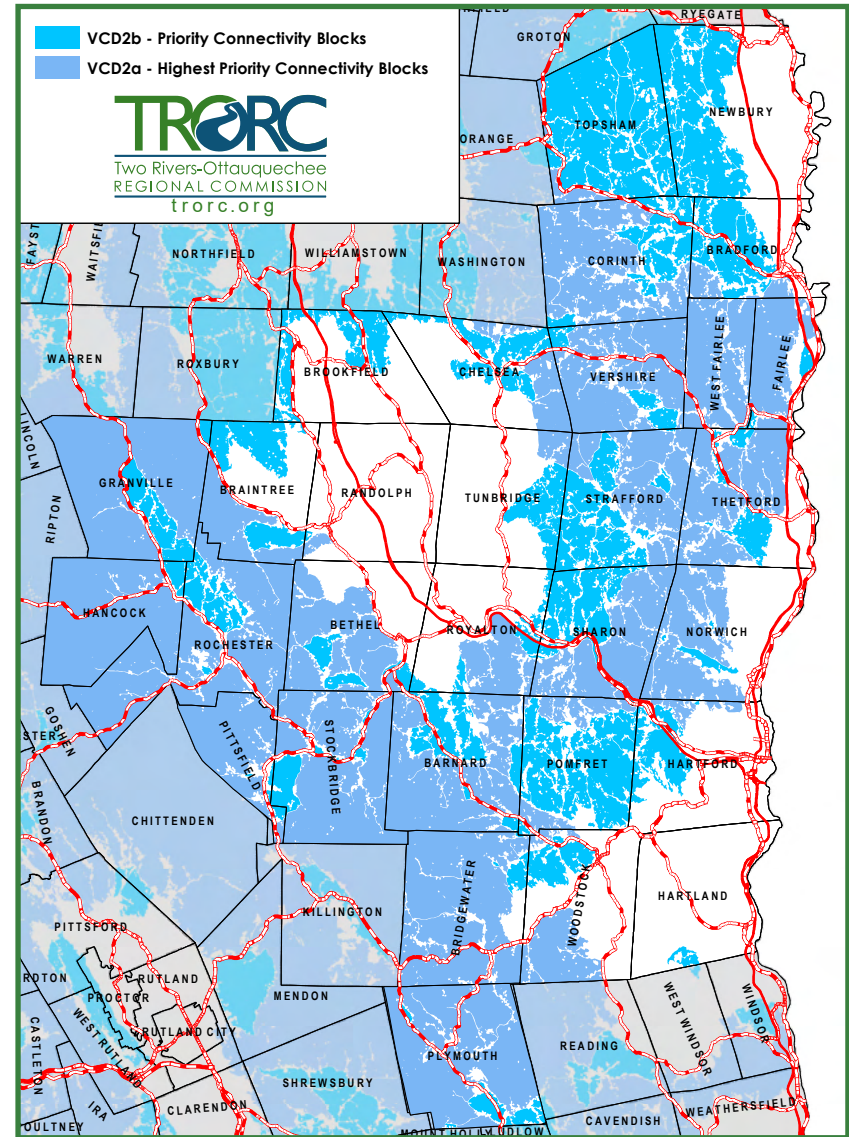




**Figure 3-2:** Highest Priority and Priority Interior Forest Blocks in the TRO Region



**Figure 3-3:** Highest Priority and Priority Connectivity Blocks in the TRO Region





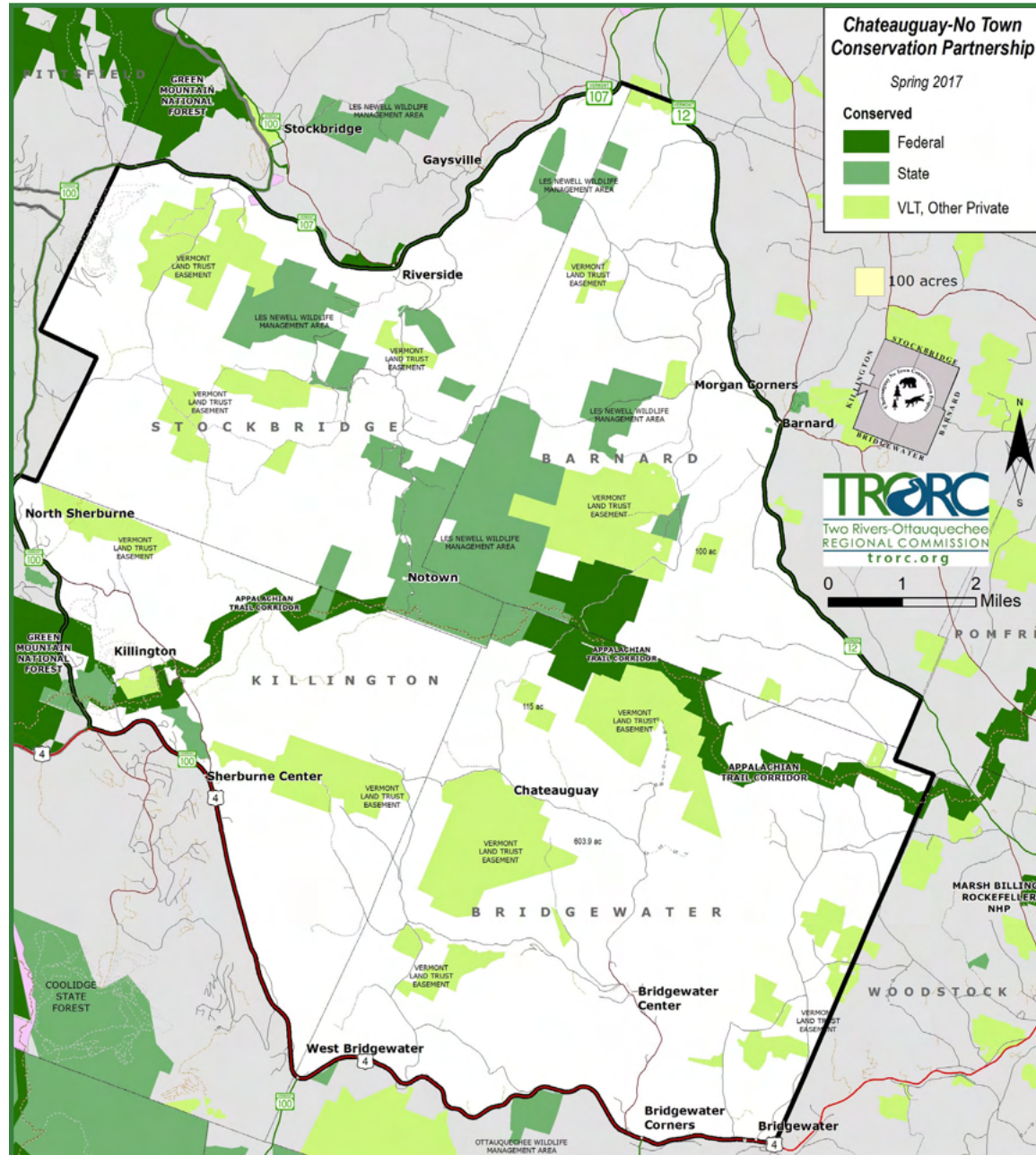
**Table 3-1: Wildlife Present in Forest Patches**

Undeveloped	500 - 2,500 acre blocks	100 - 500 acre blocks	20 - 100 acre blocks	1 - 20 acre blocks
Raccoon	Raccoon	Raccoon	Raccoon	Raccoon
Small rodent	Small rodent	Small rodent	Small rodent	Small rodent
Squirrel	Squirrel	Squirrel	Squirrel	Squirrel
Red fox	Red fox	Red fox	Red fox	Red fox
Songbirds	Songbirds	Songbirds	Songbirds	Songbirds
Skunk	Skunk	Skunk	Skunk	Skunk
Amphibians	Amphibians	Most Amphibians	Most Amphibians	Most Amphibians
Reptiles	Reptiles	Reptiles	Most Reptiles	Most Reptiles
Hare	Hare	Hare	Hare	
Porcupine	Porcupine	Porcupine	Porcupine	
Beaver	Beaver	Beaver	Beaver	
Weasel	Weasel	Weasel	Weasel	
Mink	Mink	Mink		
Turkey	Turkey	Turkey		
Horned owl	Horned owl	Horned owl		
Barred owl	Barred owl	Barred owl		
Sharp-skinned hawk	Sharp-skinned hawk	Sharp-skinned hawk		
Cooper's hawk	Cooper's hawk	Cooper's hawk		
Broad-winged hawk	Broad-winged hawk	Broad-winged hawk		
Osprey	Osprey	Osprey		
Harrier	Harrier	Harrier		
Deer	Deer	Deer		
Wood frog	Wood frog	Wood frog		
Ring-neck snake	Ring-neck snake	Ring-neck snake		
Bald eagle	Bald eagle			
Goshawk	Goshawk			
Moose	Moose			
Red-tailed hawk	Red-tailed hawk			
Coyote				
Bobcat				
Black bear				
Fisher				

Source: Above and Beyond. Campoli, J., Humstone, E., & MacLean, A. 2002.



**Figure 3-4: Chateaugay No Town (CNT) Conservation Area Map**



owned by timber companies or families interested in using the land for wood production and land is enrolled in Vermont’s Land Use Value Appraisal Program.

In late 1997, the Chateaugay No Town Conservation Project was launched by the four towns the CNT is located in, “to foster, through locally sponsored conservation activities, the long-term commitment to stewardship of exceptional forest, wildlife, and recreational lands.” Since then, a locally appointed committee, in cooperation with the Vermont Land Trust, the Conservation Fund, TRORC, Appalachian Trail Conference, and the Vermont Agency of Natural Resources, has been evaluating ways to voluntarily conserve this area, to protect critical habitats, to promote sustainable forestry, and to ensure recreational opportunities. To assist the CNT partners in the implementation of the project, both a local and a regional conservation fund have been established to provide financial resources to landowners interested in conservation of their property. Several landowners have agreed to work with the project on specific plans to voluntarily conserve their land.

Like much of the Forest-Based Resource Areas, in the CNT multiple recreational activities are present, especially seasonal hunting camps, snowmobiling, and hiking. The Appalachian Trail passes through the central section of the CNT. The CNT also contains the 7,988 acre Les Newell Wildlife Management Area and provides valuable habitats for wildlife, including black bear, moose, bobcat, and deer. The entire CNT has been identified by the Vermont Department of Fish and Wildlife as bear production habitat. The CNT serves as a critical



link between the bear production areas south and north of US Route 4. The long-term stability of black bear depends on the retention of this area in a predominately undeveloped state.

### ***Taylor Valley***

The Taylor Valley area straddles parts of the towns of Vershire, Chelsea, Tunbridge, and Strafford. This area has large stretches of undeveloped land, wildlife habitat, unique flora and fauna, productive timber land, productive agricultural land, and extensive areas for hunting and other outdoor recreational opportunities. The privately organized Taylor Valley Conservation Project has identified a core area of 19,000 acres centered around the Taylor Valley for special conservation attention. Approximately 4,000 acres in the core area have been conserved through conservation easements, and landowners have committed to the conservation of an additional 1,700 acres in the core area. The greater Taylor Valley Area also includes extensive forestlands stretching from the Strafford-Tunbridge Road in a southerly direction to the Joseph Smith birthplace including over 1,000 acres protected by conservation easements held by the Upper Valley Land Trust and the Vermont Land Trust.

### ***Brushwood Community Forest/West Fairlee Town Forest/Fairlee Town Forest***

In 2009, Brushwood Community Forest was established on approximately 475 acres of relatively undeveloped forestland in the Towns of Fairlee and West Fairlee. With the help of the Trust for Public Land, an additional 580 acres was added in northern Fairlee that had been owned by the Town of Bradford. The 1,055 acre area is now owned by the

Town of West Fairlee and protected from development through a conservation easement. It abuts the separate West Fairlee Town Forest and the large 1,500 acre Fairlee Town Forest. The lands in public ownership comprise just a small section of the greater 28,000-acre Brushwood Forest area that boasts an extensive trail network, vast undeveloped forestlands, wetlands, and wildlife habitat.

### ***Coolidge State Forest (CSF)/Arthur Davis Wildlife Management Area***

CSF encompasses 21,500 acres of land in Plymouth and Woodstock, and additional lands in Reading, Killington, Mendon, and Shrewsbury. The State Forest includes Coolidge State Park where campsites, hiking trails, and beautiful scenic views are abundant. CSF is the state's third largest State Forest and is managed by the Vermont State Parks' Department of Forests, Parks, and Recreation (FPR). It abuts the 7,788 acre Arthur Davis WMA found in Plymouth and Reading, which is managed by the Vermont Department of Fish and Wildlife.

### ***Green Mountain National Forest (GMNF)***

With over 400,000 acres, the GMNF is located within several TRORC towns, including Woodstock, Rochester, Hancock, Pittsfield, Stockbridge, Granville, Bridgewater, Pomfret, Hartford, and Norwich. The lands contain portions of the Long Trail, Appalachian Trail, and Robert Frost National Recreation Trail. These areas preserve the headwaters of the White River and provide significant outdoor recreation and forestry opportunities, as well as form part of the largest north-south wildlife corridor in the State.

### ***Orange County Headwaters (OCH)***

The OCH Project was started by landowners in the Towns of Washington and Corinth who had an interest in conservation. Through the Vermont Land Trust and the Upper Valley Land Trust, 31 OCH landowners have conserved 4,500 acres. Much of this land is forested.

### ***Pine Mountain Wildlife Management Area (WMA)***

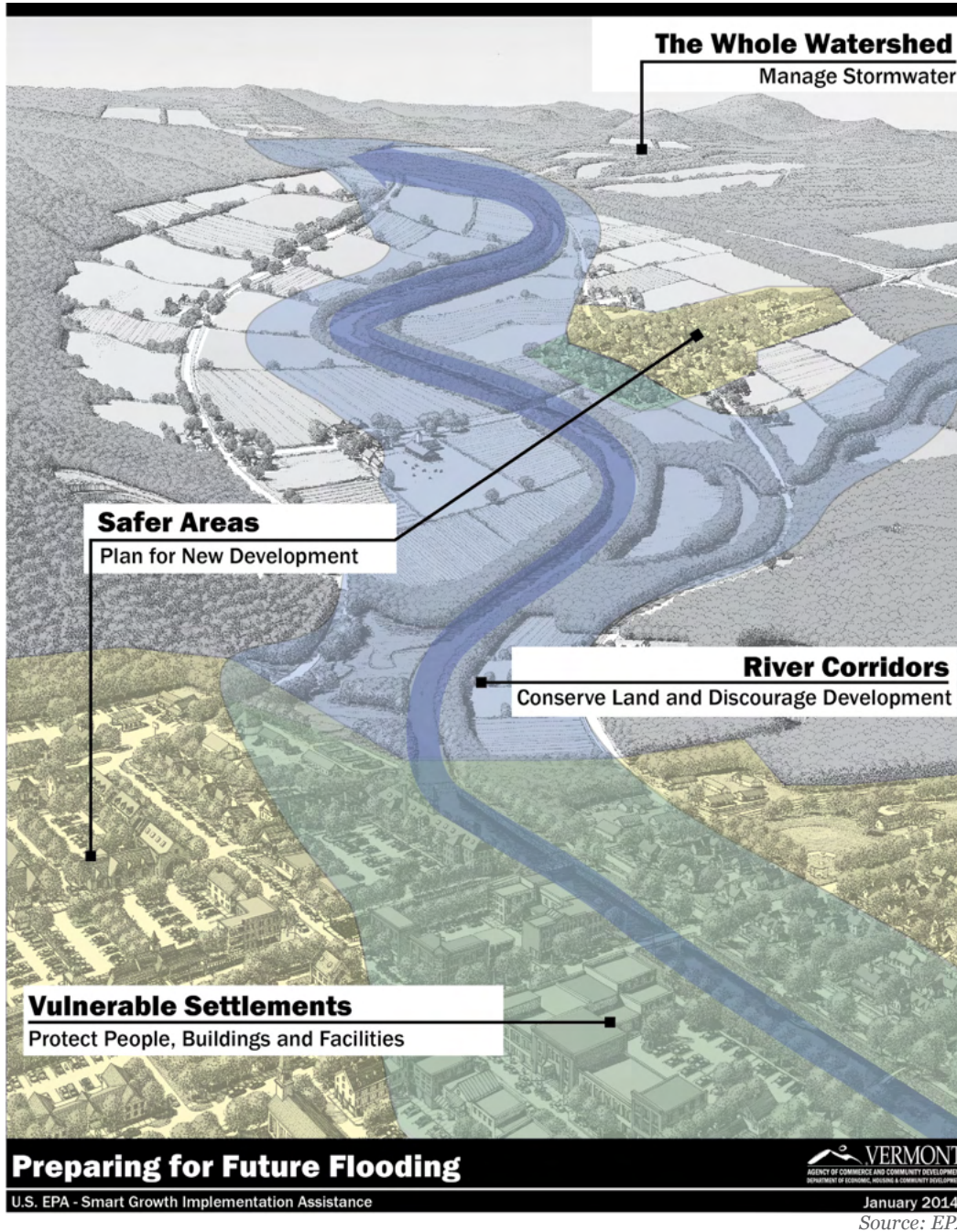
Pine Mountain is one of the larger WMAs in the Region. It spans the towns of Topsham and Newbury as well as Groton and Ryegate (outside of the Region). It is 2,274 acres in size, 95 percent of which is forested. Managed by the Vermont Fish and Wildlife Department, the Pine Mountain WMA is home to white-tailed deer, black bear, moose, and many other mammals, birds, fish, and amphibians. The area is open for hiking, fishing, trapping, and hunting.

### ***Other Lands***

The Region has other smaller state and town owned lands, as well as privately owned lands that are protected through conservation easements held by land trusts, such as the Vermont Land Trust or Upper Valley Land Trust.







## C. Flood Resilience

### Types of Flooding

Generally speaking, there are two types of flooding that impact communities in the State of Vermont—flooding caused by inundation and flash flooding. Inundation flooding usually occurs slowly, but flood waters can cover a large area. It may take days or weeks for inundation floodwaters to subside from low areas, which may severely damage property. Inundation flooding takes place on flat and poorly drained land, typically along obvious floodplains. Ice or debris jams can also create inundation flooding as floodwaters back up behind such jams.

Flash flooding occurs when heavy precipitation falls on the land so quickly that the soil is unable to absorb it into the ground, leading to surface runoff. Runoff can be increased by saturated soil, extremely dry soil, frozen ground, and impervious surfaces. The quick-moving runoff collects in the lowest channel in an area, turning upland streams, small tributaries, and even dry ditches into roaring brooks. Flash flooding typically does not cover a large area, but the water moves at a very high velocity and the flooding manifests quickly, making flash floods particularly dangerous. Due to the velocity of the water, a flash flood can move boulders, trees, cars, or even houses.

Heavy storms can also cause fluvial channel erosion, in which the bank erodes and the channel migrates sideways and/or cuts deeper. Fast-moving water in a stream channel may undermine roads and structures and permanently change





the channel itself, predisposing other roads and structures to future flooding damage. Flash floods can also mobilize large amounts of gravel and woody debris, depositing these in less steep areas as well as plugging culverts and leading to even greater damage. In Vermont and the Region, most flood-related damage is caused by flash flooding and fluvial erosion (erosion of stream banks). Flooding is the worst current natural threat to residents and infrastructure in the TRO Region and the State.

Significant flooding events have occurred in the TRO Region throughout recorded weather history. Due to the topography of the Region, it is likely that large-scale or widespread localized flooding has been occurring for hundreds or thousands of years. Please see Appendix D for a table outlining the flooding events that have occurred in the TRO Region over the past 100 years, beginning with the worst flooding event to hit the TRO Region and Vermont, the “Great Flood of 1927.”

### Causes of Flooding

Flooding in our Region is caused by a small number of distinctive types of weather and can be worsened by the conditions on the land (such as saturated or frozen soils) at the time the flooding occurs. By far the most common type of weather event to cause flooding in our Region is a severe thunderstorm. These storms are usually afternoon storms in the warmer months, but they can also be associated with hurricanes and tropical storms, which also occur during the summer and into the fall. By the time most hurricanes reach Vermont, they have been downgraded to tropical storms, but that is not

to say they are less dangerous. The speed of the hurricane or tropical storm and pockets of varying severity within the storm system have an impact on the rainfall totals observed from town to town. For example, Tropical Storm Irene dropped over six inches in much of the White River Valley (and nine inches in Rochester, according to local reports), causing extensive flooding damage. However, the towns in the Region along the Connecticut River received only 3” to 5” and experienced minimal flood damage. Storm impacts can be greatly magnified by previous rains. Tropical Storm Floyd in 1999 was very similar to Irene, but it fell on dry ground and is hardly remembered.

“Resilience” means that an entity—a person, neighborhood, town, state, region or society— when faced with a particular situation or event, has the ability to effectively return to its previous state or adapt to change(s) resulting from the situation or event without undue strain.

Ice jams due to the combination of melting snow and rain leave our Region vulnerable to the impacts of flooding in the winter and early spring. Ice jams typically occur during the spring when river ice begins to break up and move downstream, but they may also occur during a thaw period in the winter months. These sheets of ice then “jam” as they become hung up on a narrow or shallow portion of the stream or river, creating a dam, and additional ice and water rapidly back up behind

them. Once the “dam” breaks free, flash flooding may occur downstream. Ice jams in our Region typically cause minimal damage, but they can damage road infrastructure and flood homes and businesses. The mainstem and First and Third Branches of the White River, the Waits River, the Connecticut River, and several smaller brooks have all experienced ice jams.

Flooding is worsened by land uses that create hard surfaces, which lead to faster runoff, and by past stream modifications, such as straightened or dredged channels, which can create channel instability.

### Implications of Climate Change and Flooding

According to a white paper produced by the Vermont Agency of Natural Resources (VT ANR)’s Climate Change Team, climate change will likely bring about conditions that exacerbate flooding in Vermont. The summer season is expected to lengthen overall, and the total precipitation is expected to increase in all seasons except the fall. The frequency of heavy precipitation events is likely to increase in all seasons, with the heaviest precipitation events occurring during the summer months. Perhaps more importantly, precipitation will likely occur in shorter, more intense bursts and, consequently,

**Climate change will likely bring about conditions that exacerbate flooding in Vermont.**  
~VT Agency of Natural Resources





*Route 4 Before and After Tropical Storm Irene*  
| Source: USDA Farm Service, Google Earth

will produce precipitation that runs off the land more than it filters into it. An increase in extreme precipitation is already documented in the Northeastern U.S., especially after 1996. Precipitation models currently used in designing and building road infrastructure, informing policy decisions, and in regulating the location where structures and facilities are built rely on historical data that is no longer accurate for current conditions and will only become less accurate as climate change continues.

### Flood Damages

Floodwaters spilling over riverbanks have given us broad and fertile floodplains. Floods have carved our valleys and made our hills and mountains. Were it not for human infrastructure and settlement in the path of it, flooding would be a natural occurrence but not a hazard. However, we have built most of our towns and villages right next to the rivers that powered our mills, carried logs, provided water, and took away our waste. We built our roads along streams, as that was the easiest route, and often used gravel mined from the adjacent stream. When it seemed inconvenient to plow around meandering streams or to bridge rivers, we just moved the waterways aside. Erroneously

thinking that rivers behaved like pipes, we straightened them thinking they would flood less, but that actually only increased their erosive force. Due to our actions, not nature's, flooding is the worst current natural threat to residents and infrastructure in the TRO Region.

Flooding in the Region causes immediate impacts such as eroded river banks, road closures, flooded structures, and crop damage. However, once the stress of the initial flooding impacts has subsided, the more long-term impacts begin to show, especially after major flooding events. One long-

term impact is the effect of flooding on the Region's economy. Economically speaking, Tropical Storm Irene struck at a very inopportune time at the end of August 2011, when the year's crops were ready for harvest or would have been ready in a few weeks. Because many of the Region's farms and agricultural lands are located in the floodplain, crop damage was widespread. Approximately \$2 million in vegetable crops alone were destroyed or left to decompose statewide. The economic impact for flood damage to farms statewide was estimated at \$20 million (this estimate includes buildings and land, hay, corn, pasture, soybeans, vegetables, and fruit).

Vermont is a destination for travelers, especially in the fall foliage season. Due to the damaged road infrastructure after Irene travel was difficult. Finding an east-west route was especially difficult, as many of the major roads in the Region had been damaged at one section or another, including US 4, VT 100, VT 107, and VT125. With the fall season approaching, travel to areas not directly off the major highways was slow or impossible. Woodstock was among the most hard-hit areas in the State for room sales, reporting a drop of 68.4 percent in September 2011 and 20.4 percent in October 2011.

### Flood Hazard and Fluvial Erosion Hazard Areas in the TRO Region

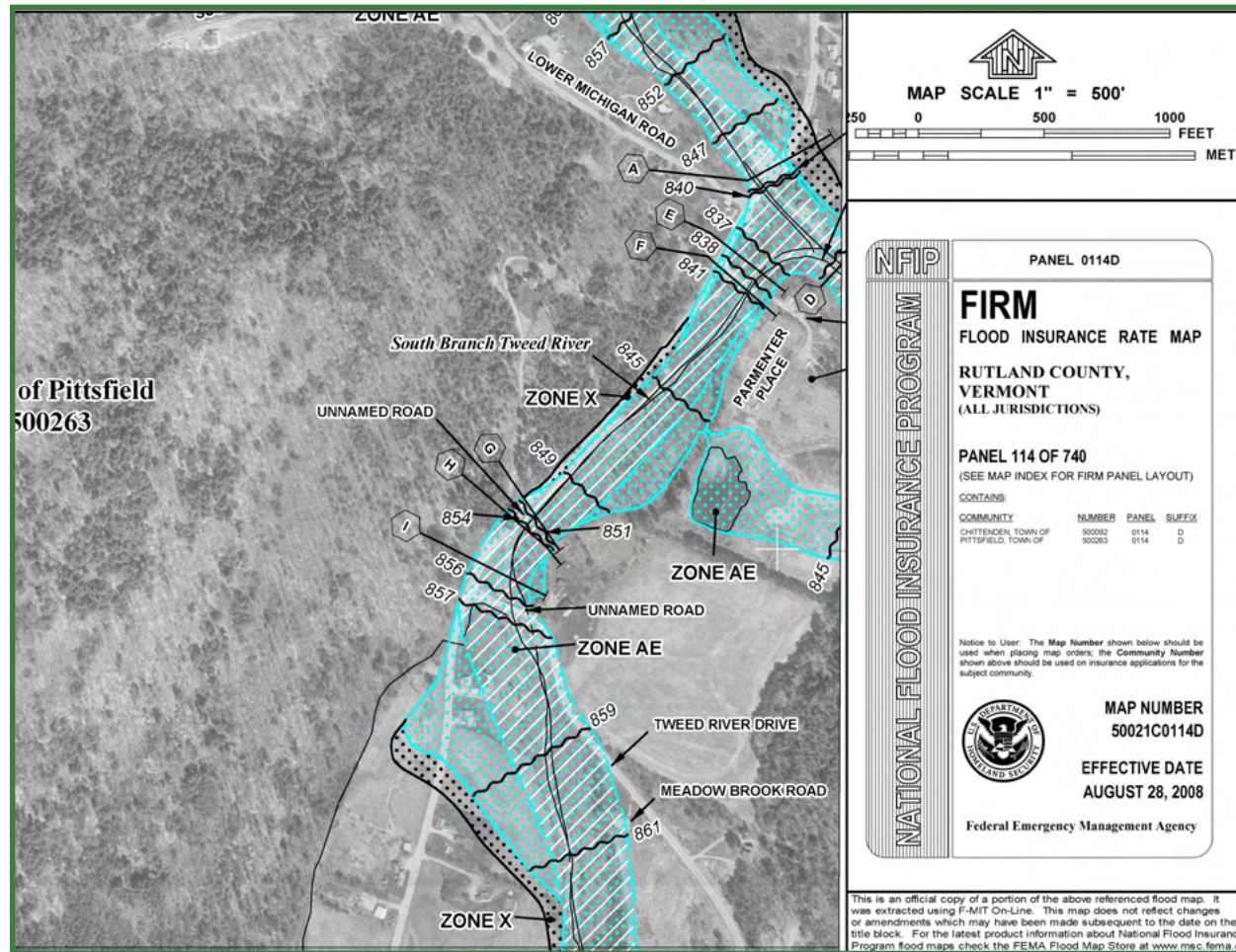
#### **Flood Hazard Areas**

There are two sets of official maps that can govern development in the floodplain in Vermont. Though they have limitations, these maps are the best current means of showing areas with higher flood risk. The first of these is the Federal Emergency





Figure 3-5: Example of a FIRM Map in Pittsfield



Management Agency’s (FEMA) Flood Insurance Rate Maps (FIRMs). Every town in our Region has these areas of flood risk mapped by FEMA. The FIRMs show the floodplain (the Special Flood Hazard Area or SFHA) that FEMA has calculated would be covered by water in a 1 percent chance annual inundation event, also referred to as the “100-year

flood” or base flood. It is important to understand that the 1 percent chance flood was calculated with limited historical rainfall data on a relatively rough topographic scale. Many parts of the Region have had several “100-year” floods in the last 20 years and there is now evidence that extreme rainfall increased starting in the mid-1990s.

Most of the FIRMs used by the towns in the Region are outdated. Most towns have maps drawn up in the 1970s. Orange County’s maps are largely still in paper form and are not able to be used with modern mapping programs. Windsor County’s maps have been converted to digital format, but the underlying data, except along the Connecticut River, is also 30 to 40 years old. The outdated information on these FIRMs provides challenges for administering a town’s flood hazard regulations. Some towns or areas of towns have extremely basic FIRMs with approximate A Zones (labeled “Zone A”). In these areas, the base flood elevation has not even been determined and the map is drawn at a rough scale. As a result, a map like this does not provide the elevation to which a structure must be raised, leading to more expense by landowners who must find out that information. Such maps also do not show where the “floodway” is. The floodway is an extremely risky part of the floodplain where the current is strong. Since special restrictions apply to floodways, not having these mapped is cumbersome for owners and towns as these areas must first be determined on a case by case basis. Lastly, no Special Flood Hazard Areas or floodways are mapped at all for smaller streams, leaving out these risky areas and creating a false sense of safety.

A significant portion of flood damage in Vermont occurs outside of the FEMA mapped areas along these smaller upland streams, as well as along road drainage systems that fail to convey the amount of water they are receiving. Since FEMA maps in the Region are concerned only with inundation and also assume that river channels never move, they



are poor at showing that these other areas along small streams or alongside channels are at risk from flash flooding and lateral erosion. This leads to these areas often not being recognized as flood-prone or to the risk being identified simply as high water. Property owners in such areas outside of SFHAs are not required to have flood insurance.

To remedy this lack of accurate risk information and to create a tool that would allow towns to regulate development in these additional areas with flood erosion risk (but that are not shown on FIRMs), VT ANR has developed the second kind of flood risk map we have: a “river corridor” map. Initial river corridor maps have been produced for the entire state, and the agency is refining these as additional data is available. Maps of river corridors depict where the lateral movement of the river and the associated erosion is more of a threat than inundation by floodwaters. Elevation or floodproofing alone is often not protective of structures in these areas, as erosion can undermine them.

It should be noted that some lands within developed areas or next to existing structures, though mapped as river corridors and potentially subject to erosion risk, may be removed from this area during permitting, as the channel’s edge has already been reinforced so that erosion does not occur or will be repaired. In recognition of this, the river corridor maps already stop at state highways and railroads, as it is assumed that these will be protected from erosion or replaced post-disaster by the government. TRORC is working with VT ANR on having the maps in developed areas adjusted to reflect this reality.

### ***Flood Hazard Regulations***

In order to enable property owners to be eligible for federal flood insurance through the National Flood Insurance Program (NFIP), municipalities must adopt and enforce flood hazard area regulations either through their regular zoning bylaws or through a separate bylaw. A community’s flood hazard regulations must apply to at least the Special Flood Hazard Areas (SFHA) identified by FEMA and contain certain minimum standards. The regulations deal with the permitting of new structures in the floodplain and place restrictions on other types of activities within the floodplain. They also specify land, area, and structural requirements to be adhered to within the SFHA. Paradoxically, using only the minimum required FEMA regulations can increase flood risk, as these allow the placement of fill in areas that could have stored flood waters, permit development to flood heights that are outdated and too low, and also fail to take erosion into account at all.

Municipalities can seek to reduce the threat of flood damage within their jurisdiction by not allowing new structures in the floodplain and through enacting stricter standards than the minimum required by the NFIP, such as elevating structures one to two feet above the base flood level and regulating development in river corridor areas as well. Lax enforcement of flood regulations can place people at risk of injury or death, place infrastructure and property at risk of damage or destruction, and can even create liability on the part of the community.

### ***Home/Property Buyouts***

Following the flood damage caused by the 2011 spring flooding and Tropical Storm Irene, a number of property owners in Vermont applied for property buyouts, which were funded by FEMA’s Hazard Mitigation Grant Program (HMGP) and HUD’s Community Development Block Grants for Disaster Recovery (CDBG-DR) administered through TRORC. Roughly 70 properties in the TRO Region, and 150 in the State, were involved in the buyout process. The towns in our Region with buyout properties include Bethel, Braintree, Bridgewater, Granville, Hartford, Pittsfield, Plymouth, Rochester, Royalton, Sharon, and Stockbridge. Most of these towns are located on the White River and its tributaries. Buyouts are an effective way to reduce a community’s vulnerability to flooding and therefore improve the community’s overall resilience to flooding. Homes are no longer potential objects that will wash downriver and clog a bridge, and buyout sites (once cleared) provide floodwaters more room to release energy. As a result, a number of communities in our Region have been made safer.

### ***Lands That Help Prevent Flooding***

#### ***Wetlands***

Wetlands are a vital component for maintaining the ecological integrity of land and water, and they provide an array of functions and values that support environmental health and provide benefits to humans, including flood and stormwater control. Draining, filling, and development have resulted in the loss of more than 35 percent of Vermont’s original wetland acreage, primarily due to agricultural and large-scale development projects,





and this loss has increased flood risk.

The Vermont Wetlands Rules “identify and protect significant wetlands and the values and functions which they serve in such a manner that the goal of no net loss of such wetlands and their functions is achieved.” Although only wetlands designated as “significant” are protected under the Wetlands Rules, the rules state, “Wetlands not designated as significant under these rules should be assumed to have public value, and therefore may merit protection under other statutory or regulatory authority.”

In the Region, just over 1 percent of the land area has been identified by the State of Vermont as “significant” wetlands, eligible for state protection under the Vermont Wetlands Rules. However, there are a large number of smaller wetlands that may qualify for protection. Examples of larger wetlands that help to attenuate floodwaters and reduce flooding damage in the TRO Region include the Class 2 wetlands through the Killington Flats area and along Swamp Road in Newbury. However, there are a number of smaller wetlands in all of the towns that also provide flood mitigation, water quality benefits, and wildlife habitat.

TRORC recognizes the critical value of wetlands in relation to the health of the water, wildlife, and plant resources in the Region and to the ecosystem as a whole. TRORC supports and encourages communities to identify and inventory wetlands within the Region and to adopt mechanisms for their increased protection. This information can increase the effectiveness of the state and federal

regulatory process. Towns and communities have the ability to adopt mechanisms that provide stricter protections than are required by the State. For more on wetlands, please see the Natural Resources chapter.

### ***Riparian Buffers and Lands Adjacent to Streams***

Naturally vegetated riparian zones (vegetated buffer strips next to surface waters) are essential for healthy and resilient river corridors. Vegetated riparian buffers provide a number of “ecosystem services” including attenuating floodwaters; providing river bank support and stabilization; reducing flood and ice damage to adjacent lands and structures; and slowing surface water runoff.

Moving outside of the riparian buffer, lands adjacent to streams also provide benefits, especially during flooding events. Once water overtops the river or stream channel, these areas help slow the velocity of the water by allowing the water to expand laterally over the land area instead of moving down the river or stream channel. Because of their tendency to flood and the consequent deposition of nutrients on the land, these areas tend to be very productive agricultural lands. They also serve to collect ice or debris during floods, helping river or stream channels to stay clear. The importance of these lands was demonstrated during the flooding caused by Tropical Storm Irene, as the White River was able to dissipate along fields between towns, helping to attenuate some of the floodwater.

### ***Upland Forests***

Upland forests are distinguished by having a nearly



*A home in Rochester that was bought out in the buyout program.*

continuous canopy cover of 60 percent or more. They also contain many small unnamed streams that make up the headwaters of a watershed. These headwater streams are the smallest yet most abundant streams draining the State of Vermont and the TRO Region. Therefore, the activities occurring in the headwaters can impact an entire watershed.

Healthy and well-managed upland forests reduce flooding by intercepting rainfall so that the force of rain is less erosive, increasing the infiltration and storage of rainwater into rich soils, and soaking up massive amounts of water during the growing season. The TRO Region is home to many different kinds of forested areas. For instance, the Region contains some of the vast unbroken forested ridgelines of the Green Mountain National Forest, as well as several large blocks of conserved forested areas, like the Chateaugay No Town Conservation Project, which stretches across the towns of Barnard, Bridgewater, Stockbridge, and Killington.



These and other forested lands not only provide ecological, scenic, and economic benefits but also help mitigate flood damage.

### **Stormwater and Impervious Surfaces**

Impervious surfaces prevent the infiltration of water into the soil. Man-made impervious surfaces include parking lots, rooftops, roads (even gravel roads), and severely compacted soils, all of which exacerbate flooding events by increasing the amount and velocity of stormwater runoff, especially in heavy rain events. The percentage of impervious surfaces can be reduced by limiting the number of rooftops and amount of pavement, by using permeable surfacing materials, by employing disconnection practices, and by implementing Low Impact Development (LID) principles. Low Impact Development refers to the process of designing and implementing practices at the site level to minimize the creation of stormwater and to replicate conditions present before the development of an area by managing stormwater runoff the way a healthy and intact environment would—by slowing it, spreading it, and/or sinking the runoff into the ground.

While widespread impervious surfaces are detrimental to water quality, and even as little as 10 percent impervious cover in a watershed can destabilize rivers, impervious surfaces in village centers and downtowns are the desired result of dense development and are important in the fabric of the Vermont landscape. It is critical to maintain the dense development of village centers and downtowns for their outright benefits to their community. However, it is also important to understand the stormwater runoff issues that exist

and the various ways to mitigate their effects.

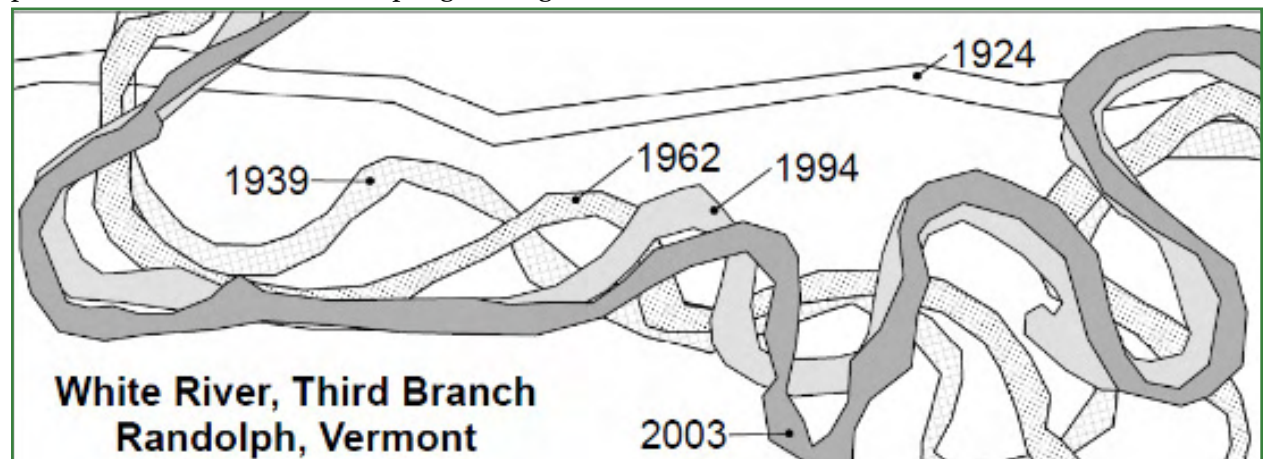
### **The Site-Specific Nature of Flooding**

The risk of flooding in Vermont varies site by site, to the point that even adjacent parcels may be impacted differently in a flooding event.

Generally speaking, floodways are extremely dangerous places and the Special Flood Hazard Area and river corridors are high risk, but each site presents specific issues and a unique set of circumstances. For example, on a site only in the Special Flood Hazard Area, the risk may be solely from inundation, so the specific elevation is a major factor in flood damage. On a site in the river corridor, the risk may be due to lateral erosion, so elevation is less important than whether you are sitting on bedrock. On other sites, the risk may be from both inundation flooding and erosion. The site-specific nature of flooding complicates assessing and planning for flood risks. It is important to understand the specific risks that are present at each site before attempting to mitigate

flood damage on that site.

The late Gilbert White, considered the father of floodplain management in the United States, wrote, “Floods are ‘acts of God,’ but flood losses are largely acts of man.” By this he meant that flooding is a hazard not simply because it rains hard, but that we have put things in the way that will suffer from that rain. Historically, Vermont town and village centers were established around water power, which created the densely developed village and town centers we value. Today, the desire to maintain and continue this settlement pattern still holds true—even if the downtown or village center is vulnerable to flood risks. As such, it is important to recognize that there are trade-offs between flood risk and having compact development. Keeping these areas of compact settlement as safe from flooding as possible, given their location, may require elevation and floodproofing efforts, but will largely depend upon natural flood storage and surface runoff retention in upstream areas.



*The White River's path through the years.* | Source: George Springston



## Goals and Policies: Overall Land Use

### Goals

*The land use goals within this section represent the foundation of the planning and development for the Region. These goals are intended to be applied throughout the Region.*

1. Development patterns and their related transportation systems promote public health and reduce energy use and greenhouse gas emissions.
2. Energy-efficient and affordable housing choices are expanded.
3. Land use planning and regulation maintains our quality of life, environment, and economy.
4. Intensive development occurs only where adequate public services and facilities are currently available or planned.
5. The health of residents is improved by investing in clean water, soil, and air and safe and walkable neighborhoods.
6. The patterns of development in the TRO Region remain consistent and compatible with the goals of VSA Title 24, Chapter 117, §4302.

### Policies

*The land use policies apply throughout the Region. Subsequent sections on individual types of land use areas have policies specific to each of them.*

1. Any public investment in public and private housing for the elderly, disabled, and low- or moderate-income families shall be directed into Regional Centers, Town Centers, and Village Settlements, or areas within one mile of these along state highways and transit routes, and away from unsettled rural areas where no services exist.
2. Principal retail establishments must be located only in Regional Growth Areas to minimize the blighting effects of sprawl and strip development along major highways, to protect the vitality of our villages and downtowns, and to maintain rural character.
3. Development of federal or state governmental offices distant from and outside Regional Growth Areas contributes to increased traffic, scattered development, and costly public services. Such a pattern of development is incompatible with the goals and policies of this Plan.

## Policies: Regional Centers

### Policies

1. Regional Centers should support a mixture of single family, two-family, and multi-family housing and should have the highest densities in the Region.
2. Commercial land uses, services, offices, wholesale business, industry, transport facilities, and community facilities and programs that serve regional needs and markets shall be located in Regional Centers.
3. Intense growth in Regional Centers is appropriate when a complete complement of public services such as water, sewer, and highways are available. To accommodate additional development, continued maintenance or expansion of such facilities must occur.
4. Local capital planning programs and public investment strategies must encourage renovation of existing buildings and in-filling within Regional Centers.
5. Retail establishments that provide goods and services to a regional clientele must be located within or immediately adjacent to Regional Centers and Town Centers to ensure that the vitality of these economic centers is maintained.



## Policies: Regional Centers

### *Policies (continued)*

6. Adaptive use of larger homes (including those of historic and architectural significance) for differing, more economical uses, such as offices and multi-unit housing, is consistent with this Plan. See the Historic Resources section for more information.
7. In historic districts or areas with a concentration of buildings with architectural or industrial significance, new development must be compatible with the existing character of the district or historic buildings but should not replicate the historic features exactly.
8. In areas containing structures and buildings of architectural or engineering significance, new development must be planned to be reasonably compatible with existing development and to not unduly impact the general and special character of the area.
9. Major developments like large governmental, medical, and commercial buildings must be located in Regional Centers where utilities, facilities, and populations are concentrated.
10. Highway investments within Regional Centers must include multi-modal transportation, pedestrian circulation, traffic calming, and streetscaping.

## Policies: Town Centers

### *Policies*

1. Town Centers shall support a mixture of single-family, two-family, and multi-family structures at the highest densities possible given existing sewer and water capacity and community character.
2. Commercial uses (including principal retail establishments), services, offices, wholesale business, industry, transport facilities, and community facilities and services are appropriate to locate in these areas.
3. Intense growth is appropriate in Town Centers when a complete complement of public services such as water, sewer, and highways is available. To accommodate additional development, continued maintenance or expansion of such facilities must occur.
4. Local capital planning programs and public investment strategies must encourage renovation of existing buildings and in-filling within Town Centers.
5. Principal retail establishments must be located in Regional Growth Areas to minimize the blighting effects of sprawl and strip development along major highways, to protect the vitality of our villages and downtowns, and to maintain rural character.
6. Conversion of larger older homes (particularly those with historic merit) to newer, more economical uses, such as offices and multi-unit housing, is consistent with this Plan. See the Historic Resources section for more information.
7. New development shall be planned to be reasonably compatible with existing development, preserve buildings of historic, architectural, or engineering significance, and not unduly impact the character of the area.
8. Postal facilities and similar governmental offices should be located where other public services are available or planned.
9. Highway investments within Town Centers must give significant consideration to multi-modal transportation, and include pedestrian circulation, traffic calming, and streetscaping.





## Policies: Village Settlements

### *Policies*

1. Village Settlements should support a mixture of single-family, two-family, and multi-family structures at the highest densities possible given existing sewer and water capacity. Village Settlements that have neither public water nor sewer should plan for the maximum densities that can be supported by the soils present, in order to avoid ground and surface water contamination while also keeping the area denser than surrounding rural areas.
2. Conversion of larger older homes (particularly those with historic merit) to newer, more economical uses, such as offices and multi-unit housing, is consistent with this Plan. See the Historic Resources section for more information.
3. Principal retail establishments, services, tourist businesses, lodging, public facilities, and business and industrial enterprises of a scale and design that fit the context of the area are appropriate for this area.
4. Local capital planning programs and public investment strategies must support renovation of existing buildings and in-filling within Village Settlement Areas.
5. New development must not place undue burdens on municipal or regional facilities, utilities, and services, including transportation systems.
6. New development shall be planned to be reasonably compatible with existing development, preserve buildings of historic, architectural, or engineering significance, and not unduly impact the character of the area.
7. Long-range planning for the provision of public services in these areas to accommodate future growth is encouraged.
8. Planned and existing services should be coordinated so that the future expansion of services can be more accurately evaluated.
9. Highway investments within Village Settlements must include pedestrian circulation, traffic calming, and streetscaping.

## Policies: Hamlet Areas

### *Policies*

1. The density of development in Hamlet Areas must reflect the existing settlement patterns, physical land capability, and availability of utilities for expansion. Hamlet Areas should support primarily single- and two-family homes and residential-scale small business enterprises (including principal retail establishments) that fit the context of the immediate area and are meant primarily to serve local markets.
2. Major traffic thoroughfares through Hamlet Areas must be planned with traffic calming elements.
3. New buildings should maximize allowable density. Where unusual natural features, soil limitations, or special resources (including high value agriculture land) are identified, use of cluster development concepts is encouraged to protect such resources from unnecessary development.
4. Existing postal facilities, and similar governmental offices, must be retained in Hamlet Areas and not be relocated into Rural Areas.



## Policies: Industrial Areas

### *Policies*

1. Industrial development and uses are the primary use within an Industrial Area, provided that the scale and intensity of the development does not have an undue adverse impact on the surrounding area.
2. In addition to industrial development, commercial development (excluding principal retail establishments), services, and offices may be appropriate, provided these are not the dominant uses.
3. Traffic and pedestrian safety must be a strong consideration in the design of development within Industrial Areas, particularly those areas with a large trucking component.
4. Principal retail establishments shall not be located in Industrial Areas, but secondary retail may be.

## Policies: Mixed-Use Areas

### *Policies*

1. Light industrial development may be appropriate, provided that the scale and intensity of the development does not have an undue adverse impact on the surrounding area.
2. Multi-family housing at several units per acre or greater is appropriate in this area.
3. Commercial uses that include land-consumptive uses, lumberyards, repair services, service businesses, secondary retail, warehouses, kennels, and indoor recreation are appropriate in this area.
4. Principal retail shall not be permitted in this area.
5. Reasonable efforts shall be made to provide pedestrian connections between uses, interconnect parking lots, and limit access points onto the state highway.

## Policies: Quechee Gorge Tourist Area

### *Policies*

1. Retail and commercial uses that serve the tourism focus of visitors to the Quechee Gorge Tourist Area or the needs of the local community are appropriate. For example, smaller mixed-use offices, hotels, restaurants, and shops selling gifts and other sundry items.
2. Residential uses such as multi-unit or mixed-use residential buildings and single-family units are appropriate.
3. Individual principal retail buildings must not be larger than 10,000 square feet in footprint, and single retail uses no larger than 4,000 square feet.
4. In order to maintain mobility, all new construction must use existing side streets or existing accesses onto US 4 for vehicular traffic, and new uses shall provide pedestrian interconnections to adjacent uses.



## Policies: Interchange Areas - General

### Policies

*The following policies apply to all designated Interchange Areas:*

1. Land use activities and public or quasi-public investments planned for Interchange Areas that have the effect of eroding the socioeconomic vitality of downtowns are incompatible with this Plan. Land uses planned for Interchange Areas must be of a type, scale, and design that complement rather than compete with uses that exist in Regional Growth Areas. Unless otherwise noted in the following Interchange Specific Policies, appropriate uses include residential, highway-oriented lodging and service facilities, trucking terminals, light industrial, offices, truck-dependent manufacturing, and park-and-ride commuter lots. No use should impose a burden on the financial capacity of a town or the State to accommodate the growth caused by the project.
2. Development planned for Interchange Areas must be constructed to:
  - a. Complement the design principles and standards reflected in this Plan;
  - b. Promote the most appropriate land uses as determined through a locally sponsored planning process involving affected landowners, municipalities, and TRORC;
  - c. Minimize visual impacts from roadways through screening and landscaping and maintain a high standard of scenic amenities for visually sensitive areas with due regard to impacts on neighboring land uses and highway users; and
  - d. Encourage planned unit developments.
5. Master plans for each Interchange Area should be completed. Such Plans should be conducted locally as part of each local planning commission's ongoing planning program in cooperation with landowners, TRORC, and other affected parties. Work should focus on creating an integrated site plan and design plan that serves as a means of addressing the potential conflicts or problems noted above. Elements that the Plan should include are:
  - a. Access management controls;
  - b. Pedestrian amenities;
  - c. Transit access;
  - d. Parking;
  - e. Energy efficiency;
  - f. Utilities/public services;
  - g. Outdoor lighting standards;
  - h. Landscaping and screening;
  - i. Signage; and
  - j. Open space conservation.
4. Master Plans must serve as the foundation for the identification of the highest and best use of these areas and should provide a framework for future development. Incremental and uncoordinated development inconsistent with Master Plans for each of the Interchange Areas is discouraged.
5. Development concepts that must be utilized for Interchange Areas include:
  - a. A circulation system that is conducive to pedestrian, bicycle, and other non-vehicular travel modes;
  - b. A density or lot coverage area that is higher than surrounding rural settlement areas;
  - c. Use of planned unit development concepts, such as compact development that is offset by open space;
  - d. A design that incorporates public spaces and promotes social interactions;



## Policies: **Interchange Areas - General**

### *Policies (continued)*

- e. A mixture of uses including non-residential and community facilities, and possibly residential;
  - f. Central focal points or public spaces serving the entire area;
  - g. A pattern and scale of development that complements traditional patterns and uses in Regional Growth Areas; and
  - h. Provision for park-and-ride commuter parking lots, transit access, and travel information services.
6. Municipalities with Interchange Areas are encouraged to promote creation and adoption of an Official Map, per 24 VSA §4421, to provide a legal means of creating an interconnected network of streets, walkways, and other public facilities or amenities on land designated as interchange development areas. Concepts employed in Master Plans and the Official Map should employ traditional streetscape patterns and designs deemed compatible with existing Regional Growth Areas.
  7. Principal retail establishments must be located in Regional Growth Areas to minimize the blighting effects of sprawl and strip development along major highways, to protect the vitality of our villages and downtowns, and to maintain rural character.

## Policies: **Quechee Interchange**

### *Policies*

1. Intensive development that increases traffic volumes must not be permitted on the open lands accessed by Stagecoach Road; it would degrade the operation and safety of Interstate 89 and U.S. Route 4.
2. Development around the southbound interchange must be planned based around access points that do not degrade the functionality of U.S. Route 4 or the I-89 on- and off-ramps.
3. The types of land development appropriate for this interchange include offices, light industrial, residential, appropriately scaled traveler-oriented uses, and other similar uses that are not intended to draw on regional populations.
4. Principal retail establishments must be located in Regional Growth Areas to minimize the blighting effects of sprawl and strip development along major highways, to protect the vitality of our villages and downtowns, and to maintain rural character.

## Policies: **Randolph Interchange**

### *Policies*

1. The development of large-scale retail at the Randolph interchange—including shopping centers, malls, auto dealerships, and big-box stores—is inconsistent with this Plan.
2. Small-scale retail uses secondary or subordinate to primary uses and non-traditional to downtown Randolph or its village areas may be acceptable uses subject to in-depth review and evaluation by the Selectboard and Planning Commission.





## Policies: **Randolph Interchange**

### *Policies (continued)*

3. Any project planned for the interchange must employ design and construction standards that will ensure that development does not unduly impair the scenic resources of the area.
4. New development should be sited in areas that are not highly scenic, visible, or environmentally sensitive.
5. Future development at the interchange that requires improvements to Route 66, including traffic signals, turning lanes, or roundabouts, must be carefully evaluated. These should only be authorized where it is determined such a privately funded investment will not unreasonably endanger or interfere with the function, efficiency, safety, or use of this route.
6. New development must coordinate with existing development on shared access or retrofit access point locations to improve safety.
7. The types of land development appropriate for this interchange include offices, light industrial, residential, appropriately scaled traveler-oriented uses, and other similar uses that are not intended to draw on regional populations.
8. Principal retail establishments must be located in Regional Growth Areas to minimize the blighting effects of sprawl and strip development along major highways, to protect the vitality of our villages and downtowns, and to maintain rural character.

## Policies: **Royalton Interchange**

### *Policies*

1. The types of land development appropriate for this interchange include offices, light industrial, residential, appropriately scaled traveler-oriented uses, and other similar uses that are not intended to draw on regional populations.
2. Principal retail establishments must be located in Regional Growth Areas to minimize the blighting effects of sprawl and strip development along major highways, to protect the vitality of our villages and downtowns, and to maintain rural character.

## Goals, Policies, and Recommendations: **Rural Areas**

### *Goals*

1. Agriculture continues to form an important visual, economic, and cultural part of the landscape.
2. Rural lands provide a place for people's homes and small businesses.
3. Development is at a scale and type that conforms to historical patterns and does not detract from Regional Growth Areas.



## Goals, Policies, and Recommendations: Rural Areas

### *Policies*

1. Development shall be at a scale that is less dense than adjacent Regional Growth Areas.
2. Except along paved roads, development density greater than one principal structure per two acres is not appropriate to maintain rural character, but lot sizes are encouraged to be smaller than this in subdivisions so as to preserve a larger portion of the remaining lot as undeveloped and still meet overall density goals.
3. New freestanding, individual multi-unit residential buildings containing five units or less per structure are appropriate along Class 3 or better roads in order to stay in keeping with rural scale, but larger ones are not, excepting inns, outdoor recreation, and other lodging. However, a development may contain more than one such multi-unit building. Individual buildings with more than five residential units each are not appropriate in this Area. This unit limit does not apply to adaptive reuses, or to rooms in senior care facilities, outdoor recreation, or lodging establishments.
4. Adaptive reuses, such as small light industrial operations or multiple housing units, are encouraged in older existing large structures as towns desire, but care must be taken to not lead to development too intensive for the rural character.
5. Development of resource-based commercial uses is appropriate in these areas, with safeguards to protect neighbors from undue adverse impacts from noise, dust, and other nuisances (see also Section H in the Natural Resources chapter for more on extraction policies).
6. In Rural Areas that abut state highways and that are no greater than a quarter mile to Regional Growth Areas, land-consumptive uses may be appropriate, provided that they do not have an adverse impact on the character of the adjacent Regional Growth Area and that they mitigate the impacts of sprawl and strip development.
7. Projects subject to Act 250 must be planned and sited to satisfy the following:
  - a. Utilize compact development design and locate new development or lots near or adjacent to existing road infrastructure and away from productive fields or forests to conserve the maximum feasible amount of usable farm, pasture land, or managed woodland;
  - b. Locate non-agricultural buildings next to or within the forest edge (if any), instead of in open fields, to enable new construction to be screened by natural landscape features;
  - c. Minimize buildings, utilities, or structures blocking or interrupting scenic vistas as viewed from a public highway;
  - d. Take reasonable steps to protect historic features, wetlands, stream buffers, forest blocks, wildlife crossing areas, necessary wildlife habitat, and habitat connectors; and
  - e. Give consideration to burying power and phone lines, if cost effective, when new roads are being constructed.
8. Use of planned unit developments or conservation subdivision design schemes is strongly encouraged as a means of providing rural development that concentrates development on part of a parcel in order to preserve larger lots that are more useful for farming, forestry, or wildlife habitat. Towns should consider incentives such as density bonuses.
9. Non-residential uses, including small service businesses, small professional offices, and inns are acceptable land uses for Rural Areas provided that such uses are located near existing transportation infrastructure; planned at a residential scale and form; are not primary or dominant uses in an area; would not unduly conflict with existing or planned residential, forestry, or agricultural uses; and do not unduly affect rural character.
10. TRORC supports the right of a resident to use a minor portion of a dwelling unit for a home occupation, which is customary in Rural Areas, provided it does not create a nuisance or have an undue adverse effect on the values noted in this Plan as being important to sustaining the character of Rural Areas.
11. Major retail enterprises or service centers that draw principally on regional market shares (including factory outlets, large grocery stores, fast-food establishments, and shopping malls) shall not be permitted in Rural Areas.



## Goals, Policies, and Recommendations: **Rural Areas**

### *Policies (continued)*

12. Development shall be designed to take reasonable steps to minimize accesses onto public roads, and projects that would create traffic demands that require the paving of rural gravel roads are not appropriate in Rural Areas.

### *Recommendations*

1. TRORC will work with towns and developers to site housing in Rural Areas to meet housing needs. (See also the Housing chapter.)
2. TRORC will work to ensure that agriculture in these areas remains an important part of our economy. (See also the Working Landscape chapter.)
3. TRORC will work with towns, state and federal agencies, and conservation organizations to conserve important forest and agricultural lands.
4. TRORC will work with member towns on Town Plans and bylaws to address development in the Rural Areas so that it meets state planning goals and the desires of towns.

## Goals, Policies, and Recommendations: **Forest-Based Resource Areas**

### *Goals*

1. Healthy forests remain an important part of the Region's landscape and continue to provide their unique functions, including recreation, forest products, and wildlife habitat.
2. Upland forests serve to retain and cleanse water and have high-quality waters.
3. Forest blocks are connected so that species can move between them.

### *Policies*

1. Land above 2,500 feet elevation shall be maintained predominantly in a natural wilderness state, except in cases of wind power and/or telecommunications projects endorsed by this Plan.
2. Acquisition of lands, or conservation easements on lands, by the Federal Government, the State of Vermont and nonprofits is encouraged between willing parties. Management plans prepared for conserved or acquired areas must recognize the concept of preservation as well as forest utilization.
3. Outdoor recreation and forestry uses are encouraged provided these uses do not unduly impact other significant resources of the site.
4. Timber production is encouraged in this land use area provided it is done in accordance with best management practices and managed and harvested in ways that keep soil erosion and sedimentation of streams to a minimum.
5. Motorized recreation must be limited to designated existing trail/road networks and new connections between trails and be compatible with any critical wildlife habitat and water quality protections. Retention of snowmobile trails, many of which go over private land and are part of the statewide VAST trail network, is a priority. Conservation plans developed for landowners in this land use area should reflect, where practicable, the desire to retain this network of trails and not close or cut off important trail routes.
6. New structures capable of being occupied year-round are not appropriate in interior (greater than 300 feet from the forest edge) parts of these areas, but noncommercial seasonal camps serving hunters, snowmobilers, and other outdoor recreational users are appropriate.



## Goals, Policies, and Recommendations: **Forest-Based Resource Areas**

### *Policies (continued)*

7. Any use deemed appropriate to elevations over 2,500 feet should be sensitive to slow vegetative recovery and severe soil limitations and must avoid erosion.
8. Subdivisions and other development subject to Act 250 on lots over 30 acres shall minimize impacts on forestry potential and habitat values of undeveloped areas by concentrating development at the forest edge near other development and roads; use small lot sizes and shapes so that at least 80 percent of the land remains in a large undeveloped tract; minimize clearing of forest; and avoid the creation of additional roads or power lines that would further future development into interior areas.
9. Large subdivisions of more than ten structures are inconsistent with this Plan.
10. Outdoor recreation is encouraged. Development of snowmobile, hiking, and cross-country ski trails and similar recreational facilities are appropriate uses subject to meeting acceptable management practices and applicable state law.
11. Formal designation of Class II groundwater areas and Class A1 and B1 surface waters by the State of Vermont is encouraged within the land use area.
12. No development in its built-out state shall create more than one acre of impervious surface.
13. New developments must take reasonable steps to avoid disruption or loss of major identified wildlife corridor crossings. Transportation enhancement projects should be pursued to mitigate vehicle conflicts with wildlife, including signage and education and awareness programs along road corridors that host significant numbers of wildlife crossings. In addition, initiatives should provide for improvements to the transportation infrastructure to reduce vehicle collisions and wildlife fatalities.
14. Upgrading or paving gravel roads, upgrading electric distribution lines, or extension of utilities is not appropriate in this area, except as needed to serve outside areas, unless the public is clearly benefited thereby and where it is determined not to compromise the land use goals and policies for this Area.

### *Recommendations*

1. As habitat data is updated, TRORC will re-evaluate this land use area to ensure that its purposes are being met.
2. TRORC will work to ensure that the functions of these areas are economically valued so that both the towns containing them and their owners have incentives to leave them in a largely undeveloped state.
3. TRORC will work with state and federal agencies and conservation organizations to conserve these lands in ways that also support the local economy and bring value to landowners.
4. TRORC will work with member towns on Town Plans and bylaws that will address smaller development not subject to Act 250 so that it is done in ways that preserve the functions of these areas while allowing compatible development.





## Goals, Policies, and Recommendations: **Flood Resilience**

### *Goals*

1. The citizens, property, and economy of the TRO Region and the quality of the Region's rivers as natural and recreational resources are protected by using sound planning practices to address flood risks.
2. The Region is able to recover from flooding quickly and in a manner that improves flood resilience.
3. The creation of impervious surfaces and development in wetlands or upland forests is lessened, and where it does occur, is done in a manner that does not worsen flooding.

### *Policies*

1. All new fill and construction of buildings in FEMA-mapped Special Flood Hazard Areas increases flood risk and is discouraged, and at a minimum must comply with the Association of State Floodplain Managers' No Adverse Impact policy.
2. All new buildings, other than accessory structures, in FEMA-mapped flood areas must have the lowest floor elevated or floodproofed at least one foot above base flood elevation.
3. Natural areas, non-structural outdoor recreational, and agricultural uses are the preferred land uses within river corridor areas due to the dangerous erosive nature of these areas. Commercial, industrial, and residential uses within river corridors are strongly discouraged outside of village and town centers.
4. New buildings within FEMA-mapped floodways shall be prohibited.
5. In order to lessen the conflict between roads and streams, towns and the State should consider moving or abandoning roads when there are more cost-effective solutions or other routes.
6. The State and municipalities should only rebuild/install culverts and bridges that are designed at least to VTrans' Hydraulics Manual and ANR's Stream Alteration Standards, and are encouraged to adopt road and bridge standards to the 50 or 100-year storm level for identified critical transportation routes.
7. Critical facilities such as emergency services, wastewater treatment plants, power substations, and municipal buildings shall not be built in Special Flood Hazard Areas unless floodproofed or elevated to at least 2 feet above the base flood elevation and designed to withstand erosion risk, and they must have dry access above the base flood.
8. To reduce flood flows and be more protective of existing development, the current one-acre threshold in Vermont's Stormwater Management Rule should be reduced to one-half acre.
9. Rock rip-rap and retaining walls should only be used to the extent necessary and when bioengineering techniques may not be adequate to prevent significant loss of land or property.
10. Upland forests and watersheds should be maintained predominately in forest use to ensure high-quality valley streams and to ensure that flood flows are absorbed.
11. Outside of areas of existing compact development, new development must preserve vegetated riparian buffer zones that are consistent with state riparian buffer guidelines.
12. All wetlands that provide flood storage functions shall remain undeveloped or have compensatory storage constructed so as to achieve no net loss of such wetland function.
13. In the long term, restoration and enhancement of additional wetlands should be pursued in order to improve the Region's flood resilience.



## Goals, Policies, and Recommendations: **Flood Resilience**

### *Policies (continued)*

14. Structural development or intensive land uses shall not occur in Class I and Class II wetlands unless there is an overriding public interest.
15. The purchase of flood easements is encouraged to both reduce flood risk to structures and to support owners who leave lands open.
16. Emergency planning for flood response and recovery is encouraged.

### *Recommendations*

1. TRORC will work with towns to strengthen their Flood Hazard Bylaws in order to mitigate risks to public safety, critical infrastructure, historic structures, and municipal investments from inundation and erosion.
2. TRORC will work with VTTrans on advocating for and improving the flood capabilities of state- or town-owned transportation infrastructure.
3. TRORC should continue working with the emergency coordinators, response agencies, and Selectboards from each town to develop mitigation plans and emergency preparedness and recovery procedures from flooding.
4. Existing homes and businesses at serious risk of flood damage should be identified and prioritized by towns in concert with the VT ANR River Management Section and TRORC for mitigation actions such as elevation/relocation or purchase and demolition.
5. To fully address flood risks, towns should add areas not designated in either FEMA's maps or in VT ANR's maps but that are flooded during a weather event to local flood regulations.
6. Watershed-level planning should be done by towns with assistance from TRORC to evaluate natural and constructed flood storage options upstream of existing areas of concentrated development that are at risk of flooding.
7. TRORC will work with VT ANR, towns, and landowners to lessen flood risk by restoring natural channel functions through berm or dam removal or intentional lowering of streambanks.
8. TRORC will work with towns to understand the impact stormwater runoff has on the Region and on specific towns, and then work to address impacts from impervious surfaces through increased retention and infiltration.
9. The State should institute a permanent buyout program to continue to lessen flood risk.
10. TRORC will work with VT ANR to adjust the boundaries of river corridors in developed areas per the Vermont Flood Hazard Area and River Corridor Protection Procedure.

### Land Use Endnotes

1. See Vermont Natural Resources Board for "existing settlement" test.
2. Vermont Department of Fish and Wildlife.
3. Eric Sorenson, Robert Zaino, Jens Hilke (Vermont Fish and Wildlife Department), and Elizabeth Thompson (Vermont Land Trust), Vermont Conservation Design: Maintaining and Enhancing and Ecologically Functional Landscape.





# 04 | Transportation

*Green Mountain Bike Tours in Randolph* | © First Light Studios

## A. Introduction

When we plan for “transportation,” or even “mobility” (the word used in transportation circles to generally signify movement along roads), the primary goal is access. We may drive to the store by ourselves to get groceries, but what we need are the groceries, not the drive. If the groceries were delivered, that would provide access to groceries just as well. Most of us need to physically go to work, but if we live close, we can walk or bike there instead of driving. We can carpool if we live near enough to workmates, and we can take transit if there is a suitable route. All of these are means of *access*. If our job can be done online, all we

need is good broadband to telecommute. Business and tourism needs are much the same as for households; they need access, not a specific means of transport.

The regional transportation system is not just the built network of roads. It also includes railways, airports, sidewalks, and even rivers and trails. Even the Internet can be considered part of the built network. However, the transportation system is much more than this; it includes both public and private transit services. And it also includes our feet, wheelchairs, bikes, cars, and all the fuel we buy. It includes the wider built system outside the Region that connects us to other areas, as well as

a whole slew of support services, from gasoline tankers to road salt suppliers.

It is important that we understand our system in its full complexity, context, and cost as we head into the future. This way, we can adjust to changes and craft a system that has the most access and the fewest negative impacts, all while trying not to spend more money.





## B. Regional Transportation Characteristics

### Highways

The Region contains several key transportation corridors, including Interstates 89 and 91 as well as several state routes that are utilized for statewide trucking. Of the state and federal highways in the Region, Interstates 89 and 91 carry the bulk of traffic (over 10,000 vehicles a day), followed by U.S. Route 4 and U.S. Route 5 (roughly 5,000 to 10,000 vehicles a day). The Region rarely encounters traffic congestion, even during peak hours. Population growth may exacerbate existing congestion along U.S. Route 5 in Hartford, VT-10A in Norwich, and the Route 4 corridor during peak hours.

Although the [National Scenic Byways](#)<sup>1</sup> program is no longer funded, there remains three designated [Scenic Byways in the Region](#)<sup>2</sup>: the Connecticut River Scenic Byway, the Crossroad of Vermont (Route 4) Byway, and the Scenic Route 100 Byway. There is also one Vermont Scenic Road designated in the Region, the Route 125 Middlebury Gap Road. The Scenic Road designation places strict development restrictions on the road corridor to preserve the scenic nature of the road.

The Vermont Agency of Transportation ([VTrans](#)) [collects and publishes State Highway pavement conditions](#) in our Region. VTrans prioritizes paving based on their asset management system which looks at implementing the right paving treatment at the right time of the pavement lifecycle.

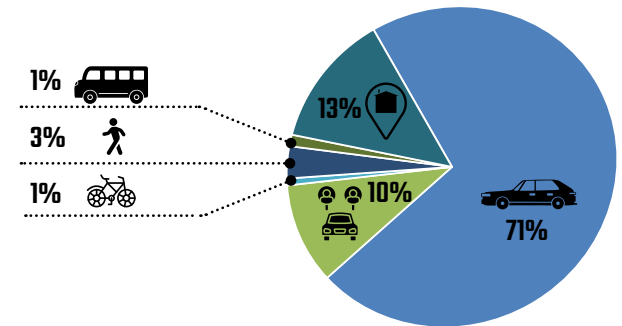
In addition to the state system, our communities

have extensive road networks of their own (see the Regional Transportation Map). The bulk of residential development in our towns is located outside of village areas on rural roads, which increases the need for well-connected roads and road improvements. As more people move into towns locating on Class 3 and Class 4 roads, additional traffic on these roads can lead to additional maintenance or costly upgrades to widen the road or make it a passable school bus route. (Towns are not responsible for maintaining Class 4 roads, only bridges and culverts.) Highway budgets are typically the second largest local expenditure after school budgets, averaging several thousand dollars per mile to plow and maintain, and typically are still insufficient for maintaining the level of service expected by residents.

In 2021, vehicles in Windsor and Orange Counties travelled [more than 1259 million miles](#)<sup>3</sup>, with almost 50 million gallons of gasoline consumed (estimate derived from EPA’s evaluation of model 2020 vehicles’ Average Fuel Economy, which is [25.4 Miles per Gallon \(mpg\)](#)<sup>4</sup>). Much of the travel in our Region is done using our personal vehicles. While this is convenient for many, it can be expensive, time consuming and contribute to air pollution. Most commuters in Orange and Windsor Counties drive to work alone while over ten percent carpool.

The Regional Plan notes that rural sprawl continues to expand, and commercial development has taken the form of automobile-dependent strip development along highways. These land use decisions limit people’s transportation options while increasing their transportation costs, both in

**Figure 4-1: Travel to Work Mode in Orange and Windsor Counties**



Source: U.S. Census Bureau, 2022 American Community Survey 5-Year Estimates

terms of direct costs (e.g., gas and ownership costs) and opportunity costs (e.g., time spent driving instead of addressing other priorities like family needs). Ultimately, this translates into a higher overall cost of living for households.

TRORC’s longstanding priorities are maintaining the existing network and diversifying modes of transportation by expanding bicycling, walking, and transit.

### Walking and Biking

Acknowledging the importance of varying transportation choices for people, the Vermont Legislature passed a Complete Streets law in 2011. This bill requires that all users be considered in the planning, design, construction, and maintenance of our roadway system. To learn more about Complete





Streets, please refer to Vermont Department of Health's [Complete Streets: A Guide for Vermont Communities](#)<sup>5</sup>.

Walking and bicycling infrastructure is an important component of the Region's goals for sustainable transportation and economic development. Higher use of these modes will have numerous benefits for the Region, including lower traffic volumes, lower emissions, and improved public health. However, pedestrians are hampered where sidewalks are in poor surface condition and lack proper markings, or with unmarked crosswalks that are hazardous to its intended users. During winter, many sidewalks disappear underneath the snow or become slick with ice. Pedestrian crossings at roundabouts, as well as interstate crossings are poorly signed and unsafe.

Marked bike lanes are rare and road shoulders in much of the Region are narrow. The advent of electrified bicycles (e-bikes), scooters, and other devices has created transportation opportunities as well as conflicts. People can now bike that otherwise wouldn't, especially over distance, increasing this mode of transportation. But, the use of electrified devices, including scooters on sidewalks, creates hazards for pedestrians. Intersections include potential pedestrian-vehicle conflict points, and without signs or traffic lights to indicate the right of way, pedestrians face fast moving vehicles that are not required to stop. For instance, a driver may start turning right at an intersection with a right-on-red while a pedestrian is still crossing.

Land use planning that concentrates growth in areas of existing development, particularly village

centers, supports the utility of pedestrian and bicycle infrastructure, and such amenities in turn improve village life. The Region has also been supportive of federal and state initiatives that incorporate safe routes programs, primarily for schools in or near the larger Regional Growth Areas. Although national [Safe Routes to School](#)<sup>6</sup> funding has been curtailed, TRORC continues to support related planning work. Lastly, increasing bicycle and pedestrian travel will require continued community outreach and education. However, bike infrastructure presents many challenges for towns, such as feasibility studies and construction costs.

### Passenger and Freight Rail

The rail industry is an important transportation mode for passenger and freight. The Amtrak "Vermont" passenger rail (running from St. Albans, VT, to Washington, DC) is subsidized by Vermont and has stops in Randolph and White River Junction, traveling on the New England Central Railroad. This rail service is utilized more for tourism purposes than commuter service. It has benefited from track upgrades in recent years that have shaved off travel time along the corridor and improved fuel efficiency. In 2022, the White River Junction station had the third highest ridership out of all 14 stations in Vermont.

Many residents in the Region would welcome the opportunity to access regional and local passenger train services in areas closer to home. In 2016, the [Northern New England Intercity Rail Initiative \(NNEIRI\)](#)<sup>7</sup> study recommended the expansion of the existing "Vermont" passenger rail services to connect Boston and New Haven to Montreal,

Quebec. The proposed daily round-trip service would stop at all existing stations and would require several infrastructure improvements. The study estimated the projected future ridership from New Haven to Montreal would be 343,000 riders annually, and from Boston to Montreal would be 103,000 riders per year.

VTrans has a [map of railroad corridors](#)<sup>8</sup> in the State, including freight corridors. In our Region, the White River Junction station serves as a freight rail interchange point. The Washington County Railroad Company (WACR) line connects from the New England Central Railroad (NECR) at White River Junction north into Newport. This train line runs parallel to the Connecticut River within the Region, with twelve designated stops in the river valley: White River Junction, Wilder, Norwich, Kendall (Strafford), Thetford, Northboro (Thetford), Ely, Fairlee, Bradford, Hooker (Bradford), Newbury, and Wells River. Additionally, the towns of Hartford and Bradford have industrial parks onsite. During times of emergency, VTrans has

**"Higher use of (walking and bicycling) will have numerous benefits for the Region, including lower traffic volumes, lower emissions, and improved public health. However, pedestrians are hampered where sidewalks are in poor surface condition and lack proper markings, or with unmarked crosswalks that are hazardous to its intended users."**



coordinated with the rail companies to ship needed materials on the Vermonter passenger rail route.

Freight rail complements other transport modes, namely tractor trailers, although it can serve as a more efficient, economical, and environmentally friendly means of transportation for heavy and bulky goods. Increases in freight rail service can only occur if service enhancements are carried out in conjunction with necessary safety improvements.

### C. Background Trends and Challenges

The Region has a network of roadways and supporting infrastructure that emanates from town and village cores, roughly mirroring historical settlement patterns.

Many of our Region's current roadways and bridges date back to the 1970s. With traffic volumes and vehicle miles traveled continuously increasing, road infrastructure requires investment. However, significant shortfalls in federal and state transportation dollars stymie statewide efforts to maintain and improve roadways and infrastructure. According to the VTrans 2022 Transportation Asset Management Plan, the funding gap projection for pavements and bridges for the next ten years is roughly \$451 million. Costly repairs in the wake of flood disasters have further strained local budgets. Towns have had to increase the resiliency of their infrastructure at a pace and cost that outstripped local capital budget planning.



Tracks in Braintree | Source: Kevin Geiger

#### Transportation Impacts

Roads and their runoff, as well as vehicle emissions have a variety of detrimental effects on recreational activities, wildlife migration, and natural resource conservation by fragmenting our landscapes. Undersized or poorly placed bridges and culverts block aquatic and amphibious passage, reducing habitat or reproduction as well as blocking the flow of water and can inflict road damage further downstream or downhill.

Improperly designed or nonexistent roadway ditches; road salt, brine, and sand usage; and the release of petroleum and other chemicals into the environment from vehicular travel have a direct

impact on our Region's air and water. Stormwater is a major contributor to sediment and nutrient loading in the Region. Transportation facilities such as roads and parking lots create enormous amounts of impervious surface. These structures generate swift-moving stormwater runoff that carries pollution and exacerbates flood risk. Evaluating the full effect of existing and proposed transportation facilities and working to install detention areas or other measures will reduce both flood peaks and water pollution.

Per requirements of Act 64 and the [Vermont Clean Water Act](#)<sup>9</sup>, municipalities are required to apply for the [Municipal Roads General Permit](#)<sup>10</sup> coverage on all town roads. The goal is intended to achieve significant reductions in stormwater-related erosion from municipal roads, paved and unpaved. Each municipality will implement a customized, multi-year plan to stabilize their road drainage system. The plan will include updating road drainage systems to meet basic permit standards and other measures to increase infiltration into soil and reduce erosion to meet a total maximum daily load (TMDL).

#### Greenhouse Gas Emissions

Our transportation system also has a huge energy demand, and consequently an enormous amount of greenhouse gas emissions as that demand is largely met by fossil fuels. The Region has been making strides toward reducing its transportation energy usage, and the use of fossil fuels to supply that energy. Hybrid buses have been introduced into public transit fleets, and electric school buses have been acquired. Track upgrades



have improved the fuel efficiency of the Amtrak “Vermont” passenger rail service. Park and ride lots continue to be built and expanded throughout the Region, and some are outfitted with electric vehicle charging stations. Some employers offer van services or incentives for carpooling or public transit to reduce their employees’ single-occupant vehicle trips.

Nevertheless, significant changes in our transportation systems are still needed if the Region is to meet its emission reduction targets. Meeting the regional target for electric vehicle fleet growth (mentioned in the Energy chapter) will be a particular challenge; the Region currently lacks sufficient charging station infrastructure to support consumers in making the transition. VTrans is working to install charging infrastructure in state-operated park and rides lots where practicable.

In rural, sparsely settled areas, ride sharing allows people to mitigate the cost and environmental impacts of their commutes. Within the Region, around one in ten commuters share rides to work. To encourage more people to travel together (either by ridesharing or using public transit), the Region contains 20 park and rides. Of these, eleven are supported by municipalities and nine are supported by the State. TRORC evaluates park and ride capacity and has collected regional data to better understand statewide needs.

## Health

Driving is an inherently sedentary activity. For most of us, it is the common means of travel to work, school, activities, shopping, and other

routine needs. Heavy reliance on this mode of travel comes at the expense of physical activity. Land use patterns that emphasize smart growth principles around compact town and village centers with pedestrian and bike opportunities promote healthy lifestyles.

## Equitable Access

As discussed in the Community Health chapter, our Region’s population is aging. To ensure that the older population has safe access to services, we must prioritize accessibility. This means having well-lit, functional sidewalks, improving road signage, having more options for carpooling, and increasing transit opportunities and adequate broadband service to allow older adults to age in place. Strengthening the Region’s multi-modal transportation networks may also help to attract and retain younger residents.

Transportation equity in our Region’s rural areas can be considerably improved. Those who are under legal driving age, those who cannot afford the costs of vehicle ownership and maintenance, the disabled, the elderly, and others find it hard to

**“Transportation facilities such as roads and parking lots create enormous amounts of impervious surface. These structures generate swift-moving stormwater runoff that carries pollution and exacerbates flood risk.”**

find safe, affordable transportation options within their towns and between towns. Ubiquitous public



Stagecoach Office, Randolph | Source: TRORC

transit would provide such access.

Transit access is key to creating healthy communities. People who do not own or cannot operate a vehicle have limited mobility, constraining their access to goods and services such as high-quality food and medical care. While some towns in the Region have small numbers of potential transit riders, large percentages of their populations may be transit dependent. Despite servicing relatively low numbers of transit riders, smaller towns still exhibit a high need for public transit. However, the rural character of the Region presents challenges for a traditional public transit system. Long distances between homes and employment centers strain commuter bus routes, while high transit dependency in low population density areas presents a serious challenge for the system. Currently, public transit provides less than 0.5 percent of the overall population with transport to work. The Vermont Agency of Health and Human Services





and the Vermont Agency of Transportation have extensively studied public transportation usage and all projections indicate demand for these services will increase.

The Region has a few public transportation services which are increasingly important to its transportation system. Fixed route services to the employment and commercial centers allow residents to work and shop. Transportation services for older adults and persons with disabilities give alternatives to people who wish to live independently but who are less able to drive themselves.

The Region depends on two public transportation providers: [Tri-Valley Transit](#)<sup>11</sup> and [Advance Tran-](#)

[sit](#)<sup>12</sup>. Both operate fixed route commuter buses in the Region.

To connect transit-dependent residents with shopping and social centers, Tri-Valley Transit offers weekly deviated fixed routes to Lebanon and Randolph, serving the towns of Hancock, Rochester, Stockbridge, and Bethel. Upon passenger request, deviations of up to ¾ mile can be made for pick-ups or drop-offs. Tri-Valley Transit also operates weekday transit circulators in the Randolph and Bradford areas.

Transportation services for older adults and persons with disabilities are a unique asset to the transportation system and one that operates almost

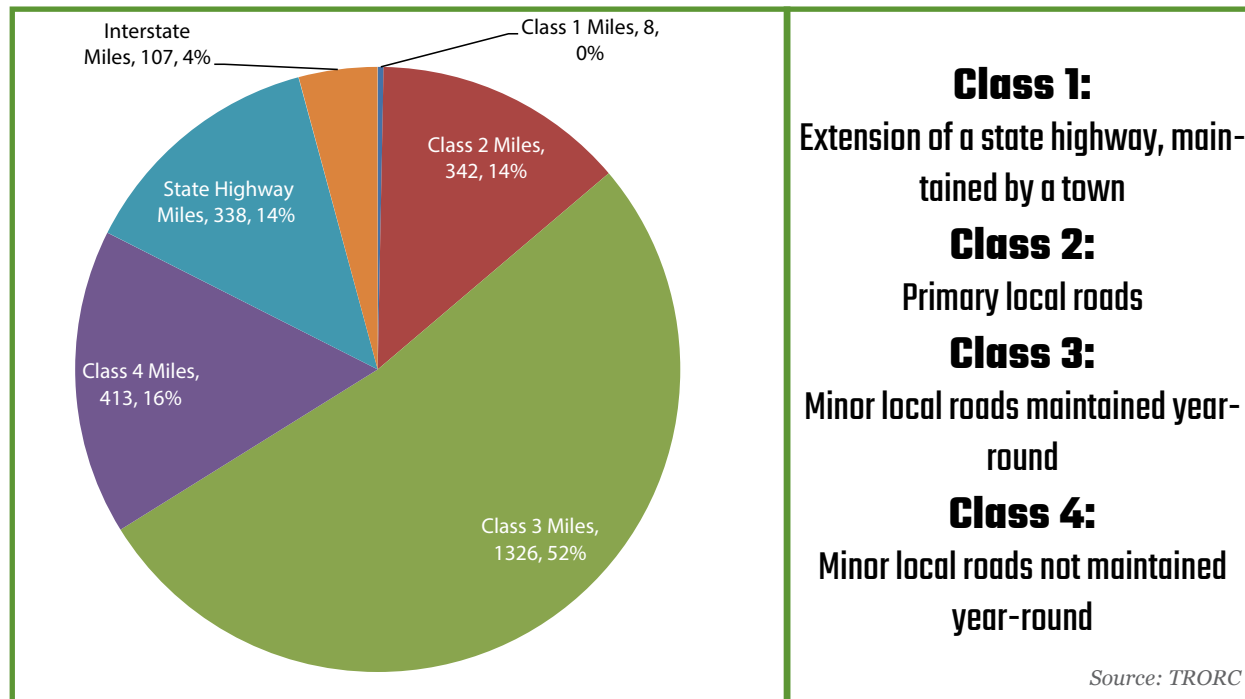
invisibly to most citizens. These services, funded by Medicaid and the Federal Transit Administration, offer transportation to eligible individuals for accessing medical appointments, senior meal sites, adult day programs, and commercial service and shopping centers. While medical rides typically are a priority, transportation to shopping and social interaction are also important factors to the quality of aging in place. The Region’s senior centers and adult day programs provide transportation for their

“Long distances between homes and employment centers strain commuter bus routes, while high transit dependency in low population density areas presents a serious challenge for the system.”

older adults and persons with disabilities clients both through Tri-Valley Transit and through their own network of vehicles and volunteer drivers. Although it appears the Region has redundancy in service areas, there remains a large percentage of unmet needs and service area gaps. The partnering transportation groups continue to coordinate services to maximize each provider in addressing service gaps.

Social service providers who work with transit-dependent populations including older adults, persons with disabilities, and people living below the poverty line have identified two primary unmet public transport needs. The first is the need for extended hours of public transit operation. Currently, buses operate generally between 6AM

Figure 4-2: Road Miles in the TRO Region





and 7PM. This schedule does not accommodate people who work evening or night shifts, or seniors who wish to attend social events in the evenings. The second need is for weekend bus service. Transit buses in the Region generally operate Monday through Friday; this presents a significant challenge for those who work on the weekend. Advance Transit recently launched weekend service for their main routes and have seen significant positive ridership numbers. In addition to these unmet needs associated with the existing bus service, there is a need to have a bus service along Route 4 to connect communities in the Ottauquechee Valley to the Upper Valley.

Private sector intercity bus transportation is provided by Greyhound, which has a regional service hub in White River Junction. The Greyhound route operates several daily round-trip runs between Boston, MA, and Montreal, QC, with stops in White River Junction, Montpelier, and Burlington. In 2014, [Vermont Translines](#) began operation of an intracity route along Route 4 from Rutland to

Lebanon, NH to Dartmouth Coach. The route has since been discontinued due to low ridership. In addition to Greyhound, Dartmouth Coach provides service between Hanover, NH, and Boston, MA, and Boston Logan International Airport with stops in between at Lebanon and New London, NH. Dartmouth Coach also offers service between Hanover, NH, and New York City. Supplementing these bus services, Amtrak offers intercity commuter rail transportation with two stations in the Region: White River Junction and Randolph.

### Housing in Relation to Transportation

Housing unavailability has pushed residents farther from historical downtowns and job centers in recent decades, increasing personal vehicular reliance. While housing in areas outside of town centers may, on the surface, appear more affordable to residents, increased distance from work, retail, and recreational opportunities significantly increase costs of living compared with in-town housing. Average transportation costs in Orange and Windsor Counties are 26 percent

of annual median household income (\$14,233), nearly as much as housing costs (30 percent of annual median household income). For context, transportation costs are considered affordable if they do not exceed 15 percent of a household's annual income. Sprawl doesn't just hurt household budgets; it also negatively impacts the economic health of our Region's villages and community centers. (For policies related to Housing and transportation, read Homes in the Region chapter).



## Goals, Policies, and Recommendations: **Transportation**

### *Goals*

1. Our Region's transportation systems follow context-sensitive designs with climate resiliency features, and are consistently funded, constructed, and well-maintained.
2. The Region's transportation system supports a strong regional economy.
3. Public transportation options are diverse and easy to utilize throughout the Region.
4. Single occupancy vehicle dependency is reduced.
5. The Region has a safe and broad network for pedestrians and bicyclists.

### *Policies*

1. Future road and parking projects should prioritize improving existing infrastructure over building new ones, in addition to adding flood resilient features.
2. Development that causes strip development and sprawl is not consistent with this Plan.
3. Public transportation should serve high density development to reduce single occupancy vehicles.
4. New development that generates daily truck traffic in Rural Areas shall only locate along paved roads immediately adjacent to Regional Growth Areas (as defined by this Plan), and only if existing infrastructure is sufficient to maintain traffic safety.
5. Development subject to Act 250 shall not result in a degradation of the roadway level of service (LOS) to D or worse in Rural Areas. If the impact is LOS C or greater, a traffic study may be required to mitigate impacts.
6. Public and private transportation infrastructure investments in Interchange Areas shall not enable development that will have the effect of eroding the economic vitality and quality of life of a Regional Growth Area.
7. New development in Regional Growth Areas subject to Act 250 shall be designed to connect internal roads and walkways with adjacent lots to minimize access points with main highways and maximize services that can be accessed from the same parking areas.
8. Developments that have "substantial regional impact" (as defined in this Plan), whether they are located within the TRORC Region or in a neighboring region, shall include transportation impact studies for each phase of development and shall mitigate any impacts identified as part of their permit.
9. Multi-unit housing developers subject to Act 250, when creating more than ten units in a single project, shall make reasonable provisions for sidewalks and/or connections to sidewalk systems that are present or likely, and coordinate with public transit agencies on possible stops during site design for potential transit service access.
10. Major highways should minimize barriers to movement of wildlife, terrestrial or aquatic, especially in high priority wildlife crossings (as mapped by the Vermont Agency of Natural Resources), through more wildlife-friendly culverts, bridges, railings, and signage designed to avoid collisions.
11. Developments subject to Act 250 shall demonstrate that they have taken or will take steps to incorporate electric vehicle charging stations in parking spots.
12. Traffic calming projects are encouraged in Regional Growth Areas, and any place where speed safety concerns exist alongside active pedestrian and biking activity with vehicles.



## Goals, Policies, and Recommendations: **Transportation**

### *Policies (continued)*

13. Increased paratransit and demand-response transit services (transportation services without fixed routes, unlike bus routes) for elders and persons with disabilities are strongly encouraged.
14. The number and design of park and rides should support regional public transportation needs.
15. Strategies reducing total vehicle miles travelled are encouraged such as employers allowing telecommuting and teleconferencing options.
16. Town construction projects should accommodate bicyclists and pedestrians by improving pavement and bike lane conditions such as adding street trees, signage, pavement plantings, benches, and lighting.
17. TRORC supports improved rail service along the I-91 corridor and will assist the State in improving service.
18. Downtown parking efficiencies should be increased to better utilize spaces and support businesses. ADA parking also needs to be increased.
19. Public access to noncommercial outdoor recreational opportunities, such as lakes and hiking trails, should be provided and protected wherever appropriate.
20. Opportunities should be expanded for pedestrian transportation within our villages and hamlets, such as designing and installing pedestrian facilities that meet pedestrians' safety, comfort, and accessibility needs, and connect to end uses, such as transit stops, homes, and businesses. Pedestrian facilities include sidewalks, shared use paths, signs, crossings, and or walkways on bridges.
21. Snow and ice must be cleared from sidewalks, curb ramps and crosswalks to provide safe and accessible passage for pedestrians and cyclists.

### *Recommendations*

1. Towns should identify dead-end Class 3 town roads that serve few structures and consider reclassification to Class 4 to reduce town expenses.
2. TRORC will work with towns during plan and bylaw revisions to connect housing needs to transportation systems.
3. TRORC will work with local highway departments, as requested, to assist with compliance with the Municipal Roads General Permit to minimize stormwater runoff, minimize road/river conflicts, and minimize roadway erosion.
4. TRORC will assist the towns in minimizing the use of impervious surfaces for parking through shared parking, reduced parking requirements when supported by data, or phased parking development when demand arises.
5. TRORC will continue to ensure that regional transportation planning activities are integrated with land use planning and economic development planning efforts.
6. TRORC will offer support to towns in capital budgeting for transportation facilities and related equipment.
7. TRORC will work with towns and Vermont Agency of Transportation to identify poor pavement conditions for paving projects.
8. TRORC will continue to work with towns to identify and address road safety risks through the Vermont Agency of Transportation's Strategic Highway Safety Plan and through town requested Road Safety Audits.
9. TRORC shall assist interested communities with studies and planning designed to improve multi-modal networks in Regional and Town Centers, such as the development of the Upper Valley U.S. Route 4 commuter bus service.



## Goals, Policies, and Recommendations: **Transportation**

### *Recommendations (continued)*

10. TRORC will assist public transit providers in assessing unmet transit needs, such as bike storage for riders and better connections to destinations. Strategies could include, but are not limited to, improving coordination between providers to identify and address underutilized capacity of existing services.
11. The Transportation Advisory Committee (TAC) shall continue to identify park and rides which are in need of state investments and improvements.
12. TRORC will work with towns and the Vermont Agency of Transportation to implement pedestrian and bicycle accommodations (including transit connectivity) in all its planning, engineering, and construction related activities. This may include the development of free-standing Bicycle and Pedestrian Plans.
13. TRORC will work with towns to support land use regulations (i.e. increasing the density and mixed-use development pattern) that improve walking and bicycling conditions, and also bring parking regulations into compliance with recent legislation.
14. TRORC will continue to support municipal planning for safe routes to school, especially within densely settled villages or town centers.
15. VTrans should take over Route 132 as a state highway.
16. TRORC will work with towns during plan and bylaw revision to ensure road infrastructure takes account of the needs of all road users and is designed to facilitate safe behaviors (i.e., clear road signage and markings, traffic calming designs, and promotion of physical barriers of road users including use of protected bicycle lanes and pedestrian-only zones).

### Transportation Endnotes

- 1 <https://nsbfoundation.com/vermont/>
- 2 <https://www.byways.org/explore/states/vt/>
- 3 [https://vtrans.vermont.gov/sites/aot/files/documents/VT\\_VMT\\_FC\\_COUNTY\\_2021.pdf](https://vtrans.vermont.gov/sites/aot/files/documents/VT_VMT_FC_COUNTY_2021.pdf)
- 4 <https://www.epa.gov/newsreleases/epa-report-us-cars-achieve-record-high-fuel-economy-and-low-emission-levels-companies>
- 5 [https://www.healthvermont.gov/sites/default/files/documents/pdf/HPDP\\_PA%26N%20Complete\\_streets\\_guide\\_for\\_VT\\_communities.pdf](https://www.healthvermont.gov/sites/default/files/documents/pdf/HPDP_PA%26N%20Complete_streets_guide_for_VT_communities.pdf)
- 6 <https://www.transportation.gov/mission/health/Safe-Routes-to-School-Programs>
- 7 [https://www.mass.gov/files/documents/2018/05/24/NNEIRI\\_StudySummary.pdf](https://www.mass.gov/files/documents/2018/05/24/NNEIRI_StudySummary.pdf)
- 8 <https://vtrans.vermont.gov/planning/freight>
- 9 <https://dec.vermont.gov/tags/clean-water-act>
- 10 <https://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program>
- 11 <https://www.trivalleytransit.org/>
- 12 <https://advancetransit.com/>







# 05 | Economic Development

## A. State of the Economy in the TRO Region

The TRO Region is largely rural and sparsely populated, as is typical of most of Vermont. Most towns in the Region have a low level of commercial development, typically many small commercial operations in the form of home-based businesses. Regional occupations are diversified across the professional, technical, service, manufacturing, and agricultural sectors, with the Region's economy not dominated by a single business type. Our landscape and scenery form the basis for many place-based businesses in tourism, recreation, food, wood products, and the arts. The Region's economy

began as agrarian and moved to manufacturing. Recent economic trends, both local and statewide, have moved us towards a service-based economy.

The TRO Region's economy is dominated by outlying areas that present significant opportunities for future economic development based on strong job markets, developed infrastructure, extensive services, and proximity to educational/health institutions. Rutland to the west and Montpelier/Barre to the north are within a 30-minute drive of parts of the Region, but the largest of these outlying areas, spanning two states, encompasses the towns of Hartford and Norwich in Vermont and the towns of Lebanon and Hanover across the Connecticut

*Huntington House Inn, Rochester | © John Knox*

River in New Hampshire. This area is the core of what is known as the 'Upper Valley.' Our regional economy is intricately interwoven in the fabric of the greater Upper Valley area.

Internal subregional economic centers include Randolph, Bethel, Royalton, Rochester, Woodstock, and Bradford. These areas continue to expand but have limited suitable locations for growth as well as supporting water and wastewater infrastructure.

Job growth in the Upper Valley and the Region has been modest, and unemployment in the Region has been low. While low unemployment rates have



their positive attributes, there are negative ones as well. Low unemployment can be regarded as a barrier for businesses looking to expand or relocate to the Region because not enough skilled and available workers exist in the area. Wage rates have been growing but still lag slightly behind the State as a whole.

Several smaller towns in the Region are “bedroom communities” that provide housing opportunities for workforces that commute. Many residents in the Region routinely travel outside of their towns for shopping, but also for work opportunities. [With respect to jobs, 72.7 percent of workers in Orange County and 54.8 percent of workers in Windsor County are employed outside of their county of residence](#)<sup>1</sup>. These rates far exceed those rates seen at the statewide level, due to the ease of access from the Region to outside work markets.

Most towns in the Region are close to major interstates (I-89 and I-91), making access to distant employment areas easier and allowing many to live farther from work. This has escalated the trend of extending growth and development away from historical settlement areas throughout the Region, placing strain on the provision of municipal services and businesses. The addition of remote working enabled by the Internet has allowed many residents to work outside of their towns but not commute to work, though they still drive to services.

## B. Workforce Composition

A workforce is defined as all adults aged sixteen years and over who are currently employed and

unemployed but still able to work. Individuals who are held in an institution (for incarceration, mental health, or other health-related reasons), or are in the Armed Forces are not a part of the workforce. The workforce does not typically include those who are full-time students unless they happen to work while in school. For more information about who counts towards the workforce, please read [U.S. Bureau of Statistic’s explanation](#)<sup>2</sup>.

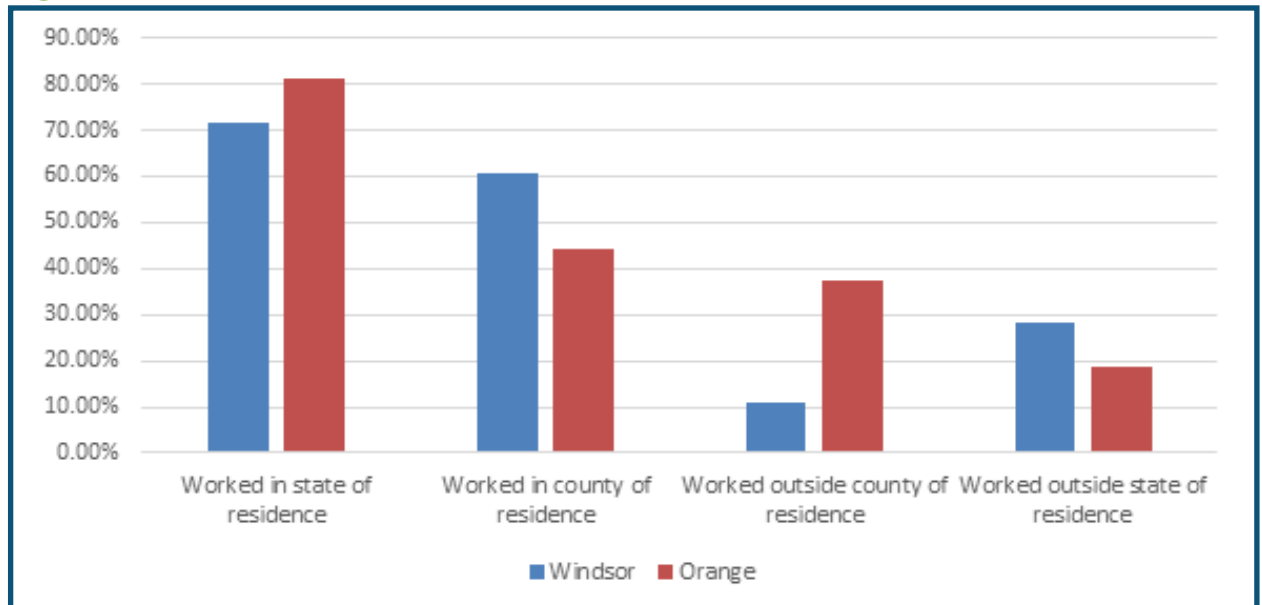
Though our Region includes towns in parts of four counties, using Windsor and Orange Counties’ data is a good proxy for the overall Region and offers the most accurate data. Knowing this, the [2023 Economic & Demographic Profile](#)<sup>3</sup> published by Vermont Department of Labor concludes that our Region’s labor force increased since the COVID-19

pandemic (Windsor County by 5%; Orange County by 2%). To see the most up-to-date labor market information by county, please visit State of Vermont’s [Labor Market Data Dashboard](#)<sup>4</sup>.

The TRO Region has seen significant shifts in certain workforce age groups in the past decades. A steadily aging workforce is already upon the State, as many baby boomers have entered retirement. Having a young workforce capable of replacing the established workforce is necessary for economic vitality for the Region.

According to the 2022 American Community Survey, Vermont’s median age was 43 years old—an increase by two years since 2010. Many baby boomers (people born between 1946 and 1964)

Figure 5-1: Place of Work



Source: Commuting, 2011-2016 American Community Survey





have entered their retirement years, and about 40,000 people from ages 65-79 were added to Vermont’s population since 2010. [In Windsor County, the number of people who are 65+ years old \(typically considered as outside the workforce\) is projected to increase by 61 percent by 2030, while Orange County will expect a 97.3 percent increase](#)<sup>5</sup>. At the same time, the state also saw a decrease in working-age people in the 40 to 54 age group, a trend that is severely pronounced in our Region. The Region will not fill vacant positions while simultaneously driving additional job growth unless this demographic trend is reversed and the Region attracts thousands of younger replacement workers.

In agriculture, this problem is much worse. For instance, the average age of Vermont farmers is 56, with over a quarter 65 and older. While farm operations are often family-owned, there is no guarantee that a family member will take over the farm. Luckily, there are a growing number of young people interested in becoming farmers or starting a food enterprise business. The challenge is that farms are expensive to purchase and operate for new farmers. Most farms also require one or more family members to hold a full-time job to supplement farm income and maintain access to health insurance.

Our well-educated workforce bodes well for having a skilled workforce capable of attracting higher-paying, specialized jobs to our 30 towns. In 2022, many working-age residents had completed, were pursuing, or had pursued higher education qualifications beyond a high school diploma (44.2%); this is higher than the national average of

**Table 5-1: Per Capita Personal Income 2018-2022**

Indicator	2018	2022	Change from 2018-2022
US	\$ 53,309	\$ 65,470	19%
VT	\$ 51,692	\$ 63,039	18%
Orange	\$ 46,315	\$ 56,029	17%
Windsor	\$ 54,823	\$ 67,971	19%

Source: Vermont Department of Labor

35.6 percent. (To see the most current information on Vermont’s education attainment, please visit [this interactive map](#)<sup>6</sup> created by the U.S. Chamber of Commerce).

As previously mentioned, many industries routinely struggle to find qualified workers. This problem is multifaceted in that it reflects a too-small, qualified workforce, an inability to retain and train from within local communities to fill positions, and the struggle employers face to recruit from outside the Region (largely due to our cost of living). According to findings presented in the [2014 Upper Valley Workforce Needs Assessment](#)<sup>7</sup>, developed by the Green Mountain Economic Development Corporation (GMEDC), three key industry areas that require skilled workers are the health care and social assistance sector; manufacturing; and professional, scientific, and technical services industries. This assessment still holds true today.

There are many workforce development and training programs throughout the State that are run through the [Agency of Commerce and Community](#)

[Development \(ACCD\)](#)<sup>8</sup>, the [Department of Labor \(DOL\)](#)<sup>9</sup>, and the [Agency of Human Services](#)<sup>10</sup>. (See Chapter 8 for a list of adult and secondary vocational education centers in our Region).

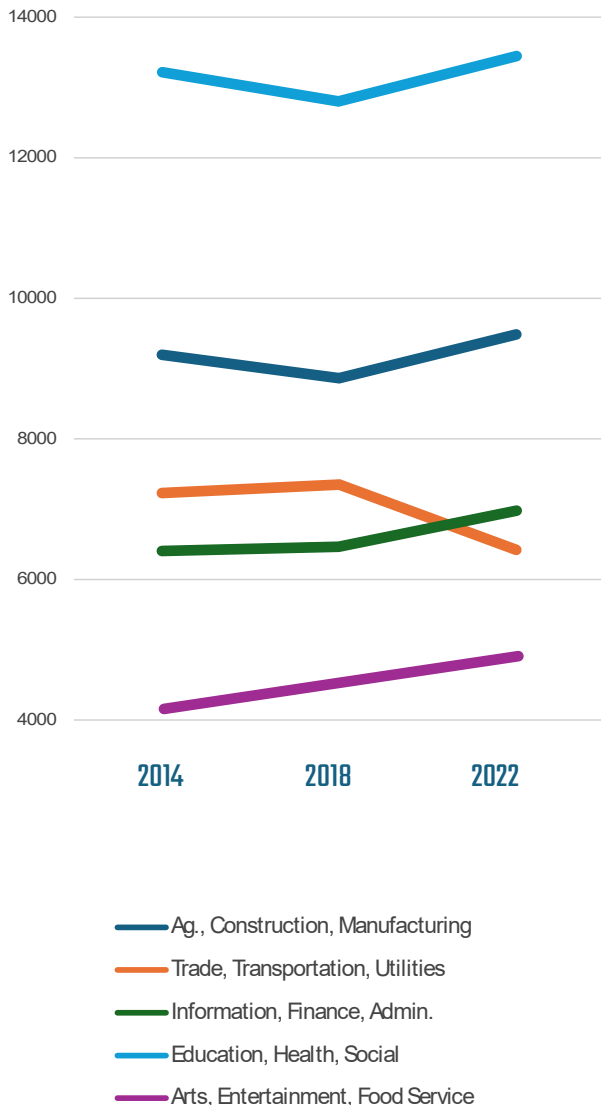
Another way to bolster educational opportunities for the Region’s burgeoning and existing workforces is to promote the creation of continuing adult education opportunities throughout the Region. The workforce needs experience with learning day-to-day job skills but also with more general business and personnel management skills. Training in these areas can be in the form of practical on-site job training opportunities or courses and accreditation programs outside of the workplace that supplement existing job skills.

### Income and Poverty Levels

Windsor County has a higher per capita income than the state average and is the fourth highest out of the 14 counties in Vermont. In contrast, Orange County ranks tenth among Vermont counties. As incomes are increasing in the TRO Region, the



**Figure 5-2: Occupational Sectors and Employment in Orange and Windsor Counties**



Source: American Community Survey (2014, 2018, 2022)

number of households on state public assistance programs is continuing to decrease.

However, an overview of the U.S. gender wage gap demonstrates a decreased but persistent wage gap between women and men. Despite the gender wage gap having closed somewhat since the 70s, the rate at which the gender wage gap has declined has stalled. [Since the early 2000s, the female-to-male earnings ratio has fluctuated between 79 percent and 83 percent](#)<sup>11</sup>. Employers addressing the gender wage gap will help lower the number of disadvantaged women, minimize job loss for all workers, and raise the fixed incomes of elderly people (which tend to skew more heavily female) when they reach retirement.

In January 2018, nearly 5,000 households, representing just above 14 percent of those in Orange and Windsor Counties, were enrolled in Vermont’s cash assistance programs, which assist those below recognized income levels. The communities with the highest percentage of households that receive benefits are Bradford and Corinth. Each of those towns has more than 19 percent of their households involved in public assistance programs.

While our Region has lower rates of poverty compared to other counties, the [Upper Valley Haven](#)<sup>12</sup> suggests that individuals experiencing poverty feel their economic hardships more acutely while living in the Region. The services provided by The Haven have come under increasing demand in recent years, especially from families. This is directly related to the interaction between the Region’s increasing housing costs, as described by

the Vermont Housing Finance Agency in their 2021 [Housing and Wages Report](#)<sup>13</sup>. Without addressing these trends, the Region will continue to see rising numbers in both individuals and families slipping into poverty or increased numbers of residents emigrating to more affordable areas.

### C. Employment Sector Characteristics

#### Employment by Occupation and Industrial Sector

Nearly 79 percent of the Region’s jobs fall within the service producing sector (such as information, education, and hospitality), whereas jobs in the goods producing sector (such as natural resources, construction, and maintenance) account for only 21 percent of all jobs in the Region. While most sectors from 2018 to 2022 experienced moderate shifts in their number of employees, some jobs have seen significant growths or declines.

Occupations that experienced a decreasing trend in workforce participants were primarily in wholesale trading (-34.9%), utilities (-12.8%), and the information sector (-8.8%). Unfortunately, the Region saw a drop in health care and social assistance employees, which underscores the need for planning the future of high-quality health care services in our Region. The number of unfilled jobs in the health sector is huge, with local clinics being short-staffed, and Dartmouth-Hitchcock regularly having several hundred job openings. On the other hand, the top three job positions that have seen tremendous growth were managerial positions in businesses (67.7%), mining (45.1%),





and educational services (18.6%).

The educational services continue to have a major impact on the growth of the Region's jobs. This is attributed to the existence of major academic institutions, which include all the municipal and private schools, and higher education institutions like Dartmouth College, Vermont Law and Graduate School, and Vermont State University.

### Agriculture and Silviculture

In 2022, it was estimated that the agricultural economy Statewide had almost 11,500 businesses employing nearly 64,000 Vermonters, according to [Vermont Farm to Plate's 2022 Annual Report](#)<sup>14</sup>. It is estimated that during the same year, the direct agricultural revenue in Vermont was \$781 million.

Dairy remains a multimillion-dollar industry in both Orange and Windsor Counties, accounting for 66 percent of farm revenue for Orange County and 43 percent for Windsor County. Over the years, however, both Windsor and Orange Counties experienced a decline in the number of dairy farms.

[The 2017 Census of Agriculture](#)<sup>15</sup>, published by the USDA National Agricultural Statistics Service, shows that Vermont farms have become fewer in number but larger in size. This trend is also evident in our region; [Orange County](#)<sup>16</sup> experienced a 25 percent decrease in the number of farms but saw a seven percent increase in average farm size, and [Windsor County](#)<sup>17</sup> saw a 12 percent decrease in the number of farms but a 26 percent increase in the average size of farms.

In our Region, the reduction in the number of

farms occurred the most with farms that sold less than 50,000 dollars' worth of products—particularly in mid-sized farms (grossing between 5 to 10 thousand dollars' worth of sales). From 2012 to 2017, the number of mid-sized farms dropped nearly 30 percent (specifically, 241 farms in 2012 to 174 in 2017). While the number of small-scale farms (farms that sell products at \$2,500 or less) comprise nearly 40 percent of our Region's total number of farms, they generate less than one percent of Vermont's total agricultural income.

Farm innovation and diversification is essential to our agricultural landscape. Instabilities in traditional markets have led to farmer embracing direct-to-consumer sales, on-farm events, participation in farmers markets, agritourism, and the production of value-added products. However, farmers must improve consumer education, helping them recognize the broader benefits (social, economic, environmental, etc.) of buying locally and regionally produced food to grow their market. Farming itself is exempt from local land use regulations per Vermont statute, but many of these new types of nontraditional commercial uses can be regulated, at least to a certain extent.

With respect to the silviculture industry and value-added wood products, there are major regional employers that rely on forestland products, such as Copeland Furniture in Bradford and the Pompanoosuc Mills Corporation in Thetford, each with a workforce varying between 100 and 249 people. Numerous smaller operations exist too, such as local sawmills and lumberyards, firewood processors, maple sugaring businesses, Christmas tree farms, and furniture producers. Initiatives like the



Maple Syrup Production | © Kevin Geiger





ShackletonThomas | ©Sarah Tucker Kevin Geiger

Forest Products Value Chain Investment Program (a collaboration between the Vermont Sustainable Jobs Fund, the Northern Forest Center, and the Vermont Working Lands Enterprise Board) seek to enhance the economic competitiveness of the forest products industry in the Region by exploring ways to access new markets outside the State, developing new products that could be produced using Vermont wood, encouraging innovation, and facilitating collaboration among industry members.

## Tourism

No exact numbers exist to show how many people in the Region work specifically in jobs catering to

tourism; however, if we combine the number of individuals working in entertainment, the arts, recreation, and food services with those working in the retail trade, roughly 21 percent of the Region's workforce directly and indirectly have a part in the Region's tourism industry. Thus, tourism is a key component to the Region's financial success. There is not simply one tourist attraction that is the anchor for the entire Region; rather, there are a multitude of year-round opportunities that visitors flock to the Region to explore and enjoy.

To illustrate how important tourism is for the Region, in 2022 the U.S. Bureau of Economic Analysis (BEA) Outdoor Recreation Satellite Account (ORSA) calculated that outdoor recreation (e.g., skiing) generated [\\$1.9 billion](#)<sup>18</sup> for Vermont. A key area of concern within the tourism sector is the need to diversify this part of the economy in the Region, and to attract visitors on a season-to-season basis instead of attracting a niche tourist base at only certain times of the year. Further, ensuring that the tourism industry is equipped to face future impacts from climate change is critical to ensuring business continuity and financial and economic resiliency. This is of particular importance with respect to the winter sport industry, as it is most vulnerable to increasing temperatures and reduced snowpack levels.

## Major Regional Employers

The TRO Region is home to several important economic activities that employ many of our residents. The largest sector in the Region is the education and health care sectors, with academic institutions like Vermont Law and Graduate School

## Snapshot: Workforce & Economic Development Resources

- **Vermont Manufacturing Collaborative (VTMC)** – Opened in 2020 on the Vermont State University Randolph campus, VTMC is a public-private partnership funded by a Department of Defense contract. The collaborative builds the infrastructure and partnerships needed to support business evaluation of advanced manufacturing technology and to help learners become skilled through training and hands-on experience. VTMC hosts the Advanced Manufacturing Center, featuring leading-edge technology that supports the full product lifecycle, from ideation to production and is accessible to businesses and students.
- **Cultivator** – A Randolph-based 501c3, registered in 2024 and with start-up funding provided through an EDA-funded partnership with the Black River Innovation Campus located in Springfield, Vermont. Founded to foster and support innovation, creativity, and entrepreneurship in the Randolph region, Cultivator is dedicated to providing resources and cultivating connections for businesses, individuals, job seekers, and members of the community, empowering them to thrive in a dynamic and evolving economy. Programming includes Main Street business networking, legal guidance provided in partnership with VT Law and Graduate School, and targeted business support workshops for creatives, youth, and women.





and Vermont University and medical centers like Gifford Medical Center and the VA Medical Center being among the largest employers in the Region, and Dartmouth-Hitchcock and Dartmouth College being nearby. The second largest sector, leisure, and hospitality, employs 23 percent of our Region's employees. Lake Morey Resort, the Woodstock Inn and Resort, and the Quechee Club are all large employers that contribute to this sector. With almost half of our Region's labor listed under educational, medical or hospitality sectors, these are clear anchor institutions within our local economies.

## D. Regional Challenges and Opportunity Areas for Economic Development

### Telecommunications

Parts of the TRO Region still need access to fast, affordable, and efficient Internet, data, and cellular technologies to promote business growth and attract prospective employees. According to a Vermont Public Service Department January 2018 report, 9,000 buildings in Orange and Windsor Counties are underserved even for basic Internet speeds.

### Housing

Providing ample workforce housing, in both rental and home buyer markets, is key to meeting the needs of the TRO Region's workers. The Region is short several thousand housing units of the type and price needed to attract new workers.

### Sewer and water supply

While some areas in the Region have ample infrastructural capacity to handle any anticipated growth, only small parts of nine of the Region's 30 towns currently have both municipal water and sewer services. Expansion and updates to existing services and the creation of such systems in other village and town centers is needed (where practical) for economic growth and to attract new businesses.

### Workforce

Anecdotal evidence from local employers suggests a labor shortage in the Region. This is due to lack of housing opportunities and essential services, low wages, and inadequate number of qualified workers. The Region's workforce is rapidly aging and needs a more diverse, younger population to live and work here.

### Existing buildings and brownfields

A better understanding of sites suitable for reuse or redevelopment as new business headquarters or for the expansion of existing businesses is needed in core town and village locations. Appropriate grant funding such as [EPA brownfields funding](#)<sup>19</sup> can help communities and businesses advance the revitalization process.

### Plans and permitting

Lack of clarity in municipal plans makes it difficult for town officials, residents, and developers alike to properly discern which locations are most desirable for new business growth as well as what types of growth is preferred. Further, inconsistencies between some municipal plans and their

## Snapshot: Workforce & Economic Development Resources (continued)

- **Space on Main (SOM)** – A Bradford-based 501c3 founded in 2017 to support entrepreneurship, innovation, the arts, education, health, and recreation in order to increase opportunity for personal and collective growth in the Cohase Region of Vermont and New Hampshire. SOM provides a creative facility with access to affordable equipment, workspaces, and classes. Opened to the public in 2018 and hiring the first employee in 2022 the goal at SOM is to ensure the prosperity of the community by leveraging talent in the region and creating pathways to outside individuals, services, and technologies. Programming covers everything from co-working space and youth coding camps to the Civics Supper Clubs, a monthly, interactive potluck dinner featuring themes of skill building, participatory government, volunteer service, or civic engagement.

Source: Green Mountain Economic Development Corporation, 2024

corresponding implementing bylaws also confuse those making investment decisions.

### Public transit and transportation

There is a distinct lack of public transit routes in most of the Region's towns and within the regional growth centers, which makes commuting to jobs or for services difficult for people who are elderly



or disabled. Many towns in the Region lack even a single transit stop (for policies addressing this issue, please refer to Chapter 4 of this Plan). Only the area of Hartford near the state line has good transit service.

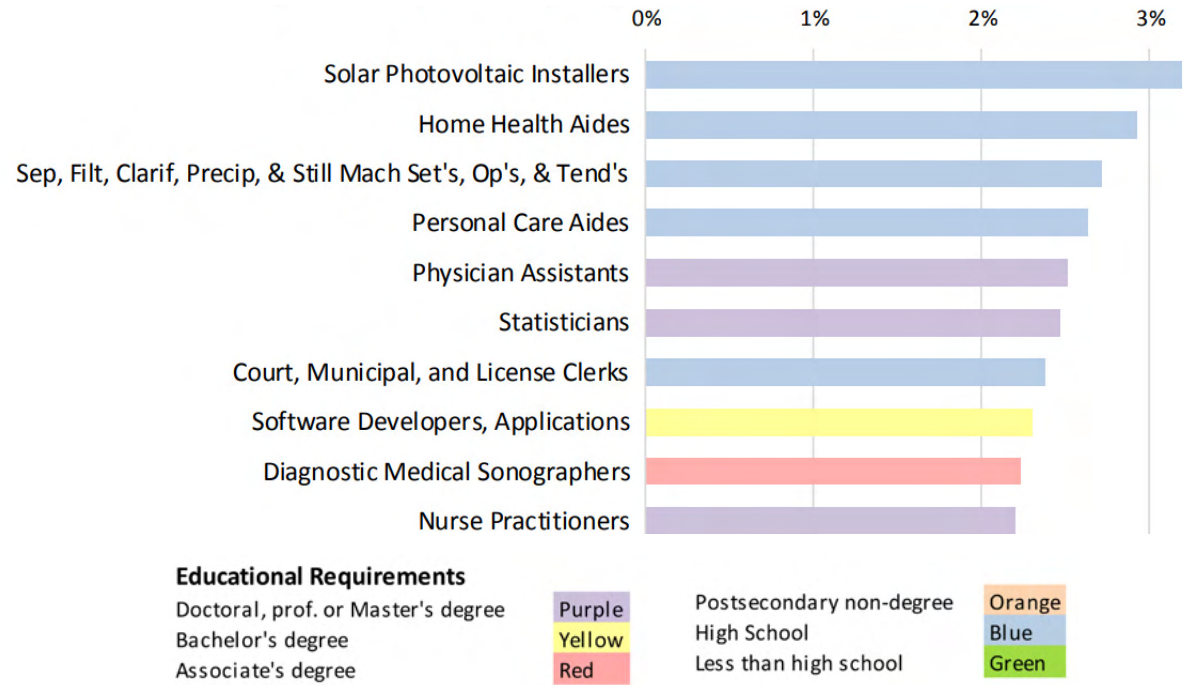
### Creative Economy

The creative sector is made up of people employed in creative industries, and those employed in creative occupations that are not in creative industries. The [CreateVT Progress Report](#)<sup>20</sup> and the [Action Plan](#)<sup>21</sup> produced by the [Vermont Creative Network \(VCN\)](#)<sup>22</sup> found that creatives face limited higher end venues for professionals, lackluster educational programs in the arts, and small networking opportunities. [Cornerstone Creative Community of Vermont \(3CVT\)](#)<sup>23</sup> aims to boost economic prosperity and networking for creatives in east central Vermont.

### Value-added agriculture

While Vermont-based dairy and maple products have successfully reached national, and even international markets, our Region's value-added food products have room to grow. As identified in the [Vermont Agriculture and Food System Plan 2021-2030](#)<sup>24</sup>, opportunities include teaching entrepreneurial skillsets to young farmers, increasing collaboration with restaurants, and supporting on-farm processing facilities for small-scale producers.

Figure 5-3: Top 10 Occupations by Average Growth Rate in Vermont



Vermont Department of Labor: 2016-2026 Long Term Occupational Projections

## E. The Future of Economic Development

### A Vision for the Future

The [2020-2025 Comprehensive Economic Development Strategy \(CEDS\)](#)<sup>25</sup>, updated every five years, is an economic roadmap designed to diversify and strengthen our economy by helping to guide growth throughout the 40 towns of the [East Central Vermont Economic Development District](#), which includes the TRO Region. The plan contains workforce development strategies through education, housing infrastructure, and quality of life improvements. A CEDS is required

by the [U.S. Department of Commerce's Economic Development Administration \(EDA\)](#) for districts to be eligible for planning and construction funds. TRORC has used funding made available by the preparation of a CEDS to support work around the creative economy as well as health and wellness planning throughout the Region. The dynamic process of developing a CEDS is heavily dependent on the coordinated efforts of regional planning and economic development organizations, town governments, interest groups, and private industries that are concerned about the economic development of a Region. The most recent CEDS contains an increased focus on resilience to





both economic shocks as well as climate related disasters.

TRORC recognizes that the Region has a few unique characteristics that provide the opportunity for a high quality of life. Like other parts of Vermont, it is blessed with mountains, lakes, open fields, and villages. The Region's residents have ready access to the natural environment, yet they also have good access to culture, technology, transportation, and other characteristics typically associated with urban life.

Building on the assets of our place is the cornerstone of our economic strategy. While some believe that enticing large new employers is the preferred means of promoting economic development, this approach does not focus on the best source of jobs in our region: small business growth from existing employers. Enticing large new employers also usually involves public subsidies and creates vulnerability in the event of future closure.

TRORC advocates that the region focuses on development based on our local assets and existing small businesses, including cottage industries, which will enable a more stable economy that can grow and flourish. We can also grow local entrepreneurs and attract workers who can telecommute remotely for employers outside of the Region. Given the current shortage of housing, training employees from amongst our current workforce may be easier than attracting outside employees in some cases. However, we also need a concerted effort to attract new working-age adults to augment our aging population.

As noted within the “Major Regional Employers” section of this chapter, higher education and health institutions comprise two of the most significant sectors of our regional economy. Instability of any of these institutions, be it Vermont University, Vermont Law and Graduate School, Gifford Medical Center, or Dartmouth-Hitchcock Medical Center, would trickle down to communities throughout our Region, prompting job loss and adverse financial impacts to the towns and businesses that depend on their continued existence.

In 2022, the Vermont Department of Labor published a [long-term projection of occupations](#) that are anticipated to see job growth and decline across the State. However, it is important to note that the projections are not absolute, as many factors constantly influence employment trends (such as the COVID-19 pandemic and emergence of new occupations). It is worth noting that, of all the major occupation groups that are set to see the most growth, many do not pay high wages. For instance, restaurant cooks are predicted to grow by 5.5 percent—more than any other jobs—but the median pay is \$17.73 dollars per hour. Looking at the state-level data, it is highly likely that occupations that require less educational or professional qualifications will have the highest growth in our Region.

While providing jobs is important for both attracting and retaining residents, our Region needs to ensure that there are ample services and housing in place. Childcare services contribute to the regional economy as a business and employer and as a service industry that provides crucial

support to employers and employees. Ample supply of childcare services and facilities allows parents in the regional economy to work, and their importance to the local economy cannot be overstated if we wish to see an influx of workers to the Region. Further, providing increased housing opportunities is critical, especially near job centers.

A more robust transit system will increase people's access to both work and services, and increased high-speed Internet and cell coverage will increase the area's viability for prospective residents to the Region. Multimodal opportunities influence diverse settlement patterns, as [vehicle ownership is due to demographics and life choices](#). Similarly, [a 2015 study by the Vermont Transportation Board](#) conducted eight forums at various college campuses, and found that young Vermonters believe that the state would be a more attractive place to settle for young adults if there were alternative means of transportation. Regional infrastructural improvements will lead to lower costs of living, increased community vitality, and a wider array of professional opportunities for residents.



## Goals, Policies, and Recommendations: **Economic Development**

### *Goals*

1. Economic development, community development, and land use policies and plans improve the Region's unique quality of life.
2. Essential elements for attracting new younger residents are in place.
3. Agriculture and forestry continue to preserve, reinforce, and revitalize the best characteristics of the Region's landscape and communities while also improving soil and forest health.

### *Policies*

1. Public and private infrastructure shall be planned and funded to support our economy and the natural environment.
2. Regional development activities should support the diversity of the Region's economic base by encouraging entrepreneurship, supporting local businesses, and attracting new businesses that are consistent with the Regional Plan.
3. New workforce housing development is supported in villages and downtowns.
4. Economic development strategies between TRORC, ECVEDD, and other regional economic development consortiums should align to support a diverse and resilient regional economy.
5. Efforts should be made to engage and assist anchor institutions with community dialogue and business continuity planning.
6. Businesses that are sited and designed in accordance with this Plan and promote the local processing, sale, and distribution of native raw materials and products are encouraged. Planning and regulatory review at the state and local levels should not unduly restrict the development of such commercial operations, which complement farming and forestry

### *Recommendations*

1. TRORC will assist towns with Act 250 support, zoning bylaw revisions, and grant and loan management to further the development of desired job growth and workforce housing close to our Region's core economic areas.
2. TRORC will assist towns in asset management, capital budgeting, and shared services/purchasing to lower costs and stabilize taxes.
3. TRORC will participate in discussions to improve the regulatory system at the state level and improve permitting coordination between local and state levels of government.
4. TRORC will work with Vermont state agencies, regional and local development groups, trade associations, Chambers of Commerce, planning commissions, and other groups to integrate land use planning with economic planning and development programs based on our Region's assets.
5. Public agencies, schools, and private businesses should expand workforce training and education that aligns with the strategic needs of our Region's current and future employers.
6. TRORC will work with the Vermont Arts Council to support regional and statewide creative zones.
7. TRORC will work with towns and development organizations in the Region to identify and undertake brownfields assessments to rehabilitate underutilized sites and buildings most suitable for near-term commercial and residential development in existing downtowns and villages where water, sewer, power, Internet, and roadways have capacity.



## Goals, Policies, and Recommendations: Economic Development

### Recommendations (continued)

8. TRORC should work with local producers, development corporations, educational programs, the Vermont Agency of Agriculture, and other organizations to study, identify, and create needed processing, storage, and distribution capacity for locally made food and forestry products; and other types of incubator/maker spaces.
9. TRORC should work with land trusts and local conservation commissions to inventory farm and forest lands to understand where parcels are available that could provide opportunities for new farm and forest businesses and to assist towns in crafting regulations to reduce fragmentation and leave land available for farming, forestry, and other land-based businesses.
10. TRORC strongly supports property tax reform efforts at the local and state levels that would reduce the costs of land ownership for farming and forestry, while protecting against the Current Use Program's use as a low-cost vehicle for speculative holding of property for future development.
11. The Natural Resource Conservation Service, Conservation Districts, University of Vermont Extension, and others should continue efforts to educate landowners on the benefits of maintaining and improving the health of forests.

### Economic Development Endnotes

- 1 <http://www.labor.state.vt.us/profile2023.pdf>
- 2 [https://www.bls.gov/cps/cps\\_htgm.htm#nilf:~:text=The%20basic%20concepts%20involved,the%20labor%20force.](https://www.bls.gov/cps/cps_htgm.htm#nilf:~:text=The%20basic%20concepts%20involved,the%20labor%20force.)
- 3 <http://www.labor.state.vt.us/lmi/profile2023.pdf>
- 4 [https://www.bls.gov/cps/cps\\_htgm.htm#nilf:~:text=The%20basic%20concepts%20involved,the%20labor%20force.](https://www.bls.gov/cps/cps_htgm.htm#nilf:~:text=The%20basic%20concepts%20involved,the%20labor%20force.)
- 5 <http://www.labor.state.vt.us/lmi/profile2023.pdf>
- 6 <https://www.uschamber.com/workforce/understanding-vermont-labor-market?state=vt>
- 7 [https://docs.google.com/file/d/0B7fGuPMC\\_Sk6RUdDYU1Jc002V1RpM0pGS2ImNIZzaGx1RW9z/edit?resourcekey=0-PKGV59dQV6WekQj4Y5p3Yg](https://docs.google.com/file/d/0B7fGuPMC_Sk6RUdDYU1Jc002V1RpM0pGS2ImNIZzaGx1RW9z/edit?resourcekey=0-PKGV59dQV6WekQj4Y5p3Yg)
- 8 <https://accd.vermont.gov/economic-development/doing-business/workforce>
- 9 <https://labor.vermont.gov/workforce-development>
- 10 <https://humanservices.vermont.gov/our-work/programs-services/financial-employment-security>
- 11 <https://www.americanprogress.org/article/quick-facts-gender-wage-gap/>
- 12 <https://uppervalleyhaven.org/>
- 13 <https://www.vhfa.org/news/blog/vhfa-releases-2021-annual-report>
- 14 [https://www.vtfarmtoplate.com/sites/default/files/2023-01/farm-to-plate-annual-report-2022\\_final\\_hires.pdf](https://www.vtfarmtoplate.com/sites/default/files/2023-01/farm-to-plate-annual-report-2022_final_hires.pdf)
- 15 [https://www.nass.usda.gov/Publications/AgCensus/2017/Full\\_Report/Volume\\_1,\\_Chapter\\_1\\_State\\_Level/Vermont/vtv1.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_State_Level/Vermont/vtv1.pdf)
- 16 [https://www.nass.usda.gov/Publications/AgCensus/2017/Online\\_Resources/County\\_Profiles/Vermont/cp50017.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Vermont/cp50017.pdf)
- 17 [https://www.nass.usda.gov/Publications/AgCensus/2017/Online\\_Resources/County\\_Profiles/Vermont/cp50027.pdf](https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Vermont/cp50027.pdf)
- 18 <https://apps.bea.gov/data/special-topics/orsa/summary-sheets/ORSA%20-%20Vermont.pdf>
- 19 <https://www.epa.gov/brownfields/types-epa-brownfield-grant-funding>
- 20 <https://www.vermontartscouncil.org/wp-content/uploads/2023/05/CreateVT-Action-Plan-2022-Progress-Report.pdf>
- 21 <https://www.vermontartscouncil.org/wp-content/uploads/2022/12/CreateVT-Action-Plan.pdf>



Economic Development Endnotes (continued)

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22 <https://www.vermontartscouncil.org/vermont-creative-network/action-plan/creative-segments/>  
23 <https://www.ecvedd.org/3cvt/>  
24 <https://agriculture.vermont.gov/document/vermont-agriculture-and-food-system-strategic-plan-2021-2030>  
25 [https://www.ecvedd.org/wp-content/uploads/2020/06/CEDS\\_EDA\\_2020-2025\\_Final.pdf](https://www.ecvedd.org/wp-content/uploads/2020/06/CEDS_EDA_2020-2025_Final.pdf)  
27 <https://www.eda.gov/>  
28 <http://www.vtImi.info/projlt.pdf>  
29 [https://www.nber.org/system/files/working\\_papers/w25674/w25674.pdf](https://www.nber.org/system/files/working_papers/w25674/w25674.pdf)  
30 [https://tboard.vermont.gov/sites/transboard/files/pdfs/2015TransReport\\_Jan21.pdf](https://tboard.vermont.gov/sites/transboard/files/pdfs/2015TransReport_Jan21.pdf)







# 06 | Natural Resources

*Newbury Wells River* | ©John Knox

## A. Introduction

Town Plans throughout the Region express the desire to maintain the rural character of their communities while allowing compatible development. An essential part of the rural character is the quality and quantity of natural resources of the Region. Due to the rural nature of the Region and Vermont, the Region's natural resources are in better condition than in many of the other regions of the country, but they are vastly different from pre-settlement conditions. The topography has changed little, but rivers have been dammed and moved aside in valleys, and enormous swatches of wetlands have been filled.

Virtually all of the timber has been cut over at least once, and immense amounts of soil have washed down from the hills. Native animals such as wolves and catamounts have been extirpated, trees such as chestnut and elm drastically reduced, and fish species such as Atlantic salmon have disappeared. Still, we are left with fertile valleys, large amounts of forest, and many species of wildlife in healthy populations. If we can retain enough of our natural resources in good condition, then the place we cherish will continue to function as an ecosystem, a source of livelihood, and an integral part of the character of Vermont.

## B. Groundwater

### Background

Virtually all of the Region relies upon [groundwater](#)<sup>1</sup> for domestic and commercial water supply, whether it is individual wells or larger town systems. Quality groundwater is a basic human need. It is fiscally prudent to review and prevent threats to groundwater before they occur. Protection of groundwater requires protection of surface waters, wetlands, watersheds, and recharge areas.

The quality of the groundwater in the Region is generally good; however, there is potential for





groundwater quality problems. Contamination sources of concern include old industrial and town solid waste disposal sites, leaking underground fuel tanks, continuing use of improper industrial floor drains, accidental fuel or chemical spills, poor agricultural practices, road salt, PFAS, natural nutrient runoff, and failed septic systems. Many residential septic systems in Vermont were installed prior to regulation and do not adequately treat septic discharge prior to entering groundwater. [Straight pipe](#)<sup>2</sup> systems, where waste is directly discharged to a wetland or stream, are illegal but some are likely still in use.

## C. Surface Water

### Background

The streams, rivers, ponds, and lakes of the Region are critical resources for economic vitality and physical health. These surface waters support direct and indirect livelihoods for many of the Region's residents through sports and tourism-related businesses.

Vermont's high-quality surface water also support the existence of the quality of life deemed valuable to the Region. Surface waters integrated with groundwater, wetlands, land cover types, and land uses should be considered in any decisions affecting those elements.

### Water Quality Standards, Classifications, and Designated Uses

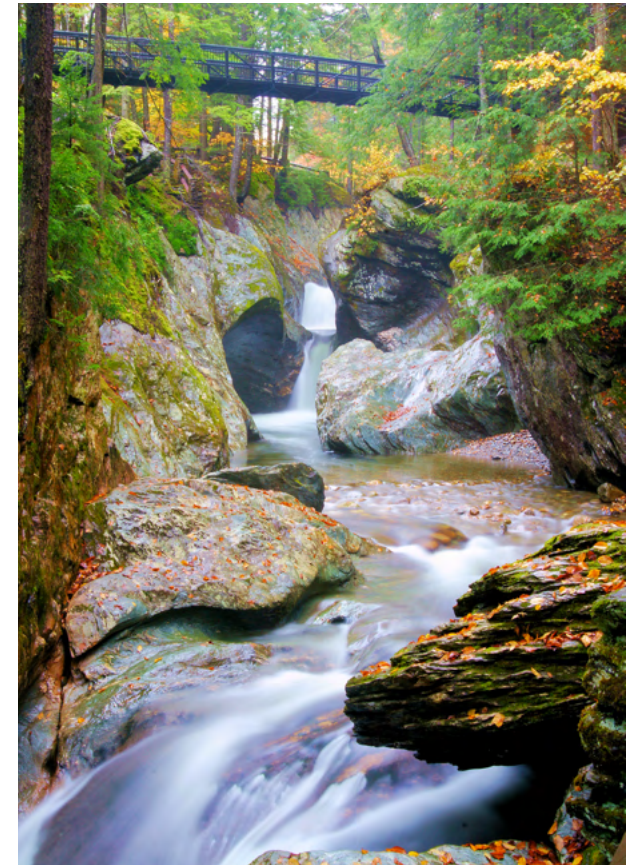
The [Vermont Water Quality Standards \(VWQS\)](#)<sup>3</sup> are rules that establish the goals of the Vermont Water Quality Policy and the objectives of the

federal Clean Water Act—which enforces the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The [2022 VWQS](#)<sup>4</sup> contain numeric and narrative criteria that describe the classification of all waters based on designated uses. Water quality classifications that are administered by the Vermont Department of Environmental Conservation (DEC) establish water quality goals for each body of water in the State.

The State's waters are currently classified as Class A1, A2, B1, or B2 with an overlay Waste Management Zone in Class B2 waters for public protection downstream of sanitary wastewater discharge points.

Class A waters are managed for enjoyment of water in its natural condition, as public drinking water supplies (the A2 classification is exclusively reserved for this use, and it includes the disinfection and filtration of waters) or as very high-quality waters in excellent condition that have significant ecological values. Class B1 waters are managed as waters that are in very good condition.

Despite data showing many small streams are B1 quality, most waters in the Region are now classified as Class B2 (with the exception of all surface waters above 2,500 feet elevation that are classified as A1). Surface waters classified as A1 include waters within the Breadloaf Wilderness Area of the Green Mountain National Forest, surface waters within the Joseph Battell Wilderness Area of the Green Mountain National Forest, Bingo Brook in the White River watershed, Smith Brook in the White River watershed, and Beaver



*Texas Falls, Hancock* | © John Knox

Meadows Ponds in the White River watershed. A few reservoirs and sections of tributaries have been classified as Class A2 and are designated as secondary sources of drinking water for the towns in which they are located.

*Outstanding Resource Water* can be designated by the Agency of Natural Resources. There is currently only one “outstanding” water resource in the Region: The Great Falls of the Ompompanoosuc River, located in Thetford. The main stem of the White River has been proposed as a prospective



*Outstanding Resource Water* because it is undammed.

In classifying the surface waters of the State, the Agency considers any adopted Basin Plan, existing uses, background conditions, and the degree of water quality to be obtained and maintained. Recommendations for use reclassifications are made during the tactical basin planning process of each watershed. The Agency, on its own motion or in response to a petition, will review an established classification to determine if it is contrary to the public interest and, if so, what classification is in the public interest.

### Sources of Surface Water Degradation

[Non-point source pollution](#)<sup>5</sup> is run-off from our roads, parking, and fields that carry pollutants into our waterways, but are not directly carrying a pollution source in a pipe. Non-point pollution sources are the greatest cause of water quality impairment in rivers and streams now that the State has completed the building of public wastewater treatment plants and largely eliminated individual straight pipes. The four most common water quality impairments caused by non-point sources are siltation, thermal modifications, pathogens, and nutrients. Other common causes of impairment to rivers and streams are habitat alterations and flow alterations. The principal sources of these impairments are agricultural runoff, streambank destabilization and erosion, removal of riparian (streamside) vegetation, flow regulations or modifications (largely due to dams and withdrawals), stormwater discharges from developed areas, and highway maintenance and

runoff. Known and suspected problems are often detailed in the [DEC's basin assessments](#)<sup>6</sup> and the [303\(d\) List of Impaired Waters](#)<sup>7</sup>, but considerably more work is needed to identify problems in sufficient detail to undertake planning to address them.

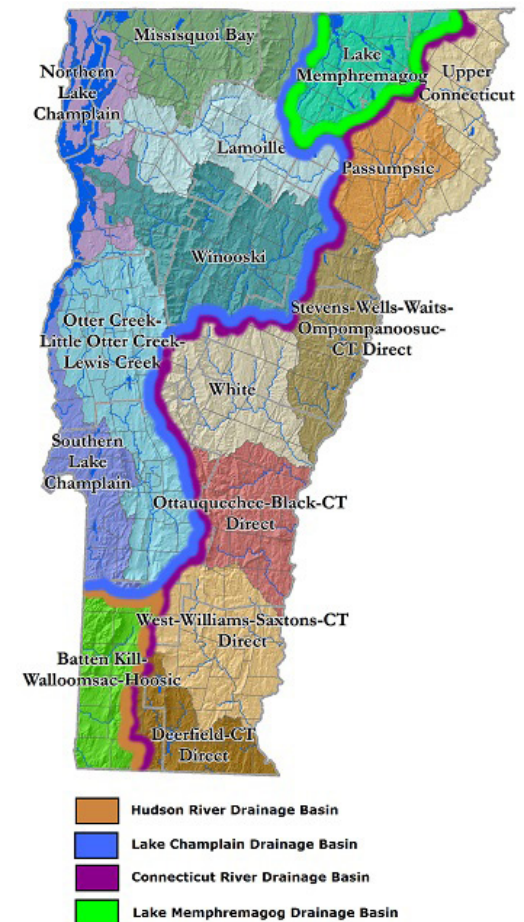
In lakes and ponds, many recreational and development activities can also threaten water quality. Shoreline development can cause erosion and sedimentation. Failing septic systems and poor agricultural practices contribute pathogens, nitrogen, and phosphorous. Motorboats and trailers transport invasive species such as Eurasian water milfoil and zebra mussels. Intentional water level fluctuations from drawdowns harm bordering wetlands. Also, any entering rivers and streams can bring with them the above-mentioned pollution. Vermont regulates all development within 250 feet of lakes and ponds of at least 10 acres, but unfortunately this regulation took effect after most shoreline areas were developed.

### Watershed Management and Basin Planning

A watershed is all of the land that drains into a certain point. The [Vermont Watershed Management Division](#)<sup>8</sup> of the Vermont Department of Environmental Conservation has divided the State [into fifteen basin areas](#)<sup>9</sup>. Designated basins in the TRO Region include the [Ottauquechee River \(including Black River\)](#)<sup>10</sup> (Basin 10), [the White and Tweed Rivers](#)<sup>11</sup> (Basin 9), [the Wells River, Waits River, Ompompanoosuc River, and Upper Connecticut River tributaries](#)<sup>12</sup> (Basin 14). Very small portions of [Otter Creek](#)<sup>13</sup> (Basin 3) and the [Winooski River](#)<sup>14</sup> (Basin 8) are also in the Region.

These plans have a duration of five years, and planning efforts typically commence one year prior to their expiration. TRORC is integrated into this basin planning process by statute. The White River Natural Resources Conservation District ([White River NRCD](#)<sup>15</sup>) and Ottauquechee Natural Resources Conservation District ([ONRCD](#)<sup>16</sup>) are also involved in water quality planning.

Figure 6-1: Watersheds and Basins



Source: Vermont Agency of Natural Resources





The items that [tactical basin plans](#)<sup>17</sup> must cover are laid out by the [Vermont Water Quality Standards](#)<sup>18</sup> and the federal [Clean Water Act](#)<sup>19</sup>. Basin plans inventory the existing and potential causes and sources of pollution that may impair their surface waters and then establish a strategy to improve or restore waters. The plans form the basis for state implementation actions and should serve to coordinate stakeholders' efforts. In the development of plans, ANR seeks public participation to identify and inventory problems, solutions, high-quality waters, existing uses, and significant resources of high public interest and is required to consider approved municipal and Regional Plans.

The maintenance and enhancement of streamside and lakeside vegetation are the easiest and most effective means of protecting the many benefits and values associated with surface waters. Setting aside unmowed areas of naturally growing grasses, shrubs, and trees is essential to the health of streams and lakes and to resource conservation. The many benefits of vegetated shorelines are included in [this link](#)<sup>20</sup>.

The Watershed Management Division produces the [State of Vermont Water Quality Integrated Assessment \(305\(b\) report\)](#)<sup>21</sup> every two years and the State Clean Water Strategy every five years, in which priority waters are targeted for remediation or protection.

### Shoreline Buffers and Riparian Areas

The Connecticut River forms the eastern boundary of Vermont, and nearly the entirety

of the TRO Region lies within its watershed. With the exception of impounded areas, the Connecticut River is in New Hampshire. There are large sections of the shoreline area that exhibit erosion. The Connecticut River features a major hydroelectric facility, the Wilder Dam, which is operated by [Great River Hydro](#)<sup>22</sup> (formerly owned by TransCanada). The Wilder Dam's impoundment, or reservoir area, extends for 45 miles upstream to the Town of Newbury. The reservoir fluctuates daily as the owner of the facility increases the rate of water to the turbines to generate electricity during peak periods. However, the daily fluctuation, which can be up to five feet, can dramatically affect the shoreline areas of the Connecticut River. The rapid saturation and removal of water along streambank areas, as well as boat wakes, cause erosion, and fluctuating water levels impact waterfowl nesting and fish habitat.

Setting aside unmowed areas of naturally growing grasses, shrubs, and trees is essential to the health of streams and lakes and to resource conservation.

### D. Fisheries and Aquatic Resources

The Region's rivers and streams provide cold and warm water habitat for many [species of fish](#)<sup>23</sup>. In order to support native fish populations, both warm and cold water habitats must be able to provide adequate supplies of oxygen and support the plant, animal, and insect life on which fish populations feed. Also, because many cold-water species return

annually to the same breeding areas, waterways must remain open to fish migration.

The damming of streams to create ponds, either within a stream channel or drawing from the stream channel, damages fish habitat by increasing water temperature, decreasing dissolved oxygen, encouraging nuisance algal growth, creating barriers to fish passage, and increasing the potential introduction of nonnative species.

### E. Wetlands

[Wetlands](#)<sup>24</sup> provide an array of functions and values that support environmental health and benefit humans. Benefits include flood and stormwater control, maintenance of surface and groundwater quality, open space and aesthetic appreciation, and fish and wildlife habitat (including a large number of threatened and endangered species). Wetlands are also important for recreational activities such as hunting, fishing, bird-watching, and photography.

Draining, filling, and development have resulted in the loss of [more than 35 percent of Vermont's original wetland acreage](#)<sup>25</sup>, primarily due to agricultural and large-scale development projects. At present, roughly 4 percent of Vermont's lands are classified as wetlands, totaling 244,000 acres. The Vermont Wetlands Office estimates that an additional 80,000 acres of wetlands exist that have not been identified, bringing the actual total to about 5 or 6 percent of the State's land. The current rate of wetland loss in Vermont has been estimated at eight acres a year through incremental destruction by numerous smaller projects, many of which are less than one acre, with serious





implications for short- and long-term wetland values.

The [Vermont Wetlands Rules](#)<sup>26</sup> classify all wetlands into three categories. Class 1 wetlands are those identified as “exceptional or irreplaceable in their contribution to Vermont’s natural heritage.” The [Eshqua Pond in Hartland](#)<sup>27</sup> is the only Class 1 wetland in the Region. Class 2 wetlands are those shown on the National Wetlands Inventory, as well as any wetlands contiguous to these mapped wetlands. Most wetlands considered Class 2 have areas of at least a half-acre, but many vernal pools are smaller and still protected. Class 3 wetlands are those that have not been evaluated. The Vermont Wetland Rules require a 100 -foot buffer for Class 1 wetlands and a 50 -foot buffer for Class 2 wetlands.

In the TRO Region, just over one percent (1.2%) of the land area has been identified by the State of Vermont as “significant” wetlands, eligible for state protection under the Vermont Wetlands Rules. However, there are a large number of smaller wetlands that may qualify for protection. Forested wetlands have also been recognized as containing critical spring food sources for black bears and other species. In addition to state protection, wetlands are also overseen by the U.S. Army Corps of Engineers, which has the responsibility of administering [Section 404 of the Clean Water Act](#)<sup>28</sup>, which regulates the dredging or placing of fill into any wetland.

Wetlands are important for a variety of plant and animal species. Certain freshwater fish species require wetlands as spawning grounds and as nursery areas for their young. Wetlands are also

important for maintaining the quality of fish habitat by providing shade or discharging water from cold springs, both of which moderate surface water temperatures.

Wetlands provide essential habitat for numerous plant and wildlife species, some of which only live in wetlands. Many species rely on wetlands, especially amphibians, for some or all of their life cycles; for others, wetlands are important for a part of their life cycle or during certain times of the year. A forested buffer zone is essential protection both for species in the wetland and for those species preferring the upland/wetland border. The trees and shrubs provide important food, cover, and nesting sites for large and small mammals, songbirds, reptiles, and amphibians. The vegetation also screens wetland wildlife from noise, light, and other human activities in adjacent uplands. State officials at the Vermont Department of Environmental Conservation recommend a setback of at least 200 feet for wildlife habitat protection around wetlands.

### Wetlands Protection

In order to be protected by [Criterion 1\(G\)](#)<sup>29</sup> of Act 250, wetlands, including [vernal pools](#)<sup>30</sup>, must be listed as significant by the State. Municipalities, TRORC, or other interested parties may petition the Agency of Natural Resources to (1) have a wetland reclassified to a higher or lower classification, (2) determine which functions make the wetland significant, (3) determine whether the size or configuration of a buffer strip associated with a significant wetland should be modified, or (4) determine the final boundaries

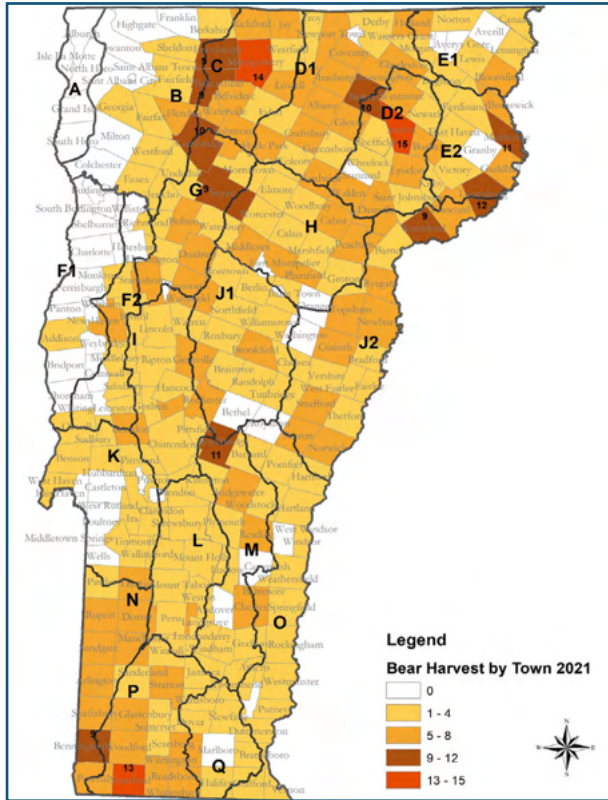
of any significant wetland. However, wetlands may be protected under several other sections of Act 250, including criteria dealing with water pollution waste disposal (1(B)), floodways (1(D)), streams (1(E)), shorelines (1(F)), erosion control (4), natural areas and aesthetic considerations (8), wildlife habitat (8A), and public investments and facilities (9K), and under local and Regional Plans. TRORC recognizes the critical value of wetlands in relation to the health of the water, wildlife, and plant resources in the Region and to the ecosystem as a whole.

**Vernal pools are a unique and vulnerable habitat that must be identified and protected under municipal regulations. It is estimated that every town in Vermont has at least one vernal pool.**

Because of their small size and temporary nature, vernal pools are not mapped very well, but they are now protected under the Vermont Wetland Rules as Class 2 wetlands. They are a unique and vulnerable habitat area, as these habitats are safe breeding grounds for many amphibian and insect populations because they are not connected to stream systems and do not support fish populations. To see real-time locations of potential and verified vernal pools throughout the state, visit Vermont Center for Ecostudies’ [VPAtlas](#)<sup>31</sup>, an interactive map showcasing almost 4,000 vernal pools.



Figure 6-2: Bear Harvest by Town 2021



Source: VT Fish & Wildlife

## F. Wildlife

Wildlife habitat is the physical and biological environment in which a particular species of plant or animal lives. Large wildlife species such as black bear, moose, deer, and bobcat, as well as large birds of prey and many varieties of songbirds require larger expanses of contiguous habitat to survive. To maintain or improve the populations and diversity of these species, their habitat must be managed wisely and protected from unreasonable

fragmentation and alteration. Wildlife management requires controlling human activities around animals as much as management of animals around human activities. Many wildlife cannot live where there is any amount of development, no matter how seemingly unobtrusive.

Habitat that is productive for most species of wildlife in the Region requires a diversity of forest type and maturity. Forests that are carefully managed, for the benefit of both humans and animals, support older nut-producing trees, medium-sized trees for firewood, and an undergrowth of young trees and shrubs that provide food and cover for a variety of species. In addition, occasional clear-cuts, if done according to accepted management practices, can provide browse for moose, deer, and bear, and can be followed by planting trees such as oak. Hard mast, such as the nuts of oak and beech, is a critically important source of food for many kinds of wildlife.

The Vermont Department of Fish and Wildlife considers areas of beech or oak with a history of bear feeding use to be necessary wildlife habitat, as these stands are absolutely essential for the survival and reproduction of black bears in Vermont. Since only older trees produce mast, mature oak trees are considered a critical resource to all forms of wildlife. However, cutting trees is largely unregulated in Vermont. Unless a project is in Act 250, an [intent-to-Cut Notification](#)<sup>32</sup> must only be submitted to the Vermont Department of Forests, Parks, and Recreation when a landowner plans to conduct a heavy cut of 40 acres or more.



Barred Owl at King Farm | © Tory Littlefield

## Threatened and Endangered Species and Critical Natural Communities

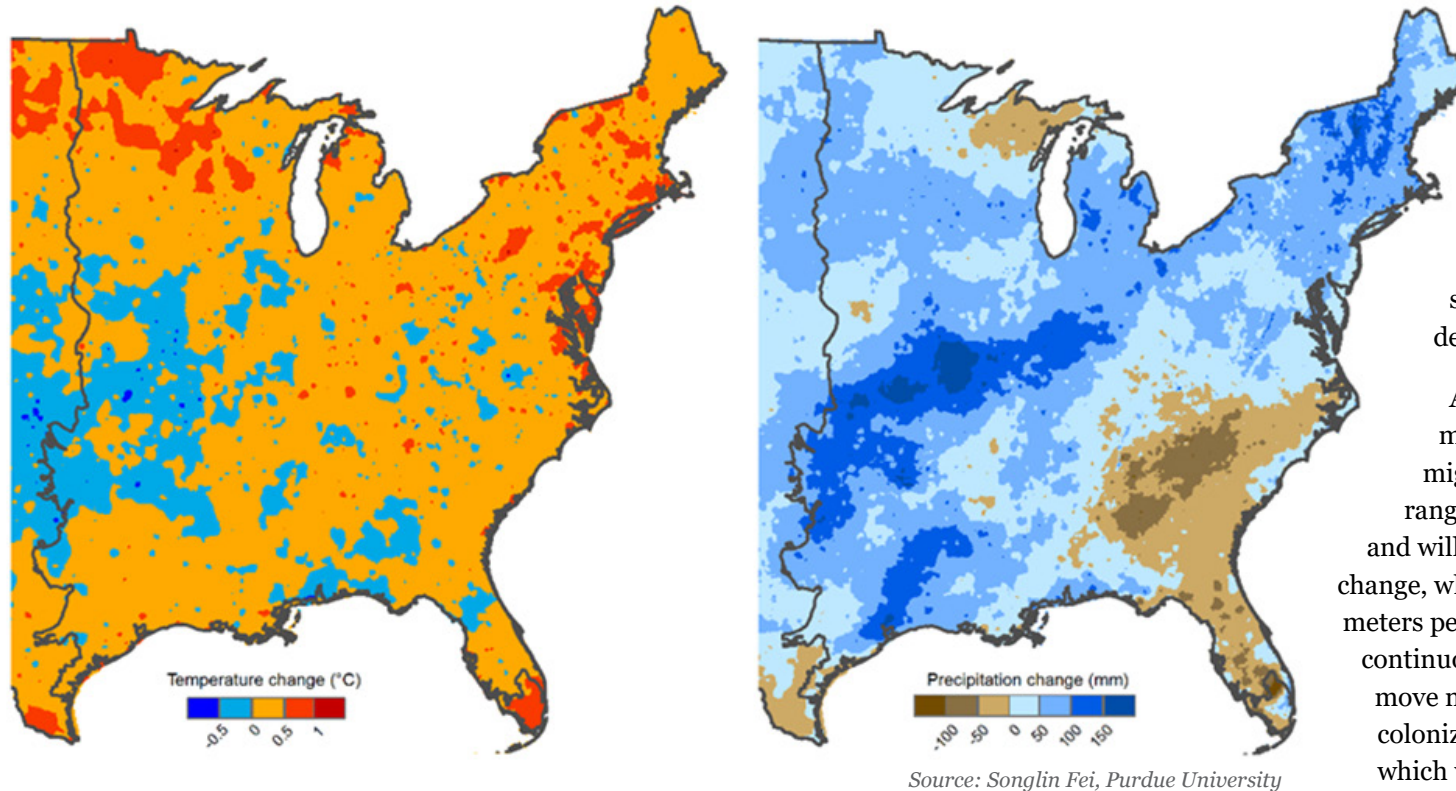
Rare plants and animals are important for a variety of reasons. Some are indicators of unusual habitats or of colder or warmer climates in Vermont's distant past. Some serve as indicators of environmental quality. Some species may provide compounds for medicines and agricultural or industrial products. Some species are attractive and add beauty to the landscape. And most importantly, the presence of a diversity of plant and animal species is vital to a healthy, functioning ecosystem. Many uncommon species will disappear if not recognized and protected.

Species with a state status of threatened or endangered are protected by Vermont's [Endangered Species Law \(10 VSA Chapter 123\)](#)<sup>33</sup>, as well as being protected by the [Federal Endangered Species Act \(P.L. 93-205\)](#)<sup>34</sup>. The Vermont





Figure 6-3: Temperature and Precipitation Change in the Past 30 Years



Department of Fish and Wildlife maintains [lists of threatened or endangered plants and animals](#)<sup>35</sup>. These animals and plants may be rare because they have very particular habitat requirements, are at the edges of their ranges, are vulnerable to disturbance or collection, or have difficulty reproducing for unknown reasons.

[The Vermont Nongame and Natural Heritage Program](#)<sup>36</sup> in the Department of Fish and Wildlife has identified and mapped special natural features or species and natural communities. Several species of grassland birds, including the upland

sandpiper, and other endangered birds such as the bald eagle, depend on critical habitat areas in the Region. In addition to animals on the Threatened and Endangered Species of Vermont list, the [Vermont Institute of Natural Science \(VINS\)](#)<sup>37</sup> has recognized several species, such as the wood turtle, that are in decline and may soon become endangered.

### Climate Change and Habitat Shifts

As the climate warms, tree species need to shift their geographies northward to remain within

an inhabitable environment (a phenomenon called [range migration](#)<sup>38</sup>). It is expected that, under the best climate scenario, the Northeastern United States will lose spruce/fir/paper birch type forests and that more oak/hickory forests will move in.

This shift in forest will also mean a shift in other species as well that are dependent on the forest.

A study on the pace of tree species migration suggests that natural species migration rates in undisturbed forests range from 100 to 200 meters per year and will not match the speed of climate change, which is on the order of at least 350 meters per year. Therefore, while maintaining continuous forests for southern species to move northward will be critical, assisted colonization programs will also be needed, which will require [large-scale environmental intervention](#)<sup>39</sup>. This is being studied at UVM for its pros and cons. Keeping contiguous areas of forests will enable wildlife to migrate northward as well, although some slower species, such as amphibians, may need assistance.

### Invasive Species and Diseases

The Region is currently undergoing changes to our woods, fields, wetlands, and waters due to invasive species. Invasive species are non-native species (both plant and animal) that flourish to the detriment of native species. They occur in lakes and rivers, as with Eurasian milfoil or the algae didymo





“rock snot”); in wetlands, as with species such as purple loosestrife; fields, as with wild parsnip or buckthorn; and in forests, as with the emerald ash borer. Invasives are best managed by avoiding infestations through management actions that limit spread, such as the ban on moving untreated firewood across state lines. Some species can be managed through well-timed mowing or manual removal. A well-educated citizenry is one of the best defenses against inadvertent spread. Once established, invasives are very difficult to control. As climates shift northward, species that had been kept at bay due to extreme cold will be on the rise.

A major epidemic that plagues Vermonters is Lyme disease. Vermont is well-known for its working landscapes for our farmers, hunters, and foresters, and expansive outdoor recreational opportunities that span all seasons. [In 2017, Vermont had the highest rate of reported confirmed and probable Lyme disease cases in the nation](#)<sup>40</sup>. There are many preventative measures that people can take to avoid contracting Lyme, such as wearing long socks and pants, bug spray, and checking for ticks upon returning home. According to the Centers for Disease Control and Prevention (CDC)’s annual survey of Lyme disease, Vermonters reported having less Lyme since the pandemic; however, we are not in the clear, and Vermont is still categorized as having a “high incidence” of Lyme, more than any other state.

Deer are plentiful in Vermont, and many Vermonters rely on wild game for food. [Chronic wasting disease \(CWD\)](#)<sup>41</sup>, or “zombie deer disease”, have been found in wild deer in more than half of United States; however, CWD in deer has yet to be

reported in Vermont. CWD isn’t passed down to people, but exposure through contaminated soils and infected venison may increase the possibility of the disease jumping the species barrier and transferring to humans. Currently, there is no contingency plan if an outbreak were to happen, as there is no treatment or vaccine for CWD.

## G. Air Quality

### Background

The air quality of Vermont and the TRO Region appeals greatly to its inhabitants and visitors, and contributes to the high quality of life and health in the area. Although air polluting industries are not a major component of our economy, many activities threaten the Region’s air quality and should be managed wisely in the short and long term.

#### **Wood Stoves**

While federal air quality regulations require stove manufacturers to produce cleaner burning stoves—and there are incentives like tax credits and rebates to residents to swap out their older wood-burning stoves—woodstoves often last several decades longer than modern stoves. Pellet stoves are an alternative to traditional woodburning stoves, as they produce less ash and lower emissions. A multi-town or subregional approach to woodstove pollution may be the most acceptable resolution to these potential problems.

#### **Garbage Burning**

Because of solid waste disposal fees, there has been an increase in illegal open burning of garbage in the Region. Open burning can cause wildfires and releases of toxins (such as heavy metals, dioxins,

toxic gases, and carbon monoxide) into the air that impair the health and environmental quality.

#### **Air Pollution**

Trans-regional air pollution, where the Region is impacted by air pollution from hundreds or even thousands of miles away, will become more important in the future. Trans-regional air pollution should be addressed by the state and federal government, as the Region’s communities may be the recipients of pollution that could affect them or their natural resources but will have little ability to deal with these issues.

#### **Carbon Dioxide**

With [74 percent of the Region’s land forested](#)<sup>42</sup>, it hosts a unique vegetative cover that processes a large volume of carbon dioxide and regulates air temperatures. Increases in carbon dioxide emissions, primarily as a result of combustion of fossil fuels, are a leading cause of the buildup of greenhouse gases in the atmosphere. It is estimated that an amount equal to half of the carbon emitted in Vermont is sequestered by our forests. Harvesting operations that mimic conditions more akin to old growth forests have been shown to better retain carbon in the forest while also producing more wood than traditional harvest methods. Activities that increase the biomass accumulation in a forest or in forest products increase carbon sequestration.

As climate change and potential regulations to curb its impact grow in importance to national policy makers, business leaders are considering forest growth as an inexpensive way to mitigate atmospheric carbon. Forest managers may be able



to receive financial benefit from the value of carbon storage, in effect selling another product off their land, and thus increasing the economic viability of sustainable forest management in the Northeast.

## H. Mineral Resources

### Background

The wise use and management of the Region’s earth and mineral resources are matters of public good. Maintenance of sustainable quantities of gravel, sand, crushed rock, and other materials are essential for the development industry as well as maintenance of state and local highways. Public and private interests are often in conflict over utilization of the resource. It is in the interest of the Region to enable utilization of these resources when such uses do not unduly threaten or significantly inhibit or conflict with other existing or planned land uses. TRORC recognizes the need to balance the rights of the owners of these resources with the public’s right to minimize the nuisance potential resulting from mineral extraction.

### Act 250

Vermont’s Act 250 includes a project review criterion that protects land with the high potential for the extraction of earth resources and also requires planning for the future rehabilitation of the site. Generally recognized issues incidental to mineral extraction include:

1. Creation of excessive dust and noise as a result of truck traffic and operations at the site, thus denying reasonable use of

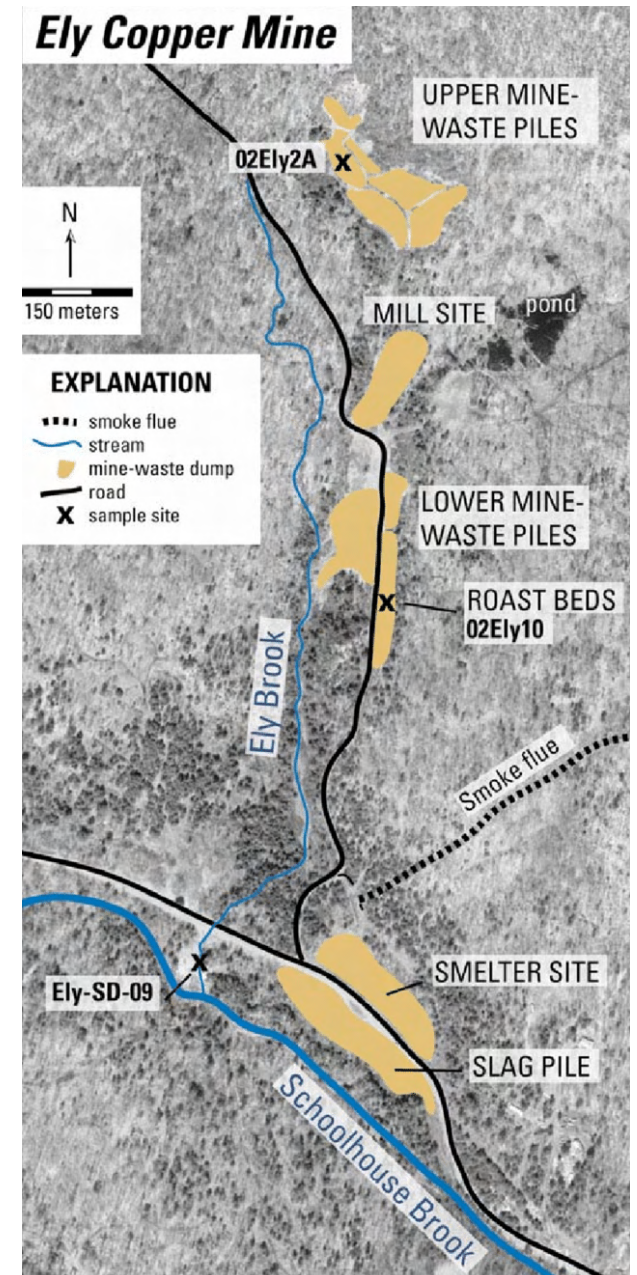
neighboring properties.

2. Degradation of the site or adjacent areas that cause aesthetically unpleasing conditions in the vicinity.
3. Undue deterioration of and traffic congestion on town and state highways.
4. Improper management practices that result in unnecessary soil erosion and inadequate site restoration.

### Contaminated Sites

The Region is host to three former copper mines that are now federally listed “Superfund” sites: the Elizabeth Mine in Strafford, the Ely Mine in Vershire, and the Pike Hill Mine in Corinth. Each mine was operated during the nineteenth and twentieth centuries and extensive remediation is required by the U.S. Environmental Protection Agency according to CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act), the federal law that governs cleanup of these sites. As of now, each site is at a various remediation stage.

The Region also has hundreds of smaller contaminated sites from a variety of industrial and commercial activities. TRORC has been fortunate to receive several EPA grants to assess such sites. Recent contamination concerns are focusing on PCBs in public buildings, PFAS in water supplies, and PCE in indoor air from old solvent products.



Locations of Samples from the Ely Copper Mine, Vershire | Source: Nadine Piatak (2007)



## Goals, Policies, and Recommendations: **Groundwater**

### **Goal**

1. The quality and quantity of groundwater resources are maintained or enhanced.

### **Policies**

1. Commercial water withdrawal must be monitored by the State and shall not lower aquifers and impact surface waters.
2. The State should review land use activities that threaten groundwater quality, including the following:
  - a. Underground storage for petroleum or other hazardous substances,
  - b. Pesticide and herbicide applications on agricultural land, golf courses, resorts, residential properties, and railroad and utility rights-of-way; and
  - c. Junk yards and solid waste disposal sites.
3. It is the policy of TRORC to permanently protect Class 1 groundwater. These are high-quality resource areas mapped by the Agency of Natural Resources and classified by the Secretary as currently being used or suitable for a public water supply source.

### **Recommendations**

1. TRORC will work with the Agency of Natural Resources and with towns to identify and map aquifers and aquifer protection areas to determine critical areas for protection of drinking water supplies.
2. Towns should develop Source Protection Plans for public water supplies or aquifers that have been identified. Such programs may include limiting or prohibiting development and other land uses within wellhead or aquifer protection areas.
3. The Legislature must keep the Petroleum Cleanup Fund at a level sufficient to meet all cleanup needs, including enforcement.
4. TRORC will work with the Agency of Natural Resources, town officials, and others on educational outreach about the proper use of floor drains and local spill response capacity.
5. TRORC will coordinate with EPA, the Agency of Natural Resources, other state agencies, and local officials in the assessment, cleanup, and redevelopment of contaminated (brownfield) sites.
6. TRORC will assist towns when requested to identify, monitor, and search for federal funding programs to conserve and protect important local groundwater resources as part of their planning programs.





## Goals, Policies, and Recommendations: **Surface Water**

### *Goals*

1. Surface water quality and quantity are improved.
2. A coordinated program for surface water quality and quantity is supported at municipal, basin, and regional levels.
3. High-quality waters, including fragile high-altitude waters, and the ecosystems they sustain are protected and reclassified.

### *Policies*

1. Maintenance or enhancement of recreation, fisheries, wildlife habitats, and quality aesthetics are high priorities. Water use decisions at all levels of government and the private sector shall protect these resources and their existing and desired uses and conditions.
2. Within each of the watershed basins in the Region (see Figure 6-1), state, regional, and local decisions relating to surface water must reflect:
  - a. The public's high interest in the use and enjoyment of rivers and streams for recreation, fishing, and aesthetics;
  - b. Existing and projected growth rates for towns in each watershed, including towns within the Region, towns bordering the Region, and towns within each specific basin;
  - c. Present state water quality management plans and relevant portions of municipal and state plans;
  - d. Established environmental, social, and economic goals and policies of the Region as expressed in local plans and bylaws and this Regional Plan;
  - e. Status of existing and proposed municipal and community wastewater treatment facilities, plans, and needs; and
  - f. Existing water quality conditions and known public and private pollution sources.
3. Existing water pollution problems, as identified in the Agency of Natural Resources' Basin Plans, the Water Quality Integrated Assessment (305(b) report), the 303(d) List of Impaired Waters, and the Vermont Surface Water Management Strategy shall be considered high priority for abatement.
4. Discharges to any water in the Region shall be based upon assimilative capacity studies. Allocation and use of limited assimilative capacity shall be based on the following priorities from highest to lowest:
  - a. To abate pollution from existing and possible future sources;
  - b. To hold in reserve some capacity to account for any uncertainties in mathematical assimilative capacity estimate; and
  - c. To accommodate new growth and development that is part of a detailed and publicly reviewed and accepted growth management plan or designated growth center.
5. Class A1 and A2 waters shall be protected from development and other activities that diminish their purity, natural flow, or condition.



***Policies (continued)***

6. Vegetated buffer strips (area of controlled landscape designed for filtering pollution and erosion control) must be maintained in riparian zones and shoreland areas surrounding streams, rivers, lakes, and ponds. Rock rip-rap and retaining walls should only be used to the extent necessary and when bioengineering techniques may not be adequate to prevent significant loss of land, property, or infrastructure.
7. Upland watersheds should be maintained predominantly in forest and low impact recreation use to ensure high quality of valley streams and their tributaries.
8. Given the statewide recreational resource value of the free-flowing White River, new hydropower development on that river shall not be constructed, except where it is done in a “run of the river” manner that does not affect the river flow volume and does not create any significant impounding or dewatering of bypass reaches.
9. Great River Hydro, and its subsidiaries, shall maintain the ramping rates associated with its hydroelectric facilities to prevent erosion and loss of land along the streambanks of the Connecticut River.
10. Tactical Basin Plans shall identify appropriate classifications for waters, including A1 for extremely high-quality waters and B1 for very high quality waters based on existing and reasonably attainable uses as directed by water quality management goals.

***Recommendations***

1. Municipalities need to review existing and proposed water quality classifications of surface waters within town boundaries, or within basins, to determine if classifications meet their uses and needs. Both TRORC and the Agency of Natural Resources are available to provide support.
2. Municipalities must play an active role in the basin planning process and prepare water resources elements in municipal plans that comply with state and federal laws.
3. The Vermont Department of Environmental Conservation’s listing of threatened and impaired waters must be targeted for immediate attention by the Department.
4. Towns in the Region are encouraged to cooperate on a watershed-wide basis when planning for surface water quality and use.
5. TRORC, in cooperation with the Vermont Watershed Management Division, the Agency of Natural Resources, Vermont Local Roads Program, and the Agency of Transportation, should advise town officials on cost-effective road erosion and sediment control.
6. TRORC shall continue to participate in watershed and basin planning efforts.
7. Unless there are specific public benefits to lower classifications, the Agency of Natural Resources must adopt the highest possible classification, water management types, and uses for water bodies based on their actual conditions and uses, or that which is reasonably attainable if higher.
8. Public and private sectors should refrain from activities that spread invasive plants such as ill-timed roadside mowing, transporting invasive plants in ditch soil, and the cleaning of mowing and earthmoving equipment after working in an infested area. Road maintenance personnel should be trained to recognize the invasive plants on the Vermont Noxious Weed Quarantine List and Watchlist.
9. The Agency of Natural Resources and local watershed groups are encouraged to monitor water quality, and when monitoring indicates a water quality violation, to promptly locate and address the source of degradation when possible.



### *Recommendations (continued)*

10. In preparation for writing any basin plans, the Agency of Natural Resources must conduct a comprehensive assessment of water quality in such basins and identify the source(s) of any known water quality problems.
11. Proper erosion control procedures shall be applied in all construction activities, and all stormwater shall be treated through natural or mechanical systems to remove nutrients and sediments and to attenuate flood flows to natural levels before any stormwater reaches streams.
12. To protect high-quality forested riparian (riverbank, streambank, or lakeshore) habitat, towns should prohibit development near these areas and regulate the disturbance of vegetation in riparian zones through general, conditional use, and/or site plan standards.
13. TRORC will help Municipalities employ road maintenance techniques to prevent soil erosion and road surface deterioration to comply with the Municipal Roads General Permit.

## Goals and Policies: **Fisheries and Aquatic Resources**

### *Goals*

1. The water quality and quantity necessary to sustain existing aquatic ecosystems is improved.
2. The natural diversity, population, and migratory routes of fish are improved.

### *Policies*

1. Manmade alterations to flows must ensure downstream protection of water quality and quantity for aquatic ecosystems.
2. The construction of dams on rivers and streams, other than the White River where it is not consistent with this Plan, are discouraged except when the public interest is clearly benefited, and the following criteria are met:
  - a. Projects operate as run of the river and do not affect the flow of river volume;
  - b. Fish passage and canoe portages are provided at dams; and
  - c. Water quality and minimum flows are maintained.
3. The construction of ponds is discouraged, unless fed by groundwater and/or overland drainage. Discharges from ponds shall be designed to withstand a 100-year storm event and operate in a run of the river mode.
4. In-stream ponds are discouraged on all stream segments that support fish life.
5. Permanently vegetated streamside buffer strips of at least 50 feet on small streams and 100 feet on rivers should be preserved except in those areas with dense development in connection with existing similar development such as adjacent to, or infill of, existing downtowns or village centers. This does not include agricultural activities allowed by the State of Vermont's Required Agricultural Practices (RAPs).





### ***Policies (continued)***

6. New or replacement bridges and culverts must be adequately designed and constructed to handle stormwater, provide sediment transport, and accommodate fish and wildlife passage.
7. Bioengineered bank stabilization is the preferred method of streambank restoration. When rock armament of streambanks is necessary, efforts should be made to revegetate on top of the rock to reduce water temperature.
8. Fishing shall be considered to be an existing use in all waters of the State in basin plans and water quality planning.
9. Increased public access to surface waters is the policy of TRORC.

## **Goals, Policy, and Recommendations: Wetlands**

### ***Goals***

1. There is no net loss of wetlands that provide significant functions and values.
2. Critical natural communities such as vernal pools, fens, and bogs are identified and protected.

### ***Policy***

1. Significant wetlands must be protected from development by maintaining an undisturbed buffer strip of naturally vegetated upland of at least 100 feet in width (or wider according to the type of development and the wildlife species to be protected) around the edge of each wetland and by preventing runoff and direct discharge into wetlands.

### ***Recommendations***

1. The State of Vermont must identify and map significant wetland areas not currently classified as Class 1 or 2 wetlands and petition the Agency of Natural Resources to have such areas reclassified at a higher level.
2. TRORC should work with towns to establish a priority list of wetlands for protection and/or acquisition.
3. The State should provide property tax relief incentives for the protection of designated wetlands.
4. To protect wetland functions, native biological diversity, and the loss of habitat, towns should adopt zoning and/or subdivision regulations that discourage development near wetlands and vernal pools that are not already protected under state or federal law. They should consider restricting development within 500 feet of all wetlands in conservation districts.
5. TRORC supports and encourages community efforts to identify and inventory all types of wetlands, including seeps and vernal pools, and to adopt mechanisms for their increased protection, including formal petitions to be shown on the Vermont Wetlands Inventory Map, and adding Vernal pools to the Vernal Pools Atlas (VPAAtlas). This information can increase the effectiveness of local, state, and federal regulatory process.
6. Vernal pools should be protected in local zoning from development by establishing an overlay district that identifies vernal pools and their surrounding terrestrial amphibian habitat.



## Goals, Policies, and Recommendations: **Wildlife**

### *Goals*

1. Wildlife biodiversity and population are maintained or enhanced.
2. Stable populations of threatened or endangered wildlife (at both state and federal level) and their habitats are restored.
3. Sport and subsistence hunting is done in an ecologically sound manner.
4. Increase people's access to public green spaces without increasing Lyme and other tick-borne disease cases.

### *Policies*

1. Development should preserve contiguous areas of active or potential critical wildlife habitat. Corridors connecting habitat areas for large mammals must be incorporated in plans for management and conservation of forested areas. Fragmentation of critical wildlife habitat should not be approved.
2. Large contiguous tracts of forest should be managed to maintain the diversity of tree cover necessary for shelter and food supply for wildlife.
3. The rate of harvest of wildlife for sport or subsistence must not exceed the capacity of an area to replenish the species.
4. Development should utilize existing roads and field edges to avoid additional fragmentation.
5. Deer wintering areas should be protected from development and other uses that threaten the ability of this habitat to support deer.
6. Developers subject to Act 250 and Section 248 or 248a must demonstrate that they have taken reasonable steps during development planning to minimize impacts on critical habitats, including, but not limited, to the following:
  - a. Habitat connectors;
  - b. Grassland regions;
  - c. Cliff areas identified as potential or active nesting places for peregrine falcons;
  - d. Areas over 2,500 feet in elevation;
  - e. Large tracts of contiguous forest land identified as priority or high priority forest blocks; and
  - f. Oak mast stands and designated bear habitats.
7. Landowners, foresters, and developers must be sensitive to critical bear habitat areas in their management plans.
8. Buffer zones must be maintained between land development and critical wildlife habitat.
9. Actions to monitor and curb the spread of invasive species are encouraged.
10. Efforts to raise public awareness of climate change-related hazards and mitigate its impacts on the natural environment are supported.



### Recommendations

1. With the help of specialists from the Department of Fish and Wildlife or the Vermont Institute of Natural Science, towns in the Region should inventory wildlife species; sensitive areas including wetlands, vernal pools, bogs, and fens; mature oak trees; and critical habitats for birds, deer, bear, bobcats, heron, and threatened or endangered plant species.
2. Towns should establish Conservation Commissions that work alongside VTrans, Vermont Fish and Wildlife, and nonprofit conservation organizations to maintain wildlife corridors.
3. Towns are encouraged to use cluster zoning, conservation districts, transferring or purchasing of development rights, or purchasing of land containing critical habitat areas to maintain large forest blocks and preserve critical habitat and habitat connectors.
4. Towns should work cooperatively with and seek assistance from land trusts to maintain large tracts of undeveloped habitat that cross political boundaries.
5. Town Plans and zoning regulations should protect significant natural features and sensitive habitat areas by using setbacks and buffers.
6. VTrans and towns should always consider terrestrial and aquatic wildlife passage as part of a design when constructing bridges and culverts, especially in areas along known wildlife corridors.
7. Towns should time roadside mowing to limit spread of plants such as wild chervil and wild parsnip.
8. When using heavy machinery near streams, machinery operators must clean them before and after use to avoid the spread of invasive species.
9. Towns should conserve large tracts of bear habitat and adopt cluster land use concepts in zoning bylaws as a mechanism for maintaining contiguous areas of forest cover.
10. TRORC should work with municipalities to distribute information on Lyme disease and prevention.

### Goals, Policies, and Recommendations: Air Quality

#### Goals

1. Air quality in local and regional airsheds is improved.
2. Dependence upon fossil-fueled and single-occupant automobiles for transportation is reduced.

#### Policies

1. Proposed developments must be reviewed for their direct and indirect impact on air quality.
2. As a source of heat, wood burning should be continued, but efforts should be made to update wood stoves.
3. Wood burning as a method of disposal should be reduced.





### *Policies (continued)*

4. Proposed developments must be reviewed for their direct and indirect impact on air quality.
5. As a source of heat, wood burning should be continued, but efforts should be made to update wood stoves.
6. Wood burning as a method of disposal should be reduced.
7. Any emissions of hazardous or toxic air pollutants by commercial operations shall be controlled and monitored for public health and safety so that concentrations of hazardous or toxic air contaminants in local and regional airsheds are below those listed for human health protection by federal and state regulations.
8. Local education and enforcement activities are strongly encouraged to eliminate backyard burning of trash.
9. The development and use of more energy-efficient devices and renewable energy resources is promoted.

### *Recommendations*

1. Install and maintain a regional air quality monitoring network in cooperation with the Vermont Agency of Natural Resources to determine current and potential threats to air quality. Potential impact areas include village centers or other areas of traffic congestion and high elevations, where pollutants and acidic levels are potentially greater and more harmful to fragile vegetation.
2. Municipalities and state agencies should educate communities about the impacts of trash burning and develop more effective mechanisms to enforce laws prohibiting backyard burning of trash, including the adoption of civil ordinances.
3. Woody debris from site clearing or forestry operations should be left on site or chipped, instead of being burned, in order to reduce pollution and to enable this material to contribute to soil formation.
4. TRORC should engage in projects outside the Region that may potentially impact air quality within the Region.

## Goals, Policies, and Recommendations: **Mineral Resources**

### *Goals*

1. Mineral resources accommodate growth and development of the Region.
2. Extraction and processing of minerals are appropriately managed and benefits the public interest.
3. Extraction and mining sites in the Region are remediated.



### *Policies*

1. Mineral extraction and processing facilities shall be planned, constructed, and managed:
  - a. To not unduly, adversely impact existing or planned uses within the vicinity of the project site;
  - b. To provide direct access to Class 3 or better highways;
  - c. To not burden the function and safety of existing roads and bridges serving the project site. Factors to be considered in determining impacts are:
    - Extent of increase in heavy vehicular traffic;
    - Effects of weight loads on roadbeds and bridges;
    - Conflicts with pedestrians or bike users;
    - Numbers and frequency of heavy vehicles traveling through dense residential areas;
  - d. To minimize loss of significant prime agricultural land; and
  - e. To minimize any adverse effects on water quality, fish and wildlife habitats, and adjacent land uses.
2. Extraction sites must be screened to the extent practical if topography and vegetation allow.
3. Commercial extraction of gravel from streams is prohibited by law, and private extraction is strongly discouraged. All streambed extraction should be done after the site is assessed by professionals and in consultation with the Vermont Department of Environmental Conservation's River Management Section.
4. Future extraction activities of copper and other metals must follow protocols for safe mine waste disposal.

### *Recommendations*

1. All sites must plan for their eventual rehabilitation so that slopes are stable and the surface is revegetated. To that end, topsoil shall not be removed from sites and excavations shall stop early enough so that stable slopes can be established on the property.
2. Mineral extraction and processing facilities must be planned and developed so they do not burden local and state highways and bridges.
3. All extraction sites must maintain at least a 50-foot buffer of undisturbed land by any wetland or surface water and sufficient additional land above the grade of adjacent streams to preclude a danger of avulsion of the stream into any working areas under flood conditions.



## Natural Resources Endnotes

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- 1 <https://dec.vermont.gov/geological-survey/groundwater>
- 2 <https://www.house.mn.gov/hrd/pubs/ss/sspiped.pdf>
- 3 <https://dec.vermont.gov/watershed/tasc/water-quality-standards>
- 4 <https://dec.vermont.gov/sites/dec/files/documents/2022-Vermont-Water-Quality-Standards.pdf>
- 5 [https://dec.vermont.gov/sites/dec/files/12.3.20\\_PointingoutNonpointSources\\_HelenCarrPresentation.pdf](https://dec.vermont.gov/sites/dec/files/12.3.20_PointingoutNonpointSources_HelenCarrPresentation.pdf)
- 6 <https://dec.vermont.gov/watershed/tasc/assessment-and-listing>
- 7 [https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/PriorityWatersList\\_PartD\\_2022.pdf](https://dec.vermont.gov/sites/dec/files/wsm/stormwater/docs/PriorityWatersList_PartD_2022.pdf)
- 8 <https://dec.vermont.gov/watershed>
- 9 <https://dec.vermont.gov/watershed/map/program/major-basins>
- 10 [https://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp\\_basin10final.pdf](https://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/mp_basin10final.pdf)
- 11 [https://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl\\_WhiteRiverTacticalPlan.pdf](https://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/pl_WhiteRiverTacticalPlan.pdf)
- 12 <https://dec.vermont.gov/sites/dec/files/documents/2020%20Basin%2014%20Tactical%20Basin%20PlanSigned.pdf>
- 13 [https://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/B3\\_TBP\\_FINAL\\_ARA.pdf](https://dec.vermont.gov/sites/dec/files/wsm/mapp/docs/B3_TBP_FINAL_ARA.pdf)
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- 15 <https://www.whiterivernrcd.org/>
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- 17 <https://dec.vermont.gov/water-investment/watershed-planning/tactical-basin-planning>
- 18 <https://dec.vermont.gov/watershed/tasc/water-quality-standards>
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- 21 <https://dec.vermont.gov/document/2022-2023-water-quality-monitoring-and-assessment-summary-report>
- 22 <https://www.greatriverhydro.com/>
- 23 <https://vtfishandwildlife.com/conservation/conservation-planning/animal-inventory/fish>
- 24 <https://dec.vermont.gov/watershed/wetlands/what>
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- 31 <https://vpatlas.org/>
- 32 <https://fpr.vermont.gov/heavy-cut-law>
- 33 <https://legislature.vermont.gov/statutes/section/10/123/05403>
- 34 <https://www.fws.gov/law/endangered-species-act>
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# 07 | Historical, Archaeological, and Scenic Resources

*Covered bridge coming down and iron bridge going up over the White River, 1902 (the covered bridge was built in 1848; the iron bridge was built between 1901-1902) | Source: Royalton Historical Society*

## A. Introduction

There are many examples of desirable development that have adapted very well to our historical landscapes and existing settlement patterns. Vermonters have a strong desire to conserve the Vermont landscape while accommodating growth. Growth provides significant advantages for Vermont and the TRO Region, particularly in the creation of employment opportunities and housing.

## B. Historic Structures and Sites

### Advantages of Historic Preservation

Historic preservation is a means to curb the decay of our traditional village centers. It is also a means to celebrating, appreciating, understanding, and protecting our heritage and built environment.

Preservation of historic buildings can increase the market value of property and increase tax revenues to towns. Buildings of architectural merit help shape community identity. In numerous settings throughout the Region, preservation of important landmarks such as the Strafford Meeting House,

Bridgewater Woolen Mill, Bethel Town Hall, and Fairlee Town Hall, have contributed to sense of place and community pride. Once such work has begun in a community, other efforts follow, often heightening community betterment and identity. The combination of rural scenery and the attractive built environment is a key reason why thousands come to the Region and contribute millions of dollars to our economy.

Beyond the practical and aesthetic, preservation is part of our ethic—do not throw something away if it is still useful. Instead, common sense and tradition seek to conserve, use, and improve what already exists.





And lastly, as eloquently stated by former Governor Hoff: “There’s no way you can understand the present unless you have a firm grounding in the past.”

### The National Register and Programs for Historic Preservation

More than 30,000 of the Region’s historic structures have been documented by the Agency of Commerce and Community Development’s Historic Division under their program, the [Vermont Architectural Resource Inventory \(VARI\)](#)<sup>1</sup>. VARI is a collection of survey information regarding properties of historic or architectural significance throughout Vermont.

To aid in the preservation of the most notable historic resources, Congress in 1966 created [The National Register](#)<sup>2</sup>, which is a federally maintained list of culturally important districts, sites, buildings, and structures worthy of preservation. Historic districts are geographic locations that contain historically or architecturally significant buildings, properties, or sites. Such structures or sites are considered to be contributing components, but an historic district may also contain non-contributing (non-historically or architecturally significant) buildings, structures, objects, or sites.

Inclusion in the Register offers a measure of protection against federally licensed or funded construction projects because federal agencies are required to consider the impact of their projects on properties included in or eligible for inclusion in the Register. Many of the buildings and structures included in the State Survey are eligible for the National Register.

Under the provisions of [Section 106 of the National Historic Preservation Act](#)<sup>3</sup>, prior to proceeding with a federally funded project affecting a historic structure, the federal agency and the State Historic Preservation Officer must attempt to identify ways to avoid or minimize adverse effects. One successful example in the Region was the replacement of the Elm Street Bridge in Woodstock Village, which is listed on the Register. In this case, the Vermont Agency of Transportation and the Federal Highway Administration were forced to waive national bridge design standards and to downsize the project to retain many of the elements and components of the historic smaller and narrower bridge.

Another advantage of the National Register of Historic Places is that owners of income producing buildings are eligible for tax credits on rehabilitation work, provided such work meets certain prescribed standards.

Several state organizations and agencies have been actively involved in historic preservation and community development:

- [Preservation Trust of Vermont](#)<sup>4</sup>
- [Division for Historic Preservation](#)<sup>5</sup>
- [Vermont Agency of Transportation](#)<sup>6</sup>
- [Vermont Downtown Program](#)<sup>7</sup>
- [Vermont Barn Preservation Grant Program](#)<sup>8</sup>
- [Vermont Historic Preservation Grant Program](#)<sup>9</sup>

### Local Historic Preservation Methods

Under the provisions of the Vermont Municipal Planning and Development Act (24 VSA §4414), municipalities can protect areas of [historical sites](#)<sup>10</sup> by designating [historic overlay districts](#)<sup>11</sup> as part of local zoning bylaws. Within such overlay districts, prior to exterior modifications to a structure or the erection of a new one, the local planning commission must first grant approval. In determining whether to grant approval, the commission must evaluate whether the proposed changes would not impair the special character or significance of its surroundings.

For projects that fall under the jurisdiction of Act 250, [Criterion 8](#)<sup>12</sup> protects historic sites along with other rare and irreplaceable natural resources. See the [Historical Preservation project review flowchart](#)<sup>13</sup> for more information. Before granting a permit, the District Commission or Environmental Court needs to find that a subdivision or development will not have an undue adverse effect on historic sites. Historic sites are defined as those included in the National Register of Historic Places, the State Register, or other properties deemed historically significant by the Division for Historic Preservation (10 VSA §6001(4)). In approaching such a determination, the Act 250 review process can evaluate local and Regional Plans to determine whether the proposed project complies with or violates a community standard intended to preserve the historic qualities of the site.



## C. Archeological Resources

### Background

Archeological evidence found throughout the State depicts a history of human occupation that dates back 9,000 years. Most Native American populations in the Northeast lived in small groups that subsisted by following a seasonal cycle of resource availability. Rivers provided an important transportation network, water supply, and fishing grounds.

The archeological record provides the only physical remnants of pre-European human occupation. In addition, the record can provide information about past environments, climate, and landscape changes. Although only a few archeological sites in the Region have been designated on the Vermont Archeological Inventory, there are many areas whose topography and proximity to natural resources indicate a likelihood of pre-European habitation. Most prehistoric sites are located within 300 to 500 feet of an existing or relic water source, on slopes of eight percent or less, and often have a southern exposure. Criterion 8 of the Act 250 requires that a development [“will not have an undue adverse effect”](#) on historic sites and sites of archeological importance; however, Act 250 only covers larger developments, and many archeological sites may be located on private land. For areas of potential archeological significance, private landowners need to know how best to preserve important resources on their land. Since many archeological resources are located in areas such as river corridors and prime agricultural land, preservation and conscientious management will

serve multiple purposes.

Public awareness, appreciation, and understanding of the Region’s archeological resources is limited. This is due partly to incomplete documentation of the resources, and partly to a narrow perception of what constitutes archeological resources. Lack of recognition and appreciation can result in missed opportunities for stewardship. These resources are not easily identified and are often subject to accidental destruction. Additionally, there is a perception by landowners that the protection of archeological resources invariably means more restriction on the use of their property without much benefit.

## D. Scenic Resources

### Background

In Vermont, the economic value of scenic resources to tourism cannot be overstated. The landscape of the Region is an economic asset. It represents some of the finest examples of townscapes and rural scenic character in the world, and it has tangible economic value. Tourists spend money in the Region because they are attracted to the scenery, values, and quality of rural life. Tourism is a significant industry in Vermont’s economy. The public’s commitment to the preservation of our visual resources can be traced to the late 1960s with the passage of Vermont’s anti-billboard legislation. All municipal plans prepared and adopted by member towns in the Region consistently stress the goal of maintenance of rural character.



*Bradford Academy | © John Knox*

### Patterns for Development: A Community Standard

The inherent beauty of the Region is tied to the visual relationship between buildings, the working landscape, and mountains and river valleys. Over the past fifty years, development patterns have emerged that propagate highway strip development. Certain areas immediately adjacent to major highways are examples of development sprawl. In some instances, these areas adversely affect the value of scenic resources for travelers. Such a land use pattern will serve, amongst other factors, to destroy the transition between town village centers and the countryside.

The Region’s landscape is also changing due to a gradual reforestation and loss of fields and meadows due to a reduction in agriculture. The resultant land use pattern is a product of economic forces that can permanently alter or pressure that landscape.



Determining scenic significance of resources and evaluating the probable impacts of land development or subdivision on the resource and the recommended measures that may be desirable to mitigate visual impacts is a complex matter.

### Prominent Scenic Landscapes

The following areas are likely to be areas of scenic significance:

1. Shorelands immediate to public lakes, rivers, or ponds;
2. Areas immediately adjacent to scenic corridors;
3. Prominent ridgelines, mountaintops, or excessively steep slopes that can be readily viewed from public corridors;
4. Exceptional agricultural and historic areas;
5. Areas within or immediately adjacent to natural areas (i.e., wetlands) designated by the State; and
6. Areas of high scenic quality that are publicly recognized as exceptionally unique or are noted examples of the dominant characteristics of an area in the Region.

7. Examples of prominent scenic areas within the TRO Region include designated byways.
  - Connecticut River Byway (a National Scenic Byway): Route 5, Hartland to Newbury
  - Crossroads of Vermont Byway: Route 4, Bridgewater to Hartford
  - Scenic Route 100 Byway: Plymouth to Granville

## E. Outdoor Lighting Design and Management

### Issues and Opportunities

Increased development in recent decades brings a corresponding increase in the use of outdoor lighting in our Region. However, such lighting does not need to lead to adverse impacts. Improper lighting contributes to light pollution, limiting our ability to view the night landscape, and has adverse impact on the character of our historic villages.

In May 1996, the Chittenden County Regional Planning Commission published [Outdoor Lighting Manual for Vermont Municipalities](#)<sup>14</sup>. The

suggestions and recommendations contained in the Manual form the basis of many of the design principles and issues reflected in this section of the Plan.

Choosing appropriate light sources and intensity makes good economic and environmental sense. By selecting a lighting design that enhances nighttime comfort, our town centers and other areas planned for concentrated mixed use will be better served.

Using a large quantity of light does not guarantee good visibility. Overlighting can cause problems that hinder good vision. Using the minimal amount of light necessary to allow adequate visibility for a site decreases sky glow and avoids escalation of light levels. Glare is another lighting issue facing growing communities in the Region. Sky glow, or reflected light from surfaces, is visible in the night sky over towns or large commercial or industrial complexes and is a form of light pollution that contributes to a loss of our ability to see stars.



Cover of *Outdoor Lighting Manual for Vermont Municipalities (1996)* | Source: Chittenden County Regional Commission





## Goals, Policies, and Recommendations: **Historic Structures and Sites**

### **Goals**

1. Historic structures and sites, where the public interest is clearly benefited, are enhanced and preserved.
2. The renovation of existing or construction of new structures is consistent and compatible with the historic character of the site or area.
3. Sensitive economic development is promoted in areas of historic value (such as in town centers, villages, and hamlets).
4. Improvements to historical transportation facilities, instead of replacement, are promoted.

### **Policies**

1. Land development or subdivision within or immediately adjacent to areas or sites of historic significance should take reasonable steps to ensure that the design of the project fits the historic context.
2. Restoration or rehabilitation of historic sites should not destroy or significantly alter their character and immediate environment.
3. Destruction of a historic site is discouraged.
4. Public improvements or structures such as bridge rehabilitation or replacement, street widening, roadway reconstruction, signage, utility distribution systems, and lighting must be designed to avoid unnecessary degradation of recognized historic sites or areas.
5. Public investments of regional or statewide significance must be planned in consultation with local and state officials and the Division for Historic Preservation.
6. Improvements to historical transportation facilities, instead of replacement, are promoted.

### **Recommendations**

1. TRORC will continue to support efforts to designate National Historic Register Districts and Sites. In so doing, TRORC will coordinate with the State and affected municipalities.
2. TRORC will work with the Agency of Transportation, town officials, its Transportation Advisory Committee, and other groups and organizations to ensure that design standards and plans for proposed transportation projects are reasonably compatible with historic resource needs and values.
3. Towns are encouraged to outline in their town plans historic resources deemed worthy of protection. Town officials can then use this to participate in the Act 250 process, thus influencing decisions affecting historic sites in their community. Local historical societies should continue research, documentation, education, and advocacy efforts.
4. Developers should incorporate historic structures and important architectural details into their project planning.





## Goals, Policies, and Recommendations: **Archaeological Resources**

### **Goals**

1. Archeological resources within the Region are preserved, and an appreciation of their value as a vital aspect of the Region’s historic and cultural past is promoted.
2. Comprehensive planning and land use development are better integrated with archeological resource protection at the federal, state, regional, and local levels.

### **Policies**

1. Existing archeological resources must be protected where public interest is demonstrated. No land development should be permitted when it results in unnecessary loss of an archeological resource at the state or federal level.
2. Within archeologically sensitive areas, planning should consider the impacts a project may have on the resource. If warranted, a site inventory should be conducted as part of project planning. Projects that have undue adverse impacts on these resources must be discouraged or redesigned to mitigate the impact. Project planners are encouraged to contact the state archeologist for further information.
3. To preserve significant archeological sites, purchase of land or development rights is encouraged when such actions are compatible with local plans and this Plan. Because these sites are often farmland, floodplains, wetland margins, and other similar low-lying land, priority should be given to projects that serve multiple preservation purposes.

### **Recommendations**

1. To increase public awareness of archeological resources, TRORC encourages archeologists, local and regional groups, towns, and landowners to organize educational programs focused on Vermont’s history. Such a program could be made a part of an overall cultural heritage program through public schools.
2. Local planning commissions, conservation commissions, historical societies, and other interested groups are encouraged to incorporate an archeological plan for their community in their town plan. Such a plan could be an important step in planning future development in identified areas.

## Goal, Policies, and Recommendation: **Scenic Resources**

### **Goal**

1. The natural and scenic resources of the Region are protected and preserved.

### **Policies**

1. Where development is proposed in areas of scenic value (examples listed under “Prominent Scenic Landscapes”), design plans must:
  - a. Maintain the prominent natural feature of the developed area;



## Goal, Policies, and Recommendation: **Scenic Resources**

### *Policies (continued)*

- b. Work toward enhancing or retaining views;
  - c. Minimize adverse impact on views and areas of historic significance;
  - d. Minimize contrasts with areas of historic significance; and
  - e. Reflect traditional settlement patterns.
2. Projects must minimize the adverse effects of strip development on existing scenic resources through the following design principles:
- a. Integrate landscaping into parking areas;
  - b. Encourage compact and densely developed projects;
  - c. Place street trees as buffers between traffic arteries and internal drives;
  - d. Use unobtrusive signage;
  - e. Vary the pattern, number, size, and location of structures within the site;
  - f. Employ screening plans for visually objectionable features on the site; and
  - g. Minimize access roads or curb cuts onto public highways and use of common access drives.
3. Roads with scenic and cultural values, and determined to be of local or state significance, must be constructed or improved with due concern for the special scenic qualities inherent to the roadway and roadway fringe. Substantial modifications or off-alignment options that unnecessarily destroy the special characteristics of such roadways are not consistent with this Plan.

### *Recommendation*

1. TRORC should employ a process for evaluating impacts to scenic resources in the development proposals.

## Goals, Policies, and Recommendations: **Outdoor Lighting Design and Management**

### *Goals*

1. Lighting provides for safety and convenience in ways that enhances qualities of streets, architecture, and public spaces, while preserving dark skies and avoiding light pollution.
2. Outdoor lighting systems designed to conserve energy and minimize life cycle costs are used.



## Goals, Policies, and Recommendations: **Outdoor Lighting Design and Management**

### *Policies*

1. Lighting plans will be compatible with the character of the neighborhood. New lighting installations shall be designed to minimize glare from nearby surfaces, to not directly light beyond the boundaries of the area to be illuminated or onto adjacent properties, and to not result in excessive lighting levels.
2. For larger projects, lighting professionals should follow lighting design guidelines and other technical information established by the Illuminating Engineering Society of North America (IESNA). Additionally, project planners should give due consideration to the guidelines set forth in the Outdoor Lighting Manual for Vermont Municipalities.
3. Light sources shall use cut-off or shielded fixtures to direct light downward and prevent the light source from being seen on an adjacent property.
4. Excessively high lighting levels for uses in rural or very low residential areas are inappropriate.
5. Lighting levels shall use the minimum necessary to achieve safety and security concerns.
6. Lighting schemes that serve as advertising or to attract attention are discouraged.
7. Illuminated signs that are excessively bright, causing glare and illuminating surrounding areas, are prohibited.
8. Lighting designs shall avoid sky glow through lighting plans that direct luminaries downwards and turn off unneeded lights after hours.

### *Recommendations*

1. TRORC should provide technical guidance and support to municipalities and others on lighting trends, needs, and opportunities
2. TRORC should assist local and state policymakers in evaluating lighting options. TRORC will consider sponsorship of educational workshops for planning commissions, design professionals, and others to acquaint them with the principles of good lighting design.
3. Towns interested in planning for outdoor lighting in their communities should consider using their municipal plans to establish goals and objectives for lighting. Additionally, consideration should be given to incorporating a lighting section into a town's zoning ordinance or a separate ordinance to cover lighting installations in all or parts of the town.
4. TRORC staff should continue to work with Vermont's public utilities and design professionals to evaluate lighting technologies and efficiencies.



## Historical, Archaeological, and Scenic Resources Endnotes

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- 1 <https://accd.vermont.gov/historic-preservation/identifying-resources/VARI>
- 2 <https://www.nps.gov/subjects/nationalregister/index.htm>
- 3 <https://www.gsa.gov/real-estate/historic-preservation/historic-preservation-policy-tools/legislation-policy-and-reports/section-106-of-the-national-historic-preservation-act>
- 4 <https://www.ptvermont.org/>
- 5 <https://accd.vermont.gov/historic-preservation/funding/historic-preservation-grants>
- 6 <https://vtrans.vermont.gov/planning/maps/historic>
- 7 [https://outside.vermont.gov/agency/ACCD/ACCD\\_Web\\_Docs/CD/CPR/State-Designation-Programs/CPR-DT-Annual-Report.pdf](https://outside.vermont.gov/agency/ACCD/ACCD_Web_Docs/CD/CPR/State-Designation-Programs/CPR-DT-Annual-Report.pdf)
- 8 <https://accd.vermont.gov/historic-preservation/funding/barn-grants>
- 9 <https://accd.vermont.gov/historic-preservation/funding/historic-preservation-grants>
- 10 <https://legislature.vermont.gov/statutes/section/10/151/06001>
- 11 <https://legislature.vermont.gov/statutes/section/24/117/04414>
- 12 <https://nrb.vermont.gov/sites/nrb/files/documents/8aestheticsfinal.pdf>
- 13 [https://outside.vermont.gov/agency/ACCD/ACCD\\_Web\\_Docs/HP/Review\\_%26\\_Compliance/2018\\_Permitting\\_Flow\\_Chart-v1-2-WEB.pdf](https://outside.vermont.gov/agency/ACCD/ACCD_Web_Docs/HP/Review_%26_Compliance/2018_Permitting_Flow_Chart-v1-2-WEB.pdf)
- 14 [https://studiesandreports.ccrpcvt.org/wp-content/uploads/2017/01/vt\\_outdoor\\_lighting\\_manual\\_1996.pdf](https://studiesandreports.ccrpcvt.org/wp-content/uploads/2017/01/vt_outdoor_lighting_manual_1996.pdf)







Chelsea | © John Knox

# 08 | Homes in the Region

**Disclaimer:** This chapter has not been updated to incorporate changes enacted into law in 2023 and 2024. The regional housing targets and guidance on how to make land use changes are not yet available to TRORC. We will update this chapter in the 2026 revision.

## A. Background

### General Trends

During the 2000-2010 period, the Two Rivers-Ottawaquechee Region saw moderate growth in the number of homes in spite of the economic downturn of 2008 (see Table 16, Appendix F). The Region as a whole is typified by a tight and costly housing market that does not adequately provide the types and availability of homes necessary for current residents or for younger families and others we want to attract to fill workforce needs. At the

same time, the second-home market has become an even larger component of the regional housing market, according to 2010 Census data.

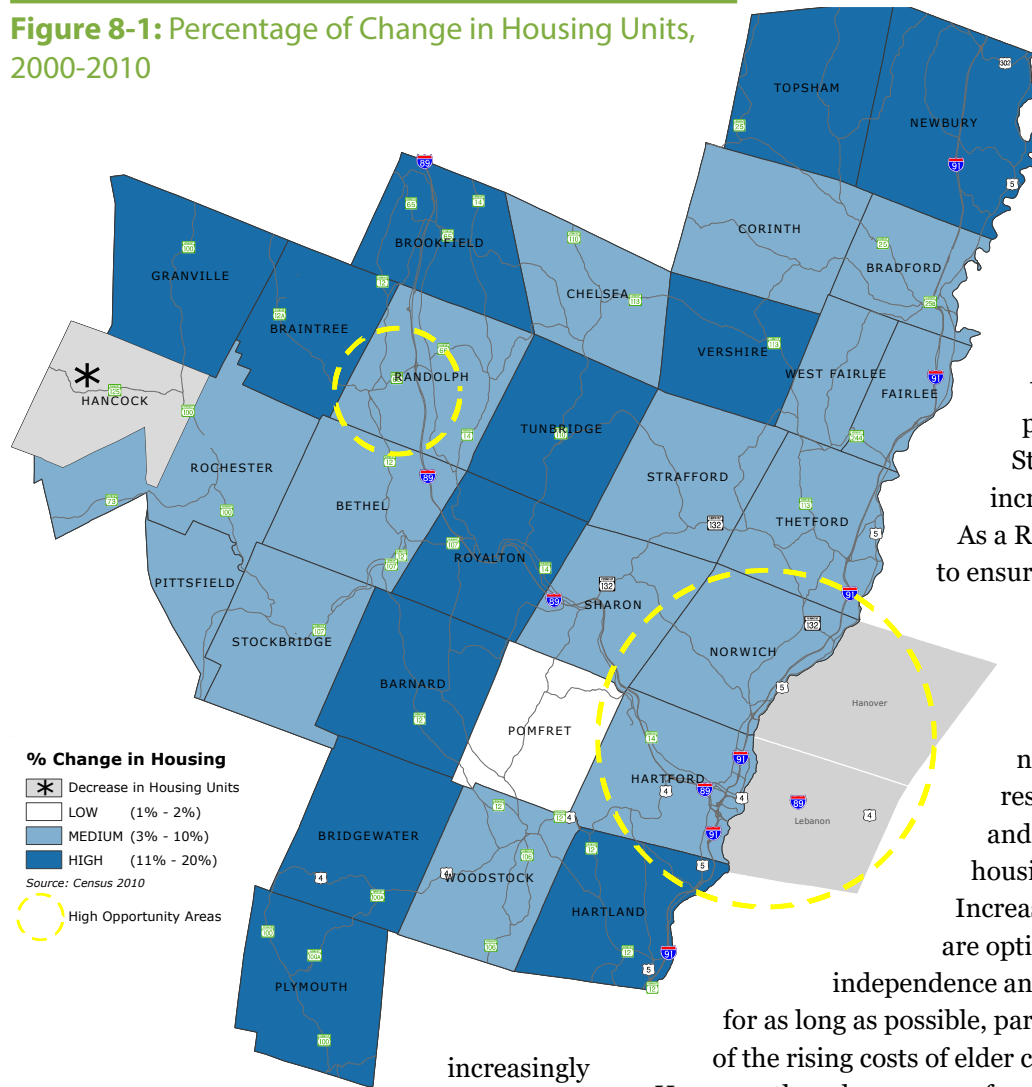
Continued increases in purchase and rental prices of homes, coupled with the limited housing supply, restrict first-time home buyers from getting into the market. These buyers are both people wanting to move to the Region for jobs and younger families ready to buy a home. Additionally, many people who successfully attain homeowner status find their income does not adequately support the expense of homeownership (see Tables 17 and

18, Appendix F). Municipal employees, teachers, service workers, and skilled tradespeople, among others, are confronted with limited housing options and high costs, including costs associated with transportation. There are real costs to towns when employees must commute considerable distances to other towns where they can't afford to live: road crews can't respond as well to brief storms, police take longer to be called in, and the feeling of helping one's own community lags. This problem is not limited to low-income households; skilled workforce recruits and young professionals





**Figure 8-1: Percentage of Change in Housing Units, 2000-2010**



Map Source: TRORC

burdened by housing costs in the Region. Many businesses rank housing costs as their number-one impediment to attracting new talent and economic growth.

increasingly find themselves

for as long as possible, particularly in light of the rising costs of elder care facilities.<sup>2</sup> However, these homes are often much larger than they need and not suited for the elderly. Many seniors could move to smaller, more accessible homes and apartments (especially if such housing were in their towns so they could retain their social circles), but these options are largely not available in their communities. Aging in place ensures

According to Census data, the State of Vermont's population is projected to increase by 88,000 residents by 2030. At the same time, the elderly population in the State is projected to increase by 91,000.<sup>1</sup>

As a Region, we need to ensure that we have the capacity to support this growing segment of our population, namely with respect to services and affordable housing opportunities. Increasingly, seniors are opting to maintain independence and live at home

that a person is able to maintain their quality of life as they age, allowing retirees to age happily and healthily in homes of their choosing that take into account the needs of seniors (single floors, accessible doors, smaller yards, etc.). Aging in place allows communities to keep their aging populace, conserving vital sources of local knowledge and a cadre of volunteers, as opposed to compelling them to move to facilities at a great distance from their homes and families. Given that nursing home care expenses are currently costing the State millions of dollars annually, Vermont officials would like to accommodate seniors' wishes to remain home longer as well.<sup>3</sup>

### Regional Housing Challenges

The Region faces numerous housing challenges that this chapter and its policies seek to address. The following list, while not exhaustive, illustrates some of our most pressing housing issues:

- A lack of construction of homes of the appropriate types and prices needed for residents and newcomers throughout the Region.
- Poor infrastructure in town and village centers, making it harder for these areas to attract in-migration and provide the needed housing growth.
- A lack of developable flat land in areas serviced by municipal water and/or sewer systems.
- The high cost of land in many towns.
- The aging of a significant part of our population and the need to develop more elder housing and care facilities as well as other measures

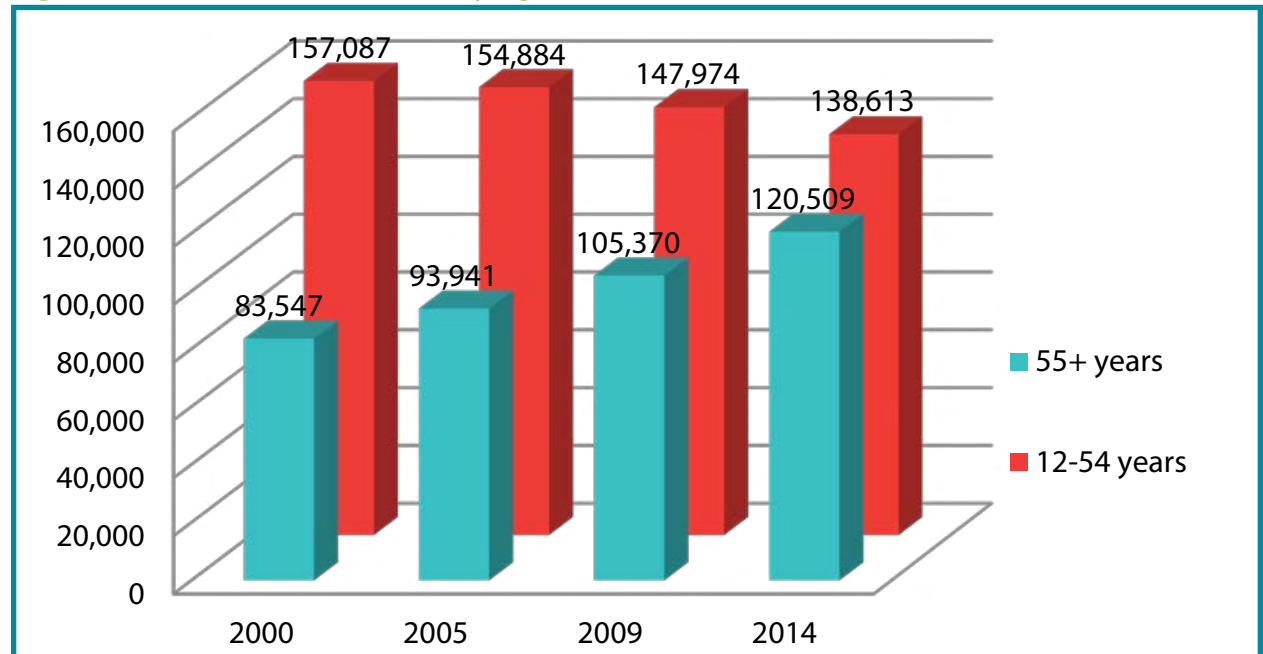


that ensure seniors can maintain their lifestyles in a manner that fosters continued independence.

- A scarcity of housing that is affordable across the income spectrum, both for purchase and for rent, to accommodate the Region’s current and future workforce.
- Limited adaptive reuse of buildings in town centers, housing conversions, and creation of accessory dwelling units, particularly in growth centers.
- The prevalence of most new construction as scattered housing away from compact designated growth centers, which puts a strain on municipal resources and furthers fragmentation.
- Regulatory burdens restricting housing development, especially around multi-family houses, and permitting appeal processes that make new housing construction difficult.
- The large number of residents burdened by the costs of their current housing (see Figure 8-6).
- Widespread resistance to increasing the density of housing.

Roadblocks toward the provision of “affordable housing” are pervasive, perhaps in part due to the misunderstandings commonly associated with workforce housing. False notions around declining property values, increased traffic, and alteration of existing neighborhood character are commonplace and hinder the creation of integrated, mixed-income, mixed-tenure neighborhoods. In fact, affordable homes help a community prosper. They allow new families to move to town, bringing in

Figure 8-2: Vermont Households by Age of Householder



Sources: VHFA Analysis of U.S. Census Bureau 2000 SF1 Table P-21; American Community Survey 2005 Table 25007; and Nielsen Claritas estimates (2009, 2014)

fresh energy, children for schools, and replacement workers for an aging workforce. New small, accessible units let seniors safely stay in their towns and lead independent lives. Rentals that are affordable provide competition so that apartment quality is kept high and renters can save for a down payment. Housing that is affordable frees up income that is then spent on the local economy for food, clothing, and services.

Local processes and the Act 250 process can slow projects or raise costs, especially if there are appeals. However, this challenge can be avoided or improved with state exemptions available in compact centers and good zoning.

## B. Characteristics of Our Homes

### Number of Homes

People live in homes. Some rent and some own. Some homes are small apartments and others are large estates. Though we don’t call where we live a “housing unit,” that is the term the U.S. Census uses to define separate living quarters, whether they are conventional houses, apartments, mobile homes, or rooms for occupancy. According to the U.S. Census Bureau, there were a total of 31,486 housing units in the Region as of 2010, an increase of 9.2% from 2000 to 2010. The 1990s saw a more modest growth rate of 7.2%, following the 1980s and a 22.8% boom in growth. Both the Region and



the State grew at fairly similar rates from 1980 through 2010, with 43.8% growth for the Region and 44.5% for the State.

Only one town (Hancock) in the Region saw a decrease in housing units between 2000 and 2010 (see Table 16, Appendix F). Our largest towns grew slowly, and several smaller towns had the highest growth rates between 2000 and 2010, some within close range of high opportunity areas and others likely due to lower land costs.

During the 2000s, Newbury experienced the most dramatic change, adding 225 new units for a growth rate of 19.5%. The four towns with the next highest rates of growth in housing units from 2000 to 2010 were Bridgewater (18.2%), Brookfield (16.6%), Vershire (15.1%), and Royalton (14.8%).

Several factors influence new housing growth: the relative cost and availability of real estate, a healthy and vibrant economy, good schools or school choice, and the comparative ease of access to employment centers. Certain towns have seen growth in second homes, which is partially attributable to access to recreational opportunities in the Region and other scenic and cultural opportunities.

VHFA's 2013 "Housing Needs in East Central Vermont" study looked at projected growth in households in our Region, with particular emphasis on those in Windsor and Orange Counties. If VHFA's anticipated projections hold true, Windsor County will see a need to house only 20 additional households per year between 2010 and 2020; and Orange County will see a need to house 90 additional households per year between 2010 and

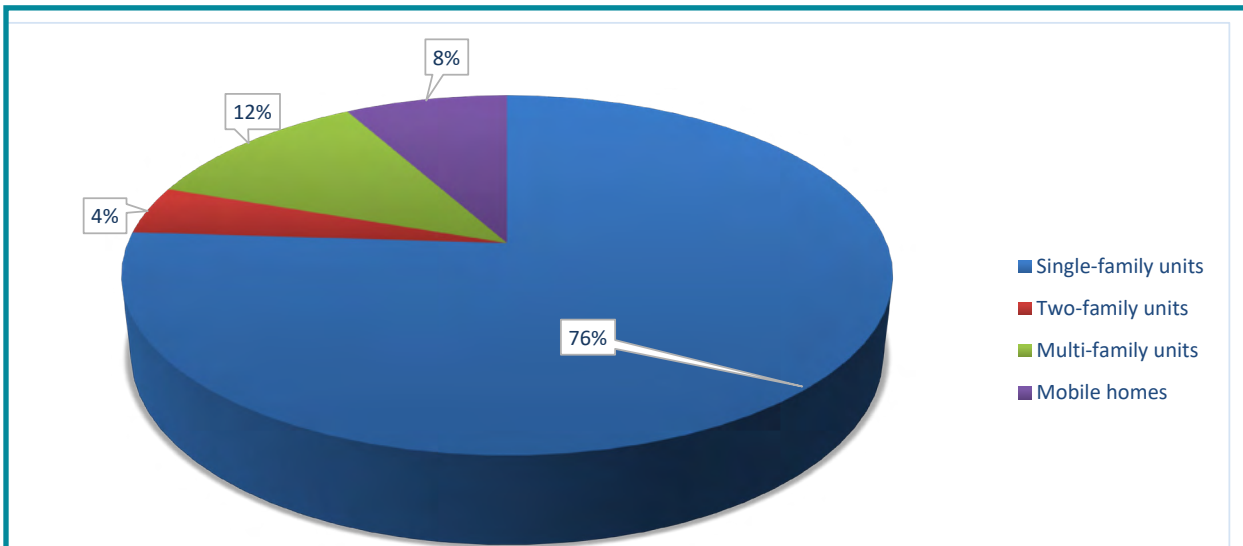
2020. However, the study also highlighted the current pressing need for 675 additional elderly housing units and a further affordable 4,409 workforce housing units for existing residents who are currently cost-burdened by housing. Finding the most suitable locations for the Region's current and anticipated housing needs is imperative to accommodate the needs of the Region's aging population and the population segments the Region wishes to attract. Accommodating these needs will help keep communities vibrant and thriving. (For further information, please see "Housing Needs in East Central Vermont," Appendix G.)

### Types of Homes

Single-family homes are the most common housing type in the Region. The second most common type of housing unit is multi-family units (which can range from a triplex to an apartment building). The larger communities with defined centers and in closer proximity to employment centers have the largest proportions of multi-family housing units.

Mobile homes constitute only 8% of the overall housing stock throughout our Region, but these homes offer low- to moderate-income homeowners a financially accessible housing opportunity. The towns with the largest percentages of mobile homes in 2016 were Braintree (23.8%), West Fairlee (20.1%), Hancock (17.6%), Topsham (16.5%), Royalton (14.7%), and Sharon (14.7%), according to the U.S. Census. While older mobile home units may be much more affordably priced than other housing opportunities for many residents in our Region, their lower initial cost also comes at the expense of thermal and energy efficiency. It is

Figure 8-3: Types of Homes in the Region by Structure, 2016

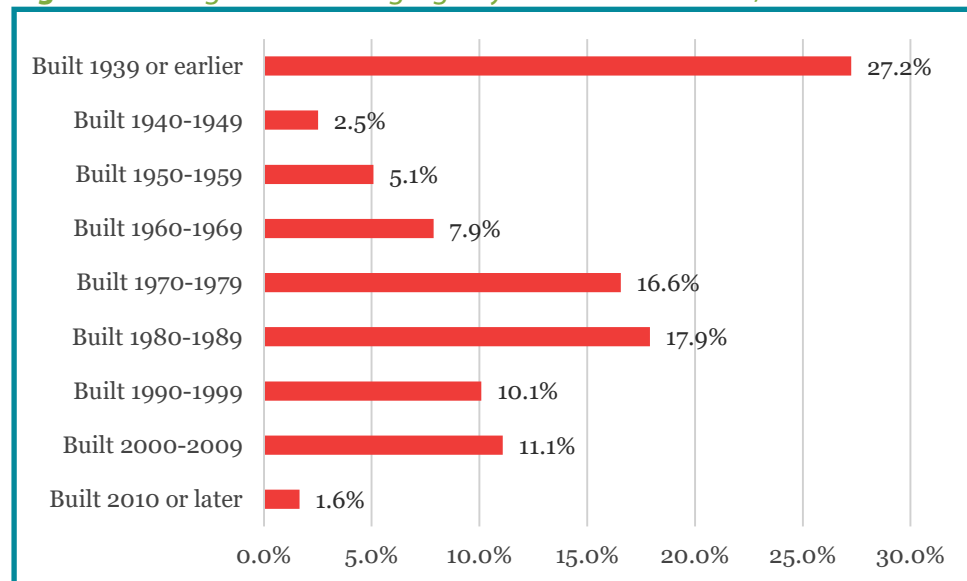


Source: Housingdata.org





**Figure 8-4: Regional Housing Age by Construction Date, 2017**



Source: 2012-2017 American Community Survey 5-Year Estimates

estimated that owners of manufactured homes in Vermont pay up to 66% more of their income on energy than owners of brick-and-mortar homes do.<sup>4</sup>

In response to the ownership cost associated with older mobile home units and the fact that 15% of homes damaged by Tropical Storm Irene were mobile homes, the Vermont Energy Investment Corporation, in conjunction with the Vermont Housing and Conservation Board and other partners, have designed and created new Vermod Nordic Homes. These homes feature numerous energy-saving design elements and are priced at under \$125,000 per unit. Vermod homes have been constructed in the Region in White River Junction and may become much more of a feature of the Region’s housing market, particularly

where incentives are available to homeowners to defray the unit price.<sup>5</sup>

Single-family homes are more prevalent in the Region than in the State overall. Additionally, the TRO Region has significantly lower percentages than the State of two-family and multi-family housing opportunities, particularly with respect to multi-

family housing (11.3% for our Region compared to 16.6% for the State). Growth in these latter housing sectors will be necessary to increase housing opportunities for low- to moderate-income households. It is also important to note that the market for single-family homes for sale is incredibly tight for those seeking housing near the median price of \$173,000, and more has to be done to ensure growth within that area as well.

### Housing Age

The age of the Region’s housing stock, like much of the rest of Vermont, is skewed heavily toward older homes that are increasingly more costly to maintain and heat and may be financially burdensome to their owners. The greatest percentage of housing

in this Region was built prior to 1939 (27.2%); the Region’s slowest growth era was 1940–1959 (7.6% cumulatively). Much of the Region’s housing stock (42.7%) predates 1970. Likely this also means that there are a large percentage of homes that have the existence of lead paint. Renovation, retrofitting, and general maintenance on these properties are imperative in order to ensure the health and well-being of residents just as much as to conserve energy and maintain home values and overall aesthetic appeal. Larger, older homes may offer opportunity for additional units if the residential zoning permits multi-family housing.

U.S. Census data show that only 12.7% of the Region’s housing stock has been built since 2000, which is similar to the state percentage of 13.4%. However, ten towns experienced higher than average rates of housing construction since 2000, with three much higher than the regional percentage: Barnard (24%), Sharon (21%), and Stockbridge (19.9%). Three towns experienced significantly below-average rates of construction in the 2000s: Braintree (7.5%), Pittsfield (6.9%), and Bradford (6.3%).

Figure 8-5 depicts the breakdown of new housing construction in the Region by selected timeframes.

### Housing Occupancy

The Region has a shortage of single-family, two-family, and multi-family housing, as illustrated by vacancy rate numbers from the 2000 and 2010 U.S. Censuses. This is a region with a strong second-home and seasonal-home housing market, which can distort overall figures for vacant homes for rent



or purchase on a year-round basis. To interpret the vacancy rate numbers, we must extract just the rate that applies to primary residences and not allow the vacancy rate to be skewed by seasonal residences. In 1990, the vacancy rate for the Region’s primary residences (those having year-round occupation) was 6.6% (see Table 20, Appendix F). In 2000, it dropped to 4% and remained fairly steady between 2000 and 2010 (3.99%). A vacancy rate at or below 3% is considered to be a “functional zero.” There are deemed to be essentially no vacant units at 3% or lower because obstacles like substandard conditions likely keep the vacant units from being inhabited.

Vacancy rates in the Region are some of the lowest in the State as demand outstrips the supply of properties. This in turn increases prices for financially burdened residents.<sup>6</sup> Steady job growth, low unemployment rates, and a shortage of housing development (especially housing that is affordable to low- and middle-income earners) have given us a very tight housing market.

### Housing Tenure

Historical Census figures on housing tenure reveal the proportions of owner-occupied housing units and renter-occupied units. Between 1990 and 2000, the Region’s housing stock became even more owner occupied, a trend that has steadily continued since 2000, with growth in owned units continuing to outpace rental unit opportunities (see Table 21, Appendix F). For Census purposes, housing units, both rental

and owned, are considered occupied when the property in question is the usual place of residence for the individual(s) living there.

The majority of the Region’s housing units are occupied by their owners (78.49%), more so than the state average (75%). Only four towns in the Region have less than the average state or regional percentage of owner-occupied homes: Hartford (71.8%), Randolph (71.7%), Bradford (69.7%), and Royalton (59.5%). These towns all have downtown core areas, and, in the case of Royalton, a glut of rental housing opportunities for the Vermont Law School student and faculty population.

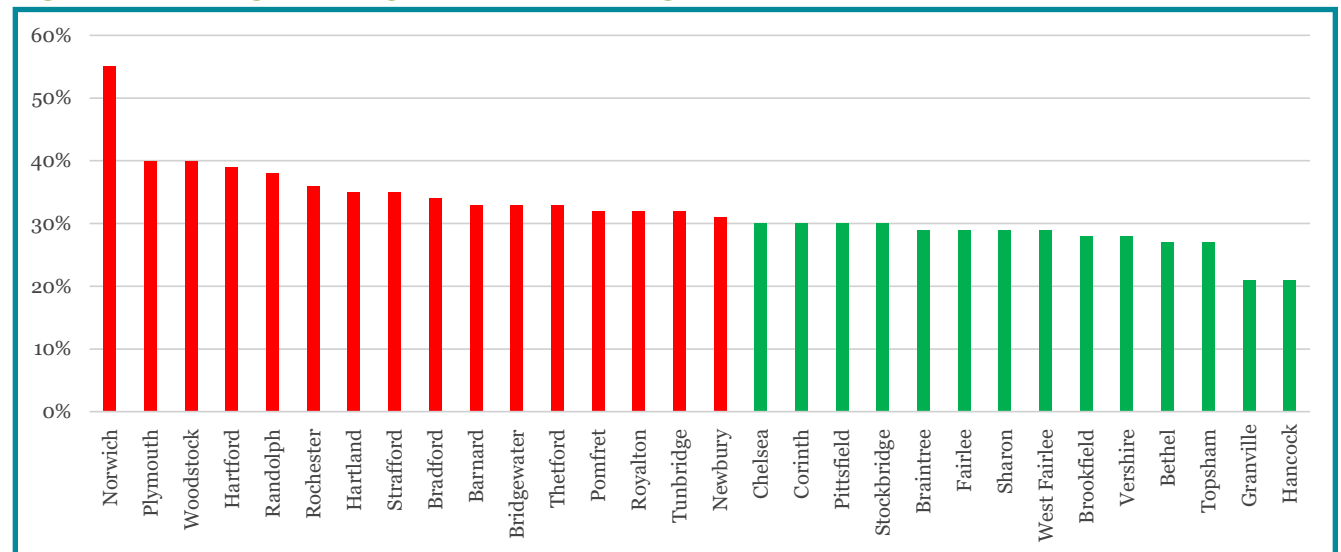
The construction of rental units has not kept pace with the construction of homeownership units in the Region. According to Census data, twelve towns in the Region have seen a decrease in the

number of rental units available. High percentages of owner-occupied units and decreasing supplies of rental units make transition from rental to ownership difficult. As a consequence of this and the aforementioned prices of available housing stock in the Region, it is not often easy for prospective homebuyers to climb the property ladder, particularly when attempting to purchase property at an affordable price.

### Home Aesthetics

Aesthetic considerations of homes pose another housing hurdle in permitting. People may not want new housing to be constructed in their towns if the homes look unattractive. With a few exceptions, such as design control districts, homes do not go through permitting that addresses aesthetics. This problem can be addressed through good

Figure 8-5: Average Housing Costs as a Percentage of Income in TRO Towns



Source: HUD Location Affordability Index, 2014



design. This may also include more screening by landscaping, increased setbacks, and placing multistory buildings against hills to encourage higher density while lessening the visual impact of the building height. Such efforts increase cost. Larger projects that trigger Act 250 or that involve conditional use approval at the town level do look at aesthetics.

### C. Affording a Home

Whether someone can afford a home is measured based on the percentage of income that an individual pays toward housing, including rent and other associated housing-related expenses. Housing is no longer considered affordable when a household spends more than 30% of its income on housing and related expenses, be that electricity, heating, fuel, or other ancillary expenses. As can be seen in Figure 8-6, the average home in half of the Region's towns is unaffordable by this measure. Thirty percent is the commonly employed HUD-defined affordability threshold in housing data analysis and in financial and banking transactions, such as determining mortgage eligibility requirements. When housing costs exceed this threshold, the excess housing costs place strain on other financial decisions in both the short and long term, creating burdened households.

As the retirement-age segment of the Region's population living on a fixed income increases, so does the need to consider housing provisions that allow older generations to age in place without the need to move out of their community. Further, a large portion of the Region's population is comprised of younger people who often only have

access to lower-wage jobs, and they are precluded from entering the property market as a direct result. These population groups rely on access to housing that is affordable within their income brackets. It is also important that this affordable housing be near compact growth centers so that both the elderly and younger low-wage workers have access to transit, public services, and health centers. Both younger and elderly populations are best served by increasing the numbers of apartments, condominiums, and small starter homes, and assisted living and other care home opportunities in and around these compact center areas.

The cost of land and housing is a function of access as well as travel time to key service, retail, and employment centers. One major consequence of the housing shortage in the Region has been the continued increase in commute times from towns in the Region to larger employment centers, which are often outside of the TRO Region. While some housing development has occurred in traditional growth centers, notably projects in Hartford recently, most of the single-family development has occurred in the towns that border these centers, as land and homes are more favorably priced in outlying towns. But there are direct costs associated with longer commutes—the clearing of undeveloped land, road construction, and construction of private water and septic systems—as well as more indirect costs such as poorer health from more driving and more pollution. A study of 2010 Census transportation data by TRORC found that over 20% of individuals are traveling 50 or more miles to work. Lengthy commutes cost the

average resident of Windsor and Orange Counties \$13,030 per year in transportation costs alone, based on data from the Department of Housing and Urban Development's Location Affordability Portal (<https://www.hudexchange.info/programs/location-affordability-index/>). This is more than many people should be paying for their homes!

When viewed in terms of affordability for the median-income resident in the Region's towns, most of the housing stock is valued in excess of residents' financial grasp, particularly in the towns of Hancock, Strafford, Pittsfield, and Norwich (see Table 17, Appendix F). Spending such a large percentage of income on housing has repercussions that trickle throughout the economy.

Within the TRO Region, it is common to find towns where a large percentage of residents are living well in excess of the HUD-defined level of housing affordability. Indeed, according to HUD's Location Affordability Index, neither Windsor County nor Orange County qualifies as being affordable when housing and transportation are considered together.

In recent years, the cost of housing throughout Vermont has increased along with increases in food, fuel, and transportation costs. These housing costs have outstripped increases in income that ordinarily absorb the shock of rising costs associated with inflation. Lack of affordable housing across all socioeconomic sectors means that financially burdened households (paying at or in excess of 30% of their income on housing) make sacrifices, including lowering fuel consumption in colder months, decreasing visits to medical



professionals, delaying necessary home repairs, and failing to adhere to retirement planning needs and investments in education. These decisions affect the residents' quality of life, but residents also decide not to go out to dinner, buy a new jacket, or replace worn tires and make myriad other decisions that result in lower total economic activity.

According to the 2019 update of "Out of Reach," produced by the National Low Income Housing Coalition, Vermonters earning an annual wage of \$47,375 (\$22.78/hour) can afford the Fair Market Rent (FMR) for a two-bedroom apartment.<sup>7</sup> Coupled with rising costs of goods and services that produce a small decline in real income, fewer residents are able to afford living in Vermont.

A further complication in assessing the true cost of properties is the issue of housing development in rural areas that lack public sewer and water. Only eight of our Region's thirty towns have both municipal sewer and water facilities (Chelsea, Randolph, Bethel, Rochester, Royalton, Woodstock, Hartford, and Bradford). Lacking both of these, or even lacking one, places logistical and practical restrictions on property lot sizes by requiring more land and putting in on-site water and waste treatment, raising the initial cost of a house by at least \$15,000. Smaller lots (e.g., parcels of one acre or less) that would be more affordably priced for low- and moderate-income households may not be adequate to build on if the landowners are required to install on-site water and septic systems for a property, assuming such lots are even available in towns. Consequently, when a town lacks these services, it may limit the number of

future residents as they cannot afford larger parcels of land to build on.

### Regional Housing Concepts, Fair Share Housing, and Fair Housing

Low- and moderate-income households, and even households making well above the median income, continue to have difficulty finding affordable housing in desirable locations. This situation does not meet the goals set out in statute for Regional or Town Plans.

All towns are responsible for providing a realistic opportunity for the construction of their share of the Region's affordable housing supply, which would be affordable to people making 80% of the median income or less. The "fair share" housing concept originated from the *Mount Laurel* legal decisions of 1975 and 1983, wherein the New Jersey Supreme Court declared that municipal land use regulations that prevent affordable housing opportunities are unconstitutional.<sup>8</sup> Therefore, a municipality cannot use its zoning to foreclose the opportunity for any class of people, especially low- and moderate-income families, to acquire affordable housing.

*Mount Laurel's* principal argument in support of its zoning plan was that limiting affordable housing was a good fiscal move, designed to limit an increasingly heavy burden on homeowners for local taxes and school costs. While the Court was sympathetic to the need to control costs, it found that the municipality could not legitimately accomplish this end by restricting certain types of housing (i.e., mobile homes and multiple housing

dwellings). Vermont planning statutes echo this intent.

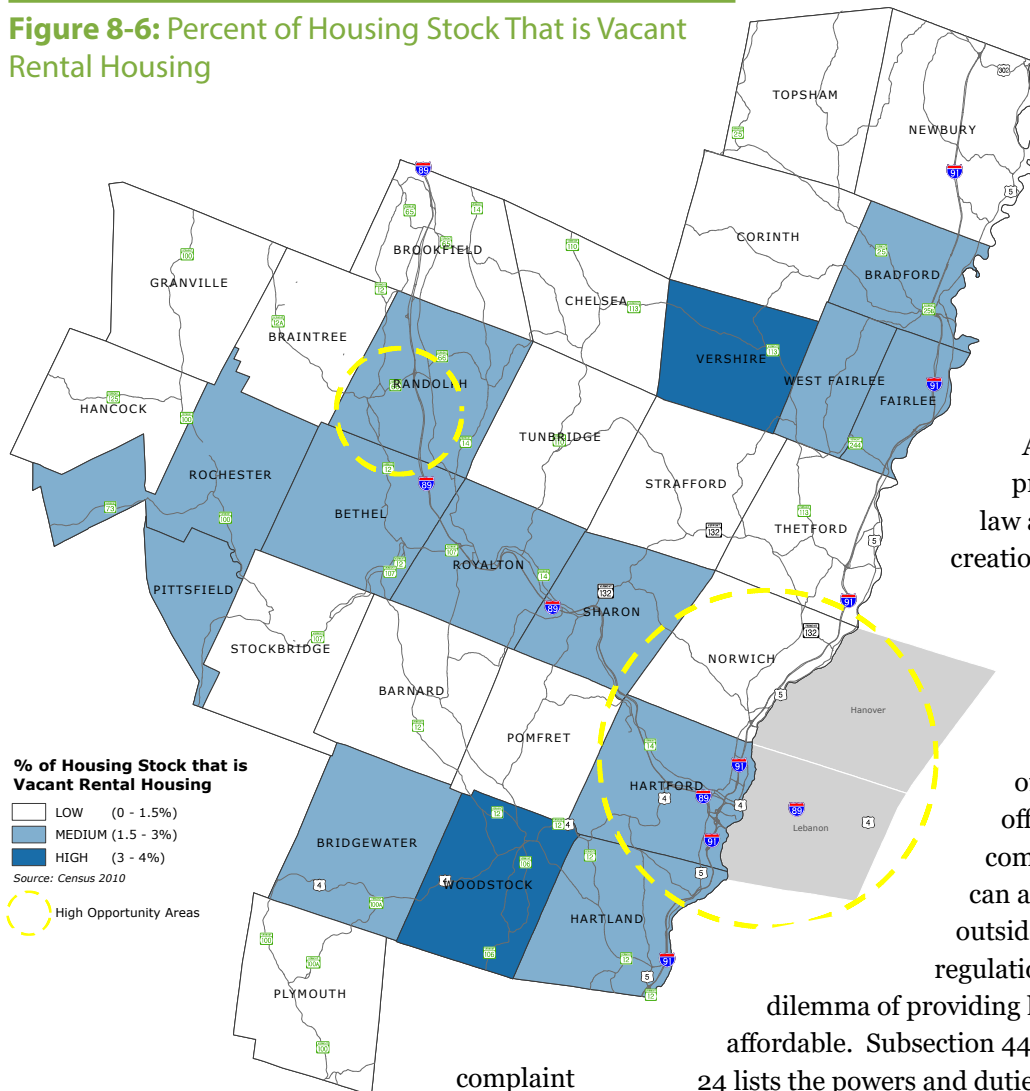
The Vermont Municipal and Regional Planning and Development Act (24 VSA Chapter 117) places responsibilities and requirements on municipalities and regional commissions. Essentially, the *Mount Laurel* concept discussed above has been integrated into the Act in several places. Exclusionary zoning practices are expressly prohibited. All types of housing must be allowed in towns, including accessory dwelling units, multi-unit residences, mobile homes, mobile home parks, modular or prefabricated housing, and residential care or group homes.<sup>9</sup> Additionally, as stated in §4382 of the Act, all municipal plans must include "A housing element that shall include a recommended program for addressing low- and moderate-income persons' housing needs as identified by the regional planning commission pursuant to §4348a(a)(9) of this title."<sup>10</sup> Regionally approved Town Plans must work to ensure the availability of safe and affordable homes, and both mobile homes and multi-family homes cannot be shunted off to far corners of the town but be able to locate in areas similar to single-family homes.<sup>11</sup> It is not necessary or even proper to debate if a town or the Region wants affordable homes; that issue has been settled by the Legislature. What this Plan tries to offer, and what is needed in local plans and bylaws, are ways to meet these goals.

It is in the Region's interest to affirmatively advance the concept of fair share housing. Towns should be aware that a new section of statute was added several years ago requiring the attorney general or a designee to "investigate when there is a





**Figure 8-6: Percent of Housing Stock That is Vacant Rental Housing**



Map Source: TRORC

of administration violates subdivision 4412(1) of this title, relating to equal treatment of housing and adequate provision of affordable housing.” If the violations continue after a town has been told to

complaint that a bylaw or its manner

dilemma of providing homes that are affordable. Subsection 4433(5) of Title 24 lists the powers and duties of housing commissions. An abbreviated list of those powers and duties is as follows:

- Make an inventory and identify any gaps.
- Review municipal regulations and make recommendations, such as increasing allowable

correct them, the court shall order the municipality to grant all requested permits and certificates of occupancy that were wrongly denied.<sup>12</sup>

A little-known provision of state law allows for the creation of municipal housing commissions. These commissions can take some of the workload off of planning commissions and can also work in areas outside of planning and regulation on solving the

densities to increase the possible number of affordable housing units.

- Assist appropriate municipal panels and district environmental commissions by providing testimony on the housing needs in town when there is a pertinent application before them.
- Cooperate with the legislative body, planning commission, zoning board of adjustment, sewer or water commission, road foreman, or other organizations on affordable housing.
- Collaborate with not-for-profit housing organizations, government agencies, developers, and builders in pursuing options to meet the housing needs of the local residents.

Federal law prohibits people from refusing to sell or rent homes on the basis of race, color, national origin, religion, sex, or familial status (having children). In addition to these characteristics, Vermont law extends protection and prohibits housing being denied on the basis of sexual orientation, age, marital status, income level, survivors of domestic or sexual violence, or because a person receives public assistance.

### Status of Existing Programs in the Region Supporting Fair and Affordable Housing

Subsidized housing is any housing that is publicly funded or supported. This public support can come in a variety of forms, including public housing, subsidies, nonprofit sponsored housing, cooperative housing schemes, and rent supplements. There are two basic approaches to reducing housing costs for low- and moderate-income families, the elderly, and other groups



through subsidies. The first involves interest subsidies that reduce interest on mortgages to a level well below market interest, thereby reducing total costs required to cover homeownership or rental costs. The second approach involves direct subsidies to either a housing authority, a private developer, or a tenant to cover the difference between 30% of a tenant's income and rent.

In the State of Vermont and within our Region, there are numerous types of organizations that promote the availability of and access to affordable and fair housing:

- Two Rivers-Ottawaquechee Regional Commission
- Twin Pines Housing Trust
- Randolph Area Community Development Corporation
- U.S. Department of Housing and Urban Development
- Housing Vermont
- Vermont Affordable Housing Coalition
- Vermont Housing Finance Agency
- Vermont State Housing Authority
- Vermont Housing and Conservation Board

## D. Housing Needs and Planning Implications

### Density and the Location of the Region's Housing Opportunities: From Sprawl to Smart Growth

As detailed above, the Region needs significantly more homes to rent and buy in order for the market to be functioning well. We need not only more units but also units of a type and price to fit our current needs and those of people we wish to move here. Historically, our Region's development was characterized by growth focused around compact neighborhoods, central services, and a village green area at the heart of the community since there were no cars. Rural homes, scattered throughout the hills and valleys, were largely farms. Today, with vehicles commonplace, much growth occurs outside of town centers in a largely scattered fashion that runs counter to many town's policies directing growth in a way that preserves these denser historic settlement patterns around compact villages. Directing growth back toward village and hamlet centers, where there is most often municipal infrastructure in place to support growth, is key to a sound regional housing policy that is both viable and sustainable for our Region.

Such growth has the support of the Vermont Legislature, which passed a growth center statute in 2006 (24 VSA § 2790), emphasizing the economic, social, health, and other benefits of strong downtowns. The statute promotes growth that reflects Vermont's traditional settlement patterns and seeks to avoid sprawl. "Sprawl" can be defined as rapid and uncoordinated growth

that is largely auto dependent and outside of compact growth areas. It is not dense. In Vermont, sprawl has increased dramatically over the past half-century or more. Sprawl increases our dependence on vehicular travel, and by extension fossil fuels, in order to access regional job centers, shopping districts, schools, and other services and recreational facilities. Further, sprawl has other economic and environmental impacts. Scattered development fragments the natural landscape that is so highly prized throughout the Region and State by obstructing open space, fragmenting wildlife habitats, and removing farms and woodlands from working use. (See Land Use chapter: Rural Areas, Forest-Based Resource Areas). Businesses in historic downtown areas can feel the financial impacts of this growth as people living farther afield from downtown areas rely increasingly on larger shopping areas that provide access to box stores and malls.

Smart growth redirects growth toward compact centers with a view to social, economic, and environmental sustainability for towns, the Region, and residents alike. It involves expanding the range of housing stock in rural areas in proximity to designated downtowns, villages, hamlets, and growth centers throughout the Region, with more equitable distribution of housing and employment opportunities and the necessary transportation links to connect these interests. Smarter, dense growth decreases burdens on municipal services, concentrating housing growth in areas that have access to public water and sewer and are within closer range of emergency services. This growth creates healthy, vibrant communities where natural



and cultural resources are enhanced and the public health and welfare of residents is considered in development efforts.<sup>13</sup> Cleaning up brownfields, encouraging infill, and allowing for mixed uses in historic downtown areas will increase density and help apply smart growth principles.

Compact settlement principles, key to smart growth, are reinforced by the state planning and development goals (24 VSA § 4302), which seek to plan development in compact village and urban centers, as typified by historic settlement patterns. TRO Region communities can directly further this goal through local regulations by promoting the use of density bonuses and clustered development incentives. One way to aid such growth is to target specific, suitable locations for development or expansion of existing village and hamlet centers, especially those that have municipal water and sewer systems and capacity for growth.

Inclusionary zoning, whereby a municipal ordinance requires that a given share of new construction be affordable housing units within reach of low- and moderate-income households, is one tool that towns may utilize to expand housing options in the Region. These units would exist alongside units that are available at the standard market rate. This practice is advantageous to property developers who may receive a density bonus, allowing a greater number of overall units to be built on-site and potentially boosting overall earnings. Within our Region, such ordinances could serve as an effective policy measure toward creating workforce housing and reducing economic segregation.

Another way to augment affordable housing stock, as mentioned above, is by creating more accessory dwelling units (ADUs). ADUs are currently permitted uses by right across the State; however, they are an underutilized feature of the local housing market in the Region. While the initial outlay of funds to convert or create a space suitable for an ADU may discourage homeowners from creating ADUs, their long-term benefits, namely as a revenue stream, may make them a viable and lucrative option. The advantages for towns are manifold as well: increasing the overall local housing supply; increasing the number of affordable housing units for young professionals and the elderly; preventing further sprawl; and increasing the tax base for towns, to name but a few.

Town Plans do not build houses, but they must seek to address the local need for additional housing. Plans need to contain language that support housing on a scale that meets the rough dimensions of the need. The placement of the homes is also important.

### E. Emerging Issues/Solutions

Tiny houses, which are often considered to be 400 square feet or less, are rapidly growing in popularity around the country as an alternative to traditional housing. People who live in tiny homes are often attracted to the simpler lifestyle, minimal environmental footprint, and relatively lower cost that these homes offer. Tiny homes are still expected to adhere to regulations of regular-sized homes, so zoning and building codes may present legal challenges.

Housing co-ops and homeshares are emerging affordable options that are alternatives to traditional home occupancy. Limited equity housing cooperatives are owned by the residents and offer below-market buy-in for people with low or moderate incomes. Homeshares are formal programs that match owners with people needing housing. Homeshare Vermont is a service that helps to match homeshare hosts and guests.

Airbnb and other online marketplaces for short-term rental of homes have become popular alternatives to hotels and bed and breakfasts. Airbnb allows people to list their homes (or a room within their home) online, and guests can book the home or room through the online service. Because renting out homes on Airbnb is profitable, some homeowners choose to do short-term rentals aimed at temporary visitors instead of putting the home on the rental market. This can result in raised rents and a shortage of rental housing opportunities for town residents. In other cases, people or corporations buy up residences as they come on the market and convert previous primary dwellings to short-term rentals. Towns are grappling with this new trend.



## Goals, Policies, and Recommendations: Homes in the Region

### Goals

1. Sufficient decent and affordable primary homes (both rental and owned) are available now for residents and for needed newcomers.
2. Planning, design, and construction of homes minimize energy consumption and environmental impacts.
3. The existing housing stock for year-round occupancy is preserved.
4. New construction of homes is primarily centered in regional growth areas and, when possible, does not increase parcelization and fragmentation of productive or ecologically important farm and forest lands.

### Policies

1. Increasing the availability of homes (both rental and owned) that are affordable to our residents is an urgent, high regional priority. Municipalities' plans must reflect their role in supplying the Region's housing stock as identified in the Regional Housing Needs Analysis and in ways that focus growth around historic settlement patterns.
2. When reviewing Town Plans and housing, TRORC will look for consideration of:
  - Aging in place
  - Accessible, safe housing
  - Low-income housing
  - Workforce housing
  - Fair housing that advances integration and inclusion
  - Energy efficiency
  - Connection to transit routes or walkability to services
3. Multi-family housing, assisted living facilities and group homes (including single room occupancy facilities), and senior housing are encouraged in close proximity to services in village, hamlet, and town centers and along public transport routes, especially in areas with adequate public sewer and water service.
4. Vermont should create additional state housing credits to supplement the limited supply of federal credits, which can finance the creation of senior housing units.
5. Housing projects of 10 or more market rate units must include an affordable component. Affordable housing developments are encouraged to have a mix of units so that some are market rate.
6. Innovative construction and renovation design techniques that enhance affordability, energy efficiency, occupants' health, and environmental suitability are encouraged.
7. Towns should plan so that most new residential development is near employment, transportation lines, and/or service centers.
8. Newly developed or rehabilitated housing that has been subsidized with public funds (such as grants, loans, or subsidies) should remain affordable for a period of at least 30 years.





### *Policies (continued)*

9. Land trusts and other similar organizations must consider whether compatible residential development can take place on farm and forest parcels when drafting conservation easements.
10. Perpetuation and development of properly managed and sited mobile home parks to meet the need for housing in communities are encouraged.
11. New housing projects subject to Act 250 must minimize additional financial burden on municipalities and taxpayers by not locating on Class 4 roads, on steep slopes, or in remote areas.

### *Recommendations*

1. TRORC will continue to assist nonprofit housing organizations in the development of affordable housing projects and programs when such efforts are consistent with the policies of the Regional Plan.
2. TRORC will continue to provide professional assistance to member municipalities in the identification of housing needs and implementation of local housing assistance programs, including revising regulations to encourage more housing to meet town needs and minimize development costs while still protecting community values and to qualify for a Neighborhood Development Area designation.
3. Community leaders within the Region will work with state housing agencies, nonprofit organizations, and lending institutions to ensure the availability of loan or grant funds for Vermonters to purchase, acquire, or improve their primary homes.
4. TRORC will continue to work with the State and towns on regulatory efforts to make quality construction happen.
5. Towns within the Region should actively cooperate with local and regional nonprofit housing trusts to develop and preserve new and existing housing, with mechanisms to ensure the perpetual affordability of that housing.
6. Community leaders, housing advocates, and TRORC must work to retain Vermont's innovative publicly financed home mortgage lending and housing assistance programs.
7. TRORC will assist towns in writing strong housing components in Town Plans that are based on current data that address proven needs. TRORC will actively help identify land that is suitable for development so that towns may work with developers and existing property owners to promote mutually beneficial partnership opportunities.
8. TRORC will educate communities on density allowances in towns, encourage communities to allow for ADU approval at the municipal staff level, and enhance local awareness of the need for workforce housing in the Region through community forums.
9. TRORC should offer assistance to towns to address aesthetic concerns about housing in ways that reduce permitting obstacles while resulting in quality projects.
10. TRORC will facilitate discussions with local land developers, bankers, and community leaders to better understand the structural and institutional impediments to providing new housing throughout the Region.
11. TRORC will work with housing providers and adjacent regional planning commissions to understand our neighbors' growth pressures and increase housing production that meets our joint needs.
12. Towns and the State should provide incentives to property owners to rehabilitate existing vacant structures for housing in town, village, and hamlet centers that are compatible with existing neighborhoods. Towns should incentivize affordable housing through a variety of methods, including regulatory bonuses, easier permitting, and minimizing lot size, parking, and other requirements.



### Recommendations (continued)

13. TRORC will represent the Regional Plan’s housing policies to the Vermont State Legislature.
14. TRORC will support the public awareness campaign of the Vermont Housing Finance Agency and facilitate the education of our towns on the Federal Fair Housing Law.
15. TRORC should work with towns facing pressure for short-term rentals so that they retain housing for residents while allowing such a business model to produce income for residents.

### Homes in the Region Endnotes

- 1 Casey Klyszeiko, “Housing and the Needs of Vermont’s Aging Population,” Vermont Housing Finance Agency, September 2007.
- 2 Ibid
- 3 Ibid
- 4 “High-Performance Manufactured Homes Offer Comfort, Affordability to All,” Vermont Energy Investment Corporation, <http://www.veic.org/our-results/success-stories/high-performance-manufactured-homes-offer-comfort-affordability-to-all>.
- 5 “Manufactured Housing Innovation Project,” Vermont Housing & Conservation Board.
- 6 “Out of Reach,” National Low-Income Housing Coalition, 2019.
- 7 Ibid
- 8 So. Burlington Cty. N.A.A.C.P. v. Tp. of Mt. Laurel, 336 A.2d 713 (1975); So. Burlington Cty. N.A.A.C.P. v. Tp. of Mt. Laurel, 456 A.2d 390 (1983).
- 9 24 VSA § 4412(1).
- 10 24 VSA § 4382(a)(10).
- 11 24 VSA § 4302(b)(11).
- 12 24 VSA § 4453.
- 13 “Downtowns, Villages and Historic Settlements: An Idea from the Past That Strengthens Our Future,” Vermont Natural Resources Council, 2013.



# 09

## Utilities, Facilities, and Services

### A. Background

The communities in our Region depend on a system of public, nonprofit, and private utilities, facilities, and services. These are needed to maintain the health and welfare of our citizens, as well as support a sound economy.

While TRORC does not have a direct role in maintaining these systems, it does have the ability to provide municipalities with guidance and technical assistance to achieve regional and local planning goals. Compact land use patterns generally improve the efficiency of wastewater and water supply systems, roads,

transit, and emergency services. Conversely, sprawling development leads to an expansion of infrastructure and services to new areas and is generally inefficient. Nearly all services and facilities benefit from greater density and intensity of land development within a given area.

Achieving Vermont's land use goal, [“to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside”](#)<sup>1</sup> is nearly impossible without public sewer, or at least water. Continued increases in density and development in our villages is unsustainable without water and wastewater facilities.

*Bridgewater Fire Station | © Kevin Geiger, TRORC*

Long-range planning for such infrastructure investments and their maintenance, as well as town buildings, roads, and emergency resources is essential to avoid jumps in annual tax rates. Therefore, state statutes enable communities to create a [Capital Improvement Plan \(CIP\)](#)<sup>2</sup> for the purposes of planning and investing in long-range capital facilities. From a regional standpoint, investments in municipal infrastructure must be made based on the population they will serve and on the most pressing needs. For communities with sufficient existing infrastructure and stable population numbers, capacity is not a significant issue, therefore priority for future investments is





in modernizing or replacing aging infrastructure. This will make these systems more sustainable and affordable and will protect against loss of service.

## B. Water and Wastewater Systems

The TRO Region is largely a rural region, with most of the water supply handled through individual on-site wells. Only a fraction of municipalities has public water systems, and in those municipalities, the systems serve a limited area—generally downtown or village areas. Many of the supply lines need repairs or upgrades. Some systems suffer from inadequate storage or from poor line pressure. Many systems have poorly mapped lines due to their age (50 to 100 years old). Municipalities are required by law to create [Source Protection Area \(SPA\)](#)<sup>3</sup> plans, which help ensure that drinking water supplies will remain safe and untainted.

Threats to water supply include fuel spills, leaking underground tanks, high amounts of natural contaminant sources such as arsenic, and chemicals known as per- and polyfluoroalkyl substances (PFAS). PFAS does not break down in nature and cause [devastating effects on our health](#)<sup>4</sup>. Currently, the Vermont Agency of Natural Resources has created a [PFAS Road Map](#)<sup>5</sup> (2023) that helps town and state officials track public exposure of PFAS. While the EPA does not currently have a maximum contamination level (MCL) for PFAS, the Department of Environmental Conservation has set a limit of 20 ng/L for drinking water.

The best way to know whether there are contaminants in your water is to test your water. The Vermont Department of Health recommends

that residents with private water sources should test their water regularly. To learn more about testing both private and public water sources, please contact certified Vermont laboratories found on ANR's website [here](#)<sup>6</sup>.

Currently, [there are 12 wastewater treatment facilities in 9 communities in our Region](#)<sup>7</sup>. The bulk of these systems were originally built in the 1970s and 1980s, with periodic improvements being made in response to aging equipment or increasing demand. As time goes on, the cost of necessary upgrades for these facilities increases.

Wastewater treatment facilities suffer from structural defects such as leaking sewers, as well as decrepit connections that funnel stormwater into combined sewer and stormwater lines—which diminishes the efficacy of wastewater treatment.

The majority of the wastewater systems in our Region have sufficient capacity. Given that population growth rates have flattened, it is likely that the design capacity of the systems in most communities will be sufficient, as long as they are maintained.

Like water supply, waste is largely handled on site with private systems. For villages and downtowns, water supply and septic systems are vital infrastructures, as they allow communities to create greater population density than would be possible without them. Well-maintained public drinking water infrastructure and septic systems are critical for public health, strong businesses, and a clean environment.

New wastewater treatment facilities and/or

public water supplies will eventually be necessary in all communities' core areas if they desire to grow, create more housing, or attract businesses. Hartland and Norwich are the largest communities in the TRO Region without wastewater treatment facilities. Fairlee and Strafford both have viable village centers that would benefit, both economically and in overall health, from the ability to concentrate more development within those areas. Municipal plans, per Vermont statute, shall identify and prioritize future capital improvements and major repairs, as well as estimate costs and financing for maintenance and future capacity.

## C. Solid Waste

All Vermont municipalities, either individually or as part of a solid waste district or an intermunicipal association, are required by Vermont law to adopt a [Solid Waste Implementation Plan \(SWIP\)](#)<sup>8</sup>. The SWIP documents town or district waste management facilities and articulates how solid waste will be managed over the next five years. All solid waste districts and intermunicipal SWIPs must be in compliance with the goals outlined in the statewide 2019 [Materials Management Plan \(MMP\)](#)<sup>9</sup>. In addition to being in conformance with the state plan, all SWIPs must be in accordance with any Town or Regional Plan. The TRO Region is served by a total of [six waste management districts](#)<sup>10</sup>, as well as one intermunicipal association. [The Greater Upper Valley Solid Waste Management District](#)<sup>11</sup> covers a ten -town area, which contains nearly half of the Region's population. The second largest service area by population is within the town of Hartford, which





operates the [Hartford Community Recycling Center](#)<sup>12</sup>. The third largest waste management district by population is the [White River Alliance](#)<sup>13</sup>, which covers eight of the Region’s towns.

In 2023, there were 25 active solid waste facilities throughout our Region that have been certified by the State. Presently, the Region has 7 recycling facilities, 4 composting facilities, and 11 transfer stations. A third of the Region’s towns lack any waste management facility and are instead reliant on their neighboring municipalities for waste disposal. In some instances, these towns find themselves two to three towns removed from a landfill or transfer station. There are no operating landfills in the region.

#### D. Educational Facilities and Services

Access to quality education is required to achieve social and economic goals of the TRO Region. According to Vermont statute, the right to public education is key to guaranteeing political and civil rights to constituents. Indeed, “[to keep Vermont’s democracy competitive and thriving, Vermont students must be afforded substantially equal access to a quality basic education](#)<sup>14</sup>.”

##### Elementary and Secondary Schools

All public schools in the Region are governed by a district school board elected by the voters of their respective municipalities, and administrative support to the district board is received from supervisory unions. Some school districts and municipalities accept, on a year-to-year basis, tuition-paying students from neighboring communities that do not provide elementary

or secondary education, or that lack adequate facilities.

Declining enrollments have created staffing, programmatic, and financial planning challenges for schools throughout the Region, resulting in the closure of some schools. Sustained levels of enrollment decline may have adverse social and economic impacts for towns in the TRO Region, and are, therefore, an area of vigilance and concern for the future well-being of the Region.

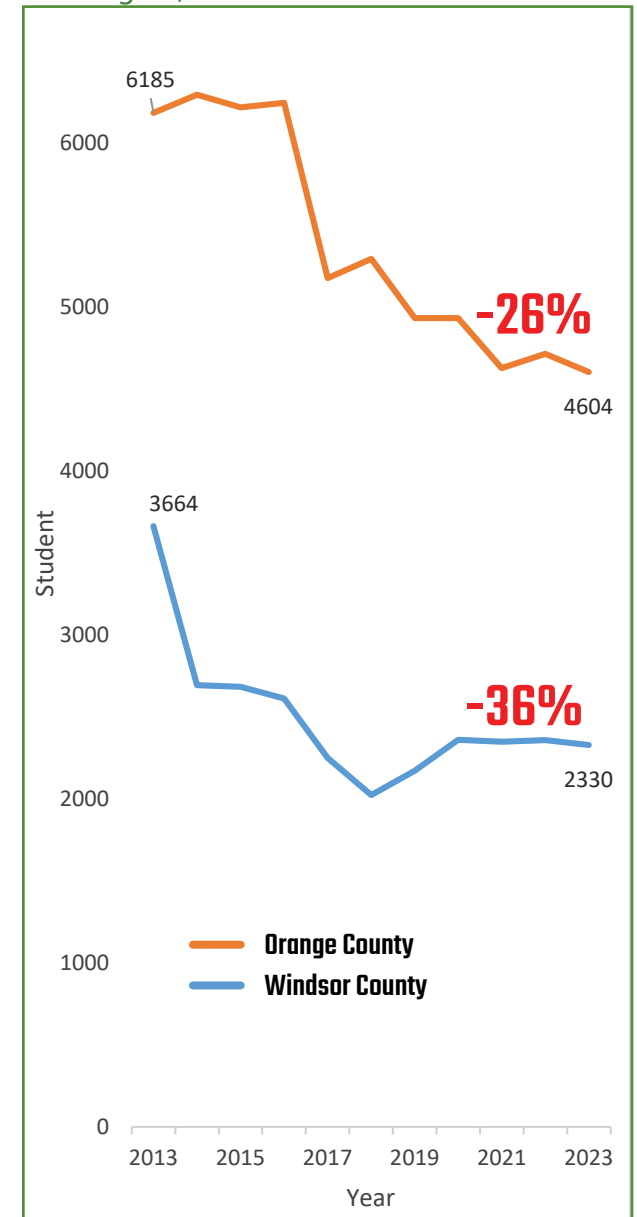
A table of schools in the Region and their average daily enrollment can be found on the [Vermont Department of Education website](#)<sup>15</sup>.

While homeschooled children do not require educational provisions from school districts, there are actions that towns and local organizations should consider for the wellbeing of these children.

##### Poverty and Education

The Region’s school system provides a major avenue of support for children living in poverty, as it may be the main source of food for children in this condition. Children who are homeless have the same right of access to a free public education that other children do. Many students may not be classified as homeless but may be staying with friends and family members, or be housed in a motel. The summer, when school is out, is concerning for those that are homeless and living in poverty, as schools can be the main source of food for children who are homeless and living in poverty.

Figure 9-1: School Enrollment Figures for the TRO Region, 2013-2023



Source: Vermont Department of Education



### ***Vocational Training and the Region's Youth***

Educational opportunities that support the acquisition of professional skillsets allow students to better understand and prepare for valuable local employment sector opportunities. Many trades are an integral part of our economy and can supply a good living wage. Providing opportunities for the Region's youth to see, experience, and learn about local jobs may serve as an incentive, convincing many youths to stay in our communities well beyond high school. In our region, there are currently three vocational schools:

- [River Bend Career and Technical Center in Bradford](#)<sup>16</sup>
- [Randolph Technical Career Center](#)<sup>17</sup>
- [Hartford Area Career & Technology Center](#)<sup>18</sup>

Both students and prospective employers from local enterprises stand to benefit substantially from networks formed between students and the working world, both within and outside of the traditional classroom. These connections serve as an enriching supplement to traditional academic course offerings.

### ***Adult Education***

The availability of education services for [adult learners](#)<sup>19</sup> is critical to the social and economic well-being of the Region and its residents. The adult learning centers in the region offer classes free of cost to adults in basic skills, General Educational Development (GED) certification, English as a second language, college transition skills, and



**Testing Water Quality** | Source: Community College of Vermont

work readiness skills, including WorkKeys (ACT) certification. For instance, The Family Place is a family support center that offers courses to young mothers with the aim of helping them earn their GED and acquire basic employment skills.

The Agency of Education funds three adult learning centers in the region: the [Vermont Adult Learning Center](#)<sup>20</sup> in Hartford and the two [Central Vermont Adult Basic Education Centers](#)<sup>21</sup> in Randolph and Bradford. Both of the Community Action Agencies covering the TRO Region ([Southeastern Vermont Community Action](#)<sup>22</sup> and [Capstone](#)

[Community Action](#)<sup>23</sup>) have adult education and job skills programs. Capstone Community Action has two locations in our Region: Bradford and Randolph. Southeastern Vermont Community Action's physical location is in Westminster, with an additional office in White River Junction. Other than these options, participants are required to travel outside the Region for these educational opportunities. This is a burden to the Region's lower-income residents who wish to use these services.





### **Continuing Education**

As Vermont's senior population significantly increases, and adults of all ages continue to seek learning opportunities for economic or personal reasons, the State will be confronted with the need for both new educational and recreational activities. Currently, residents can enroll in the following institutions:

- [Artistree in Pomfret](#)<sup>24</sup>
- [Vermont Law and Graduate School in South Royalton](#)<sup>25</sup>
- [Vermont State University in Randolph](#)<sup>26</sup>
- [Dartmouth College in Hanover, NH](#)<sup>27</sup>
- [Riverbend Career and Technical and Oxbow High School in Bradford](#)<sup>28</sup>
- [Bethel University in Bethel](#)<sup>29</sup>
- [Community College of Vermont in Wilder](#)<sup>30</sup>

### **The Future of Education in the Region**

Many of our Region's communities have a school. Unfortunately, declining enrollments and an aging population have made the traditional model of "one school in every town" less sustainable. The cost of publicly educating children places a significant financial strain on many municipalities. As a result, many communities continue to work on ways that they can collaborate together to decrease costs and maintain the quality of education desired by everyone.

Ensuring all students have access to high-speed Internet will extend our students' academic opportunity beyond the brick-and-mortar classroom

setting and put students on an equal footing with those from more developed regions of the nation. Lack of access to high-speed Internet in portions of the Region hinders access to education materials.

With the adoption of [Act 46](#)<sup>31</sup> in 2015, many schools in the Region began consolidating with other districts. Several communities have either closed or merged their schools with other communities. If the trend toward smaller classes and fewer children in many towns continues, more communities will need to engage in these consolidation discussions.

Considering the cost of repairs is also important when determining whether schools ought to be consolidated. In the event that communities choose to close or merge schools, how to manage vacant infrastructure should be part of the discussion.

For many communities, the closure of a school can present new opportunities; because schools are often located within villages or town centers, they can become prime locations for reuse in areas that are otherwise built up. Possible options for reuse of existing school buildings could include:

- Town offices and other municipal services
- Inclusive, mixed age and income housing opportunities
- Senior centers
- Light industrial development
- Business incubators or office parks

### **E. Childcare Services**

The availability of high-quality and affordable childcare is an important factor in the appeal



*Town Green and Gazebo in Rochester* | © Kevin Geiger

and sustainability of our Region. For example, the childcare industry contributes to the regional economy as a business and employer in its own right. It also functions as a service industry that provides crucial support to employers and employees. Without access to affordable, high-quality childcare, one parent would likely leave the labor force to care for young children. Good quality childcare helps prepare children for schooling or may even supplement a child's school curriculum, and it provides them with opportunities for socialization.

According to the 2020 U.S. Census, approximately 56,000 people live in the TRO Region. The number of children aged 0-14 is a relatively small percentage of the Region's population: just over 15 percent, or 8,430 individuals. As of 2020, there are 101 registered and licensed childcare providers; to see the locations of providers and the types of



programs they provide, please visit [Bright Future's Childcare Information System](#)<sup>32</sup>.

After-school programs and summer camps provide childcare options for parents with children old enough to attend public or private school full time. Both help to keep children engaged in enriching activities, while also allowing parents to feel comfortable that their children are safe if they are working past school hours or during summer vacation. According to the [2020 Vermont After 3 PM study](#)<sup>33</sup>, statewide there are approximately 19,000 children who are participating in afterschool programs and 26,000 children who are not because of financial constraints and lack of available programs in their communities.

Barriers associated with childcare in Vermont include inadequate amount of infant to toddler care available, complicated application forms, and insufficient financial assistance to cover the cost of high-quality services (despite receiving financial help from some childcare providers). Searching for childcare is often difficult for parents in the Region,



Bradford Library | © Kevin Geiger

as the availability of childcare providers, especially for infant and school-age children, is not enough to meet the need. To learn more about other obstacles to childcare services that caretakers commonly experience, visit [Vermont's Early Childhood Systems Needs Assessment 2020](#)<sup>34</sup>.

To address the workforce needs of childcare providers, there are a few vocational schools in the Region that have training programs that teach students to care for infants and preschool-age children. One vocational school to offer such a program is the River Bend Career and Technical Center in Bradford in their "[Teacher Education](#)<sup>35</sup>" curriculum. The Randolph Technical Career Center has a similar program in their "[Education Services](#)<sup>36</sup>" curriculum. CCV offers a [degree in Education](#)<sup>37</sup>, along with several other related degrees, and an option to obtain a certificate. In addition, there is ongoing professional development offered through Northern Lights at CCV for those who are in the field and seek training or additional qualifications.

To help families pay for childcare, the State of Vermont provides financial assistance through the [Vermont Childcare Financial Assistance Program \(CCFAP\)](#)<sup>38</sup>. Vermont's CCFAP helps families who meet certain work, education, and income requirements afford childcare. The program also provides childcare financial assistance for children in foster care and children and families who meet certain health criteria.

Given the high costs of childcare, it can be difficult for low- to moderate income families to afford placing their children in childcare. As a consequence of this situation, a family member

may decide to provide care for the child or children instead of working and supplementing the family income.

Out of approximately 32,000 households in the TRO Region, 1,704 of them are classified as "single-head-of-household" with children 18 years old or younger. It is very important for single parents to find childcare so that they are able to work and provide for their families. The parent may have another family member or trusted adult care for their child or children while at work, or they may seek out a childcare provider. Women are often the ones filling the role of the primary caregiver for young children. A national statistic states that [out of all women between the ages of 25-44 who are not participating in the workforce, about a third are not working due to childcare \(compared to 12% of men for the same reason\)](#)<sup>39</sup>.

[Let's Grow Kids](#)<sup>40</sup> is a statewide campaign looking for more high-quality, affordable childcare in Vermont to better support our children, families, women, communities, and economy. [More than 70 percent of Vermont children under age 6 have both of their parents in the labor force](#)<sup>41</sup>, meaning they're likely to need care. Yet half of those infants and toddlers don't have access to any regulated care, and [nearly 80 percent don't have access to high-quality programs](#)<sup>42</sup>. This has a negative ripple effect on our businesses, schools, communities, health-care system, and economy as a whole.

In our Region, there have been two major reports that focus on childcare. [The Blue-Ribbon Commission on Financing Childcare](#)<sup>43</sup>, published in 2016, looked into the real cost of childcare and





found that “the estimated cost of high -quality early care and learning is currently unaffordable for almost 90% of Vermont families.” The second report was [Stalled at the Start](#)<sup>44</sup>, published in 2022 and produced by Let’s Grow Kids, which analyzed the supply and demand of childcare.

One available program that could benefit families is the [Childcare Financial Assistance Program \(CCFAP\)](#)<sup>45</sup>. This is a government program that helps eligible families cover some of the cost of childcare. There is also a federal scholarship program for childcare center teachers that are trying to earn credentials/degrees. Through the [T.E.A.C.H. Early Childhood Vermont program](#)<sup>46</sup>, up to 80 percent of tuition can be covered, along with other benefits.

In 2023, [Act 76 \(H.217\)](#)<sup>47</sup>, which pertains to childcare and early childhood education, was enacted into law. This legislation includes significant investments in Vermont’s childcare system and introduces policy changes that will affect childcare services for both early childhood and school-age children.

## F. Telecommunications

Information technology (such as broadband Internet and wired/wireless telecommunications) has become essential to residents and businesses in the Region. Our economy, educational systems, and functionality of our homes rely on ubiquitous availability of data and communications for our Region.

In the 2021 [Vermont Ten-Year Telecommunications Plan](#)<sup>48</sup>, the Public Utilities

Commission set the following goals:

- Bringing every currently unserved and underserved on-grid Vermont home access to 100/100 megabits per second (Mbps) broadband that can be scalable to faster speeds as demand warrants
- Leveraging residential fiber deployments into better mobile voice coverage along key roadways and in small communities
- Ensuring that telecommunications systems are resilient, redundant, secure, and



*An example of a Cell Tower in Disguise*  
| © Bill Morrow

futureproof for commercial, consumer, and public safety needs

- Facilitating competition and choice of multiple internet service providers at the majority of premises in the state
- Promoting local input and oversight in the direction of future use for publicly funded broadband infrastructure through empowered regional Communication Union Districts
- Leveraging fiber broadband expansion to ensure public safety has access to reliable and redundant communications capacity.

In the TRO Region, access to broadband is provided via a number of mediums, including cable, DSL (digital subscriber line), fiber-optic cable, cellular, wireless, and satellite. This access varies from town to town, with the highest concentration of availability being in villages and downtowns. Broadband providers tend to locate their infrastructure in areas with high population density to maximize the subscriber-to-infrastructure ratio. The farther away from a community center, the fewer options for broadband connectivity; this makes the “last mile” homes and businesses the least likely to have access.

Efforts to improve broadband coverage in the TRO Region are ongoing. Between 2000 and 2012, the State of Vermont invested a substantial amount of funding in an effort to bring broadband to all Vermonters. One such project was the [Vermont Digital Economy Project \(VDEP\)](#)<sup>49</sup>, which was developed as part of the State’s goal to create more resilient communities after Tropical Storm Irene in 2011 by



delivering 26 free Wi-Fi zones/hotspots and pursuing other prominent projects that expanded digital literacy in rural towns. Similar in scope, the [VT Community Broadband Board \(VCBB\)](#)<sup>50</sup>, was established in 2021 in order to “accelerate the development and implementation of universal community broadband solutions” all throughout Vermont.

In our Region, VDEP has built free village Wi-Fi zones in the communities of Bethel, Royalton, and Rochester. These investments provide residents who lack access in their homes with a reliable place to connect to the Internet. In East Barnard, there is also a community-funded Wi-Fi zone for residents. Village-wide access is a boon to businesses who can take advantage of the additional customers who are drawn to the village for Internet access. To see Wi-Fi coverage across our Region and Vermont, visit [Vermont Department of Public Service’s interactive map showing Wi-Fi hotspots](#)<sup>51</sup>.

The [East Central Vermont Fiber-Optic Network \(EC Fiber\)](#)<sup>52</sup> is a consortium of 24 towns (including 21 TRO Region towns) that is working to expand access to high-speed Internet. Major cellular providers are continually working to expand coverage, particularly along major transportation corridors, such as Interstates 89 and 91.

Use of cellular phones in day-to-day activities has skyrocketed over the past decade. The availability of broadband cellular data has increased the use of cellular phones to the point that they are essential to businesses and individuals alike. In fact, [most U.S. households no longer have a “landline” phone](#)<sup>53</sup>. The lack of cell coverage is a major deterrent to both attracting businesses and younger families.

Cellular access is determined in great part by topography in relation to the placement of cellular transmission towers. While coverage in the TRO Region is reasonably good along main travel corridors, it is spotty in more rural areas. In some instances, there are entire communities (such as Barnard) that have [virtually no cellular access](#)<sup>54</sup>. In most cases, residents support improved cell phone access, but are less supportive of having the necessary facilities located in their communities. When residents object to proposed facilities, it is almost always due to the potential for aesthetic impacts.

Wireless telecommunications facilities are primarily permitted under [Section 248a](#)<sup>55</sup>. The 248a process was created to enable a faster permitting process in order to achieve greater wireless coverage, and it specifically exempts projects that achieve this wireless coverage from local zoning or Act 250.

Under the Section 248a permitting process, the [Public Utility Commission](#)<sup>56</sup> must review the environmental, economic, and social impacts associated with a particular project prior to issuing a [Certificate of Public Good](#)<sup>57</sup>. The project is reviewed against both Regional and Town Plans, and even relevant parts of zoning that would otherwise apply, are accorded “substantial deference” in such reviews, unless there is good cause to find otherwise”. Even when substantial deference is not granted, the 248a process must give due consideration to the recommendations of municipal planning commissions, selectboards, and regional planning commissions based on their respective plans. Accordingly, it is appropriate that this Plan

address these land uses and provide guidance to town officials, regulators, and providers.

Transmission towers are necessary telecommunications facilities, but as land uses, these towers have planning concerns, primarily for aesthetic reasons. To ensure adequate transmission of signals in mountainous areas such as ours, towers and related facilities need to be located on hilltops or high elevation points. These areas are also significant contributors to the scenic and rural character of the Region. Protection of these areas from insensitive developments is a matter of public good. Thus, due to transmission towers’ higher visibility from multiple vantage points, conflict with scenic landscapes has become an issue.

## G. Municipal Buildings and Properties

Towns own a variety of public buildings, and every town has a town office building. Nearly every town has a town hall where they hold town meetings and other events. Sometimes, town offices are also located in this building. Towns with their own road crews also own town garages, some of which are woefully inadequate for their function, and are sites for salt and sand storage. Some towns own their own sand and gravel pit, but most contract this function out. Nearly all of the town halls and offices are in older structures, many of which need substantial maintenance or improvements, but several have been renovated to create better working space and improve energy efficiency. Town offices, like other civic functions, help to create a sense of community and give energy and



importance to town and village centers.

Public libraries play an important role in providing materials to inform, challenge, and inspire the Region’s residents, as well as Wi-Fi hotspots and computer access. In some towns, public libraries are privately owned entities that still provide an essential public service to residents.

## H. Recreational Facilities

Many recreational opportunities are available to the Region’s residents and visitors. These range from organized, structured prospects at state and federal parks to more informal opportunities in municipal parks and forests.

The Region has one national park—the [Marsh-Billings-Rockefeller National Historic Park](#)<sup>58</sup> in Woodstock. Associated with the Park is the privately owned [Billings Farm and Museum](#)<sup>59</sup>, which offers farm educational programs. The western part of our Region is also home to a portion of the [Green Mountain National Forest](#)<sup>60</sup> and the [Long Trail](#)



Pittsfield Town Hall | © Kevin Geiger

[corridor](#)<sup>61</sup>. The [Appalachian Trail corridor](#)<sup>62</sup> goes through the central part of the Region. Additionally, outdoor recreation opportunities are available at the [Saskadena Six ski area](#)<sup>63</sup>, many rivers and lakes, public and private forests, and Class 4 roads. Indoor recreational opportunities include ice rinks, [the Upper Valley Aquatic Center](#)<sup>64</sup>, and the [Montshire Museum of Science](#)<sup>65</sup>.

Several state parks can be found in the Region, including the [Calvin Coolidge Historic Site](#)<sup>66</sup> in Plymouth, the [Quechee Gorge State Park](#)<sup>67</sup>, and several other historical sites. The Department of Forests, Parks and Recreation, and the Department of Fish and Wildlife also have several state forests, wildlife management areas, and lake or river access points that offer additional outdoor recreational opportunities.

Several towns also offer town recreation programs through their recreation departments. These may include ski programs in conjunction with local schools in the winter, camps and track and field programs in the summer, and various events year-round. These recreation departments may also manage a modest network of town parks.

Many towns also have excellent trail networks linked to their road networks, and portions of these networks include Class 4 roads and trails. In Vermont, many trails were once town highways that gradually became public rights-of-way. These [legal trails](#)<sup>68</sup> often pass through private land, and access to them can be restricted or altered by the Selectboard.

The Region’s rivers and lakes offer opportunities

for [swimming, and boating](#)<sup>69</sup>, and [fishing](#)<sup>70</sup>, all of which require public access areas for parking or boat launching. Scenic waterfalls, cascades, and gorges are also destinations for tourists and residents. There is a need for access areas to water resources in the Region.

Only [13 percent of all land in Vermont is owned by state or federal agencies](#) which means many of the outdoor recreational resources in the Region rely on the willingness of landowners to allow access to private land. Several large private landowners allow access to their land.

## I. Opportunities for Shared Services/ Infrastructure

As is the case in much of Vermont, our Region is generally low-density with a limited population as compared to more urban locations.

Opportunities exist in our rural communities, as well as in our more urban downtowns, for inter-municipal cooperation. State statute enables communities to join into inter-local contracts or union municipal districts for the purposes of performing “any governmental service, activity, or undertaking which each municipality entering into the contract is authorized by law to perform.” TRORC also now can provide a mechanism for shared services; common existing examples among communities include shared police services and municipal aid agreements. Communities may also share staff or equipment. Under certain forms of cooperative agreements, they may purchase property together. Engaging in well-planned and well-organized cooperative efforts can ensure that services are provided more efficiently and more effectively.



## Goals and Policies: **Overall Utilities, Facilities, and Services**

### *Goals*

1. The maintenance, expansion, or construction of new facilities and utilities is financially sustainable for governments and taxpayers.
2. Investments in utilities, facilities, and recreation enhance the desired pattern of development which is compact village and urban centers surrounded by open countryside.

### *Policies*

1. Public investments in governmental and public utility facilities services should support existing and future development.
2. The scale, type, and design of major public utilities and facilities shall be consistent with the future land use settlement patterns recommended in this Plan and relevant municipal plans.
3. Public investments in municipal, regional, and state facilities should be located within existing or planned Regional Growth, Industrial, and Mixed-Use Areas.
4. Public facilities such as solid waste disposal facilities, correctional facilities, and wastewater treatment facilities shall be situated in an area where they best serve their purpose while minimizing negative impacts on the surrounding area.
5. TRORC supports the acquisition of future public and quasi-public utility sites, properties, or interests, when such acquisitions advance the goals and policies of this Plan and relevant local plans.
6. The construction of primary educational facilities, health-care facilities, emergency facilities, post offices, libraries, and other public facilities should occur in or adjacent to existing or planned Regional Growth and Mixed-Use Areas, so as to maximize their convenience to people (either locating facilities near transit stops or walking distance), to minimize additional infrastructure improvement costs, and to contribute to the vitality of communities.

## Goals, Policies, and Recommendations: **Water and Wastewater**

### *Goals*

1. Municipal water and wastewater systems are secure, financially sustainable, well-maintained and energy efficient.
2. Municipal water supply areas maintain high quality of drinking water for public health.

### *Policies*

1. Municipalities and private utilities should create capital budgets and reserve accounts for utilities and facilities management and operations.





***Policies (continued)***

2. TRORC supports proposals to install, upgrade, and improve existing public water supplies and wastewater treatment facilities that serve Regional Growth, Industrial, and Mixed-Use Areas as designated in this Plan, as well as affordable housing projects in Rural Areas.
3. Proposals for upgrades, improvements, or expansion of water and wastewater treatment infrastructure shall not promote sprawl, strip development, and scattered land uses.
4. New hookups must not promote sprawl or strip development.
5. TRORC encourages the location of community water supplies and wastewater treatment facilities primarily in Regional Growth, Industrial, and Mixed-Use Areas; however, systems designed specifically to supply appropriately scaled cluster housing projects in rural areas are consistent with this Plan.
6. Land development within existing or planned Source Protection Areas shall not pose a reasonable threat of contamination to public water supplies.
7. TRORC supports water conservation measures to reduce demand for water and to promote the life span and efficiency of water and wastewater facilities.
8. TRORC supports and encourages installation of community wastewater treatment facilities and/or water supply systems in areas of existing concentrated settlement where conventional on-site septic systems and wells are inadequate for public health and development.
9. New water and wastewater systems should be designed to be energy efficient and secure.
10. The village areas of Norwich, Hartland, Sharon, Strafford, and Fairlee are the highest regional priorities for new wastewater treatment facilities.

***Recommendations***

1. Municipal plans, per Vermont statute, shall identify and prioritize future capital improvements and major repairs, as well as estimate costs and financing for maintenance and future capacity.
2. TRORC will assist communities with the identification and prioritization of future capital improvements and repairs, grant writing, and project management.
3. TRORC will continue to offer capital budgeting services to the towns.
4. Water efficiency programs and codes should be adopted at the state or local level to reduce demand for municipal water systems.
5. TRORC shall seek grant opportunities to map water and wastewater systems throughout the Region.
6. When funding is available, municipal plans should inventory water and wastewater systems to identify current and projected capacity gaps.
7. Municipalities should conduct periodic auditing of all water and wastewater distribution systems to calculate infiltration and losses.



## Goals, Policies, and Recommendations: **Solid Waste**

### *Goals*

1. Solid and hazardous waste generation in the TRO Region is reduced.
2. Reuse, recycling, and composting in the TRO Region is increased.

### *Policies*

1. Solid waste collection systems should be coordinated to lessen costs and increase efficiency.
2. Products that are fully recyclable are encouraged to be recycled.

### *Recommendations*

1. TRORC will support and participate in any future discussions regarding the development of regional waste management services.
2. TRORC should assist towns in meeting the Universal Recycling Law requirements through outreach and education, with assistance from the Agency of Natural Resources.
3. All towns or districts of this Region are encouraged to contact TRORC offices regarding their current planning activities and determine if their SWIP revisions meet the overall goals and policies of this Plan.

## Goals, Policies, and Recommendations: **Educational Facilities and Services**

### *Goals*

1. Accessible and affordable educational facilities and services are available throughout the Region that meet or exceed statewide standards, including life-long learning opportunities.
2. Students have access to quality vocational and workforce training opportunities to prepare them for future careers.

### *Policies*

1. The construction of primary educational facilities should occur in or within close proximity to existing or planned Regional Growth and Mixed-Use Areas, so as to maximize their accessibility to people and infrastructure.
2. Expansion of continuing education and vocational education opportunities is encouraged.
3. Town schools should be supported.



## Goals, Policies, and Recommendations: **Educational Facilities and Services**

### *Recommendations*

1. Town and school authorities should create and maintain safe pedestrian access and transit opportunities to educational facilities, in line with Safe Routes to School efforts.
2. Towns must assess and incorporate the needs of disabled children and staff into educational facility and budgetary planning efforts to ensure the provision of free and appropriate education for all children.
3. Towns should consider adaptive reuse of vacant school facilities that occurs in a manner that enhances villages and downtowns and stimulates the local economy.
4. Towns should consider applying for funding opportunities enhancing educational facilities as early as possible (i.e., a year in advance) in order to request help from TRORC, if needed.

## Goals, Policy, and Recommendations: **Childcare Service**

### *Goals*

1. An adequate supply of safe and affordable childcare services and facilities is available.
2. A regional network of high-quality childcare programs fulfills the needs of families and employers.

### *Policy*

1. TRORC supports initiatives to develop childcare facilities where a need has been proven and the location conforms to this Regional Plan.

### *Recommendations*

1. TRORC should encourage major employers (employing more than 35 employees) to provide childcare services and create a partnership with a local childcare service.
2. TRORC should work collaboratively with childcare providers and towns to help them locate childcare services in convenient and safe areas.
3. TRORC should work with towns to address identified needs for childcare facilities or services by:
  - a. Identifying publicly owned buildings throughout the Region; and
  - b. Evaluating and prioritizing their suitability to serve as childcare facilities after considering Vermont regulations.
4. Towns should review their zoning regulations (if adopted) to increase the ability of the regulations to allow childcare providers to be located in the town.



## Goals, Policies, and Recommendations: **Telecommunications**

### *Goals*

1. Universal broadband access using fiber is available throughout developed areas in the TRO Region.
2. Universal availability of mobile cellular service is available throughout developed areas in the TRO Region.

### *Policies*

1. Public and private efforts to expand telecommunications access are supported, when done in a manner that does not have an undue adverse impact on the rural character of our communities.
2. Efforts to provide free public broadband access in places such as village centers and public buildings are supported.
3. Telecommunications facility development shall be excluded from the following areas:
  - a. Floodways shown on FEMA Flood Insurance Rate Maps.
  - b. Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis.
  - c. Rare, threatened, or endangered species habitat or communities.
4. All new telecommunications facilities and related infrastructure must be sited and designed to avoid or, if no other reasonable alternative exists, to otherwise minimize and mitigate adverse impacts to the following:
  - a. Historic districts, landmarks, and sites;
  - b. State or federally designated scenic byways and municipally designated scenic roads and viewsheds;
  - c. Special flood hazard areas identified by National Flood Insurance Program maps; and
  - d. Necessary wildlife habitat identified by the State or through analysis, including core habitat areas, migration, and travel corridors.
5. New telecommunications facilities and related infrastructure (including access roads, site clearing, on-site power lines, lighting, and off-site power lines) must be sited to avoid the fragmentation of large priority and high priority forest blocks.
6. Telecommunications facilities development shall minimize site clearing and highly visible roadways.
7. The developer shall minimize the aesthetic impact of the telecommunications facility or infrastructure on the surrounding landscape. This includes options such as the utilization of “stealth towers,” camouflage through paint scheme, or designs that blend into the surroundings, such as asymmetrical monopoles disguised as pine trees.
8. Telecommunications facilities shall be designed to be the minimum height necessary to achieve coverage.





## Goals, Policies, and Recommendations: **Telecommunications**

### *Policies (continued)*

9. All new facilities shall incorporate reasonable options for sharing space on the proposed towers. Applicants for new towers must demonstrate that there is no reasonable opportunity for colocation on existing towers.
10. To support resiliency, applicants shall make space available on towers for municipal communication systems to enhance or expand road and emergency service communication networks.
11. To minimize conflict with scenic values, facility design and construction shall employ the following principles:
  - a. In rural locations, be located in forested areas or be sufficiently landscaped to screen the lower sections of towers and related ground fixtures from public vantage points, such as trails, roads, or water bodies;
  - b. In more developed areas, utilize materials, architectural styles, color schemes, lighting fixtures, size, and other design elements to promote aesthetic compatibility with surrounding uses and to avoid adverse visual impacts; and
  - c. Be located downgrade of the ridge so as not to exceed the elevation of the tree line as seen from public highways.
12. Consideration shall be given to the environmental limitations of any given site. Impacts on wildlife habitats, soil erosion, forestry and agricultural lands, and similar resources should be carefully addressed. Projects that materially impact these resources are discouraged.
13. The clearing of land associated with site development for tower and facility construction shall not negatively impact the scenic views present.
14. Towers or facilities that are designed to resemble trees or natural features shall not be placed unnaturally higher than the tree line.
15. Permits must require removal of facilities that are no longer used.

### *Recommendations*

1. TRORC should continue to participate actively in Section 248a permitting process.
2. Communities should seek out funding to implement new or sustain existing Wi-Fi zones in villages and downtowns.
3. The State should continue to support programs that achieve universal broadband and cellular communication access.

## Goal, Policies, and Recommendations: **Recreational Facilities**

### *Goal*

1. The Region is home to a variety of indoor and outdoor recreational opportunities for all users.



## Goal, Policies, and Recommendations: **Recreational Facilities**

### *Policies*

1. The maintenance and development of recreation trail networks (e.g., Appalachian and Long Trails, Cross Vermont and Cross Rivendell Trails, regional and state snowmobile networks, Class IV roads, legal trails, and cross-country ski trails) is encouraged.
2. New development and land subdivisions that have an undue adverse impact on the enjoyment or continued use of recreational uses should be discouraged.
3. Consistent with private property rights, maintenance and enhancement of public access to and use of recreational amenities on privately held land are encouraged.
4. Where development interacts with the Appalachian or Long Trails and other related side trails, design plans and construction must maintain the predominant scenic character and the primitive qualities of the trail corridor.
5. TRORC supports the development of multipurpose trails using abandoned railroad beds and other public rights-of-way.
6. TRORC encourages federal, state, and local acquisition of land and facilities well-suited for outdoor recreation, provided that adequate financial and management plans and arrangements are made with involved local governments.

### *Recommendations*

1. TRORC will assist communities with the establishment of Conservation Commissions and will support existing Conservation Commissions when possible.
2. TRORC will help towns develop highway policies that address recreation needs and should encourage the adoption of walkable communities programs within the Region.
3. TRORC will assist towns with establishing and managing town forests.
4. TRORC should work with the State, White River Partnership, the Vermont River Conservancy, and other groups on increased river access.
5. TRORC will continue to assist towns with their efforts to improve public access to outdoor recreational opportunities, while ensuring consistency with local and regional land use plans.

## Goal, Policy, and Recommendation: **Shared Services and Infrastructure**

### *Goal*

1. Shared services and infrastructure increase, and are provided efficiently and effectively.



## Goal, Policy, and Recommendation: **Shared Services and Infrastructure**

### *Policy*

1. TRORC encourages communities to seek opportunities for shared staffing, services, and infrastructure with other municipalities to reduce costs and improve quality of service.

### *Recommendation*

1. TRORC will assist communities with the development of inter-local agreements, union municipal districts, and other cooperative agreements whenever possible.

## Utilities, Facilities, and Services Endnotes

- 1 <https://legislature.vermont.gov/statutes/section/24/117/04302>
- 2 <https://law.justia.com/codes/vermont/2019/title-24/chapter-117/section-4430/>
- 3 <https://dec.vermont.gov/water/drinking-water/public-drinking-water-systems/source-water-protection>
- 4 <https://www.atsdr.cdc.gov/pfas/health-effects/index.html>
- 5 <https://dec.vermont.gov/sites/dec/files/documents/DEC-PFAS-Roadmap-December-2023-Final.pdf>
- 6 <https://dec.vermont.gov/water/drinking-water/pfas>
- 7 <https://anrgeodata.vermont.gov/datasets/waste-water-facilities/explore?location=44.165157%2C-72.360567%2C10.78>
- 8 [https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/SWIPGuidance\\_VermontMunicipalities\\_7.30.14.pdf](https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/SWIPGuidance_VermontMunicipalities_7.30.14.pdf)
- 9 <https://dec.vermont.gov/waste-management/solid/planning>
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- 25 <https://www.vermontlaw.edu/>
- 26 <https://cewd.vtc.edu/>
- 27 <https://osher.dartmouth.edu/>
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- 31 <https://education.vermont.gov/vermont-schools/school-governance/options>
- 32 <https://www.brightfutures.dcf.state.vt.us/>
- 33 <https://afterschoolalliance.org/documents/AA3PM-2020/VT-AA3PM-2020-Fact-Sheet.pdf>
- 34 <https://buildingbrightfutures.org/wp-content/uploads/2020/12/Final-Vermont-Early-Childhood-Needs-Assessment-2020.pdf>
- 35 <https://www.rbctc.org/high-school-programs>
- 36 <https://rtcc.orangesouthwest.org/programs/education-services>
- 37 <https://ccv.edu/academics/programs/education/>
- 38 <https://dcf.vermont.gov/benefits/ccfap>
- 39 <https://www.census.gov/library/stories/2020/08/parents-juggle-work-and-child-care-during-pandemic.html>
- 40 <https://letsgrowkids.org/>
- 41 <https://letsgrowkids.org/crisis>
- 42 <https://web.archive.org/web/20230206163833/https://letsgrowkids.org/newsroom/state-boost-for-child-care-falls-far-short-of-need>
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Utilities, Facilities, and Services Endnotes (continued)

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# 10 | Emergency Management



Route 125 Flooding | Source: TRORC

## A. Background

Disasters have happened and will happen again. However, the impact of expected but unpredictable natural and human-caused events in the Region can be reduced through proper emergency management—preparedness (getting ready), response, recovery, and mitigation (lessening the impacts next time). Education about hazards in an area and anticipation of them create a broad understanding of the relative risk we face and a rational foundation for emergency management. TRORC’s strengths are in planning and administration, and therefore it is appropriate that our main attention is focused on assisting towns

and the State in preparing to meet the challenges that disasters will bring. We can also best assist our towns post-disaster through mitigation efforts designed to lessen the future risks residents may face in a subsequent disaster, as well as through supporting local recovery operations that can take months or years and require substantial administrative capacity. For more information about our Region’s emergency resources, visit our [Emergency Management page](#)<sup>1</sup>.

**Preparedness** covers those actions that individuals, businesses, and communities take to prepare themselves for the effects of a disaster before it happens. Preparedness generally

focuses on emergency personnel acquiring suitable equipment, creating response plans, and conducting training and exercises. Preparedness is also a responsibility of residents, business, and government to prepare themselves for the effects of a disaster before it happens. The more prepared we all are, at all levels, for disasters, the less loss of life and damage to property there will be when a disaster occurs, and the quicker our communities will recover.

**Response** is the immediate effort during and after a disaster to save lives and property. Besides the neighborly acts of people assisting each other in times of disaster, most response activities are





carried out by our local response agencies, with state and federal resources called in during severe and extended disasters.

**Recovery** is the more long-term process of getting life back to normal, preferably in a manner that does not merely rebuild but creates more resilience than we had. Recovery from disasters includes many state and federal agencies, especially the Federal Emergency Management Agency (FEMA). Recovery efforts are helped by thorough and prompt documentation of losses, good media outreach communicating the assistance that is available, and interim provision of basic services. TRORC works on recovery efforts by assisting the State and FEMA with outreach, helping towns navigate federal reimbursement programs, and writing and managing grants to rebuild better.

Hazard **mitigation** means any sustained action that reduces or eliminates long-term risk to people and property from natural or human-caused hazards and their effects. Mitigation planning begins with an assessment of likely hazards and then targets activities to reduce the effects of these hazards. Given that the largest threat in Vermont is flood related, good mitigation measures include proper road and drainage construction as well as limiting development in flood-prone areas. Mitigation actions should be the cornerstone of emergency management. TRORC works with member towns to [develop their own freestanding Local Hazard Mitigation Plans](#)<sup>2</sup>. TRORC can also help towns undertake mitigation projects such as floodplain restoration projects and buyouts of damaged structures.

## B. Emergency Services

### Law Enforcement

The primary law enforcement for most of the Region is the Vermont State Police. State Police levels are generally sufficient to handle routine incidents, but nighttime coverage is very low. Since they are also often the only law enforcement that may respond to a crime, response times can be over thirty minutes during the day depending on location, and considerably longer in the middle of the night.



Source: Department of Environmental Protection

The other large law enforcement agencies in the Region are the Sheriff's departments that cover their respective county areas. The bulk of the Region is covered by the Windsor and Orange County Sheriffs, with Pittsfield served by Rutland County, and Hancock and Granville by Addison

County. Though Sheriff's departments have the full ability to enforce the law, they have minimal funding outside of town contracts. Many towns in the Region contract with their Sheriffs for police coverage, mainly for speed enforcement.

Several towns or villages in the Region have taken the additional step of creating a paid local police department, sometimes even sharing a department with a neighboring town. However, most towns have no police, but rather just town constables, who are appointed or elected, and who may or may not have any law enforcement training. For constables to assume full law enforcement powers, they are now required to be certified through the Police Academy.

### Fire Protection

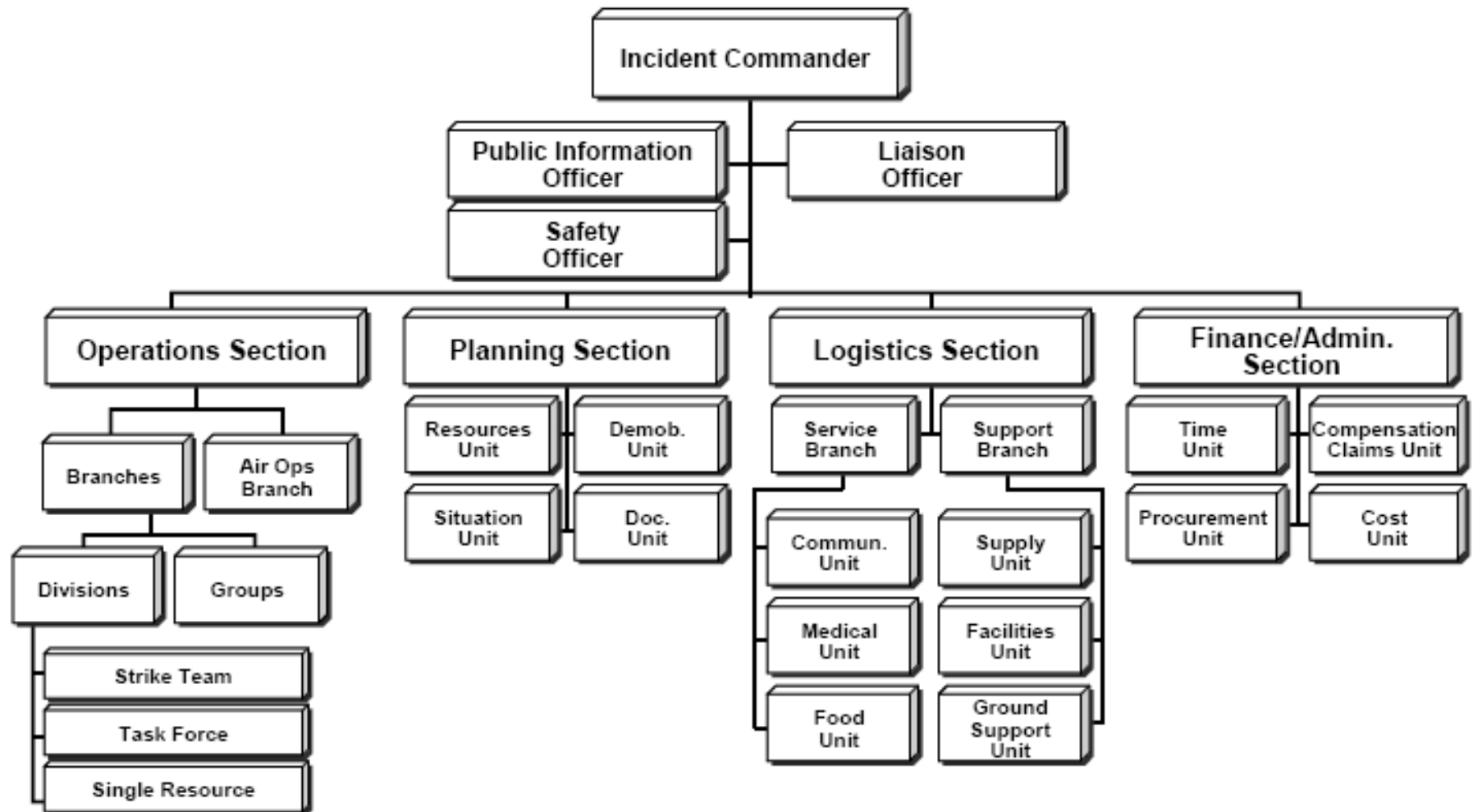
The Region is served by a network of local fire departments, some of which are actual town entities, while others are separate volunteer services largely funded by a town. There are no county departments. All towns have at least one local fire department, with the exception of Braintree, which contracts for this service from Randolph. Only one town, Hartford, has a full-time paid department. Although there are a variety of service arrangements, local governments have the responsibility to provide fire protection services.

### Ambulance and Rescue

Ambulance and FAST (first aid stabilization team) squad services provide emergency medical services (EMS) to the Region and are regulated by the Vermont Department of Health, which coordinates and licenses them. FAST squads stabilize patients



Figure 10-1: Incident Command System



Source: FEMA, Incident Command System Training Material (2008)





and are largely volunteer based, serving a single town. Ambulance services can treat and transport patients and have at least some paid staff serving one or several towns. Only three EMS services in the Region are full time: [Hartford Emergency Services](#)<sup>3</sup>, [Upper Valley Ambulance](#)<sup>4</sup>, and [White River Valley Ambulance](#)<sup>5</sup>. Both Upper Valley and White River are the contracted ambulance service for several towns each and are supported by town funding. Air ambulance service is provided to the Region through [Dartmouth-Hitchcock Advanced Response Team \(DHART\)](#)<sup>6</sup> and operate two helicopters. The eighteen EMS services in the Region are located in four of the state's [EMS districts](#)<sup>7</sup>. As with fire departments, lack of volunteers, particularly for daytime coverage, is a pressing problem for FAST squads. The high cost



*Bradford FAST Squad and Fire Dept. | Source: Kevin Geiger*

of equipment and the amount of time needed to meet licensing standards has been cited as another problem.

### Related Services

In addition to the usual three emergency disciplines above, town highway crews (though not typically categorized as first responders) are a critical part of the local response system, often needed so that responders can simply get to the emergency scene in times of winter weather, downed trees, or washed-out roads. Town staff rely on VTrans staff for assistance with road damage. Local response operations also rely on specialized teams, such as [Swift Water Rescue](#)<sup>8</sup>; [Urban Search and Rescue](#)<sup>9</sup>; [the Vermont Hazardous Materials Response Team](#)<sup>10</sup>; [K-9 teams](#)<sup>11</sup>, [the bomb squad](#)<sup>12</sup>, [tactical team](#)<sup>13</sup>, and [dive team](#)<sup>14</sup> of the [Vermont State Police](#)<sup>15</sup>; [ANR Spill Response](#)<sup>16</sup>; [Vermont National Guard Civil Support Team](#)<sup>17</sup>; [American Red Cross](#)<sup>18</sup>, as well as federal assets.

Emergency services rely on a communications system that includes dispatch centers, [911 Public Safety Answering Points \(PSAPS\)](#)<sup>19</sup>, 211, [RACES \(radio amateur civil emergency service\) ham radio operators](#)<sup>20</sup>, [VTAlert](#)<sup>21</sup>, and the [Emergency Alert System \(EAS\)](#)<sup>22</sup>. All of these communications systems require backup power and redundancy so they do not fail during disasters. Radio, cellular coverage, and even high-speed Internet remains lacking in some areas in the Region, creating dangerous coverage holes in the communications system. [FirstNet](#)<sup>23</sup> is a nationwide system being built to ensure cellular and data coverage for responders throughout the nation.



*State Emergency Operations Center (EOC) staff at work. | Source: Kevin Geiger*

### State and Local Emergency Management

Vermont's state emergency management duties are performed by [Vermont Emergency Management \(VEM\)](#)<sup>24</sup> within the Department of Public Safety. VEM is a small agency that largely supports state and local emergency planning and coordinates state resources during disasters. VEM houses the [State Emergency Operations Center](#)<sup>25</sup> and should be the primary place for towns to request assistance if they are being overwhelmed by any type of event. VEM coordinates the several state agencies (as well as federal resources) under the State Emergency Operations Plan, as well as serving as the primary point of public information in a widespread event.

All towns now have [Local Emergency Management Plans](#)<sup>26</sup> and have designated an Emergency



Management Coordinator or Director to help facilitate local planning and coordinate preparedness, response, and recovery activities. Selectboards are also increasingly realizing that they have an important role in managing many types of emergencies, and they are consequently attending training sessions in such subjects as Incident Command System (ICS) or taking part in emergency exercises. Additional people are needed in local emergency response staffing who do not already have operational roles to adequately cover the planning, logistics, and the financial elements of disasters.

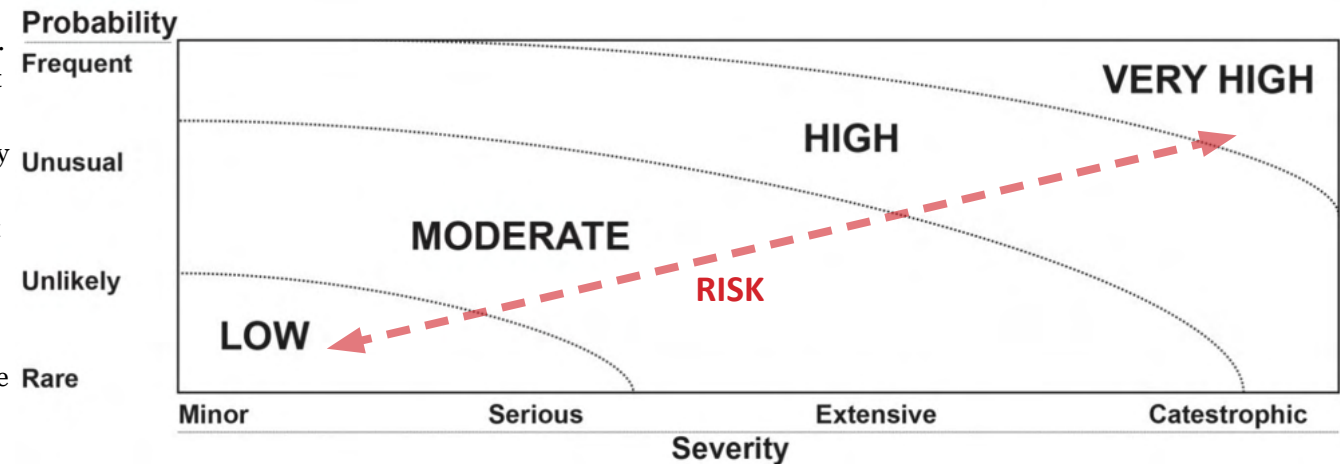
### Regional Emergency Management Committee (REMC)

[The Regional Emergency Management Committee \(REMC\)](#)<sup>27</sup> covers all the towns in the Region. REMCs are organizations whose responsibilities are established by state law to coordinate



*Severely Damaged Culvert, Stockbridge*  
| Source: Chris Sargent

**Figure 10-2: Level of Risk**



emergency planning and preparedness activities to improve the Region’s ability to prepare for, respond to, and recover from all disasters. The REMC meets quarterly and consists of voting and non-voting members. TRORC has assisted its REMC in providing a critical venue for cross-discipline dialogue, various trainings, and a chance for different agencies to meet before having to work together in an emergency.

### C. Hazards Assessment

To be most effective, planning for preparedness and mitigation efforts must be grounded in the rational evaluation of hazards to the area and the risks these hazards pose. This can be thought of as the anticipation phase and is usually done through a formal or informal [Threats Hazards Inventory and Risk Assessment \(THIRA\)](#)<sup>28</sup>, which in essence asks and answers three basic questions: What bad things can happen? How likely are they to occur? How bad could they be? A summary of the regional

THIRA, below, evaluates expected frequency and severity of hazards to help towns prioritize the types of emergencies for which they should prepare, since any community only has limited resources and cannot fully prepare for all types of events, no matter how remote. For this plan, hazard frequency was classed as follows:

**Rare:** May never have occurred; annual probability of 1/100 or less.

**Unlikely:** Has occurred; annual probability of 1/25–1/100.

**Unusual:** Has occurred in the area; annual probability of 1/10–1/25.

**Frequent:** Occurs often, although in varying degrees; annual probability of 1/2 or greater.

Each hazard was also assigned a level of severity. These are designated as follows:





**Minor:** Minor injuries or illness, less than 10% of properties damaged, minimal disruption of quality of life, within local ability to handle.

**Serious:** Limited major injuries or illnesses that do not permanently disable, 10–25% of properties damaged, shutdown of critical facilities for more than a week, mutual aid systems activated and state resources needed, possible federal resources needed.

**Extensive:** Multiple severe injuries or illnesses, few fatalities, 25–50% of properties damaged, critical facilities shut down for more than 14 days, state resources activated, federal resources needed.

**Catastrophic:** Multiple fatalities, widespread injuries, greater than 50% of properties damaged, critical facilities shut down for more than 30 days, state and federal resources needed.

The result of the combination of hazard frequency and severity creates a level of risk for each type of hazard. In determining what level of risk to assign, the likelihood of an event is rated slightly stronger than its severity. Consequently, a frequent but minor event is a high risk, while a rare yet catastrophic event is rated only a moderate to high risk. This is because these frequent events are more well known, can be anticipated with greater accuracy, and can be mitigated with fewer resources. Luckily, we live in a state that has no very high risks.

### Discussion by Hazard Type

Fifteen types of hazard were reviewed and ranked by risk to the Region. This information is

summarized below. Locally specific versions of this process are done when [Local Hazard Mitigation Plans](#)<sup>29</sup> are developed.

The greatest risk to the Region and the State is from flooding. Flooding has hit the Region in the past and will again in the future. [FEMA flood maps](#)<sup>30</sup> are a good indicator of flood risk, but severe damage also occurs along upland streams outside of mapped flood hazard areas, as well as along road drainage systems that fail to properly remove the amount of water they are receiving. In addition, FEMA maps are focused on inundation and do not take into account lateral movements (fluvial erosions) of rivers and streams, which have undermined homes and businesses.

The second greatest risk to the Region is from structural fire. Less frequent than individual structure fires are major downtown fires that can destroy entire blocks of town centers as have occurred in South Royalton, Bradford, and Randolph.

“Technological hazards” and winter storms are moderate to high risks in the Region. Technological hazards are those unintentional hazards created by man-made substances, facilities, or actions that threaten people or property. This includes train derailments, hazardous materials spills or leaks, explosions, dam failure, and structure collapse. Among these, hazardous materials incidents, primarily involving petroleum products, are the most common. The most memorable, and luckily not injurious, of these events was [a rail car propane explosion in Fairlee in the 1970s](#)<sup>31</sup>.

Winter storms (snow or ice) are a regular



*Vermont Standard Building Damaged by Structural Fire in Woodstock | © Eric Francis*

occurrence in Vermont. However, severe winter storms can cause serious damage, including collapse of buildings due to overloading of roofs, brutal wind chills, and power outages due to downed trees and on power lines. The January 1998 snowstorm was the most recent widespread severe winter storm, but severe events will occur, and ice storms appear to be increasing. The October 2005 early snow event downed trees and



power lines in higher elevations in the Region, ice storms hit southeast Vermont in 2008 and northwest Vermont in 2013, and a heavy wet snow in December 2014 caused many outages (see the 2023 updated [list of past snow storms & ice storms in Vermont](#)<sup>32</sup>) Other hazards that are moderate risks to the Region include [high winds](#)<sup>33</sup>, [hail](#)<sup>34</sup>, [extreme heat](#)<sup>35</sup>, and [invasive species](#)<sup>36</sup>. Lower moderate risks include [terrorism and civil hazards](#)<sup>37</sup>, [contagious human disease](#)<sup>38</sup> (excluding the 2019 pandemic), and climate change. Thankfully, terrorism and civil hazards are unlikely occurrences in Vermont. Earthquakes, landslides, extreme temperatures, solar storms, cyberattacks, droughts, wildfire, and shortages/outages are lower risks due to estimated rarity or lack of expected severity, but still warrant [State emergency planning](#)<sup>39</sup>.

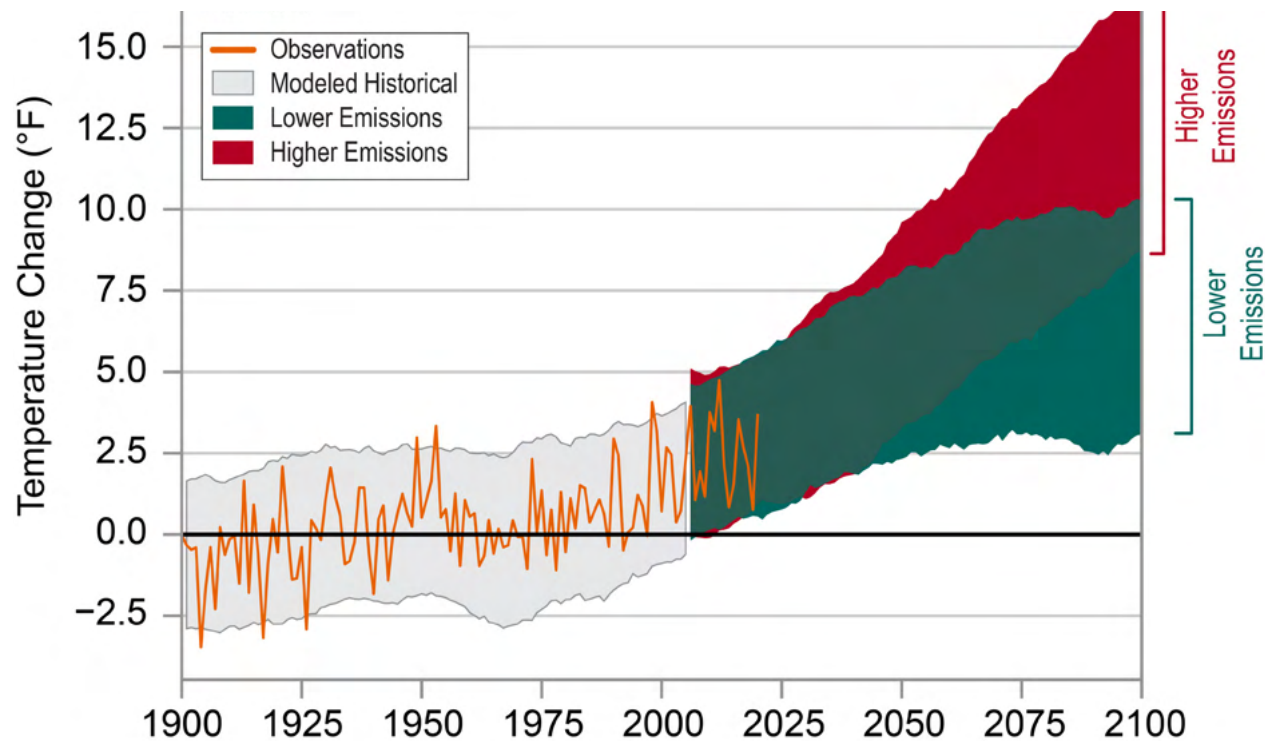
Contagious diseases, especially pandemic influenza due to a novel flu strain, will continue to threaten the state at various severities. Since the flu is a virus, there are antiviral drugs that can lessen its effects, but antibiotics have no effect, and it is the body’s immune system that is the main agent against the virus. Vaccines tailored to a specific viral strain are effective but must be created several months in advance.

COVID-19—an infectious disease caused by the novel Coronavirus identified in Wuhan, China in December 2019—was first found in Vermont in March 2020. As of November 2023, Vermont reported [152,477 confirmed cases and 910 deaths](#)<sup>40</sup> due to COVID-19, with the majority being Vermonters 80 years and older. Vermont’s peak monthly deaths occurred in December of 2020 and

January of 2022, with 72 deaths occurring due to COVID-19 in each of those months.

Climate change is not a traditional disaster type, as it is more of a catastrophic cause of disasters—a [meta-disaster](#)<sup>41</sup>. It is affecting us now, but its worst effects will occur over decades, and the severity of its effects are difficult to fully anticipate, as it has not happened to us before. However, the predicted changes range from severe if greenhouse gases are quickly lowered to catastrophic if emissions continue unabated.

Figure 10-3: Observed and Projected Temperature Change in Vermont



Source: NOAA National Centers for Environmental Information (2021)





## Goal, Policies, and Recommendations: **Emergency Management**

### *Goal*

1. There is minimal loss of life, physical and emotional injury, financial loss, and property damage resulting from all hazards.

### *Policies*

1. Response plans and capacities must reflect an all-hazards approach and be coordinated between towns, the State, and federal agencies.
2. Mitigation must be part of all recovery efforts in order to increase resilience.
3. New or rebuilt development shall not increase disaster risk and must take reasonable steps to reduce risk.
4. Mitigation actions shall:
  - a. Seek to avoid impacts of a hazard first, then reduce impacts that cannot be reasonably avoided;
  - b. Recognize the connections between land use, development siting, drainage systems, building standards, and road design and maintenance and the effects of disasters on the Region;
  - c. Be mindful of the natural and human resources of the area;
  - d. Be part of a larger systematic effort at disaster reduction; and
  - e. Seek to permanently avoid damages.
5. Additional telecommunications towers must be built to increase radio and cellular coverage for emergency responders, including FirstNet.
6. Critical facilities, including emergency service buildings, substations, medical facilities, town offices, and town and state garages, must be constructed to be disaster resistant and able to withstand expected 100-year storm events with minimal impacts.

### *Recommendations*

1. Agencies or organizations expected to respond in a unified manner should train and exercise together.
2. State and federal governments must continue funding and operation of warning systems, including the National Weather Service's Emergency Alert System, NOAA weather radio, and USGS river and precipitation gauges.
3. Towns should pursue the use of capital programs and reserve accounts to properly budget for emergency vehicles and other large capital costs, as well as coordinate and share services to achieve overall efficiencies.
4. TRORC will continue to work with all communities to annually update Local Emergency Management Plans, ensuring that these plans take into account the varied needs of people with disabilities, pets, and those without access to transportation.
5. TRORC will continue to work with all communities on hazard mitigation efforts, including updating mitigation plans, enhancing road and bridge standards for resiliency, and addressing flood resilience in Town Plans.



### Recommendations (continued)

6. TRORC will continue to work with all communities on hazard mitigation efforts, including updating mitigation plans, enhancing road and bridge standards for resiliency, and addressing flood resilience in Town Plans.
7. TRORC will continue to work cooperatively with local emergency response organizations, VEM, the TRORC REMC, social service agencies, long-term recovery organizations, community resilience organizations, and others to help improve emergency planning, response, and recovery.
8. TRORC should assist towns and VT ANR in refining river corridor maps.
9. Communities should work to ensure that important local facilities that provide emergency services, water, food, and gas or that act as emergency shelters are able to function during power outages.
10. TRORC will work with towns and other organizations to coordinate land use, transportation, and energy policies and actions to result in more resilient communities.
11. TRORC will assist towns in response and recovery stages through damage documentation assistance and navigating federal and state grants.
12. TRORC will continue to do outreach on preparedness by individuals and continuity planning for businesses so they are better prepared for expected incidents.
13. Towns should develop recruiting and training programs for increasing emergency responder retention and sharing services.

### Emergency Management Endnotes

- 1 <https://www.trorc.org/programs/emergency/>
- 2 <https://www.trorc.org/programs/emergency/plans/>
- 3 <https://www.hartford-vt.org/2440/Fire-Department>
- 4 <https://www.uppervalleyambulance.com/site/>
- 5 <https://whiterivervalleyambulance.org/contact/>
- 6 <https://www.dartmouth-hitchcock.org/dhart>
- 7 <https://www.healthvermont.gov/emergency-medical-services/ems-agency-and-district-contact-information>
- 8 <https://firesafety.vermont.gov/emergency/usar/about>
- 9 <https://firesafety.vermont.gov/emergency/usar>
- 10 <https://firesafety.vermont.gov/emergency/hazmat>
- 11 <https://vsp.vermont.gov/specialteams/canine>
- 12 <https://vsp.vermont.gov/specialteams/bombsquad>
- 13 <https://vsp.vermont.gov/specialteams/tactical>
- 14 <https://vsp.vermont.gov/specialteams/underwaterrecovery>
- 15 <https://vsp.vermont.gov/specialteams/underwaterrecovery>
- 16 <https://dec.vermont.gov/waste-management/spill-management/spill-cleanup-resources>
- 17 <https://vt.public.ng.mil/>
- 18 <https://www.redcross.org/local/me-nh-vt.html>
- 19 <https://dps.vermont.gov/document/vsp-psap-agency-list>



## Emergency Management Endnotes (continued)

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- 20 <https://vem.vermont.gov/programs/races>
- 21 <https://vem.vermont.gov/vtalert>
- 22 <https://vem.vermont.gov/eas>
- 23 <https://www.firstnet.com/>
- 24 <https://vem.vermont.gov/>
- 25 <https://vem.vermont.gov/programs/races/communications-center>
- 26 <https://vem.vermont.gov/plans/lemp>
- 27 <https://vem.vermont.gov/programs/regional-emergency-management-committees>
- 28 <https://www.fema.gov/sites/default/files/2020-04/CPG201Final20180525.pdf>
- 29 <https://www.trorc.org/programs/emergency/specific-hazards/>
- 30 <https://dec.vermont.gov/watershed/rivers/river-corridor-and-floodplain-protection/river-corridors>
- 31 <https://timesmachine.nytimes.com/timesmachine/1975/11/10/96990121.html?pageNumber=53>
- 32 <https://vem.vermont.gov/document/draft-2023-shmp-section-4-5-ice-storm>
- 33 <https://vem.vermont.gov/sites/demhs/files/documents/2018SHMP-HazardAssessmentWind.pdf>
- 34 <https://vem.vermont.gov/sites/demhs/files/documents/2018SHMP-HazardAssessmentHail.pdf>
- 35 <https://vem.vermont.gov/sites/demhs/files/documents/2018SHMP-HazardAssessmentExtremeHeat.pdf>
- 36 <https://vem.vermont.gov/sites/demhs/files/documents/2018SHMP-HazardAssessmentInvasiveSpecies.pdf>
- 37 <https://vem.vermont.gov/sites/demhs/files/SEMP/SEMP%20Base%20Plan.pdf>
- 38 <https://vem.vermont.gov/document/draft-2023-shmp-section-4-7-infectious-disease>
- 39 <https://vem.vermont.gov/sites/demhs/files/SEMP/SEMP%20Base%20Plan.pdf>
- 40 <https://usafacts.org/visualizations/coronavirus-covid-19-spread-map/state/vermont/>
- 41 <https://www.mdpi.com/2071-1050/14/13/8185#:~:text=the%20term%20%E2%80%98metadisaster,way%20of%20life.>







# 11 | Energy

*Solar Panels in Woodstock | © TRORC*

## A. Introduction

The primary purpose of this chapter is to identify a path to implement the state’s goals as outlined in the [2022 Comprehensive Energy Plan](#)<sup>1</sup> (CEP) and the greenhouse gas reduction required by the Global Warming Solutions Act (GWSA) at the regional level.

As the CEP goals, federal and state policies, and energy technologies change, this chapter will need to be updated. Regional energy planning has benefited from technical support from the Vermont Department of Public Service (PSD), the Vermont Energy Investment Corporation (VEIC), the Energy

Action Network (EAN), Green Mountain Power (GMP), Washington Electric Cooperative (WEC), and other organizations.

## B. Background

Vermont’s energy planning began in response to the oil crisis of the 1970s. The first comprehensive state energy plan was created in 1991 and required periodic updates. The most recent update was completed in 2022. Vermont’s energy policy, as codified in [30 VSA § 202a](#)<sup>2</sup>, establishes these state goals:

- “To assure, to the greatest extent practicable,

that Vermont can meet its energy service needs in a manner that is adequate, reliable, secure, and sustainable; that assures affordability and encourages the state’s economic vitality, the efficient use of energy resources, and cost-effective demand side management; and that is environmentally sound.

- “To identify and evaluate, on an ongoing basis, resources that will meet Vermont’s energy service needs in accordance with the principles of reducing greenhouse gas emissions and least-cost integrated planning, including efficiency, conservation, and load management alternatives; wise use of renewable resources;





and environmentally sound energy supply. “To meet Vermont’s energy service needs in a manner that will achieve the greenhouse gas emissions reductions requirements pursuant to 10 V.S.A § 578 and is consistent with the Vermont Climate Action Plan adopted and updated pursuant to 10 V.S.A. § 592.”

The 2022 Comprehensive Energy Plan (CEP) established the following set of goals:

- In the transportation sector, meet 10% of energy needs from renewable energy by 2025 and 45% by 2040.
  - » Zero-emissions vehicles account for 100% of light-duty vehicle sales by 2035.
- In the thermal and industrial process sector, meet 30% of energy needs from renewable energy by 2025 and 70% by 2042.
- In the electric sector, meet 100% of energy needs from carbon-free resources by 2032, with at least 75% from renewable energy.
- Weatherize 120,000 households by 2030, relative to a 2008 baseline.

Vermont statutes related to energy—requiring greenhouse gas reductions, renewable energy generation and building efficiency—are outlined below.

Greenhouse gas reduction goals ([10 VSA § 578](#)<sup>3</sup>)

- “Greenhouse gas reduction requirements. Vermont shall reduce emissions of greenhouse gases from within the geographical boundaries of the State and those emissions outside the boundaries of the State that are caused by the

use of energy in Vermont, as measured and inventoried pursuant to section 582 of this title, by:

- » “not less than 26 percent from 2005 greenhouse gas emissions by January 1, 2025 pursuant to the State’s membership in the United States Climate Alliance and commitment to implement policies to achieve the objectives of the 2016 Paris Agreement;
- » “not less than 40 percent from 1990 greenhouse gas emissions by January 1, 2030 pursuant to the State’s 2016 Comprehensive Energy Plan; and
- » “not less than 80 percent from 1990 greenhouse gas emissions by January 1, 2050 pursuant to the State’s 2016 Comprehensive Energy Plan.”

25 by 25 state goal ([10 VSA § 580](#)<sup>4</sup>)

- “It is a goal of the State, by the year 2025, to produce 25 percent of the energy consumed within the State through the use of renewable energy sources, particularly from Vermont’s farms and forests.”

Building efficiency goals ([10 VSA § 581](#)<sup>5</sup>)

- “To improve substantially the energy fitness of at least 120,000 housing units and reduce greenhouse gas emissions by 0.15 MMTCO<sub>2</sub>e by 2031.
- “To reduce annual fuel needs and fuel bills by an average of 25 percent in the housing units served.

- “To reduce total fossil fuel consumption across all buildings by an additional one-half percent each year, leading to a total reduction of six percent annually by 2017 and 10 percent annually by 2025.
- “To save Vermont families and businesses a total of \$1.5 billion on their fuel bills over the lifetimes of the improvements and measures installed between 2008 and 2017.
- “To increase weatherization services to low-income Vermonters by expanding the number of units weatherized or the scope of services provided, or both, as revenue becomes available in the Home Weatherization Assistance Fund.”
- Renewable energy goals ([30 VSA § 8005](#)<sup>6</sup>)
- [The Global Warming Solutions Act](#)<sup>7</sup> (Act 153 of 2020) mandated the creation of a [Vermont Climate Action Plan \(CAP\)](#)<sup>8</sup>, which was released in 2021.

Weatherization is improving the building thermal envelope to increase energy efficiency of homes, reduce energy costs for residents, and improve health and safety. This includes a range of efficiency improvements from a 25% reduction in energy consumption to a more comprehensive standard.

- Energy Action Network



## C. Energy Defined

Energy, as used in the 2022 CEP and this Plan, is not the same as electricity. Energy includes all forms of energy used by people for transportation, thermal (heating), and electricity. Energy can be expressed in British Thermal Units (BTUs). Charts in this Plan will be shown in BTUs, including million BTUs (MMBTUs).

## D. Key Energy Issues

### Environmental Protection

The consequences of our current pattern of energy use are increasingly alarming and urgent. National and international experts agree that if humanity does not immediately and dramatically reduce the use of fossil fuels, the negative consequences of climate change will alter human civilization.

According to the Vermont Department of Health's [Vermont Climate and Health Profile Report](#)<sup>9</sup> (September 2016), without a sharp reduction in greenhouse gas emissions, Vermont's climate will change substantially. By the end of the century, these changes may include:

- An increase in average annual temperatures of between 4 degrees F and 7 degrees F
- Increased dangerously hot days from 5 to more than 30 per year
- Lengthened tick and mosquito activity by about 40 days
- More frequent heavy rainfall events

### Energy Security

The TRO Region's current dependence on fossil fuels is significant. The primary use of these fuels is for space heating (thermal) and transportation. In the TRO Region, roughly 13,000 households rely on oil as their primary source for heating, which means a substantial portion of the Region is subject to oil price and availability fluctuations.

Where the Region's electricity is generated is also a concern. Vermont currently obtains much of its electricity from hydroelectric facilities located out of state, primarily in Quebec. While these sources of electricity currently provide the Region with low-cost, renewable generation, the prospective construction of high-capacity transmission lines from Quebec to southern New England may create increased competition for electricity between Vermont and other New England states that are also seeking electricity from renewable sources. Reducing or maintaining current levels of the Region's reliance on imported energy will make the State and Region more energy self-reliant, especially in a future where electricity demand is anticipated to increase as the use of fossil fuels decreases.

Electricity provides the most viable path toward meeting the State's energy goals in several key areas. Electrification of passenger vehicles will dramatically reduce energy use and emissions in the transportation sector through use of more efficient vehicles. Similarly, the easiest transformation in space heating of existing residential buildings is to weatherize the structure and install highly efficient electric cold climate heat pumps.

### Energy Justice

Equity is of critical importance in developing any public policy related to energy. Everyone in our society depends on energy for their daily life and livelihood, but the costs—both financial and environmental—of providing this energy are not distributed equitably. Historically, people of color and poor people have suffered disproportionately from adverse health impacts caused by energy production and from the effects of climate change. The concept of [energy justice](#)<sup>10</sup> holds that these marginalized populations should be among the first to benefit from the transition to clean energy.

In Vermont, and in the TRO Region, a just transition to clean energy will ensure that poor and other marginalized people have equitable access to home weatherization and green technologies such as solar power, electric vehicles, and heat pumps. Such technologies often have high up-front installation costs, but come with lower operations and maintenance costs. For instance, installing a high efficiency heat pump can cost upwards of \$20,000, but a household can save approximately \$500 annually on heating bills. TRORC has an important role to play in bridging the gap between local communities and the federal, state, and utility incentives that can help reduce installation costs and allow marginalized people to reap the full benefits of green technology.

Undergirding this conversation about energy justice is the importance of keeping the cost of electricity affordable for all, even as demand soars due to the electrification of the thermal and transportation sectors. However, it is also



important to note that electrification will reduce the exposure of the Region’s households and businesses to the volatile cost of fossil fuels. Any increase in the retail cost of electricity is subject to an intensive state regulatory process, while the cost of fossil fuels such as gasoline, home heating oil, and propane follow the fluctuations of the global market on a daily basis.

### Economic Needs and Opportunities

Vermont spends nearly \$2.4 billion and the TRO Region spends approximately \$160 million annually on energy, with the vast majority of those dollars exported out of state when we buy gas and oil. This Plan, like Vermont’s 2022 CEP, states that overall energy consumption will need to decline by about one-half by 2050 to meet our energy goals. That reduction can be accomplished through changes in land use patterns and the transportation system (by reducing the need for driving and by introducing more energy-efficient vehicle technologies); through extensive building upgrades and weatherization; and with energy conservation by means of more efficient appliances and devices, avoiding peak use, and by electricity storage technologies.

These improvements will also keep more of the money we spend on energy in the Region so that millions of dollars will be retained to circulate in local economies, supporting employment and social services, and improving the quality of life of our communities. The changes needed to reduce our energy demand and to produce local renewable energy offer a wide array of business and employment opportunities in renewable energy,

energy storage, energy efficiency, and advanced transportation and heating.

### E. Regional Energy Supply, Demand, and End Use

Energy use in Vermont is dominated by the transportation (38%) and residential (28.0%) sectors. According to Vermont Pathways Model modeling (energy modeling done by the State), in order to meet CAP mitigation goals, the TRO Region will have to reduce energy consumption nearly 50 percent — from 8,800,000 MMBTUs to 5,586,000 MMBTUs by 2050—and shift away from fossil fuels.

The State’s goal of meeting 90 percent of energy needs from renewable sources by 2050 represents a substantial shift from our current energy portfolio. While 65 percent of Vermont’s grid electricity came from renewable sources and 21 percent from nuclear (which is carbon-free) in 2022, electricity is just one source of energy consumption. Most energy used in the Region today still comes from fossil fuels burned for transportation and heat. The Region does get some thermal energy from wood as well. To reach the State’s energy targets, transportation and heating will largely shift to electric. In turn, that electricity will require more renewable generation to be developed, and we believe most of this will be from solar.

The growth of renewable energy generation in Vermont and the Region over the last several years has been substantial. According to PSD data, Vermont has an installed capacity of 511 MW of solar power—57 MW in the TRO Region.

The proliferation of commercial wind energy generation in Vermont has been decidedly slower, primarily due to the costs of development and the complicated permitting requirements. Vermont has an installed capacity of roughly 151 MW of wind power. Our Region has not added any commercial wind power. Vermont has 575 MW of hydro power, largely developed in the early to mid-1900’s. Hydro development has dropped off significantly since the early 1970s, due to a number of factors including stricter permitting requirements and the simple fact that many of the best sites were already developed. The TRORC Region has almost 40 MW of hydro, with the largest being the plant on the Connecticut River in Hartford.

### F. Electricity Conservation and Renewable Generation

PSD-provided Low Emissions Analysis Platform (LEAP) data modeling shows that a nearly 50 percent decrease in overall energy use in the TRO Region is required to meet the CEP’s goals for 2050, as well as the GWSA. At the same time, we must decarbonize the thermal and transportation sectors—mainly by converting to new electric technologies, such as cold climate heat pumps and electric vehicles. This means that electricity consumption is expected to increase significantly, even as our overall energy use declines. This fundamental change in the type of energy we use will require substantial changes at the utility scale.

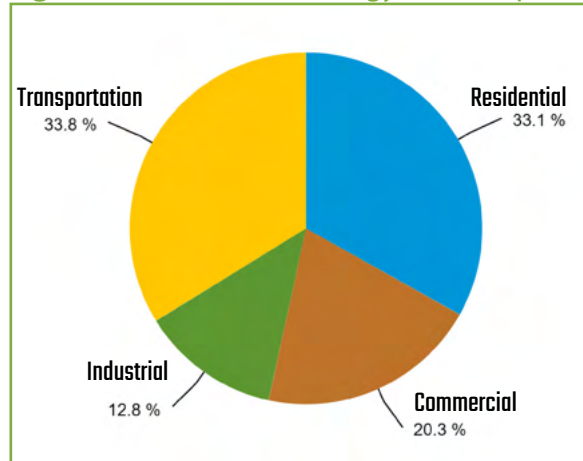
Demand management is the lowest-cost option to help meet expected electricity demand. Installing energy efficient equipment and improving building



shells to reduce the need for space heating is essential to reducing our overall energy use. Proper load management can reduce demand during peak hours. Demand response techniques include time-of-use rates, smart rates, and energy use feedback. For example, water heaters can be timed to use power in the middle of the day when electric loads are less. Utilities can install advanced meter infrastructure (AMI), which increases system reliability and load management capabilities with two-way communications technology. AMI includes smart meters to enable utilities and customers to track and manage the flow of energy more efficiently, curb peak demand, lower energy bills, and integrate renewable energy sources and storage to the grid. AMI data and smart meter technology allow utilities to implement smart rates, which can vary the price of electricity to accurately reflect the cost of electricity: lower rates for low demand and higher rates during peak demand. This incentivizes lower electric use during peak times. But even with fully implemented demand-side management, fuel-switching to electricity will require new sources of renewable energy.

Our existing electric grid is not yet fully capable of allowing the placement of large renewable energy generation facilities in every community in our Region. Currently in the GMP region, for example, parts of Hartford and Hartland have poor circuit ratings, while the Washington Electric territory has no remaining capacity. In addition, energy supply (generation) and loads (end uses) must be kept in balance, even as customers change their end uses or renewable energy facilities respond to changes in generation. As the Region transitions to 90

**Figure 11-1: Vermont Energy Consumption**



Source: U.S. Energy Information Agency, 2022

percent renewable energy by 2050 (with much of it produced in state), power companies and VELCO will need to undertake upgrades in places to expand grid capacity as well as manage load stability. This will include line upgrades, additional circuit connections, and, once the technology becomes readily available, greater provision of demand-side management (altering the timing of power use in places) and storage technologies. Electrical storage can closely align customer loads with periods of lower electric demand, store solar electricity to use during peaks, or provide some backup during power outages. EVs will eventually offer both a storage and generation capacity (pulling from their batteries). Paying for these additions to the grid will be costly, but needed to meet the transition to renewables.

Most electric utilities in the U.S. are required to meet state-mandated renewable energy requirements called [Renewable Portfolio](#)

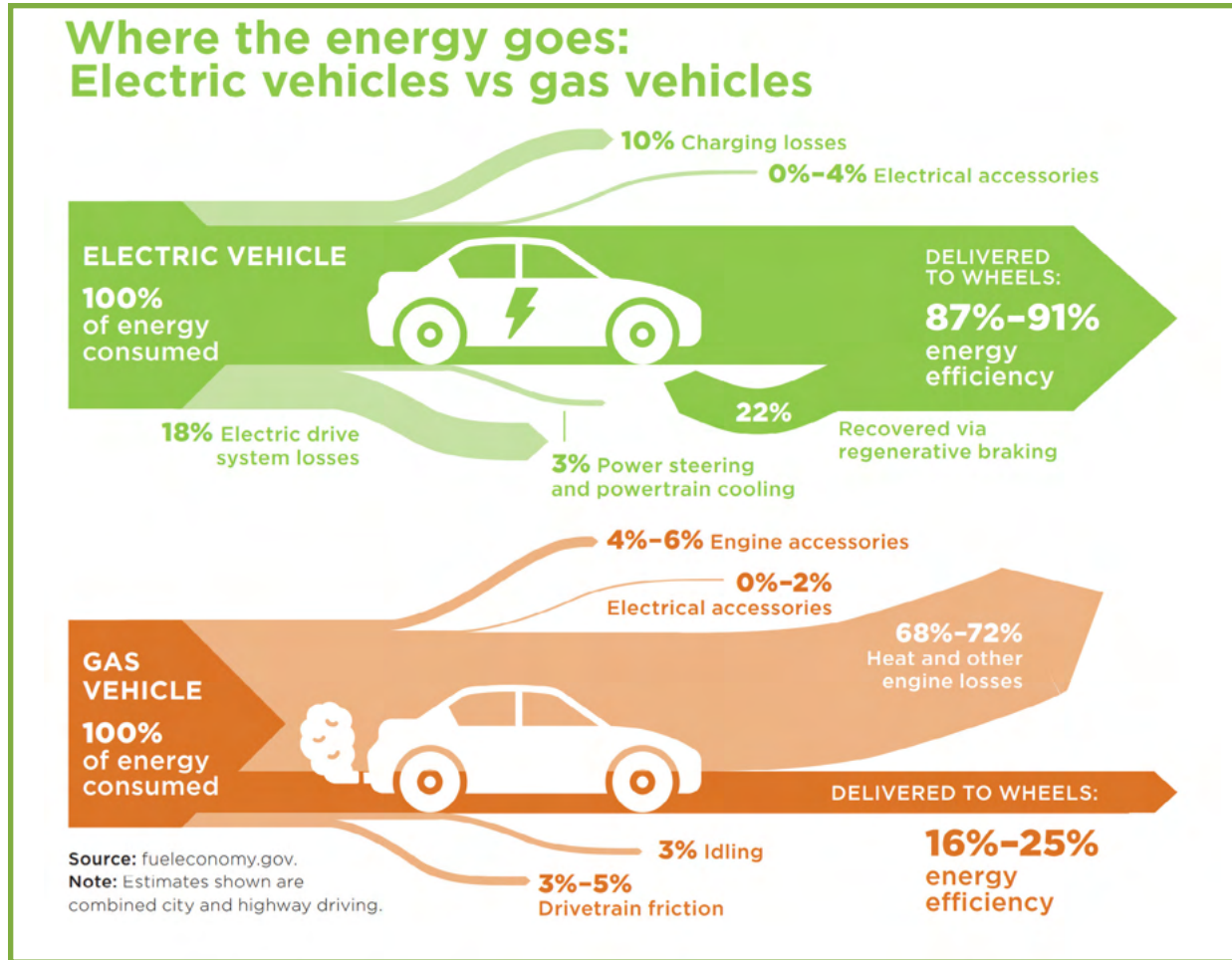
[Standards](#)<sup>11</sup>. Vermont’s Renewable Portfolio Standard policy is called the [Renewable Energy Standard, or RES](#)<sup>12</sup>, under which all utilities must be 100% Renewable by 2035. Because utilities constantly import and export power in order to meet demand, keeping track of how much renewable energy each utility uses is not easy to do. A clear system of accounting is needed to ensure that renewables are not being claimed by multiple utilities. That system of accounting is called [Renewable Energy Certificates, or RECs](#)<sup>13</sup>. RECs are created for every unit of renewable energy fed into the grid. Once created, RECs can then be purchased and traded among utilities; this way, utilities can accrue enough RECs to demonstrate compliance with their respective states’ Renewable Portfolio Standards, even if they did not actually purchase the renewable power those RECs are associated with. RECs are not a perfect system, but they help regulators track renewable generation while accounting for the way electricity wholesale markets function—across multiple state jurisdictions and highly dependent on what type of power is available for import when it’s needed.

In Vermont, many energy developers utilize the sale of RECs to help fund the construction of a project. The challenge is that RECs are often sold to utilities outside of Vermont. The energy generated by a renewable energy generation facility that has sold its RECs out of state does not count toward the state’s energy goals. But it does count toward local and regional targets. Changes in legislation have made it possible to ‘retire’ RECs in state, thus allowing us to further increase our renewable energy portfolio. Efforts to increase that cap or encourage





Figure 11-2: Going Electric Saves Money



Source: Energy Action Network

their retirement in state should continue in order to ensure that the goals of the CEP are reached.

### G. Transportation and Land Use

This section addresses the intersection of transportation, energy, and land use. The [Land Use](#)<sup>14</sup> and [Transportation](#)<sup>15</sup> chapters in this

Regional Plan complement this section and have additional relevant policies and actions.

Vermont uses more energy for transportation than for any other sector: 38 percent of the total energy consumed in Vermont. To reach the GWSA targets for transportation greenhouse gas emissions (40% below 1990 levels by 2040 and 80% below 1990

levels by 2050) goals, Vermonters will need to switch from petroleum powered vehicles to electric vehicles at a large scale. It is also important to recognize that land use choices are inextricably linked to our transportation system. Vermonters travel far from their homes to jobs, services, and shopping.

Vermont's land use patterns are key reasons why transportation uses the largest portion of our energy. Where we work, go to school, shop, utilize services, and recreate is often not close to where we live.

Much of Vermont's appeal to homeowners is the ability to own a house in the country. While many communities have small villages or downtowns, residential development in our towns is mostly located outside of these areas on rural roads. The choice to live in a rural setting leads to longer commutes for work, shopping, and services.

This dispersed pattern of development is currently furthered by the way we regulate development locally. All communities allow residential development across much of their towns at low densities. In effect, this does not direct most growth to core areas, but spreads it throughout town. If this pattern of development persists, these communities will need to improve roads in rural areas to serve new development, resulting in higher costs to taxpayers for road maintenance and increasing vehicle miles traveled (VMT). Even with the electrification of vehicles, this will entail greater energy usage than needed if we have more compact settlement that enables walking, biking and greater use of public transit.

Another challenge for Vermont's transportation patterns is the lack of available public transit.



The Regional Transit Network map illustrates that access to public transit is currently difficult or nonexistent in many parts of our Region. Public transit provides less than 1 percent of the transportation in our Region. The rural character of the Region presents challenges for a traditional public transportation system. Long distances between homes and employment centers strain existing commuter bus routes, while the need for transportation in low population density areas presents a uniquely rural challenge to the system. However, transit systems could still replace many single-occupant vehicle (SOV) trips at a significant cost savings to drivers. The main impediment to greater transit is not that it costs more than cars; it is simply that we like to own cars.

The Region does have several public transportation services which are vital to our Region's population, and elderly and disabled transportation services give alternatives to people who wish to live independently but who are unable to drive themselves (a sector of the population that is rapidly growing).

In areas where local transit services are available, other challenges exist. Commuter bus routes that stop at regular intervals along their routes extend the length of the trip, making it quicker for someone with a car to drive themselves instead. The impact of regular stops can also make it challenging to time arrivals and departures in an economic center with hours of employment.

Developments that occur in areas that are either right on or nearby a public transit route are sometimes planned without considering public

transit. If not considered during the planning stage, it is difficult to integrate public transit services into completed site plans. In addition, the location of residential subdivisions away from transit lines limits public access. Diverting an existing route to a new location is expensive and can have negative impacts on existing services.

Regular fixed route transit services, such as those in Hartford and Norwich, could increase ridership by adding additional buses and increasing the frequency of service. But to do so requires additional buses and drivers, both of which require significant funding. Funding also limits the hours of operation. Fixed route transit services in our Region are currently limited to early morning through evening, which means potential riders who work shifts outside of the traditional 9-5 model cannot take advantage of most public transit.

Finally, there are perceptions that public transit is a service geared toward low-income citizens. While it is true that these demographic groups benefit from public transit, public transportation services are available and useful to everyone.

A significant portion of commuters drive alone to get to work. This could be lessened with more carpooling, but Vermont's commuter lots are currently insufficient. While the State has increased the number of park and ride spaces significantly in recent years, expansion and facility upgrades are still needed. For example, many existing park and ride areas are not designed or sized to accommodate public transit services (allowing for bus circulation and efficient transfer of passengers). Furthermore, a new lot is needed at Exit #1 on

I-89, and no state park and rides in the region provide EV charging above level 1 (equivalent to a 110-volt wall outlet). This is due to restrictions on for-profit vendors at facilities that have received federal funds. TRORC encourages VTRANS to work with its federal partners on reforms that will allow for EV chargers throughout the state park and ride system.

The lack of EV charging station infrastructure is an impediment to reaching the State's ambitious EV goals. While numerous models of EVs now have ranges of 250 miles or more, 'range anxiety' remains a major factor in the decision to purchase an EV. To support the State's EV adoption goals, EV charging stations will need to become ubiquitous. While, according to the [Alternative Fuels Data Center](#)<sup>16</sup>, 50 publicly-accessible level 2 (240-volt) charging ports and 16 level 3 DC fast charging (or DCFC) ports are now available throughout the TRO Region, we have still not achieved this ubiquitous status where it will be as easy to charge as it is to buy gasoline.

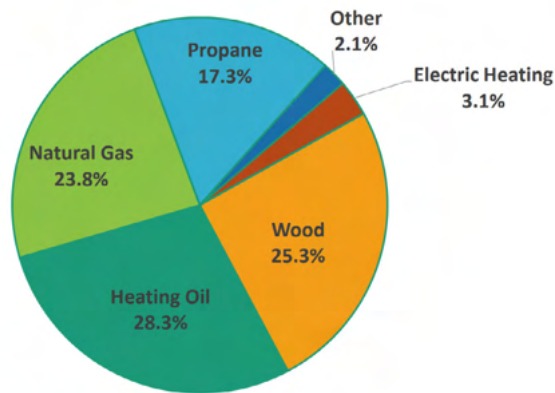
### Transportation and Land Use Strategies

To achieve the CEP's goals, transportation energy use must be reduced by embracing smart growth that directs development into existing centers, providing cost savings for households and municipalities while creating vibrant communities and taking pressure off our natural resources.

Development that is more effectively directed within and adjacent to historic downtowns, villages, and neighborhoods will reduce the need for motorized transportation and make better use



Figure 11-3: Thermal Sources Energy 2021



Source: 2024 Vermont Annual Energy Report

of transit. In 2006, via Act 183, Vermont codified its own detailed guiding principles for local and regional land use decisions based upon smart growth principles. Although communities are not required to plan, those that do are encouraged to uphold planning and development goals that reinforce smart growth principles, such as [Complete Streets](#)<sup>17</sup>. Complete Streets focus on multi-modal transportation, public transit, and pedestrian travel.

Encouraging economic development initiatives that enable individuals to work in their home communities, such as “maker” or “coworking” spaces and expanded high-speed Internet will also reduce VMT. Likewise, communities can support infill development and concentrated commercial and institutional activities in our villages and downtowns.

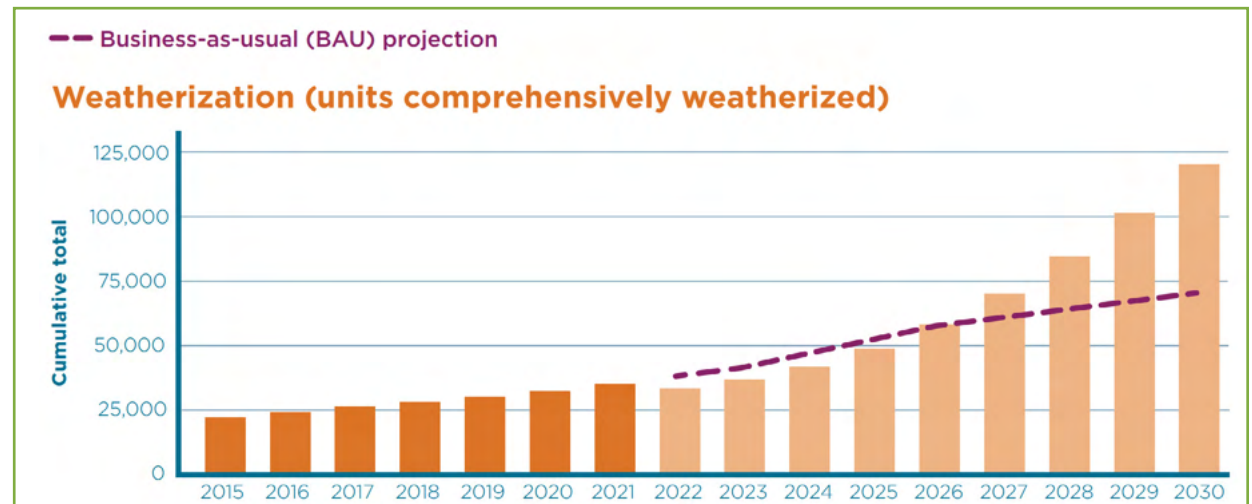
## H. Thermal Energy

According to the 2022 Comprehensive Energy Plan, thermal and process energy use accounts for 31 percent of all energy use in Vermont. The reliance on heating from non-renewable sources (fuel oil, natural gas, and propane) creates a challenge for Vermonters that extends beyond energy issues. Low-income residents may find it challenging to stay comfortable in their own homes due to fuel costs.

In addition to thermal efficiency improvements, the 2022 CEP is seeking a statewide change in how we heat our buildings. This approach will focus primarily on the installation of [cold climate air-source heat pumps](#)<sup>18</sup>, which consume far less energy to produce the same amount of heat than electric resistance, propane, or oil heating systems. In order to meet contribute to the Vermont

Pathways model State’s heat pump installation target (411,659 installed statewide by 2035), a total of over 30,610 heat pumps (residential and commercial sector combined) 26,982 will need to be installed in the TRO Region by 2035. In some cases, cold climate air-source heat pumps may be inadequate to meet a building’s heating load during extreme sub-zero days (-20 degrees F). For example, air-source heat pumps for large commercial buildings may require substantial grid upgrades to meet demand on severely cold days, so secondary heating systems may still be required. It is always best to follow the advice of licensed, reputable professionals when installing new equipment in a building. In general, though, cold climate air-source heat pumps are effective, cheaper to operate than fossil fuel furnaces, and will fully meet the needs of Vermont households during 99% of the year. Because of this, TRORC

Figure 11-4: Vermont Homes Weatherized



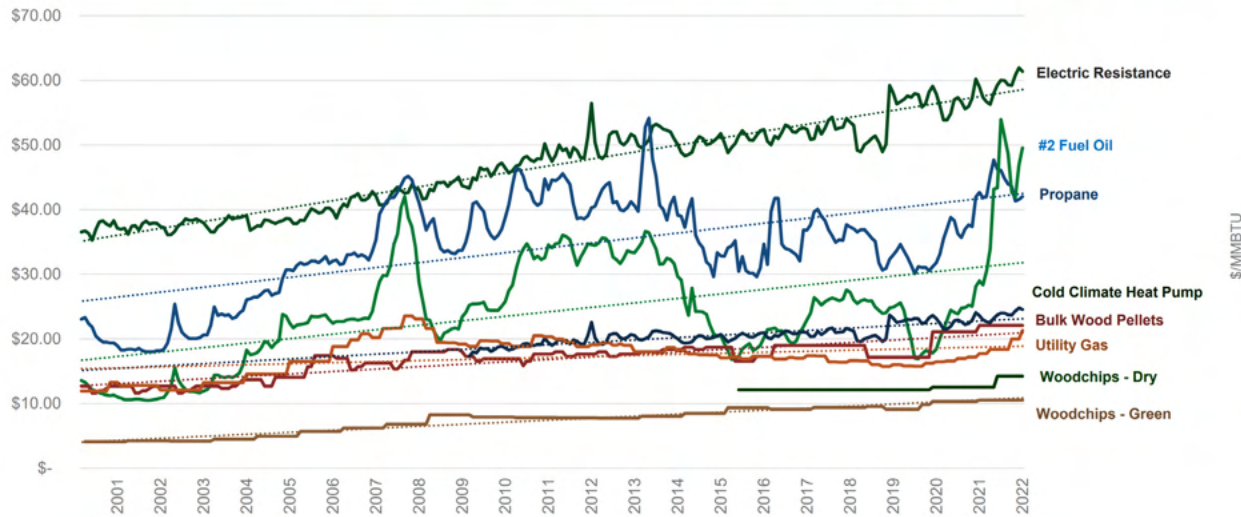
Source: Energy Action Network, 2023





Figure 11-7: Vermont Heating Fuel Price Trends

## Vermont Heating Fuel Price Trends (\$/MMBTU)



Source: VT Public Service Department and the fuel price data came from the Energy Action Network, 2023.

expects cold-climate heat pumps to become the most common primary heating source in Vermont.

[Geothermal or “ground source” heat pumps](#)<sup>19</sup> are also a tremendous opportunity. These systems are substantially more expensive to install than air-source heat pumps but are even more efficient. They are better suited to new development than retrofitting into existing buildings due to the technology’s requirements.

Where many buildings are located next to a concentration of other buildings, the CEP has also recognized the potential for district heating and/or combined heat and power, which are systems for producing heat in a centralized location and

distributing it throughout the local area. District heating requires significant up-front investment to build infrastructure but can offer economies of scale.

New buildings will need to be built to a significantly higher level of performance than is required by the State’s current [Residential and Commercial Building Energy Standards](#)<sup>20</sup>. Net-zero buildings are highly efficient and save 30 to 45 percent on overall energy costs in comparison with standard buildings. [Efficiency Vermont’s 2015 Net Zero Energy Feasibility Study](#)<sup>21</sup> determined that new construction of residential and office net-zero energy buildings is a cost-effective investment. These buildings cost less to own and operate than

standard code buildings from the first year into the long term. Towns can assess how far along they are in their energy target goals by contacting TRORC.

Meeting energy goals will be difficult in existing homes. In Orange and Windsor Counties, 47 percent of homes were built before 1970. These older homes were constructed before high energy costs made energy conservation a priority in the built environment. As a result, a substantial number of our homes utilize wasteful amounts of energy and are expensive to maintain.

To achieve GWSA requirements, approximately 15,697 of the Region’s housing units will need to be weatherized by 2035.

The upfront cost of energy efficiency improvements and building-scale renewable energy generation remains a challenge. Despite the demonstrated long-term savings benefits, the capital needed to significantly reduce energy consumption and add renewables is a significant barrier to implementation. When surveyed as part of the East Central Vermont Sustainability Project, 39.5 percent of those who responded indicated that they could not afford to make their home more energy efficient. Another 33.8 percent were unable to make energy efficiency improvements because they rent instead of own. Cost is an issue for all homeowners, but especially for low- and moderate-income homeowners.

With upfront capital cost being a significant barrier to the implementation of thermal efficiency and renewable energy improvements, it is essential that programs that provide funding and financing grow.





In particular, programs providing assistance to middle- and low-income households must increase in funding. A list of current financing programs can be found on [Efficiency Vermont's website](#)<sup>22</sup>.

These financing programs offer key features such as great interest rates, flexible terms, and ease of application. The loans can also be combined with Efficiency Vermont incentives.

While fuel assistance programs are essential, increased funding to Vermont's [Weatherization Assistance Program \(WAP\)](#)<sup>23</sup> is needed. In addition, fuel distributors must be encouraged to become energy service providers, expanding what they offer so that more homes can be weatherized and increase their energy efficiency. Some form of this model is likely to be implemented under [Vermont's Clean Heat Standard](#)<sup>24</sup>.

TRORC can support these programs and initiatives by communicating directly with energy providers, state agencies, and the Legislature. We can provide input on state level initiatives, and we can, if the opportunity presents itself, pursue federal funding to support these programs within our Region. At the commercial and public sector levels, capital and operating budgets are often set independently of each other, resulting in lack of awareness of financial incentives for energy improvements.

Incorporating better insulation and air exchange is required for many renovations, but Vermont's system of building codes and energy efficiency standards enforcement is somewhat problematic. New Residential Building Energy Standards (RBES) and Commercial Building Energy

Standards (CBES) came into effect on July 2024, but these rule changes do nothing to solve the Standards' weak enforcement mechanisms. Currently there are no state permits or code officials for energy efficiency. Energy efficiency is self-certified by the building contractor, with a requirement that a completed certificate be submitted to the municipality. However, some communities may be unaware of this requirement and how to track the submission of certificates. Towns with local code officials may enforce energy efficiency codes and towns with certificate of occupancy (COO) requirements must receive an energy code certificate before issuing the COO. Nearly two-thirds of TRORC's communities (19) have zoning bylaws, but less than half of those (9) require a COO.

Concurrently, the State needs to ratchet up the standards set forth in the RBES and CBES. Standards for achieving net-zero design must be incorporated. Some regional builders such as [Prudent Living's Southscape community](#)<sup>25</sup> and [VERMOD](#)<sup>26</sup> are currently constructing net-zero possible homes.

If adequate funding was available, TRORC could develop additional staff positions that would focus specifically on energy assistance, education, and outreach. Without duplicating existing services, such as those that Efficiency Vermont, Vital Communities, Energy Action Network, and GMP offer, a TRORC staffer could act as a clearinghouse of energy information for our communities. Acting as a bridge between state-level service providers, contractors, and municipal organizations, TRORC would effectively move the Region toward meeting

the CEPs goals relating to thermal efficiency. These services are already offered through our shared energy coordinator program, but only to member towns that buy into the program.

## I. Utility-Scale Renewable Energy Facility Siting

Vermont's [Public Utility Commission \(PUC\)](#)<sup>27</sup> is the state's principal authority for granting permits to new grid-connected energy generation facilities, through a permitting review process known as "[Section 248](#)<sup>28</sup>." [Under Act 174 of 2016](#)<sup>29</sup>, the PUC is obligated to give "substantial deference" to the portions of regional plans addressing energy development, if the plan has been submitted to and approved in advance by the Public Service Department (PSD). In addition, the PUC is obligated to give "substantial deference" to the energy chapters of town plans, if the plans have been reviewed and approved by the relevant regional planning commission. Essentially, by putting in the effort to gain this "enhanced energy plan" status, TRORC and towns can ensure that their preferences on siting are given greater weight in the PUC permitting process when new generation facilities are proposed in the region or town, provided there are clear and mandatory standards in the plans.

### Hierarchy of Suitability

All lands within the TRO Region have been analyzed on a rough scale using map data supplied by PSD. The energy potential maps were made by first identifying areas that have raw potential for certain types of power production based upon



certain qualities of the landscape. For example, only certain ridgelines are believed to have enough wind potential to justify building a wind turbine, and, usually, only lands with good exposure and gentle slopes make sense for solar development. It should be noted that the maps do not take into account whether lands are clear or forested.

These maps are not a policy document, and the “prime” areas on them do not necessarily mean that TRORC supports generation there, only that these are the areas where solar, wind, and hydro resources are present, and that they have good grid access

### Solar Siting

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Significant growth in the solar energy production sector in Vermont has sometimes led to a backlash against proposed facilities. The primary concern is one of aesthetics. For some, it is challenging to reconcile the appearance of a solar farm with the traditional rural character of the Region. Residents may also perceive a loss of property value when a solar facility locates near their home, although there is no hard data available to support this perception.

Also of concern are the natural resource implications of solar farms. Often these facilities are proposed in areas that are being used for agricultural purposes on valuable prime agricultural soils. While it is possible to conduct some forms of farming on land occupied by a solar system (such as small ruminant grazing), most agricultural uses become impractical, though the underlying land remains intact for future

cultivation. For those farmers that lease land for feed production, the removal of actively used farmland from the pool of available land has the potential to negatively impact their operation. On the other hand, solar generation on marginal lands may provide farmers with needed income.

Ground-mounted solar arrays in areas served by sewer and water needlessly use up valuable space. Solar arrays in forests require clearing large amounts of trees that sequester carbon, negating their benefit.

### Wind Siting

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Only certain ridges are tall enough and big enough to have raw wind potential. Wind energy generation, although not as prevalent as solar, also has opposition due to aesthetic and noise impacts. Because these facilities must locate on ridgelines to maximize production, they are visible from a much greater distance than solar. Additionally, residents neighboring a wind facility may experience negative effects from the noise and flicker of the spinning turbines.

Large-scale wind energy facilities can have environmental impacts as well. Much of the land on our ridges is undeveloped, making it prime wildlife habitat. The installation of wind energy generation facilities and the infrastructure needed to maintain them (primarily roads), leads to the fragmentation of continuous blocks of forestland, which can disrupt migration patterns for wildlife.

### Hydro Siting

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Not surprisingly, sites with hydro potential are along rivers with steep drops. Most good hydro sites have been developed. The development of new hydroelectric projects is challenging. All new hydro projects that are grid-connected must seek permitting from the federal government, which is time consuming and expensive. Any development in our waterways requires a strict analysis of potential environmental impacts.

### Unsuitable (Prohibited Locations)

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The Regional Plan identifies some areas as poor locations for most forms of development due to their natural or scenic value or to protect our citizens from potential natural disasters. These areas have already been removed from consideration and are not shown in the constraint or prime areas on the maps. The policies at the end of this section state the unsuitable areas in the Region. Additional lands that the region has deemed unsuitable still leave many times over the needed amount of land to reach renewable energy targets, principally through solar installations.

### Constraints

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There are many areas that have the potential for renewable energy generation but include known or possible constraints that may make these locations less desirable. Constraint areas are neither preferred nor unsuitable; they simply identify potential issues for siting energy generation facilities. Development in these areas will require more detailed mapping at the site level as well as an evaluation of the impacts on



the particular resources present. State supplied map data used in this Plan has “known” constraint areas removed and therefore these do not show on the maps as potential or prime areas. From a policy level this Plan makes no distinction between “known” or “possible” and simply combines both as constraints. Areas with constraints include:

- Historic districts, landmarks, sites, and structures listed, or eligible for listing, on state or national historic registers
- State or federally designated scenic byways, and municipally designated scenic roads and viewsheds
- Special flood hazard areas identified by National Flood Insurance Program maps (except as required for hydro facilities)
- Public and private drinking water supplies, including mapped source protection areas
- Primary agricultural soils mapped by the U.S. Natural Resources Conservation Service
- Agricultural Soils (VT Agriculturally Important Soil Units)
- Protected Lands (Updated 07/26/2016 – State Fee Lands and Private Conservation Lands)
- Deer Wintering Areas (as identified by ANR)
- Act 250 Agricultural Soil Mitigation areas (as Identified by ANR)
- ANR’s Vermont Conservation Design Highest Priority Forest Block Datasets
- Priority Forest Blocks – Connectivity, Interior and Physical Land Division (as identified by ANR)

- Hydric Soils (as identified by ANR)
- River Corridor Areas as identified by the Vermont Department of Environmental Conservation
- Class 2 Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis
- Vernal pools (as identified by ANR or through site analysis)
- State-significant Natural Communities and habitats of rare, threatened, and endangered species

### Prime and Preferred Areas

Areas that have good potential for renewable energy generation that are not in constraint areas and with good grid access are shown on the maps as “prime”. Prime areas are neither a local or regional

indication of approved for a site. Areas with local or regional approval are called “preferred” sites. Statewide preferred sites are identified in the [PUC’s net-metering rule 5.100<sup>30</sup>](#) (page 8). These areas are typically small and are not shown on the energy siting potential maps. The maps included as part of this guide were developed at the regional scale. As such, they do not include preferred locations. Communities should use their local knowledge to identify additional preferred areas. They can include preferred locations as legislated in Act 174. Other considerations when identifying preferred areas within communities include existing infrastructure. For example, an area with immediate access to three-phase power or an upland area with existing road access may be more desirable than an area without. TRORC evaluates sites for preferred status after a local determination.



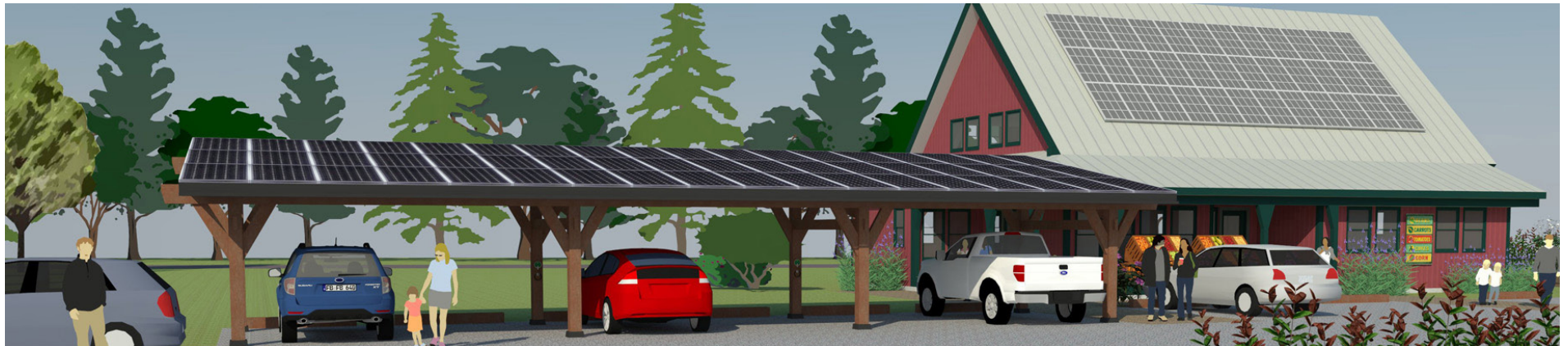


## J. Conclusion

Vermont has established ambitious but needed energy goals that will require all of us to reduce energy use and to transition to using renewable energy for our thermal, transportation, and electricity needs. This will result in a safer, cleaner, and healthier world for us and our children. This chapter should be used to guide TRORC in its development of work plans, to focus attention on key issues and opportunities, and to provide a framework to evaluate energy conservation and development projects in the Region. TRORC will fully integrate energy planning into the technical assistance it provides its member towns and continue to coordinate with the Vermont Energy Investment Corporation, the Energy Action Network, the Department of Public Service, and other state agencies and departments to update and improve energy planning as necessary.

Improvements in the development and maintenance of accurate estimates of energy

demand, fuel use, and renewable electricity generation will be needed to track progress toward goals and to help adjust local, regional, and statewide strategies and actions. TRORC will also remain engaged in statewide energy planning to ensure that future updates and information provided to municipalities remain current and consistent with state policies. A core message of the Energy chapter is that the quality of life and economic future of the Region is dependent on the efficient use of energy and access to a sufficient and sustainable amount of renewable energy. Planning for land use, transportation, community and economic development, and agriculture are interrelated must consider energy efficiency and the prudent development of renewable energy generation. The TRORC Energy chapter provides a basis for this comprehensive energy planning.



Concept Design of Parking Lot Solar Canopy | Source: SunCommon





## Goals, Policies, and Recommendations: Electricity Conservation and Fuel Generation

### Goals

1. Twenty-five percent of overall energy needs comes from renewables by 2025, 40 percent by 2035, and 90 percent by 2050.
2. The amount of renewable electricity generated in the TRO Region increases from 2022 levels by 86,740 MWh by 2050.

### Policies

1. TRORC supports using demand-side management measures, such as Flexible Load Management (FLM), to manage the expected electric energy demand increase in the TRO Region.
2. TRORC supports Efficiency Vermont and other incentive programs to reduce electric energy use and encourage the use of devices and equipment that perform work using less energy input than otherwise necessary, such as [Energy Star or CEE2, CEE](#)<sup>31</sup> or advanced appliances.
3. TRORC encourages the deployment of grid resilience measures such as energy storage, microgrids, and grid hardening that lead to improved reliability of electric service for the region's residents.
4. TRORC will promote a wide variety of renewable energy generation types, including adding photovoltaic solar installations, wind turbines, and run-of-the-river hydroelectric facilities, optimizing existing hydroelectric dams, promoting sustainable use of bio-digesters, and encouraging passive solar building designs.

### Recommendations

1. TRORC will advocate for the continuation of policies that lead to the retirement of Renewable Energy Credits in state.
2. TRORC will help interested towns meet the standards set forth in [Act 174](#)<sup>32</sup> for enhanced energy planning so that local preferences receive “substantial deference” in the Public Utility Commission’s [Section 248](#)<sup>33</sup> proceedings.
3. PSD and TRORC should support and provide outreach for Energy Action Network’s Community Energy Dashboard and Efficiency Vermont’s customer engagement web portal and home energy reports.
4. TRORC and PSD should support efforts to develop programs that encourage energy conservation through behavioral change by advocating for [smart grid technology](#)<sup>34</sup> and a pilot of advanced meter infrastructure and time-of-use rates in the Region.
5. TRORC will maintain an enhanced energy compliant Regional Plan in order to play a stronger regional role in the Public Utility Commission (PUC) permitting process.
6. TRORC will work to expand its shared energy coordinator (SEC) program and encourage other RPCs to duplicate the model around the state.



## Goals, Policies, and Recommendations: **Transportation and Land Use**

### *Goals*

1. Regionwide vehicles miles traveled (VMT) per capita is reduced to 9,500. (In 2019, the statewide VMT per capita was [11,772<sup>35</sup>](#)).
2. The number of single-occupant vehicle trips is reduced by 5 percent from 2024 figures by 2035 through remote work, carpooling, and public transit.
3. The percentage of light-duty vehicles registered in the region that are electric is increased to 5 percent by 2025, 57 percent by 2035, and 100 percent by 2050.
4. Usage of state and municipal park and rides triples by 2040.
5. By 2040, public transit ridership has increased by 100 percent compared to pre-pandemic levels, to 2 million trips annually. (In 2019, Tri-Valley Transit and Advance Transit reported a combined 1,040,776 unlinked passenger rail trips.)

### *Policies*

1. Land use policy and regulation shall be designed to encourage use of public transit, cycling, and walking for daily trips.
2. All new residential, commercial, and industrial developments subject to Act 250 that provide five or more off-street parking spaces shall install level 2 (240V) EV chargers at a rate of one port for every five employees or residential units, as applicable. Developments with fewer than five employees or residential units must install at least one port. If the developer can demonstrate that installing on-site charging stations would be unduly onerous due to poor utility access or other site constraints, they may meet the requirements of this policy by installing the requisite number of chargers at a comparable in-region location. Nothing in this policy shall prohibit the developer from charging user fees at charging stations.
3. The development of new fossil fuel service stations is strongly discouraged in the TRO region. New service stations that provide alternative transportation fuels, such as electric vehicle charging and/or hydrogen, and the conversion of existing service stations to provide these fuels, is encouraged.
4. TRORC supports efforts to provide the Region with opportunities to work closer to home and to require public transit opportunities for large scale development, likely to result in conservation of energy.
5. All developments subject to Act 250 must demonstrate that they have consulted with transit providers about reasonable accommodation of public transit. This consultation shall include the appropriateness of a dedicated transit stop and covered transit shelter.
6. TRORC supports new bike and pedestrian projects in the Region.
7. The inclusion of bike racks and e-bike charging stations at new developments, particularly in the region's village centers and downtowns, is encouraged.



*Policies (continued)*

8. TRORC supports programs and planning initiatives that will reduce single-occupant trips throughout the Region, including Go Vermont and CarShare Vermont.

*Recommendations*

1. TRORC will encourage communities to develop bylaws that allow for the development of co-working spaces as a way to reduce VMT.
2. TRORC should work with large employers to create incentives for carpooling, cycling, public transportation use, and telecommuting.
3. TRORC will work with groups such as the Vermont Bicycle and Pedestrian Coalition (VBPC), Local Motion, Green Mountain Bicycle Club, and towns to encourage safe bicycling as a transportation alternative in the Region.

Goals, Policies, and Recommendations: **Thermal Energy**

*Goals*

1. By 2035, at least 63 percent of the Region's housing stock is weatherized.
2. By 2025, 30 percent of new buildings are built to [zero energy ready standards](#)<sup>36</sup> and 100 percent by 2030.
3. By 2035, 26,982 residential cold climate heat pumps are installed.
4. By 2035, 50% of new residential, commercial, and industrial developments of 20,000 sq ft and above will use geothermal heating systems.

*Policies*

1. TRORC supports state efforts to provide additional funding for weatherization improvements, especially for low- and moderate-income populations, and weatherization programs through Capstone and COVER.
2. New residential, commercial, and industrial developments subject to Act 250 shall not use fossil fuel combustion as a primary heating source.
3. Developers of new residential, commercial, and industrial projects subject to Act 250 shall demonstrate due consideration of ground-source (geothermal) heat pumps as a method of heating. Developers must also demonstrate due consideration of heat recovery technologies such as [Energy Recovery Ventilators \(ERVs\)](#)<sup>37</sup> and heat recovery from large-scale refrigeration and/or industrial processes as applicable.
4. TRORC supports net-zero energy construction throughout the Region.
5. TRORC supports the creation of enforcement mechanisms to enhance compliance with Vermont's Residential and Commercial Building Energy Standards (RBES and CBES).



### Recommendations

1. TRORC should work with local energy committees, planning commissions, and developers in identifying potential users of district heating, [Thermal Energy Networks \(TENs\)](#)<sup>38</sup>, and combined heat and power systems—schools, college campuses, apartment complexes, shopping centers, industrial parks, and village centers—and incorporate this information into local plans.
2. TRORC will work with other organizations to distribute information regarding the available financing mechanisms, rebates, and incentives for weatherization assistance, electrification, and fuel-switching, focusing on those most in need.
3. TRORC will partner with Efficiency Vermont, Green Mountain Power, Washington Electric Coop, HVAC contractors, and others to promote cold climate heat pumps.
4. TRORC should work to expand its shared energy coordinator program and support other RPCs in replicating the program in their own regions.
5. TRORC and local energy committees should work with owners of rental housing to educate them on the financial benefits of weatherization investments and should connect owners with contractors to complete weatherization projects.
6. TRORC and its towns should support programs and initiatives that encourage the development of small homes (less than 1,000 square feet) as a means of reducing energy use.
7. TRORC will provide outreach to towns and contractors on the use and enforcement of residential and commercial building energy standards for all new construction.
8. TRORC will encourage communities that have zoning to include a certificate of occupancy when they revise their regulations if they do not already have one.
9. TRORC should provide outreach to communities with a COO to ensure that they are tracking submissions of the RBES certificate.
10. TRORC will work to maintain forest health as a prerequisite to a sustainable wood energy fuel supply and carbon sequestration.
11. TRORC can assist communities with continued outreach regarding code compliance. We can also support the PSD as they move forward on adoption of more effective energy efficiency codes.
12. The State should support woodstove change-out programs to lower heat cost and reduce particulate emissions.





## Goals, Policies, and Recommendations: **Utility-Scale Renewable Energy Siting**

### *Goal*

1. Carefully sited renewable energy facilities are built in the Region to meet generation goals.

### *Policies*

1. TRORC supports the continued development and siting of renewable energy generation that counts toward the goals of the RES, especially on preferred sites.
2. Ground mounted solar arrays above 15kW in capacity should not be constructed in Regional Growth Areas if a reasonable alternate location is available, in order to preserve these areas for compact development. Solar arrays on structures, included shaded parking in these areas are encouraged.
3. The following locations shall be considered regionally prohibited as unsuitable for renewable energy generation facilities: floodways shown on FEMA Flood Insurance Rate Maps (except as required for hydro facilities); Class 1 Wetlands as indicated on Vermont State Wetlands Inventory maps or identified through site analysis; National Wilderness Areas; projects in TRORC's Forest Based Resource Areas (please see Future Land Use, Map #3) and not in compliance with policies #12 and #14 under Forest-Based Resource Areas; and any unsuitable areas as identified in a duly adopted municipal plan that has received a determination of energy compliance from the Department of Public Service or TRORC.
4. Ground-mounted solar array facilities greater than 150 kW shall be designed to allow for permeability by small wildlife according to the standards set by the Agency of Natural Resources.

### *Recommendations*

1. TRORC will encourage communities and residents to identify areas with the potential for renewable energy generation.
2. TRORC should provide support for grid improvements that will allow improved renewable energy generation facility coverage in our Region by actively participating in the Act 250 and Section 248 review process.
3. TRORC encourages ground-mounted solar array facilities to follow accepted best practices for maintaining wildlife-friendly grassland habitat, [pollinator habitat](#)<sup>39</sup>, or [agrivoltaics](#)<sup>40</sup> within the facility's boundaries.



## Energy Endnotes

- 1 <https://publicservice.vermont.gov/about-us/plans-and-reports/department-state-plans/2022-plan>
- 2 [tes/section/30/005/00202a](https://publicservice.vermont.gov/about-us/plans-and-reports/department-state-plans/2022-plan)
- 3 <https://legislature.vermont.gov/statutes/section/10/023/00578>
- 4 <https://legislature.vermont.gov/statutes/section/10/023/00580>
- 5 <https://legislature.vermont.gov/statutes/section/10/023/00581>
- 6 <https://legislature.vermont.gov/statutes/section/30/089/08005>
- 7 <https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/ACT%20153%20As%20Enacted.pdf>
- 8 <https://outside.vermont.gov/agency/anr/climatecouncil/Shared%20Documents/Initial%20Climate%20Action%20Plan%20-%20Final%20-%202012-1-21.pdf>
- 9 [https://www.healthvermont.gov/sites/default/files/documents/pdf/ENV\\_CH\\_ProfileReport.pdf](https://www.healthvermont.gov/sites/default/files/documents/pdf/ENV_CH_ProfileReport.pdf)
- 10 <https://study-online.sussex.ac.uk/news-and-events/what-is-energy-justice/>
- 11 <https://www.eia.gov/energyexplained/renewable-sources/portfolio-standards.php>
- 12 <https://publicservice.vermont.gov/renewables/renewable-energy-standard>
- 13 <https://www.epa.gov/green-power-markets/renewable-energy-certificates-recs>
- 14 <https://www.trorc.org/wp-content/uploads/2020/09/Land-Use.pdf>
- 15 <https://www.trorc.org/wp-content/uploads/2020/09/Transportation.pdf>
- 16 <https://afdc.energy.gov/stations#/find/nearest>
- 17 <https://www.transportation.gov/mission/health/complete-streets>
- 18 <https://www.consumerreports.org/heat-pumps/can-heat-pumps-actually-work-in-cold-climates-a4929629430/>
- 19 <https://www.energy.gov/energysaver/geothermal-heat-pumps>
- 20 <https://publicservice.vermont.gov/efficiency/building-energy-standards/residential-building-energy-standards>
- 21 <https://www.encyvermont.com/Media/Default/docs/white-papers/efficiency-vermont-net-zero-energy-feasibility-study-final-report-white-paper.pdf>
- 22 <https://www.encyvermont.com/services/financing/homes>
- 23 <https://dcf.vermont.gov/benefits/weatherization>
- 24 <https://puc.vermont.gov/clean-heat-standard>
- 25 <https://southscapewilder.com/>
- 26 <https://vermodhomes.com/>
- 27 <https://puc.vermont.gov/>
- 28 <https://legislature.vermont.gov/statutes/section/30/005/00248>
- 29 <https://publicservice.vermont.gov/about-us/publications-and-resources/energy-resources/act-174-recommendations-and-determination>
- 30 <https://cee1.org/program-resources/tiers-and-energy-star/>
- 31 <https://cee1.org/program-resources/tiers-and-energy-star/>
- 32 <https://legislature.vermont.gov/statutes/section/30/005/00248>
- 33 <https://publicservice.vermont.gov/regulated-utilities/electric/smart-grid>
- 34 <https://vtrans.vermont.gov/sites/aot/files/planning/documents/planning/2021%20Vermont%20Transportation%20Energy%20Profile.pdf>
- 35 <https://www.energy.gov/eere/buildings/zero-energy-ready-home-program>
- 36 [https://en.wikipedia.org/wiki/Heat\\_recovery\\_ventilation](https://en.wikipedia.org/wiki/Heat_recovery_ventilation)
- 37 <https://www.vctn.org/the-basics>
- 38 [https://www.uvm.edu/sites/default/files/UVM-Extension-Cultivating-Healthy-Communities/horticulture/pollinators/VT\\_NRCS\\_Biology\\_TechNote\\_4.pdf](https://www.uvm.edu/sites/default/files/UVM-Extension-Cultivating-Healthy-Communities/horticulture/pollinators/VT_NRCS_Biology_TechNote_4.pdf)
- 39 <https://www.energy.gov/eere/solar/agrivoltaics-solar-and-agriculture-co-location#:~:text=Co%2Dlocation%2C%20also%20known%20as,or%20adjacent%20to%20solar%20panels.>



Energy Endnotes (continued)

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40 <https://puc.vermont.gov/sites/psbnew/files/documents/5100-net-metering-effective-3-1-2024.pdf>





# 12 | Relationship to Other Plans

## A. Relationship to Plans of Adjoining Vermont Commissions

Five Vermont regional planning commissions, and one New Hampshire regional planning commission, border the TRO Region.

All six of these have a current regional plan in effect. Below are the dates of their adoption:

- [Mount Ascutney Regional Planning Commission \(MARC\)](#)<sup>1</sup>: Plan adopted October 14, 2022
- [Rutland Regional Planning Commission \(RRPC\)](#)<sup>2</sup>: Plan adopted June 18, 2018

- [Addison County Regional Planning Commission \(ACRPC\)](#)<sup>3</sup>: Plan adopted July 18, 2018
- [Northeastern Vermont Development Association \(NVDA\)](#)<sup>4</sup>: Plan adopted July 29, 2023
- [Central Vermont Regional Planning Commission \(CVRPC\)](#)<sup>5</sup>: Plan adopted July 12, 2016
- [Upper Valley Lake Sunapee Regional Planning Commission \(UVLSRPC\)](#)<sup>6</sup>: Plan adopted June 17, 2015

*Quechee Balloon Festival* | © Jericho Hills Photography

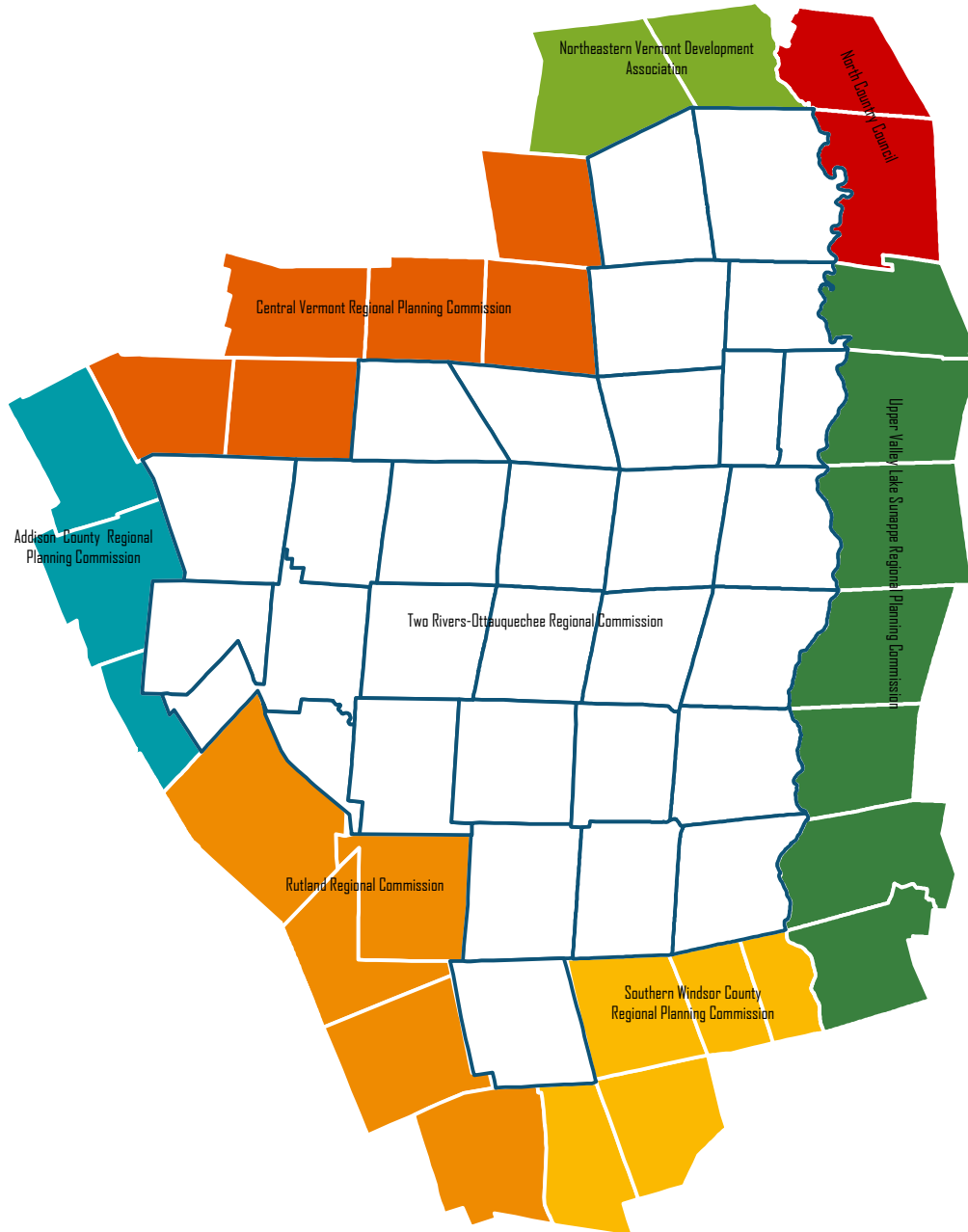
TRORC consults and coordinates with neighboring regional planning commissions during their planning processes. Our largest and most interconnected neighboring region is that of the UVLS Region, and to further coordinate, our executive directors are currently representatives on each other's board of directors.

For an issue to rise to the level where we feel that there needs to be coordination, a neighboring region's plan must affect us or we must affect our neighbors in a meaningful way. This could be a small matter that is literally on the border of two regions, such as exit 17 on I-91, or a larger matter that has effects for some distance, such as





Figure 12-1: Surrounding Regional Planning Commissions



employment at centers like Dartmouth-Hitchcock Medical Center.

### Land Use

All adjoining regional planning commissions identify regional areas that are intended to support high densities of development. Some nearby regional areas, such as Windsor, Rutland, Middlebury, St. Johnsbury, and Lebanon and Hanover in New Hampshire could have an effect on the TRO Region if they were to expand, but there are no land use conflicts noted between what adjacent regional planning commissions and ours see as desired future regional patterns of development.

Most municipalities that border our Region are quite rural, with the exception of UVLS Region towns Lebanon and Hanover, which are considered economic hubs for our Region where residents do most of their shopping. Hartford, and to some extent Norwich, tie in relatively seamlessly with their adjacent New Hampshire towns. Windsor, Vermont, adjacent to Hartland, is largely rural, but it does have some commercial development in its downtown. However, the future land use map for the SWC Region matches that of the TRO Region in that the bordering area is designated to remain primarily rural outside the town centers of Windsor and Hartland, keeping this stretch of U.S. 5 free from sprawl.



## Watersheds

The TRO Region shares several watersheds with neighboring regional planning commissions. The TRO Region receives the Connecticut River and Wells River watersheds from the NVDA Region. The Connecticut goes through a series of three dams known as Fifteen Mile Falls, just above our Region, and is managed for both hydropower production and flood control. The water quality of the river is quite good, as it drains a largely rural and forested area. The TRO Region then shares the Connecticut with the UVLS Region and the SWC Region as it flows south. Several smaller rivers from New Hampshire and Vermont empty into the Connecticut River along our border. The Wilder Dam between Hartford, Vermont, and Lebanon, New Hampshire, impounds almost all of the upstream reach of the Connecticut in

our Region. As the Wilder Dam is in both states, both regional planning commissions are involved in its relicensing. The Connecticut River Joint Commission (on which TRORC and UVLSRPC sit) is also involved in the relicensing and serves as a bi-state body to coordinate issues around the Connecticut River.

Downstream of us, the river flows into the SWC Region and the rest of the watershed, all the way to Long Island Sound. Nitrogen is a pollutant issue in the Sound, and it is therefore a matter of concern even in our Region.

With the exception of some small upland areas in the outermost reaches of the watershed, most of the TRO Region forms the entire watershed for the White River. This major river empties into the Connecticut River in the aptly named White

River Junction village in Hartford. The flooding that occurred as a result of Tropical Storm Irene serves as an example of the White River impacting downstream communities. Though the White River is usually much smaller in size, during this flooding event it was flowing at an estimated 90,000 cubic feet per second (cfs), almost three times the flow of the Connecticut, at the two rivers' confluence. Not only did the fury of the White River render a highway bridge and a rail bridge in Hartford unusable, it also transported significant amounts of silt, pollutants, and debris, which ultimately entered the Connecticut River and impacted towns downstream. Similarly, though the TRO Region is the host to just a small portion of the headwaters of the Black River, which runs through SWC Region, major erosion in Plymouth from Irene caused siltation to affect downstream waters in Ludlow.

The lower portion of the TRO Region is in the Ottauquechee River watershed, with headwaters beginning in Killington, part of RRPC's region. The Ottauquechee is an important part of the Quechee area of Hartford, providing a scenic center to Quechee Village as well as the significant attraction of Quechee Gorge. Flooding during Irene heavily damaged the covered bridge in Quechee. Just below the Gorge, the Ottauquechee is held behind the North Hartland dam run by the U.S. Army Corps of Engineers. This dam is operated for flood control, protecting communities along the Connecticut River as the Ottauquechee flows south.

Water quality and quantity are issues that tie the regions together. All agree that improving water quality is a priority. Adjacent Regional Plans are also very cognizant of flooding as an important



One Main Tap & Grill, Randolph | © First Light Studios



issue. No conflicts are noted when it comes to watershed and water quality planning.

### Economic Development

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The TRO Region is tied to the state, national, and international economies of course, but of more direct concern are the local employment links with other nearby regions. Many of our residents commute to municipalities outside of our Region for work, shopping, and other needs. While some people commute into the TRO Region, most of our economic ties are outward. On our western edge, Rutland and Middlebury are economic centers, while to our north, the Barre/Montpelier area draws commuters. However, the biggest connection is with Hanover and Lebanon, New Hampshire, to the east. These two towns are considered the economic hub of the bi-state Upper Valley region (consisting of TRORC, SWCRPC, and UVLSRPC), providing most of the shopping and employment. TRORC and SWCRPC are part of a 40-town organization called the East Central Vermont Economic Development District (ECVEDD). This organization is a federally designated area whose mission is to “provide access to resources, facilitate partnerships, and support economic decision making” and “provide resources and facilitation as regions make decisions that will affect entrepreneurs, businesses, and communities.” None of the current economic development plans for adjacent areas are viewed as detrimental to the TRO Region.

### Transportation

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There are several major highway transportation routes that pass through the TRO Region, including Interstates 91 and 89, Vermont Route 100, and U.S. Routes 302, 4, and 5. Highways function much like pipelines, in that any problems at a particular spot can affect the entire system. Therefore, planning around construction projects or larger developments that would have an effect on traffic are by their nature matters of concern across regional boundaries.

The I-89 and I-91 corridors are considered major thoroughfares for people traveling to Canada, New Hampshire, Vermont, and Massachusetts. U.S. 5 is the main non-interstate road on the Vermont side of the Connecticut River, and U.S. 4 and 302 remain main east-west corridors, with U.S. 4 being a primary artery for traffic coming from New York State. VT Route 100 is a major connector for AC Region, SWC Region, and RR Region residents to the Green Mountains in the westernmost part of our Region.

None of the neighboring regional planning commissions has plans that would adversely impact the function of these roads. It should be noted that bridges across the Connecticut River are built by NHDOT, as the Vermont border is generally the western shore of the river. Both state transportation agencies cooperate when planning construction on these bridges.

The TRO Region is also home to a freight rail line that parallels U.S. 5 and a rail line that has both freight and Amtrak service that cuts diagonally across the Region. Both of these are important to

the Region and are also supported by other regions and the state level.

There are no airports of significance in the TRO Region, but Lebanon, New Hampshire, does have a small regional airport, and both TRORC and UVLSRPC recognize the importance of this airport.

Transit services exist in the Region that cross into neighboring areas, with a commuter bus line that goes north to Montpelier and routes on the VT/NH border that cross over and provide good options in the Hanover/Lebanon/Hartford area. All neighboring regional planning commissions highly support maintaining and increasing transit options.

### Housing

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Much of the TRO Region serves as a bedroom community for larger towns, especially the economic centers just to our east.

Currently, TRORC, SWCRPC, and UVLSRPC are jointly working on developing a region-wide housing needs analysis to identify areas that need more housing to serve the Upper Valley. All of the regional planning commissions in the area support increased housing that is affordable for both residents that are currently paying too much and new families that we are trying to attract to the region, as well as needed additions to the housing stock that are handicapped accessible or senior friendly to deal with the demographics of a rapidly aging population.



## B. Municipal Plans within the TRO Region

There are 30 member municipalities that comprise the TRO Region. All municipalities have duly appointed planning commissions charged with the responsibility of planning for the future growth and development of their respective communities. As is the case in many areas of Vermont, the extent or nature of these local planning programs is varied. Several communities have had planning programs in existence since the late 1960s. As a result, these programs are relatively advanced. Other towns, particularly those removed from development pressure, are somewhat inactive and may have allowed their plans to expire. Implementation programs, including zoning bylaws, subdivision regulations, or capital budgets and programs exist for approximately two-thirds of the municipalities comprising the Region. TRORC provides technical assistance in the preparation of most of the Town Plans as well as subsequent bylaws. TRORC also provides regular training and assistance to towns on preparing plans and administering bylaws. Experience has indicated that these services are valuable resources to local planning efforts.

Towns are not required to but may request regional approval of their locally adopted plans. In conducting a formal review of these municipal plans, TRORC determines if these plans are:

1. Consistent with the goals in 24 VSA §4302;
2. Compatible with the Regional Plan;
3. Compatible with approved plans of other municipalities in the Region; and

4. Contain the elements of a plan outlined in 24 VSA §4382.

Twice in an eight-year period, regional planning commissions are also required to meet with communities to discuss their municipal planning process and report on how effectively the municipality's planning process is meeting state planning goals. Municipalities in our Region have already used the results of these consultations to improve their municipal plans and better comply with state planning goals.

Since both Town and Regional Plans have basically the same required elements, they naturally look somewhat like each other. The regional plan must, and Town Plans must also be consistent with the same set of state planning goals, furthering the similarities between the two. To the extent feasible, this Plan has been developed to reflect the general planning goals and policies expressed in plans of our member municipalities while ensuring consistency with state planning law. During the preparation of this Plan, Commissioners and staff attempted to maintain a close and coordinated working relationship with local public officials and the general public on matters relating to the purpose and application of this Plan, understanding that Town Plans often have more detailed maps and policies than the Region does.





## Goals and Recommendations: **Relationship of TRO Regional Plan to Neighboring Plans**

### **Goals**

1. Plans for the TRO Region and neighboring regions are mutually compatible.
2. Municipal Plans are compatible with the Regional Plan.

### **Recommendations**

1. TRORC will continue to actively coordinate with neighboring commissions and other organizations to achieve planning goals.
2. TRORC will work with other regional planning commissions to influence state and national policies that support our communities.
3. TRORC will actively participate in the permitting and planning of development, infrastructure, or services outside the Region that can impact the Region.
4. TRORC will work with member towns when updating their Town Plans in order to consider being compatible with plans of neighboring towns.

### Endnotes

- 1 <https://www.marcvt.org/>
- 2 <https://www.rutlandrpc.org/>
- 3 <https://acrpc.org/>
- 4 <https://nvda.net/>
- 5 <https://centralvtplanning.org/>
- 6 <https://uvlsrpc.org/about-uvlsrpc/>





# 13 | Plan Implementation

*Constructing Roberts Road Bridge, Woodstock | © Rita Seto*

## A. Determination of Substantial Regional Impact

State statute requires that TRORC define in this Plan what kinds of development would create a “substantial regional impact.” This threshold is used under Act 250 when there is a conflict between a town plan and this Regional Plan, as projects with “substantial regional impact” make the Regional Plan the primary planning document for Act 250 to consider, since such developments by their nature are regional in scope, and likely to affect the character of growth and development or impact infrastructure in adjacent towns. The “substantial regional impact” threshold does not

mean that a project is not desirable; it simply acknowledges that a proposed development has an effect that will be felt in a wider area.

For example, an industrial park or commercial complex located in one town will result in increased employment opportunities for the area, thus stimulating the demand for housing in neighboring towns. A resort complex that draws tourists from outside of the Region may impact the capacity of existing highways beyond the border of the town where the resort is located. The type, location, scale, and timing of the development are factors that determine the relative impact of growth in an area. Act 250 must give TRORC’s definition

“substantial deference”, according to the state law.

Furthermore, the relative capacity of an area to reasonably accommodate new development and the relationship of that development to existing and proposed development plans and policies for an area are determinates of substantial regional impact. A large project that generates traffic near a main highway is different than one that is on a small gravel road. Projects of such magnitude may be very beneficial, and this process is simply meant to ensure that they are thoughtfully reviewed with the impacts to the wider Region fully considered.

The specific criteria below qualify a development





that is subject to Act 250 permitting or requiring the issuance of a Section 248 or 248a Certificate of Public Good, as resulting in substantial regional impact:

1. A development, or series of affiliated or planned developments, that either in totality or cumulatively:
  - a. will contribute to a reduction in the peak hour level of service (LOS) on a town or state highway from D to E or from E to F; or
  - b. will contribute five percent or more traffic volume to the peak hour LOS D on a regionally significant local or state highway in or immediately adjacent to Regional Growth Areas or LOS C on regionally significant local or state highways in Rural Areas; or
  - c. will contribute five percent or more to the annual volume or tonnage of solid waste of the host municipality; or
  - d. will necessitate capital improvements, such as widening or signalization of regionally significant (Class II)

local or state highways, expansion of public sewer or water supply systems, additional fire apparatus, or expansion of schools; or

- e. will demand five percent or more of the average load of electrical energy on distribution lines during peak hours; or
- f. will necessitate capital grid improvements such as extension, upgrading, or enlargement of electrical transmission lines; or
- g. will increase the cost of energy for users in the Region immediately adjacent to the project site; or
- h. will generate new direct employment equal to or greater than 1% of the Region's existing employment level; or
- i. is located in areas of special flood hazard, necessary wildlife habitats or significant natural communities, Class 1 wetlands, areas identified with threatened or endangered species, source protection areas; or the Forest Based Resource Area; or
- j. A development that impairs the continued function of significant regional facilities, including but not limited to Interstate highway systems, waterways, educational institutions, hospitals, state or national recreational facilities, bridges, dams, or airports; or
- k. will entail residential construction where the total proposed housing units exceeds five percent of the total housing count of the host town; or
- l. will entail commercial or industrial

construction within a single or multiple buildings, of 10,000 square feet or more of gross floor area outside of a Regional Growth Area or 20,000 square feet or more of gross floor area inside such area; or

- m. will entail principal retail outside of Regional Growth Areas; or
- n. will entail any commercial development with structures of more than 2,000 square feet of floor space in the Forest-based Resource Area, or 4,000 square feet of floor space in Rural Areas; or
- o. will construct public, private, or nonprofit facilities or utilities meant to serve multiple towns within one mile of a municipal boundary; or
- p. affects the existing or potential capacity to provide essential or required public services by one or more municipalities adjacent to the municipality where the proposed development is located due to direct and indirect impacts; or
- q. will entail a new or expanded electric generating facility with a nameplate capacity of 2 Mw or greater.

## B. Implementation Mechanisms

Adoption of this Plan by itself does not have direct effects. This Plan comes to life through its use by TRORC and others. This section provides guidelines from which both public and private action can be taken to implement the goals and policies of the Plan. Implementation of the Plan consists of the following mechanisms:





1. regional planning;
2. municipal planning and implementation;
3. state and federal agency plans and capital projects;
4. coordination with regional entities;
5. legislative policy processes; and
6. public participation and coordination.

### Regional Planning

There are many issues that pass beyond the borders of an individual community and that require a broader level of consideration. Recognizing this, state statute enables regional planning as a way to acknowledge the need for planning and implementation beyond the municipal level. The Regional Plan is, by law, required to uphold Vermont's state planning goals ([VSA Title 24, Chapter 117, §4302](#)<sup>1</sup>). Through this Plan, those goals are implemented on a regional level.

While the Regional Plan does not have the same regulatory effect as municipal land use regulations, the policies and recommendations within this Plan do guide decision making at the state, regional, and local level. Under Act 250, the Regional Plan has a regulatory effect, as well as provides guidance for state review of projects such as cell towers or electrical generation (Section 248 and 248a); national planning and permitting of hydroelectric facilities, national forests, parks and trails; and management of state highways.

### Municipal Planning

The Planning and Development Act enables, but does not require, towns to establish planning programs to meet local needs ([24 VSA Chapter 117](#)<sup>2</sup>). If a municipality chooses to conduct a planning program, it must follow the statutory requirements in the Act, including being in conformance with the state planning goals and the required elements of a town plan. All thirty member towns in the Region have planning

programs and a Planning Commission appointed by their Selectboard. Town plans are the only statutorily created vehicles for communities to lay out their comprehensive vision for themselves.

Town plans form the foundation for regulatory and non-regulatory implementation tools that can be used by municipalities to achieve planning goals. Regulatory approaches include such actions as adopting zoning bylaws, subdivision regulations, impact fees, curb cut permits, health ordinances, noise ordinances, and junkyard ordinances. Non-regulatory approaches can include public facility projects, hazard mitigation plans, housing programs, purchase of development rights to conserve land, or adopting a capital budget to direct local funding and plan ahead for public improvements. Some of these tools are described below.

**Bylaws:** The best form of local control of land use is through implementation of the goals expressed as part of the municipal plan through zoning or subdivision bylaws adopted by towns. However, prior to having any land use bylaw, the municipality must have a municipal plan. Also, any bylaw in effect must serve to implement the plan and must be in accord with the policies of the plan in place at time of adoption ([24 VSA Chapter 117 §4401](#)<sup>3</sup>). Since municipal plans are updated every eight years, municipalities should also update their bylaws in a timely manner to reflect those changes.

**Capital Budgeting and Programming:** Capital budgeting and programming (CBP) is also a means of directing local public investments over a five-year period to implement community needs as expressed in the plan. The CBP establishes an order



Flume Model Demonstration | Source: TRORC Staff





of priority for major capital expenditures and sets forth a means of financing the investments. Read more about capital planning on [our website](#)<sup>4</sup>.

**Impact Fees:** Vermont enacted impact fee legislation to enable towns to require the beneficiaries of new development to pay their proportionate share of the costs for capital projects incidental to the impact of the development ([24 VSA Chapter 131](#)<sup>5</sup>). Impact fees require detailed capital budgeting careful accounting so that payment by the developer to the town covers the costs of the capital project attributable to them.

**Conservation and Housing Programs:**

Towns can support conservation programs done by others or directly undertake conservation through the municipal purchase of lands or easements. Town plans can call out specific properties or types of land that have a clear value to the community. Towns can likewise support the housing efforts of local, regional, and state housing agencies, or they can directly step into creating needed housing through grantmaking, fee reduction, using local lands, or creating needed infrastructure. Towns are enabled to create conservation commissions or housing commissions in Vermont Law.

**State and Federal Agency Plans and Capital Programs**

The Regional Plan is a place that our 30 towns can collectively influence State or Federal agency planning processes and capital projects, allowing more coordination between various agencies and local government. This can take place through FERC relicensing of dams, management plans for National



*Bridgewater Better Back Roads Discussion | Source: TRORC Staff*

Forests or State Parks, and other areas. Towns are encouraged to coordinate through TRORC on areas of interest.

**Coordination with Regional Entities**

Vermont law enables the creation of inter-municipal cooperative agreements, compacts, districts, and contracts by municipalities ([24 VSA Chapter 121](#)<sup>6</sup>). Under this law, towns may cooperatively organize to undertake a particular kind of project or service with other towns of similar needs. Given the complexity and economic costs associated with public services such as solid waste disposal, public safety, or public education, the creation of special purpose units of government within the Region is likely to continue.

TRORC recognizes these regional entities and seeks to work cooperatively with such organizations to ensure that the goals and policies of the Plan are fairly addressed and applied in the long-range planning operations of these entities. Regional entities currently formed in the Region include union school districts, fire and water districts, solid waste districts, and natural resources conservation districts.

In addition to intermunicipal organizations, there are many state and regional nonprofit corporations or organizations that operate to provide services or programs within the Region. Activities of these public service organizations are generally complementary and supportive of the general work of this Commission and specific Plan policies. TRORC co-



ordinates with these entities, to the extent practical, to promote the implementation of this Plan.

### Legislative Policy Processes

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TRORC works at the state and national level on legislation to inform policy makers of the needs of our towns and create legislation that will empower them to meet state planning goals and local planning goals.

### Public Participation and Coordination

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In order to implement this Plan, or any plan, local officials, agency administrators, policy makers, other governmental organizations, the public, and the private sector must understand the purpose and effect of this Plan on growth and development in the Region. Education of not only those entities that coordinate daily with TRORC but also the general public as to the Plan's policies and its implementation is essential. Plan implementation without public input is destined to have no support and thus to fail. A deliberate effort to involve the public in all aspects of the Plan development process was made.

Education of the public on the overall values of multiple town planning for an area will continue to be an ongoing function of TRORC as it seeks to implement this Plan with others.

Investment in efforts to improve the planning process by involving the public as an integral part of it will build greater consensus for the policies of this Plan and thus improve its implementation.

## C. Implementation of the Plan

This Regional Plan contains extensive goals, policies, and recommendations for action. While the goals and policies envision and support a desired future state that the Plan seeks to achieve, the recommendations for action are intended to actually implement the policies to reach the goals for the Region. To ensure that the Plan is implemented, an implementation matrix has been developed.

Appendix C: Implementation Matrix, collects a majority of the recommendations for action in this Plan and assigns a party (or parties) responsible for implementation. In addition, a rough timeframe for implementation is established, which is broken out into five groups:

- **ASAP** — The recommendation for action should be implemented as soon as feasibly possible by the responsible party. These recommendations usually reflect an urgent need.
- **Short-term** – The responsible party should implement the recommendation for action within 1-3 years of the adoption of this Plan.
- **Mid-term** – Mid-term recommendations for action should be implemented within 4-8 years of the adoption of this Plan. Recommendations of this nature often require specific funding that will need to be acquired before implementation, have multiple steps that must be taken to reach implementation, or require substantial public process.

- **Long-Term** – Recommendations for action that are important to this Plan but may take extensive effort and substantial shifts in policy at multiple levels of government are viewed as long term. Implementation of these action items may take longer than the eight-year life of this Plan.
- **Ongoing** – A substantial number of the recommendations for actions contained in this Plan represent a reaffirmation the day-to-day work of TRORC and our municipalities. By designating these action items as ongoing, the Regional Plan is acknowledging that these items are always being acted upon to further the goals of the Plan and the State of Vermont.

Estimated costs are broken into three groups:

- **Low** — less than \$10,000
- **Moderate** — \$10,000 to \$100,000
- **High** — more than \$100,000

### Tracking Progress

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An implementation plan is of no use if no action is taken to move forward. Because this is the Two Rivers-Ottauquechee Regional Plan, it falls to TRORC to monitor progress throughout the Plan's eight-year life.



Plan Implementation Endnotes

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- 1 <https://legislature.vermont.gov/statutes/section/24/117/04302>
- 2 <https://legislature.vermont.gov/statutes/chapter/24/117>
- 3 <https://legislature.vermont.gov/statutes/section/24/117/04401>
- 4 <https://www.trorc.org/capital-budgeting/>
- 5 <https://legislature.vermont.gov/statutes/chapter/24/131>
- 6 <https://legislature.vermont.gov/statutes/chapter/24/121>







# 14 | Definitions

Abbott Memorial Library in Pomfret | Source: Kevin Geiger

Words have meaning, and in the import of the goals and policies of this Plan depend on what people think those meanings are. Plans generally do not have definitions as they are not regulations and can be more ambiguous. However, for clarity's sake and for usage in areas where the Plan can have regulatory effect we have added definitions. Common words used in the Plan have the common meaning as one would find in a dictionary, unless otherwise defined. Certain common words, such as “development” do have specific meaning as defined in Vermont statutes and the statutory definitions of such words are to be used unless they are defined otherwise in this chapter.

**ACTIVE LIVING**—Active living is a way of life that integrates physical activity in daily routines.

**ACTIVE TRANSPORTATION**—Active transportation refers to any form of human-powered transportation: walking, cycling, using a wheelchair, in-line skating, or skateboarding. There are many ways to engage in active transportation, whether it is walking to the bus stop or cycling to school/work.

**ADAPTIVE REUSE**—The development of a new use for an older building or for a building originally designed for a special or specific purpose.

**AFFORDABLE HOUSING**—According to 24 VSA §4303, affordable housing means either of the following, based on tenure:

- a. Housing that is owned by its inhabitants whose gross annual household income does not exceed eighty percent of the county median income, or eighty





percent of the standard metropolitan statistical area income if the municipality is located in such an area, as defined by the United States Department of Housing and Urban Development, and the total annual cost of the housing, including principal, interest, taxes, insurance, and condominium association fees, is not more than thirty percent of the household's gross annual income.

- b. Housing that is rented by its inhabitants whose gross annual household income does not exceed eighty percent of the county median income, or eighty percent of the standard metropolitan statistical area income if the municipality is located in such an area, as defined by the United States Department of Housing and Urban Development, and the total annual cost of the housing, including rent, utilities, and condominium association fees, is not more than thirty percent of the household's gross annual income.

**AGING IN PLACE**—Allows individuals to remain at home or within a supportive living community as they age, without requiring the need to move as their needs increase over time.

**AGRICULTURE**—The production, keeping, or maintenance, for sale, lease, or personal use, of plants and animals useful to man, including but not limited to: forages and sod crops; grains and seed crops; dairy animals and dairy products, poultry, and poultry products; livestock, including beef cattle, sheep, swine, horses, ponies, mules, or goats, or any mutations or hybrids thereof, including the breeding and grazing of any or all of such animals; bees and apiary products; fur animals; trees and forest products; fruits of all kinds, including grapes, nuts, and berries; vegetables; nursery, floral, ornamental, and greenhouse products; or lands devoted to a soil conservation or forestry management program.

**ARCHEOLOGICAL SITE**—Land or water areas which show evidence or artifacts of human, plant, or animal activity, usually dating from periods of which only vestiges remain.

**BASE FLOOD ELEVATION (BFE)**—The water surface elevation resulting from a flood that has a 1 percent chance of equaling or exceeding that level in any given year. On the Flood Insurance Rate Map the elevation is usually in feet, in relation to the National Geodetic Vertical Datum of 1929, the North American Vertical Datum of 1988, or other datum referenced in the Flood Insurance Study report, or the average depth of the base flood, usually in feet, above the ground surface.

**BEST AVAILABLE TECHNOLOGY (BAT)**—Methods and products for design, operation, maintenance, retrofit, and function of activities which will result in the best reduction of undesired byproducts or effects currently achievable. BAT achievability is based upon the owner/operator's ability to implement the methods or products within their economic means. This type of technology is usually considered to be the "state-of-the-art" and achieves the best performance available.

EXAMPLES: Woodstoves achieving best EPA particulate standard performance, highest efficiency factory stack scrubbers, water treatment systems producing water of same or higher quality as the receiving water body.

**BEST MANAGEMENT PRACTICES (BMP)**—Methods of activity generally established by regulatory authorities and practitioners as the best manner of operation. BMPs are generally more stringent than AMPs. BMPs may not be established for all industries or in agency regulations, but are often listed by professional associations and regulatory agencies as the best manner of operation for a particular industry practice.

**BUILT ENVIRONMENT**—The built environment includes all of the physical parts of where we live and work (e.g., homes, buildings, streets, open spaces, and infrastructure).



**BUILD-OUT**—An estimate of the projected population, employment, traffic, utilities, and types/sizes of land uses in a project area or other designated area in accordance with the current zoning and other applicable regulations.

**CAPITAL IMPROVEMENTS PROGRAM (CIP)**—A proposed timetable or schedule of all future capital improvements to be carried out during a specific period and listed in order of priority, together with cost estimates and the anticipated means of financing each project.

**CLASS A AND B WATERS**—Class A waters are managed for enjoyment of water in its natural condition, as public drinking water supplies (with disinfection and filtration) or as high quality waters which have significant ecological values. Class B waters are managed for aesthetic values, recreation on and in the water, public water supply with disinfection and filtration, high quality habitat for aquatic biota, fish, and wildlife, irrigation and other agricultural uses. The Secretary of the Agency of Natural Resources may designate by permit portions of Class B waters as “Mixing Zones,” or “Waste Management Zones,” for any waste that has been properly treated to comply with federal and state effluent requirements.

**CLUSTER**—A development design technique that concentrates building in specific areas on the site to allow the remaining land to be used for recreation, common open space, and preservation of environmentally sensitive features.

**COMMERCIAL DEVELOPMENT**— Activity involving the sale of goods or services which are for profit.

**CULTURAL FACILITIES**—Establishments such as museums, art galleries, and botanical and zoological gardens of a historic, educational, or cultural interest which are not operated commercially.

**DESIGNATED GROWTH CENTERS**—A state designation as defined by 24 VSA 76A § 2793c.

**DWELLING, COMMERCIAL**—A commercial residential building, including but not limited to a nursing home, group home, residential care facility, or dormitory, which traditionally has common space and staff on site and in which rooms may not have all of the components of a dwelling unit and are not meant for transient occupation. An apartment building is a multi-family dwelling.

**DWELLING, SINGLE FAMILY**—A detached building used as a single dwelling unit.

**DWELLING, TWO-FAMILY**—A building containing two dwelling units. “Duplex” is synonymous with this definition.

**DWELLING, MULTI-FAMILY**—A building containing three or more dwelling units that is not a commercial dwelling.

**DWELLING UNIT**—One or more rooms, connected together, constituting a separate independent housekeeping establishment that is physically separate from other dwelling units that may be in the same structure, and containing facilities for its own independent living, including a toilet, lavatory, food preparation/kitchen facilities, and one or more bedrooms. The term shall not include rooms with such provisions intended for transient occupation in boarding houses, dormitories, hotels, or other similar buildings.

**DWELLING UNIT, ACCESSORY (ADU)**— A single unit dwelling within, attached or appurtenant to another single unit-dwelling on the same lot that is owner-occupied.

**EXPANSION AREAS**—Land that extends the cohesive core of Regional Growth Areas or Designated Downtowns, Villages, or Growth Centers, with or without the



presence of municipal sewer or water service. The land should be adjacent, as defined in 24 VSA §2791, to the cohesive core.

**FIXED ROUTE SERVICE**—A transportation service that travels along a predetermined route, with known stops, according to an established time schedule.

**FLOOD INSURANCE RATE MAP (FIRM)**—Official map of a community, on which the Federal Insurance Administrator has delineated both the Special Flood Hazard Areas and the risk premium zones applicable to the community. In some communities the hazard boundaries are available in paper, pdf, or Geographic Information System formats as a Digital Flood Insurance Rate Map (DFIRM).

**FLOODPLAIN**—Areas where excessive water flows over river banks and beyond shorelines, temporarily dispersing water, sediment, and energy.

**FLOODWAY**—A portion of the Special Flood Hazard Area, as mapped for the National Flood Insurance Program, that has protections for the movement of flood waters. Floodway means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot at any point.

**FLUVIAL EROSION**—Erosion caused by streams and rivers. Fluvial erosion can be catastrophic when a flood event causes a rapid adjustment of the stream channel size and/or location.

**FOREST-BASED RESOURCE AREA**—As used in this Plan, “Forest-Based Resource Area” means the future land use area identified as such in the Regional Future Land Use Area Map, and is a regional land use designation.

**FOREST BLOCK**—A contiguous area of forest mapped as a priority or high priority interior forest block on the [ANR Biofinder](#)<sup>1</sup> in any stage of succession and not currently developed for non-forest use. A forest block may include recreational trails, wetlands, or other natural features that do not themselves possess tree cover, and uses exempt from regulation under subsection 4413(d) of Title 24.

**FOREST FRAGMENTATION**—The division or conversion of a forest block by land development other than by a recreational trail or use exempt from regulation under subsection 4413(d) of Title 24.

**FORMULA RETAIL**— A type of retail store that is part of a chain of stores (more than 2) where the establishment maintains two or more of the following features: a standardized array of merchandise, a standardized facade, a standardized decor and color scheme, a uniform apparel, standardized signage, or a trademark or a servicemark.

**HABITAT CONNECTOR**— Land or water, or both, mapped as a priority or high priority connectivity block on the [ANR Biofinder](#)<sup>2</sup> that links patches of wildlife habitat within a landscape, allowing the movement, migration, and dispersal of animals and plants and the functioning of ecological processes. A habitat connector may include recreational trails and uses exempt from regulation under subsection 4413(d) of Title 24 VSA. Synonymous with wildlife corridor.

**HAMLET**— As used in this Plan, “Hamlet” or “Hamlet Area” means the general future land use area identified as such in the Regional Future Land Use Area Map and as specified in more detail in Town Plans, and is a regional land use designation for locally important groupings of buildings that are generally residential

<sup>1</sup> <https://anr.vermont.gov/maps-and-mapping/biofinder>.

<sup>2</sup> *Ibid.*



in nature, with a few stores and businesses supported primarily by local residents. Hamlets are not regional markets or trade centers, but minor community facilities and services sometimes are located in these areas.

**HEAVY INDUSTRIAL**—As used in this Plan, “heavy industrial” means the processing or assembly of natural or man-made materials or products where such activity generally results in off-site impacts, such as noise, and where such activity and storage of materials or products are typically not fully enclosed inside a building or screened from the abutting properties. Examples: rail and truck terminals; concrete, asphalt, or brick plants; bulk fuel storage and distribution facilities; solid waste facilities; foundry, etc.

**IMPERVIOUS SURFACE**—Any hard-surfaced, man-made area that does not readily absorb or retain water, including but not limited to building roofs, roadways, parking and driveway areas, graveled areas, sidewalks, and paved recreation areas.

**INCLUSIONARY ZONING**—Inclusionary zoning bylaws require a specified percentage of housing units in new planned unit development or subdivision to meet certain affordability standards, and comply with the following:

- a. Conform with municipal plan housing policies.
- b. Be determined based on municipal affordable housing needs, both rental and for sale.
- c. Include development incentives that contribute toward the economic feasibility of providing affordable housing units (ex: density bonuses and waivers).
- d. Require that, once built, affordable housing availability will be maintained through income qualification for residents, the promotion of affirmative marketing, and rent and resale pricing that remains affordable for a specified period of time on designated affordable units, as written in municipal bylaws.

**INDUSTRIAL AREA**—As used in this Plan, “Industrial Area” means the future land use area identified as such in the Regional Future Land Use Area Map, and is a regional land use area designation of land that is appropriate due to local plans, designs, and zoning as a location for one or more industrial buildings or uses, that may include adequate access roads, utilities, water, sewer, and other services necessary for the uses of the industrial buildings, and includes no principal retail use except that which is incidental to an industrial use. Industrial uses in this area may include both light industrial and heavy industrial uses.

**INDUSTRIAL**—As used in this Plan, “industrial” includes light industrial and heavy industrial.

**INTERCHANGE**—A grade separated system of access to and from major highways.

**INTERMODAL**—Transportation by more than one means of conveyance: as by foot, bike, car, truck, rail, air, etc.

**LAND-INTENSIVE COMMERCIAL USES**—As used in this Plan, “land-intensive commercial uses” are commercial operations that rely on large amounts of indoor or outdoor storage as the dominant use of space, and include, but are not limited to, sales lots and warehouses, but do not include retail stores.

**LEVEL OF SERVICE (LOS)**—Level of service is a qualitative measure defined as the ability of a maximum number of vehicles to pass over a given section of roadway or through an intersection during a specified time period, while maintaining a given operating condition.

1. **LOS**—Highest LOS, which describes primarily free-flow traffic operations at average travel speeds. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Stopped delay at intersections is minimal.





2. **LOS B**—Represents reasonably unimpeded traffic flow operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted and stopped delays are not bothersome. Drivers are not generally subjected to appreciable tensions.
3. **LOS C**—Represents stable traffic flow operations. However, ability to maneuver and change lanes may be more restricted than in LOS B, and longer queues and/or adverse signal coordination may contribute to lower average travel speeds. Motorists will experience an appreciable tension while driving.
4. **LOS D**—Borders on a range in which small increases in traffic flow may cause substantial increases in approach delay and, hence, decreases in speed. This may be due to adverse signal progression, inappropriate signal timing, high volumes, or some combinations of these.
5. **LOS E**—This represents traffic flow characterized by significant delays and lower operating speeds. Such operations are caused by some combination of adverse progression, high signal density, extensive queuing at critical intersections, and inappropriate signal timing.
6. **LOS F**—This represents traffic flow characterized by extremely low speeds. Intersection congestion is likely at critical signalized locations, with high approach delays resulting. Adverse signal progression is frequently a contributor to this condition.

**LIGHT INDUSTRIAL**—As used in this Plan, “light industrial” means a use involving research and development, assembly, processing, manufacturing, packaging of products, or storage and warehousing of materials or goods, conducted primarily within a building with few off-site impacts other than trucking.

EXAMPLES: cabinetry or woodworking shop, food processing, electronics high-tech manufacturing or assembly, machine shop, sewing, printing, research and testing laboratory, warehousing, and similar uses.

**MAXIMUM PEAK HOUR SERVICE VOLUME**—The maximum number of vehicles which have a reasonable expectation of passing over a given roadway section or through a given intersection under prevailing road and traffic conditions during a specified hour of time.

**MIXED-USE AREA**— As used in this Plan, “Mixed-Use Area” means the future land use area identified as such in the Regional Future Land Use Area Map, and is a regional land use area designation of land with a mixture of existing uses that is served by state highways, is generally multi-story, includes residential uses and deep lots, and is within walking distance of Regional Growth Areas. This Area is appropriate for recreational facilities, higher density residential, light industrial/manufacturing, land-consumptive commercial uses, service businesses, secondary retail, and uses not appropriate for the core of downtowns and villages, such as lumberyards, nurseries, warehouses, and kennels. Principal retail establishments are not allowed in this area.

**NFIP**—National Flood Insurance Program.

**NO ADVERSE IMPACT**—No Adverse Impact floodplain management is where the action of one property owner does not adversely impact the rights of other property owners, as measured by increased flood peaks, flood stage, flood velocity, and erosion and sedimentation.

**OPEN SPACE**—Any parcel or area of land or water essentially unimproved and set aside, dedicated, designated, or reserved for public or private use or enjoyment, or for the use and enjoyment of owners and occupants of land adjoining or neighboring such open space.

**PEAK HOUR**—As it is used in describing traffic volumes, it represents the hour of a twenty-four hour period in which the highest traffic volumes occur on a segment of roadway or at an intersection.



**PASSIVE OUTDOOR RECREATION**—Leisure time activities which use an outdoor public or private space that are not dependent upon structural facilities such as swimming pools, ball courts, etc.

**PLANNED UNIT DEVELOPMENT (PUD)**—Planned unit development is a design approach that balances intensive settlement with open land. Also known as “clustered housing,” developments can be designed to conserve energy; depending on the nature of construction, savings can be accrued on construction costs. PUDs facilitate efficient provision of municipal services such as fire protection, school transportation, and road construction or maintenance. The undeveloped open space reserved in PUDs is an asset for the landowners and municipalities. PUD design strategies should be employed in planning for development or subdivision of rural land in the Region.

**PRINCIPAL**—Means foremost or chief.

**PRINCIPAL (PRIMARY) RETAIL**—As used in this Plan, “principal (primary) retail” means a use whose primary use is the supply of merchandise or wares to the end consumer for use off site. Examples include (but are not limited to) supermarkets, hardware stores (without lumberyards), dry-goods stores, pharmacies, big box stores, etc. Principal retail does not include online sales with no product on site, land-consumptive intensive and resource-based commercial uses, service businesses, restaurants, retail as a home occupation, or secondary retail.

**PRISTINE WATERS**—Those waters having Class A status and those waters predominantly in their natural state relatively unaffected by human activity physically or aesthetically. Undeveloped lakes and ponds may be included in this category, as would streams and rivers unaffected by human activity. Pristine waters are generally accepted to be the finest unspoiled natural water bodies or other waters with Class A qualities.

**RECREATIONAL TRAIL**—A corridor that is not paved and that is used for hiking, walking, bicycling, cross-country skiing, snowmobiling, all-terrain vehicle riding, horseback riding, and other similar recreational activity.

**REGIONAL CENTER**—As used in this Plan, “Regional Center” means the future land use area identified as such in the Regional Future Land Use Area Map, and is a regional land use designation of an urban area where development is highly concentrated with a diverse mix of uses, where public sewer and water utilities exist, transportation infrastructure is capable of handling significant volumes of commuting and commercial traffic, sidewalks and transit are present, and buildings are often multi-story, particularly in the core of the area. Uses in the area include offices, principal retail, light industrial, residential, governmental and judicial functions, hospitals, schools, and cultural facilities. This area is identical to the State Designated Growth Center for Hartford.

**REGIONAL GROWTH AREA**—As used in this Plan, “Regional Growth Area” means any regional center, town settlement, village, or hamlet future land use areas.

**REGIONALLY SIGNIFICANT TRANSPORTATION FACILITIES**—Any facility primarily designed to rapidly and efficiently transport goods and passengers between towns and/or regions.

**RESILIENCE**—The ability of a system, community, region, or society exposed to hazards to resist, absorb, accommodate to, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

**RESOURCE-BASED COMMERCIAL USES**—As used in this Plan, “resource-based commercial uses” means commercial uses and any associated structures such as sawmills, quarries, sandpits, outdoor recreation facilities, nurseries, and agricultural buildings that are dependent on resources existing, generated or processed at the site and may include secondary retail of products entirely produced on site, provided that retail floor space is less than floor space dedicated to production



and does not exceed 2,000 square feet, whichever is less.

**RIPARIAN BUFFER**—A vegetated area (a “buffer strip”) near a stream, usually forested, which helps shade and partially protect a stream from the impact of adjacent land uses. It plays a key role in increasing water quality in associated streams, rivers, and lakes, thus providing environmental benefits. With the decline of many aquatic ecosystems due to agricultural production, riparian buffers have become a very common conservation practice aimed at increasing water quality and reducing pollution.

**RIVER CORRIDOR**—The land area adjacent to a river that is required to accommodate the dimensions, slope, platform, and buffer of the naturally stable channel, and necessary to maintain or restore fluvial equilibrium conditions and minimize fluvial erosion hazards, as delineated by the Agency of Natural Resources in accordance with river corridor protection procedure.

**RURAL AREA**—As used in this Plan, “Rural Area” means the future land use area identified as such in the Regional Future Land Use Area Map, and is a regional land use designation.

**SECONDARY OR ANCILLARY RETAIL**—A business whose primary use is not retail sales but contains a retail component that is clearly secondary to the primary use. Examples include (but are not limited to) eye doctor’s offices, veterinarian’s offices, small engine repair shops, manufacturers with a small showroom, etc. The term also includes retail within a multi-story, mixed-use building in a Mixed-Use Area where any total retail floor space is less than the total residential floor space, and any individual retail use in such a mixed-use building does not exceed 4,000 square feet.

**SERVICE BUSINESS**—Any establishment whose primary activity is the provision of services and retail associated with that service assistance, as opposed to the sole provision of products to individuals, businesses, industry, government, or other enterprises. Such businesses include fuel distributors, auto body shops, storage units, vehicle and tire sales with repair, heavy equipment and small engine sales with repair, landscaping contractors with a yard that has trees and mulch available, etc.

**SMART GROWTH PRINCIPLES**—Growth that:

- a. Maintains the historic development pattern of compact village and urban centers separated by rural countryside;
- b. Develops compact mixed-use centers at a scale appropriate for the community and the region;
- c. Enables choice in modes of transportation;
- d. Protects the state’s important environmental, natural, and historic features, including natural areas, water quality, scenic resources, and historic sites and districts;
- e. Serves to strengthen agricultural and forest industries and minimizes conflicts of development with these industries;
- f. Balances growth with the availability of economic and efficient public utilities and services;
- g. Supports a diversity of viable businesses in downtowns and villages;
- h. Provides for housing that meets the needs of a diversity of social and income groups in each community;
- i. Reflects a settlement pattern that, at full build-out, is not characterized by:
  - Scattered development located outside of compact urban and village centers that is excessively land consumptive;



- Development that limits transportation options, especially for pedestrians;
- The fragmentation of farm and forest land;
- Development that is not serviced by municipal infrastructure or that requires the extension of municipal infrastructure across undeveloped lands in a manner that would extend service to lands located outside compact village and urban centers;
- Linear development along well-traveled roads and highways that lacks depth, as measured from the highway.

**SOILS, PRIMARY AGRICULTURAL**—A farmland soils map unit that the Natural Resources Conservation Service of the U.S. Department of Agriculture (NRCS) has identified and determined to have a rating of prime or statewide significance. For the purposes of this Plan, Prime Agricultural Land is synonymous with this definition.

**SOILS, PRODUCTIVE FOREST**—Those soils which are not primary agricultural soils but which have a reasonable potential for commercial forestry and which have not been developed. In order to qualify as productive forest soils, the land containing such soils shall be of a size and location, relative to adjoining land uses, natural condition, and ownership patterns, so that those soils will be capable of supporting or contributing to a commercial forestry operation. Land use on those soils may include commercial timber harvesting and specialized forest uses such as maple sugar or Christmas tree production.

**SOURCE PROTECTION AREA (SPA)**—The surface and subsurface area surrounding a public water source system, through which contaminants are likely to move toward and reach the water well or well-field during normal pumping activity. Synonymous with “Wellhead Protection Area” (WHPA). Most often delineated by the Vermont Department of Health.

**SPECIAL FLOOD HAZARD AREA**—Synonymous with “area of special flood hazard.” The floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. This area is usually labeled Zone A, AO, AH, AE, or A1-30 in the most current flood insurance studies and on the maps published by the Federal Emergency Management Agency. Please note, where floodways have been determined, they may be shown on separate map panels from the Flood Insurance Rate Maps.

**SPRAWL**—Dispersed auto-dependent development occurring outside of compact urban and village centers, along highways, and in rural countryside. Sprawl is typically characterized by:

- a. Excessive land consumption;
- b. Low densities in comparison with older centers;
- c. Lack of choice in ways to travel;
- d. Fragmented open space, wide gaps between development, and a scattered appearance;
- e. Lack of choice in housing types and prices;
- f. Separation of uses into distinct areas;
- g. Repetitive one-story development;
- h. Commercial buildings surrounded by acres of parking;
- i. Lack of public spaces and community centers.





**STRIP DEVELOPMENT**—Linear commercial development along an arterial highway leading from an urban or village center or connecting two centers. Strip development has many characteristics, not all of which need to occur for strip development to be present. The characteristics of strip development include, but are not limited to, the following:

- a. Use of individual curb cuts for each project along the highway;
- b. Lack of connections between the projects, except for the highway connection;
- c. One-story buildings containing a single type of use;
- d. Little to no pedestrian circulation between projects on the strip;
- e. Accessibility of individual projects primarily to automobiles;
- f. Separation of projects by parking lots;
- g. Individual project design, signage, lighting, parking, and landscaping; lack of coordination between projects concerning these items, causing cluttered appearance;
- h. Narrow depth and broad street frontage of project parcels to take advantage of exposure on the arterial highway.

**SUBSTANTIAL REGIONAL IMPACT**— A threshold for review under Act 250 and precedence of this Regional Plan as defined in Chapter 13 of this Plan under the authority of VSA Title 24, Chapter 117 §4345a(17).

**STRUCTURE**—An assembly of materials for occupancy or use.

**TAX INCREMENT FINANCING (TIF)**—Provides authority for municipalities to bond for indebtedness due to infrastructure improvements within a TIF District.

**TOWN CENTER**— As used in this Plan, “Town Center” means the future land use area identified as such in the Regional Future Land Use Area Map, and is a regional land use designation that contains a concentrated mix of uses at a high level of density. They are areas where central public utilities for water and/or sewer are available and where there exists a central location for commercial activities, schools, and cultural and civic activities for the town and the surrounding communities. Uses in the area include offices, principal retail, light industrial, residential, governmental, clinics, schools, and cultural facilities.

**TRANSIT DEVELOPMENT PLAN (TDP)**—A regionally developed transit plan approved by the Agency of Transportation which outlines passenger transportation needs and quality of service in the region. The TDP’s goals are to be incorporated into the transportation elements of Regional Plans prepared by regional planning commissions.

**TRANSPORTATION IMPROVEMENT PROGRAM (TIP)**—A staged, multi-year, intermodal program of transportation projects, funded by the Federal Highway Administration or Federal Transit Administration, which are consistent with the Statewide Long Range Transportation Plan and its planning processes.

**TRAVELER SERVICES**—Establishments whose primary purpose is to assist road travelers. These establishments would provide easy access to fuel, prepared food, restroom facilities, commuter parking, lodging, or travel information. Establishments that fall under this definition do not include primary or principal retail establishments such as supermarkets, hardware stores, dry-goods stores, pharmacies, or big box stores.

**UNIVERSAL DESIGN**—Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need



for adaptation or specialized design.

**USE**– As used in this Plan, “use” is a commercial, public, nonprofit, or private entity, and any associated structures, operating on lands and/or in a building or part thereof.

**VILLAGE SETTLEMENT**– As used in this Plan, “Village Settlement” or “Village Settlement Area” means the future land use area identified as such in the Regional Future Land Use Area Map, and is a regional land use designation for a compact settlement that normally consists of a mix of uses, including principal retail, at medium to high densities based on the availability of municipal water and/or sewer. Unlike Regional Centers and Town Centers, Village Settlements are not regional markets or trade centers and typically serve a local clientele and visitors.

**WETLAND**–Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

**WORKFORCE HOUSING**–Housing that is in close proximity to employment centers and is typically affordable (requiring no more than 30% of income) to members of the community who are gainfully employed making up to 150% of HUD area median income.



# APPENDICES

Appendices and maps are also available on this link, as well as below: <https://www.trorc.org/trorc-regional-plan/>

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U.S. Census Bureau, 2018-2022 American Community Survey 5-Year Estimate Tables S0101, S1701, S2504, and S1810. All other data are drawn from the 2020 Decennial Census, Table P1.

<i>Transit Dependent Demographic Groups by Town</i>												
Town	Total Population	Residents Aged 15-19	% Residents Aged 15-19	Residents Aged 65+	% Residents Aged 65+	Residents With Known Poverty Status	Residents Living Below Poverty Line	% Residents Living Below Poverty Line	Occupied Housing Units with No Vehicle	% Housing Units with No Vehicle	Residents Aged 16-64 with Disability	% Residents Aged 16-64 with Disability
Barnard	992	78	6.80%	201	17.60%	1141	36	3.2%	0	0.0%	94	8.2%
Bethel	1942	30	1.60%	437	23.60%	1841	139	7.6%	12	1.4%	271	14.6%
Bradford	2790	207	7.40%	643	23.00%	2717	271	10.0%	61	5.0%	524	18.8%
Braintree	1207	67	7.10%	351	37.30%	940	107	11.4%	0	0.0%	172	18.3%
Bridgewater	903	25	2.70%	216	23.30%	926	122	13.2%	41	8.9%	130	14.0%
Brookfield	1244	41	2.80%	412	28.10%	1461	128	8.8%	24	3.7%	222	15.2%
Chelsea	1233	118	9.10%	284	21.90%	1270	161	12.7%	18	3.4%	202	15.9%
Corinth	1455	63	4.00%	364	23.20%	1567	171	10.9%	32	4.6%	280	17.9%
Fairlee	988	31	2.70%	379	32.70%	1154	123	10.7%	12	2.2%	167	14.5%
Granville	301	9	2.40%	67	18.10%	371	9	2.4%	2	1.2%	25	6.7%
Hancock	359	15	3.10%	93	19.40%	475	49	10.3%	1	0.5%	71	15.1%
Hartford	10686	464	4.30%	2,370	22.20%	10591	972	9.2%	312	6.9%	1738	16.4%
Hartland	3446	207	6.00%	827	24.00%	3452	324	9.4%	13	0.9%	430	12.4%
Newbury	2293	89	4.30%	440	21.30%	2065	218	10.6%	74	8.0%	304	14.7%
Norwich	3612	269	7.40%	508	14.00%	3620	195	5.4%	31	2.4%	279	7.7%
Pittsfield	504	23	5.30%	115	26.30%	438	19	4.3%	9	4.2%	71	16.2%
Plymouth	641	14	2.30%	120	19.50%	616	15	2.4%	0	0.0%	106	17.2%
Pomfret	916	25	2.90%	257	30.10%	854	56	6.6%	0	0.0%	75	8.8%
Randolph	4774	406	8.50%	1,078	22.50%	4436	291	6.6%	145	7.1%	730	15.4%
Rochester	1099	35	2.70%	491	37.80%	1299	137	10.5%	38	5.6%	253	19.5%
Royalton	2750	65	2.40%	597	21.70%	2747	274	10.0%	30	2.9%	374	13.6%
Sharon	1560	121	8.10%	348	23.20%	1499	107	7.1%	18	3.1%	181	12.1%
Stockbridge	718	31	4.00%	160	20.70%	772	25	3.2%	3	0.8%	66	8.5%
Strafford	1094	90	7.50%	304	25.20%	1208	32	2.6%	3	0.6%	105	8.7%
Thetford	2775	178	6.40%	527	18.90%	2741	181	6.6%	0	0.0%	297	10.7%
Topsham	1199	50	5.00%	207	20.60%	1005	213	21.2%	28	6.5%	158	15.7%
Tunbridge	1337	39	3.20%	189	15.60%	1199	188	15.7%	7	1.4%	158	13.1%
Vershire	672	36	4.70%	198	25.90%	754	121	16.0%	5	1.4%	118	15.6%
West Fairlee	621	58	7.40%	221	28.10%	783	40	5.1%	5	1.5%	134	17.0%
Woodstock	3005	218	7.20%	884	29.30%	2978	157	5.3%	62	4.5%	245	8.2%
<b>Total</b>	<b>57116</b>	<b>3102</b>	<b>5.4%</b>	<b>13288</b>	<b>23.3%</b>	<b>56920</b>	<b>4881</b>	<b>8.5%</b>	<b>986</b>	<b>1.7%</b>	<b>7980</b>	<b>14.0%</b>





## Appendix C: Implementation Matrix

<b>HEALTHY COMMUNITIES: CHAPTER 2</b>					
Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b><i>Community Design, the Built Environment, and Healthy Food Access</i></b>					
TRORC should organize and host a regional public health summit.	TRORC/VDH	Low	Ongoing	Medium	Various
TRORC should partner with schools that have limited access to nutritious food and would like to partner with local farms.	TRORC/VDH	Low	Ongoing	Medium	Various
Municipalities should connect with the Vermont Farm to Plate and Farm to School networks to see how they can best promote the consumption of locally grown foods by their residents.	Municipalities	Low	Ongoing	Medium	Various
TRORC and/or the State should create mapping resources, showing: A) Locality of grocers, convenience stores (if healthy food options are offered), farmers markets, farms, agricultural institutions, community gardens, food banks, and food pantries. B) Overlaying public transportation routes to food stores and shelves. C) Location of low-income census tracts.	TRORC/State	High	Long-term	Medium	Various
Municipalities should promote and expand farmers markets and community gardens by identifying locations for such activities and letting potential organizers know of these sites.	Municipalities	Low	Ongoing	Low	Various
Municipalities should support the preservation of large and small blocks of productive agricultural land.	Municipalities	N/A	Ongoing	Medium	N/A
TRORC should conduct a food system analysis for the Region.	TRORC/NGOs	Moderate	Long-term	Low	Various
TRORC will support Towns in establishing community nursing / community health worker services.	TRORC/ Municipalities	N/A	Ongoing	Medium	N/A
TRORC will support Towns in planning for built environments that are ADA compliant.	TRORC/ Municipalities	N/A	Ongoing	Medium	N/A
<b><i>Healthy Places</i></b>					
TRORC will encourage towns to implement greenhouse gas reduction strategies in their plans.	TRORC/ Municipalities	Low	Ongoing	Low	Various
TRORC and municipalities should participate in health impact assessments for development projects.	Municipalities	Moderate	Mid-term	Medium	Grants



**HEALTHY COMMUNITIES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC should assist municipalities in assessing and remediating brownfields, especially those with hazardous building materials.	State/Other	High	Ongoing	High	State/Private
Municipalities should encourage the renovation of existing housing stock and development of new housing stock in compliance with healthy home and energy efficiency best practices.	Municipalities	High	Ongoing	High	Various
<b>Active Living and Transportation</b>					
When requested, the State and/or TRORC assist municipalities with mapping connectivity to essential services, walkable routes, recreation opportunities, and transportation options.	TRORC/State	Moderate	Long-term	Low	VTrans
TRORC and municipalities should plan for bike-friendly state highways to connect village centers, if feasible.	TRORC/VTrans/ Municipalities	High	Ongoing	Low	VTrans
Municipalities should conduct walkability and bikability assessments.	TRORC	Low	Ongoing	Low	VTrans
The State and TRORC will educate decision makers on links between safe streets and health.	TRORC/State	N/A	Ongoing	Low	N/A
TRORC will collaborate with local agencies and communities to explore Safe Routes to Schools programs and Vermont's Complete Streets program.	TRORC/State/ Municipalities	Moderate	Ongoing	High	VTrans
Municipalities should promote joint use of park and recreation facilities between communities and ensure that residents without cars have access to outdoor recreation opportunities.	Municipalities	N/A	Ongoing	Medium	N/A
<b>Social Inclusion</b>					
Municipalities should evaluate how to make public gathering spaces more accessible and welcoming to people of all abilities and identities.	Municipalities	N/A	Ongoing	Low	N/A
Public health professionals should educate decision makers on the link between social support and health.	Other	N/A	Ongoing	Medium	N/A
TRORC will provide training for neighborhood residents to participate in boards and commissions.	TRORC/State	Low	Short-term	High	Various
Municipalities should support diversity, equity, inclusion, and justice initiatives such as audits or surveys, committees, celebration events, etc.	Municipalities	Low	On-going	Medium	Various



**HEALTHY COMMUNITIES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b>Substance Misuse Prevention</b>					
With the help of public health professionals, municipalities should assess the types of substance use problems within their community.	TRORC/ Municipalities/ VDH	High	Ongoing	Low	VTrans
Municipalities should continue to raise awareness of the nature and seriousness of health issues.	Municipalities	Low	Ongoing	Medium	N/A
Municipalities should assess the community's readiness for prevention, review current programs already in place, and identify service gaps and barriers.	Municipalities	Low	Ongoing	Medium	N/A
Municipalities should convene community organizations who serve youth and local leaders to capture ideas and resources to help implement and sustain research-based programs to promote clear expectations around substance use for youth.	Municipalities / VDH	Low	Ongoing	Medium	N/A
Municipalities should provide plenty of substance-free recreational opportunities for youth and overall community participation. Municipalities should consider establishing substance-free public spaces, events, and buffer zones around sensitive areas (e.g., libraries, community centers, etc.) to reduce youth exposure and support those who are in recovery.	Municipalities	N/A	Short-term	High	N/A
<b>Healthcare Facilities</b>					
TRORC and municipalities should evaluate and address barriers to health care access, including but not limited to transportation, service gaps and redundancy, education, language, cost of services, immigration status, and providers' competency and sensitivity in working with underserved populations.	TRORC/ Municipalities	Low-Moderate	Short-term	High	Various
TRORC should review local zoning and subdivision regulations to ensure that they do not prohibit healthcare facilities in appropriate areas and should assist with bylaw revisions as needed.	TRORC	Low	Ongoing	High	Various
TRORC will provide support for the development of new facilities by reviewing any potential projects before they are submitted to the District Environmental Commission to reduce the possibility that a permit will be denied, delayed, or heavily conditioned.	TRORC	Low-Moderate	Short-term	High	Various



## LAND USE: CHAPTER 3

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b>Rural Areas</b>					
TRORC will work with towns and developers to site housing in Rural Areas to meet housing needs. (See also the Homes in the Region chapter.)	TRORC/ Municipalities	Moderate	Ongoing	High	Various
TRORC will work to ensure that agriculture in these areas remains an important part our economy. (See also the Economic Development chapter.)	TRORC/Dept of Ag	N/A	Ongoing	Medium	Various
TRORC will work with towns, state and federal agencies, and conservation organizations to conserve important forest and agricultural lands.	TRORC/Dept of Ag	N/A	Ongoing	Medium	Various
TRORC will work with member towns on Town Plans and bylaws to address development in the Rural Areas so that it meets state planning goals and the desires of towns.	TRORC/ Municipalities	Low	Ongoing	Medium	State
<b>Forest-Based Resource Areas</b>					
As habitat data is updated, TRORC will re-evaluate this land use area to ensure that its purposes are being met.	TRORC	Low	Mid-term	Low	N/A
TRORC will work to ensure that the functions of these areas are economically valued so that both the towns containing them and their owners have incentives to leave them in a largely undeveloped state.	TRORC	Low	Ongoing	Medium	N/A
TRORC will work with state and federal agencies and conservation organizations to conserve these lands in ways that also support the local economy and bring value to landowners.	TRORC/ANR/ NGOs	Moderate	Ongoing	Medium	Federal/State
TRORC will work with member towns on Town Plans and bylaws that will address smaller development not subject to Act 250 so that it is done in ways that preserve the functions of these areas while allowing compatible development.	TRORC/ Municipalities	Low	Ongoing	Medium	State
<b>Flood Resilience</b>					
TRORC will work with towns to strengthen their Flood Hazard Bylaws in order to mitigate risks to public safety, critical infrastructure, historic structures, and municipal investments from inundation and erosion.	TRORC/ANR	Low	ASAP	High	ANR/DEHMS





**LAND USE** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will work with VTrans on advocating for and improving the flood capabilities of state- or town-owned transportation infrastructure.	TRORC/VTrans	N/A	ASAP	High	DEMHS
TRORC should continue working with the emergency coordinators and selectboards from each town to develop mitigation plans and emergency preparedness and recovery procedures from flooding.	TRORC/ Municipalities	Low	Ongoing	High	DEMHS
Existing homes and businesses at serious risk of flood damage should be identified and prioritized by towns in concert with the VT ANR River Management Section and TRORC for mitigation actions such as elevation/relocation or purchase and demolition.	TRORC/ Municipalities/ ANR	High	ASAP	Medium	HMGP
To fully address flood risks, towns should add areas not designated in either FEMA's maps or in VT ANR's maps but that are flooded during a weather event to local flood regulations.	Municipalities/ ANR	Low	Ongoing	Medium	N/A
Watershed-level planning should be done by towns with assistance from TRORC to evaluate natural and constructed flood storage options upstream of existing areas of concentrated development that are at risk of flooding.	TRORC/ Municipalities	Moderate	Mid-term	Medium	ANR
TRORC will work with VT ANR, towns, and landowners to lessen flood risk by restoring natural channel functions through berm or dam removal or intentional lowering of streambanks.	TRORC/ANR/ Municipalities	High	Ongoing	Medium	Various
TRORC will work with towns to understand the impact stormwater runoff has on the Region and on specific towns, and then work to address impacts from impervious surfaces through increased retention and infiltration.	TRORC/ANR	Moderate	Ongoing	High	Various
The State should institute a permanent buyout program to continue to lessen flood risk.	State	High	Ongoing	High	Various
TRORC will work with VT ANR to adjust the boundaries of river corridors in developed areas per the Vermont Flood Hazard Area and River Corridor Protection Procedure.	TRORC/ANR	Moderate	Ongoing	Medium	Various



## TRANSPORTATION: CHAPTER 4

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b>Overall Transportation</b>					
Towns should identify dead-end Class 3 town roads that serve few structures and consider reclassification to Class 4 to reduce town expenses.	Municipalities/ State	Low	Ongoing	Low	N/A
TRORC will work with towns during plan and bylaw revisions to connect housing needs to transportation systems.	TRORC	Low	Ongoing	High	Various
TRORC will work with local highway departments, as requested, to assist with compliance with the Municipal Roads General Permit to minimize stormwater runoff, minimize road/river conflicts, and minimize roadway erosion.	TRORC/ Municipalities	High	Ongoing	High	State/Federal
TRORC will assist the towns in minimizing the use of impervious surfaces for parking through shared parking, reduced parking requirements when supported by data, or phased parking development when demand arises.	Municipalities/ TRORC	N/A	Ongoing	Medium	N/A
TRORC will continue to ensure that regional transportation planning activities are integrated with land use planning and economic development planning efforts.	TRORC	Low	Ongoing	Medium	N/A
TRORC will offer support to towns in capital budgeting for transportation facilities and related equipment.	TRORC/ Municipalities	Low	Ongoing	Medium	State
TRORC will work with towns and Vermont Agency of Transportation to identify poor pavement conditions for paving projects.	TRORC/VTrans	Low-Moderate	Ongoing	Medium	VTrans
TRORC will continue to work with towns to identify and address road safety risks through the Vermont Agency of Transportation's Strategic Highway Safety Plan and through town requested Road Safety Audits.	TRORC/State	Low	Ongoing	Medium	VTrans
TRORC shall assist interested communities with studies and planning designed to improve multi-modal networks in Regional and Town Centers, such as the development of the Upper Valley U.S. Route 4 commuter bus service.	TRORC	Low	Ongoing	Medium	Various
TRORC will assist public transit providers in assessing unmet transit needs, such as bike storage for riders and better connections to destinations. Strategies could include, but are not limited to, improving coordination between providers to identify and address underutilized capacity of existing services.	TRORC/Transit Providers	Moderate	Ongoing	High	State



**TRANSPORTATION** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
The Transportation Advisory Committee (TAC) shall continue to identify park and rides which are in need of state investments and improvements.	TRORC	Moderate	Ongoing	High	State
TRORC will work with towns and the Vermont Agency of Transportation to implement pedestrian and bicycle accommodations (including transit connectivity) in all its planning, engineering, and construction related activities. This may include the development of free-standing Bicycle and Pedestrian Plans.	TRORC/State	Low-Moderate	Ongoing	Medium	Various
TRORC will work with towns to support land use regulations (i.e. increasing the density and mixed-use development pattern) that improves walking and bicycling conditions, and also bring parking regulations into compliance with recent legislation.	TRORC/ Municipalities	N/A	Ongoing	High	N/A
TRORC will continue to support municipal planning for safe routes to school, especially within densely settled villages or town centers.	TRORC	N/A	Ongoing	High	N/A
VTrans should take over Route 132 as a state highway.	VTrans	N/A	Ongoing	Low	N/A
TRORC will work with towns during plan and bylaw revision to ensure road infrastructure takes account of the needs of all road users and is designed to facilitate safe behaviors (i.e., clear road signage and markings, traffic calming designs, and promotion of physical barriers of road users including use of protected bicycle lanes and pedestrian-only zones	TRORC	Moderate	Ongoing	Medium	N/A

**ECONOMIC DEVELOPMENT: CHAPTER 5**

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b>Healthcare Facilities</b>					
TRORC will assist towns with Act 250 support, zoning bylaw revisions, and grant and loan management to further the development of desired job growth and workforce housing close to our Region's core economic areas.	TRORC	Low-Moderate	Ongoing	High	Various
TRORC will assist towns in asset management, capital budgeting, and shared services/purchasing to lower costs and stabilize taxes.	TRORC	Low	Ongoing	High	Various



**ECONOMIC DEVELOPMENT** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will participate in discussions to improve the regulatory system at the state level and improve permitting coordination between local and state levels of government.	TRORC	N/A	Ongoing	Medium	N/A
TRORC will work with Vermont state agencies, regional and local development groups, trade associations, Chambers of Commerce, planning commissions, and other groups to integrate land use planning with economic planning and development programs based on our Region's assets.	TRORC/State/ Nonprofits	Low	Ongoing	Medium	Various
Public agencies, schools, and private businesses should expand workforce training and education that aligns with the strategic needs of our Region's current and future employers.	TRORC/State/ Municipalities/ Non-profits	N/A	ASAP	High	N/A
TRORC will work with the Vermont Arts Council to support regional and statewide creative zones.	TRORC/VAC	Low	Ongoing	Medium	Various
TRORC will work with towns and development organizations in the Region to identify and undertake brownfields assessments to rehabilitate underutilized sites and buildings most suitable for near-term commercial and residential development in existing downtowns and villages where water, sewer, power, Internet, and roadways have capacity.	TRORC/ Nonprofits	Low	Ongoing	Medium	Various
TRORC should work with local producers, development corporations, educational programs, the Vermont Agency of Agriculture, and other organizations to study, identify, and create needed processing, storage, and distribution capacity for locally made food and forestry products; and other types of incubator/maker spaces	TRORC/State/ Non-profits/ Businesses	Low-Moderate	Short-term	Medium	Various
TRORC should work with land trusts and local conservation commissions to inventory farm and forest lands to understand where parcels are available that could provide opportunities for new farm and forest businesses and to assist towns in crafting regulations to reduce fragmentation and leave land available for farming, forestry, and other land-based businesses.	TRORC/ Nonprofits	Low-Moderate	Short-term	Medium	Various
TRORC strongly supports property tax reform efforts at the local and state levels that would reduce the costs of land ownership for farming and forestry, while protecting against the Current Use Program's use as a low-cost vehicle for speculative holding of property for future development.	Municipalities/ States	N/A	Short-term	Medium	N/A





**ECONOMIC DEVELOPMENT** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
The Natural Resource Conservation Service, Conservation Districts, University of Vermont Extension, and others should continue efforts to educate landowners on the benefits of maintaining and improving the health of forests.	Municipalities/ Nonprofits	High	Ongoing	Medium	N/A



## NATURAL RESOURCES: CHAPTER 6

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b>Groundwater</b>					
TRORC will work with the Agency of Natural Resources and with towns to identify and map aquifers and aquifer protection areas to determine critical areas for protection of drinking water supplies.	TRORC/ANR	Medium	Mid-term	Medium	Various
Towns should develop Source Protection Plans for public water supplies or aquifers that have been identified. Such programs may include limiting or prohibiting development and other land uses within wellhead or aquifer protection areas.	Municipalities	Low-to-Moderate	Mid-term	Low	State/Municipal
The Legislature must keep the Petroleum Cleanup Fund at a level sufficient to meet all cleanup needs, including enforcement.	Legislature	High	Ongoing	High	Federal/State
TRORC will work with the Agency of Natural Resources, town officials, and others on educational outreach about the proper use of floor drains and local spill response capacity.	TRORC/ANR	Low	Ongoing	Low	State/Regional
TRORC will coordinate with EPA, the Agency of Natural Resources, other state agencies, and local officials in the assessment, cleanup, and redevelopment of contaminated (brownfield) sites.	TRORC/ANR	Low	Ongoing	Low	State/Regional
TRORC will assist towns when requested to identify, monitor, and search for federal funding programs to conserve and protect important local groundwater resources as part of their planning programs.	TRORC/DEC	Moderate	Ongoing	Medium	State
<b>Surface Water</b>					
Municipalities need to review existing and proposed water quality classifications of surface waters within town boundaries, or within basins, to determine if classifications meet their uses and needs. Both TRORC and the Agency of Natural Resources are available to provide support.	Municipalities	N/A	Ongoing	Medium	N/A
Municipalities must play an active role in the basin planning process and prepare water resources elements in municipal plans that comply with state and federal laws.	Municipalities	Low	Ongoing	Medium	MPG
The Vermont Department of Environmental Conservation's listing of threatened and impaired waters must be targeted for immediate attention by the Department.	ANR	N/A	ASAP	High	N/A
Towns in the Region are encouraged to cooperate on a watershed-wide basis when planning for surface water quality and use.	Municipalities	N/A	ASAP	High	N/A



**NATURAL RESOURCES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC, in cooperation with the Vermont Watershed Management Division, the Agency of Natural Resources, Vermont Local Roads Program, and the Agency of Transportation, should advise town officials on cost-effective road erosion and sediment control.	TRORC/ANR	Low	Ongoing	Medium	VTrans/ANR
TRORC shall continue to participate in watershed and basin planning efforts.	TRORC	Low	Ongoing	High	ANR
Unless there are specific public benefits to lower classifications, the Agency of Natural Resources must adopt the highest possible classification, water management types, and uses for water bodies based on their actual conditions and uses, or that which is reasonably attainable if higher.	TRORC/ANR	N/A	Per Basin Plans	High	N/A
Public and private sectors should refrain from activities that spread invasive plants such as ill-timed roadside mowing, transporting invasive plants in ditch soil, and the cleaning of mowing and earthmoving equipment after working in an infested area. Road maintenance personnel should be trained to recognize the invasive plants on the Vermont Noxious Weed Quarantine List and Watchlist	Towns/ VTrans	Low	ASAP	High	N/A
The Agency of Natural Resources and local watershed groups are encouraged to monitor water quality, and when monitoring indicates a water quality violation, to promptly locate and address the source of degradation when possible.	ANR/Watershed Groups	N/A	Ongoing	Medium	N/A
In preparation for writing any basin plans, the Agency of Natural Resources must conduct a comprehensive assessment of water quality in such basins and identify the source(s) of any known water quality problems.	ANR	N/A	Ongoing	Medium	N/A
Proper erosion control procedures shall be applied in all construction activities, and all stormwater shall be treated through natural or mechanical systems to remove nutrients and sediments and to attenuate flood flows to natural levels before any stormwater reaches streams.	Various	Low	Ongoing	High	Various
To protect high-quality forested riparian (riverbank, streambank, or lakeshore) habitat, towns should prohibit development near these areas and regulate the disturbance of vegetation in riparian zones through general, conditional use, and/or site plan standards.	Municipalities	Low-to- moderate	ASAP	High	MPG



**NATURAL RESOURCES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will help Municipalities employ road maintenance techniques to prevent soil erosion and road surface deterioration to comply with the Municipal Roads General Permit.	Agency of Ag	Low	Ongoing	High	State
<b>Wetlands</b>					
The State of Vermont must identify and map significant wetland areas not currently classified as Class 1 or 2 wetlands and petition the Agency of Natural Resources to have such areas reclassified at a higher level.	State	Medium	Mid-term	Medium	State
TRORC should work with towns to establish a priority list of wetlands for protection and/or acquisition.	TRORC/Local Conservation Commissions	Low	Ongoing	Low	MPG
The State should provide property tax relief incentives for the protection of designated wetlands.	Municipalities	N/A	Ongoing	Low	N/A
To protect wetland functions, native biological diversity, and the loss of habitat, towns should adopt zoning and/or subdivision regulations that discourage development near wetlands and vernal pools that are not already protected under state or federal law. They should consider restricting development within 500 feet of all wetlands in conservation districts.	TRORC/ Municipalities	Low-to- Moderate	Mid-term	Medium	MPG
TRORC supports and encourages community efforts to identify and inventory all types of wetlands, including seeps and vernal pools, and to adopt mechanisms for their increased protection, including formal petitions to be shown on the Vermont Wetlands Inventory Map, and adding Vernal pools to the Vernal Pools Atlas (VPAtlas). This information can increase the effectiveness of local, state, and federal regulatory process.	TRORC/ ANR/ Municipalities	Low-to- Moderate	Ongoing	Medium	State
Vernal pools should be protected in local zoning from development by establishing an overlay district that identifies vernal pools and their surrounding terrestrial amphibian habitat.	Municipalities	Moderate	Mid-term	Low	MPG/VTFW
<b>Wildlife</b>					
With the help of specialists from the Department of Fish and Wildlife or the Vermont Institute of Natural Science, towns in the Region should inventory wildlife species; sensitive areas including wetlands, vernal pools, bogs, and fens; mature oak trees; and critical habitats for birds, deer, bear, bobcats, heron, and threatened or endangered plant species.	Municipalities	Moderate	Mid-term	Low	MPG/VTFW





**NATURAL RESOURCES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
Towns should establish Conservation Commissions that work alongside VTrans, Vermont Fish and Wildlife, and nonprofit conservation organizations to maintain wildlife corridors.	Municipalities	N/A	Ongoing	Medium	N/A
Towns are encouraged to use cluster zoning, conservation districts, transferring or purchasing of development rights, or purchasing of land containing critical habitat areas to maintain large forest blocks and preserve critical habitat and habitat connectors.	Municipalities	High	Ongoing	High	Private/Federal
Towns should work cooperatively with and seek assistance from land trusts to maintain large tracts of undeveloped habitat that cross political boundaries.	Municipalities/ State	N/A	Ongoing	Low	N/A
Town Plans and zoning regulations should protect significant natural features and sensitive habitat areas by using setbacks and buffers.	TRORC/ Municipalities	Low	Ongoing	High	State
VTrans and towns should always consider terrestrial and aquatic wildlife passage as part of a design when constructing bridges and culverts, especially in areas along known wildlife corridors.	Municipalities	Moderate	Ongoing	Medium	MPG/VTFW
Towns should time roadside mowing to limit spread of plants such as wild chervil and wild parsnip.	Municipalities	Moderate	Mid-term	Low	MPG/VTFW
When using heavy machinery near streams, machinery operators must clean them before and after use to avoid the spread of invasive species.	Municipalities	Low	Ongoing	High	Municipalities
Towns should conserve large tracts of bear habitat and adopt cluster land use concepts in zoning bylaws as a mechanism for maintaining contiguous areas of forest cover.	Municipalities	Low	Ongoing	High	Municipalities
TRORC should work with municipalities to distribute information on Lyme disease and prevention.	TRORC	Low	Ongoing	Low	N/A
<b>Air Quality</b>					
Install and maintain a regional air quality monitoring network in cooperation with the Vermont Agency of Natural Resources to determine current and potential threats to air quality. Potential impact areas include village centers or other areas of traffic congestion and high elevations, where pollutants and acidic levels are potentially greater and more harmful to fragile vegetation.	ANR	Moderate	Mid-term	Low	State



**NATURAL RESOURCES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
Municipalities and state agencies should educate communities about the impacts of trash burning and develop more effective mechanisms to enforce laws prohibiting backyard burning of trash, including the adoption of civil ordinances.	ANR	Low	Ongoing	Low	State/Municipal
Woody debris from site clearing or forestry operations should be left on site or chipped, instead of being burned, in order to reduce pollution and to enable this material to contribute to soil formation.	Various	Low	Ongoing	Low	Various
TRORC should engage in projects outside the Region that may potentially impact air quality within the Region.	TRORC	Low	Ongoing	Medium	State
<b>Mineral Resources</b>					
All sites must plan for their eventual rehabilitation so that slopes are stable and the surface is revegetated. To that end, topsoil shall not be removed from sites and excavations shall stop early enough so that stable slopes can be established on the property.	Contractors	Low	Ongoing	Medium	N/A
Mineral extraction and processing facilities must be planned and developed so they do not burden local and state highways and bridges.	Contractors	Low	Ongoing	Medium	N/A
All extraction sites must maintain at least a 50-foot buffer of undisturbed land by any wetland or surface water and sufficient additional land above the grade of adjacent streams to preclude a danger of avulsion of the stream into any working areas under flood conditions.	Contractors	Low	Ongoing	Medium	N/A

**HISTORICAL, ARCHAEOLOGICAL , AND SCENIC RESOURCES: CHAPTER 7**

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b>Historical Structures and Sites</b>					
TRORC will continue to support efforts to designate National Historic Register Districts and Sites. In so doing, TRORC will coordinate with the State and affected municipalities.	TRORC	Low	Ongoing	Medium	State



**HISTORIC, ARCHAEOLOGICAL, AND SCENIC RESOURCES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will work with the Agency of Transportation, town officials, its Transportation Advisory Committee, and other groups and organizations to ensure that design standards and plans for proposed transportation projects are reasonably compatible with historic resource needs and values.	TRORC	Low	Ongoing	Medium	State/VTrans
Towns are encouraged to outline in their town plans historic resources deemed worthy of protection. Town officials can then use this to participate in the Act 250 process, thus influencing decisions affecting historic sites in their community. Local historical societies should continue research, documentation, education, and advocacy efforts.	Municipalities	Low	ASAP	High	MPG
Developers should incorporate historic structures and important architectural details into their project planning.	Contractors	Medium	Ongoing	Medium	N/A
<b>Archeological Resources</b>					
To increase public awareness of archeological resources, TRORC encourages archeologists, local and regional groups, towns, and landowners to organize educational programs focused on Vermont's history. Such a program could be made a part of an overall cultural heritage program through public schools.	TRORC	N/A	Mid-term	Low	N/A
Local planning commissions, conservation commissions, historical societies, and other interested groups are encouraged to incorporate an archeological plan for their community in their town plan. Such a plan could be an important step in planning future development in identified areas.	Municipalities	Low	Ongoing	Low	MPG
TRORC should assist local and state policymakers in evaluating lighting options. TRORC will consider sponsorship of educational workshops for planning commissions, design professionals, and others to acquaint them with the principles of good lighting design.	TRORC	Low	Mid-term	Low	Various
<b>Scenic Resources</b>					
TRORC should employ a process for evaluating impacts to scenic resources in the development proposals.	TRORC	N/A	Ongoing	Medium	N/A
<b>Outdoor Lighting Design and Management</b>					
TRORC should provide technical guidance and support to municipalities and others on lighting trends, needs, and opportunities.	TRORC/ Municipalities	Low	Ongoing	Low	MPG



**HISTORIC, ARCHAEOLOGICAL, AND SCENIC RESOURCES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC should assist local and state policymakers in evaluating lighting options. TRORC will consider sponsorship of educational workshops for planning commissions, design professionals, and others to acquaint them with the principles of good lighting design.	TRORC/ Municipalities/ States	Medium	Ongoing	Medium	N/A
Towns interested in planning for outdoor lighting in their communities should consider using their municipal plans to establish goals and objectives for lighting. Additionally, consideration should be given to incorporating a lighting section into a town's zoning ordinance or a separate ordinance to cover lighting installations in all or parts of the town.	TRORC/ Municipalities	Low	Ongoing	Low	N/A
TRORC staff should continue to work with Vermont's public utilities and design professionals to evaluate lighting technologies and efficiencies.	TRORC	N/A	Ongoing	Medium	N/A

**HOMES IN THE REGION: CHAPTER 8**

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will continue to assist nonprofit housing organizations in the development of affordable housing projects and programs when such efforts are consistent with the policies of the Regional Plan.	TRORC/ Nonprofits	Low	Ongoing	High	Various
TRORC will continue to provide professional assistance to member municipalities in the identification of housing needs and implementation of local housing assistance programs, including revising regulations to encourage more housing to meet town needs and minimize development costs while still protecting community values and to qualify for a Neighborhood Development Area designation.	TRORC/ Municipalities	Low	Ongoing	Medium	Various
Community leaders within the Region will work with state housing agencies, nonprofit organizations, and lending institutions to ensure the availability of loan or grant funds for Vermonters to purchase, acquire, or improve their primary homes.	Others	N/A	Short-term	Low	N/A
TRORC will continue to work with the State and towns on regulatory efforts to make quality construction happen.	TRORC/State/ Municipalities	Low	Short-term	High	State





**HOMES IN THE REGION** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
Towns within the Region should actively cooperate with local and regional nonprofit housing trusts to develop and preserve new and existing housing, with mechanisms to assure the perpetual affordability of that housing.	Municipalities/ Others	N/A	Ongoing	High	N/A
Community leaders, housing advocates, and TRORC must work to retain Vermont's innovative publicly financed home mortgage lending and housing assistance programs.	VHCB/VHFA/ TRORC	Low	Ongoing	High	Various
TRORC will assist towns in writing strong housing components in Town Plans that are based on current data that address proven needs. TRORC will actively help identify land that is suitable for development so that towns may work with developers and existing property owners to promote mutually beneficial partnership opportunities.	TRORC/ Municipalities	Low	Short-term	High	Various
TRORC will educate communities on density allowances in towns, encourage communities to allow for ADU approval at the municipal staff level, and enhance local awareness of the need for workforce housing in the Region through community forums.	TRORC	Low	Short-term	Medium	Various
TRORC should offer assistance to towns to address aesthetic concerns about housing in ways that reduce permitting obstacles while resulting in quality projects.	TRORC/ Municipalities	Low	Short-term	Medium	State
TRORC will facilitate discussions with local land developers, bankers, and community leaders to better understand the structural and institutional impediments to providing new housing throughout the Region.	TRORC	N/A	Short-term	Medium	N/A
TRORC will work with housing providers and adjacent regional planning commissions to understand our neighbors' growth pressures and increase housing production that meets our joint needs.	TRORC/ Municipalities/ NGOs	Moderate	Short-term	High	Various
Towns and the State should provide incentives to property owners to rehabilitate existing vacant structures for housing in town, village, and hamlet centers that are compatible with existing neighborhoods. Towns should incentivize affordable housing through a variety of methods, including regulatory bonuses, easier permitting, and minimizing lot size, parking, and other requirements.	Municipalities/ State	High	Ongoing	High	Various



**HOMES IN THE REGION** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will represent the Regional Plan's housing policies to the Vermont State Legislature.	TRORC	N/A	Ongoing	High	N/A
TRORC will support the public awareness campaign of the Vermont Housing Finance Agency and facilitate the education of our towns on the Federal Fair Housing Law.	TRORC	N/A	Ongoing	Low	N/A
TRORC should work with towns facing pressure for Short-term rentals so that they retain housing for residents while allowing such a business model to produce income for residents.	TRORC/ Municipalities	Low	Ongoing	Low	State

**UTILITIES, FACILITIES, AND SERVICES: CHAPTER 9**

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b><i>Water and Wastewater</i></b>					
Municipal plans, per Vermont statute, shall identify and prioritize future capital improvements and major repairs, as well as estimate costs and financing for maintenance and future capacity.	Municipalities	Low	ASAP	High	MPG
TRORC will assist communities with the identification and prioritization of future capital improvements and repairs, grant writing, and project management.	TRORC	Low	Ongoing	High	Various
TRORC will continue to offer capital budgeting services to the towns.	TRORC	Low	Ongoing	High	ACCD
Water efficiency programs and codes should be adopted at the state or local level to reduce demand for municipal water systems.	State/ Municipalities	Low	ASAP	High	Various
TRORC shall seek grant opportunities to map water and wastewater systems throughout the Region.	TRORC	Low	Mid-term	Medium	Various
When funding is available, municipal plans should inventory water and wastewater systems to identify current and projected capacity gaps.	Municipalities	Low	Long-term	Medium	MPG
Municipalities should conduct periodic auditing of all water and wastewater distribution systems to calculate infiltration and losses.	Municipalities	Low-Moderate	Ongoing	Medium	Various



**UTILITIES, FACILITIES AND SERVICES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b><i>Solid Waste</i></b>					
TRORC will support and participate in any future discussions regarding the development of regional waste management services.	TRORC	N/A	Ongoing	Medium	N/A
TRORC should assist towns in meeting the Universal Recycling Law requirements through outreach and education, with assistance from the Agency of Natural Resources.	TRORC	Low	Short-term	Medium	Various
All towns or districts of this Region are encouraged to contact TRORC offices regarding their current planning activities and determine if their SWIP revisions meet the overall goals and policies of this Plan.	Municipalities/ Districts	Low	Ongoing	Medium	N/A
<b><i>Educational Facilities and Services</i></b>					
Town and school authorities should create and maintain safe pedestrian access and transit opportunities to educational facilities, in line with Safe Routes to School efforts.	Municipalities/ TRORC	Low	Ongoing	Medium	VTrans
Towns must assess and incorporate the needs of disabled children and staff into educational facility and budgetary planning efforts to ensure the provision of free and appropriate education for all children.	TRORC/ Municipalities	N/A	Ongoing	High	N/A
Towns should consider adaptive reuse of vacant school facilities that occurs in a manner that enhances villages and downtowns and stimulates the local economy.	TRORC	N/A	Ongoing	High	N/A
Towns should consider applying for funding opportunities enhancing educational facilities as early as possible (i.e., a year in advance) in order to request help from TRORC, if needed.	Municipalities	Low	Ongoing	High	MPG
<b><i>Childcare Services</i></b>					
TRORC should encourage major employers (employing more than 35 employees) to provide childcare services and create a partnership with a local childcare service.	TRORC/ Municipalities, Businesses	Low-Moderate	Short-term	Low	Various
TRORC should work collaboratively with childcare providers and towns to help them locate childcare services in convenient and safe areas.	TRORC/ Municipalities/	Low	Ongoing	High	State



**UTILITIES, FACILITIES AND SERVICES** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC should work with towns to address identified needs for childcare facilities or services by: A) Identifying publicly owned buildings throughout the Region; and B) Evaluating and prioritizing their suitability to serve as childcare facilities after considering Vermont regulations.	TRORC	Low	Short-term	Medium	State
Towns should review their zoning regulations (if adopted) to increase the ability of the regulations to allow childcare providers to be located in the town.	Municipalities	Low-Moderate	Mid-term	Medium	N/A
<b>Telecommunications</b>					
TRORC should continue to participate actively in Section 248a permitting process.	TRORC	Low	Ongoing	High	ACCD
Communities should seek out funding to implement new or sustain existing Wi-Fi zones in villages and downtowns.	Municipalities	Low	Short-term	Medium	Various
The State should continue to support programs that achieve universal broadband and cellular communication access.	State	High	Ongoing	High	State
<b>Recreational Facilities</b>					
TRORC will assist communities with the establishment of Conservation Commissions and will support existing Conservation Commissions when possible.	TRORC	Low	Ongoing	Medium	Various
TRORC will help towns develop highway policies that address recreation needs and should encourage the adoption of walkable communities programs within the Region.	TRORC/ Municipalities/ VTrans	Low	Ongoing	High	State/Federal
TRORC will assist towns with establishing and managing town forests.	TRORC/ Municipalities	Low	Ongoing	Medium	State
TRORC should work with the State, White River Partnership, and the Vermont River Conservancy on increased river access.	TRORC/NGOs/ State	Moderate	Ongoing	Medium	Various
TRORC will continue to assist towns with their efforts to improve public access to outdoor recreational opportunities, while ensuring consistency with local and regional land use plans.	TRORC	Moderate	Ongoing	Low	N/A
<b>Shared Services and Infrastructure</b>					
TRORC will assist communities with the development of inter-local agreements, union municipal districts, and other cooperative agreements whenever possible.	TRORC/ Municipalities	Low-Moderate	Ongoing	High	State





## EMERGENCY MANAGEMENT: CHAPTER 10

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
Agencies or organizations expected to respond in a unified manner should train and exercise together.	NGOs/ Municipalities/ Federal	High	Ongoing	Medium	Various
State and federal governments must continue funding and operation of warning systems, including the National Weather Service's Emergency Alert System, NOAA weather radio, and USGS river and precipitation gauges.	State/Federal	Moderate	Ongoing	High	State/Federal
Towns should pursue the use of capital programs and reserve accounts to properly budget for emergency vehicles and other large capital costs, as well as coordinate and share services to achieve overall efficiencies.	Municipalities/ TRORC	Low	Ongoing	High	Municipalities
TRORC will continue to work with all communities to annually update Local Emergency Management Plans, ensuring that these plans take into account the varied needs of people with disabilities, pets, and those without access to transportation.	TRORC/ Municipalities	Moderate	Ongoing	High	DHS/VT DEMAS
TRORC will continue to work with all communities on hazard mitigation efforts, including updating mitigation plans, enhancing road and bridge standards for resiliency, and addressing flood resilience in Town Plans.	TRORC/ Municipalities	Low	Ongoing	High	FEMA
TRORC will continue to work cooperatively with local emergency response organizations, VEM, the TRORC REMC, social service agencies, long-term recovery organizations, community resilience organizations, and others to help improve emergency planning, response, and recovery.	TRORC/DEHMS/ Municipalities	Low	Ongoing	High	DEHMS
TRORC should assist towns and VT ANR in refining river corridor maps.	TRORC/ANR	Low	Mid-term	High	Various
Communities should work to ensure that important local facilities that provide emergency services, water, food, and gas or that act as emergency shelters are able to function during power outages.	FEMA	High	ASAP	High	FEMA
TRORC will work with towns and other organizations to coordinate land use, transportation, and energy policies and actions to result in more resilient communities.	TRORC	Low	Ongoing	High	Various



**EMERGENCY MANAGEMENT** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will assist towns in response and recovery stages through damage documentation assistance and navigating federal and state grants.	TRORC	Moderate	Ongoing	Medium	Various
TRORC will continue to do outreach on preparedness by individuals and continuity planning for businesses so they are better prepared for expected incidents.	TRORC/VEM	Low	Ongoing	High	FEMA
Towns should develop recruiting and training programs for increasing emergency responder retention and sharing services.	Municipalities	Low	Mid-term	Low	State

**ENERGY: CHAPTER 11**

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<i>Electricity Conservation and Renewable Generation</i>					
TRORC will advocate for the continuation of policies that lead to the retirement of Renewable Energy Credits in state.	TRORC	Low	Ongoing	High	DPS
TRORC will help interested towns meet the standards set forth in Act 174 for enhanced energy planning so that local preferences receive “substantial deference” in the Public Utility Commission’s Section 248 proceedings.	TRORC	Low	Long-term	High	DPS
PSD and TRORC should support and provide outreach for Energy Action Network’s Community Energy Dashboard and Efficiency Vermont’s customer engagement web portal and home energy reports.	TRORC	Moderate	Ongoing	High	DPS
TRORC and PSD should support efforts to develop programs that encourage energy conservation through behavioral change by advocating for smart grid technology and a pilot of advanced meter infrastructure and time-of-use rates in the Region.	TRORC	Low	Ongoing	Medium	DPS
TRORC will maintain an enhanced energy compliant Regional Plan in order to play a stronger regional role in the Public Utility Commission (PUC) permitting process.	TRORC	Low	Long-term	Medium	DPS
TRORC will work to expand its shared energy coordinator (SEC) program and encourage other RPCs to duplicate the model around the state.	TRORC	Moderate	Ongoing	Medium	DPS



**ENERGY** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
<b>Transportation and Land Use</b>					
TRORC will encourage communities to develop bylaws that allow for the development of co-working spaces as a way to reduce VMT.	TRORC	Low	Ongoing	Medium	ACCD
TRORC should work with large employers to create incentives for carpooling, cycling, public transportation use, and telecommuting.	TRORC/ Businesses	Moderate	Ongoing	High	VTrans
TRORC will work with groups such as the Vermont Bicycle and Pedestrian Coalition (VBPC), Local Motion, Green Mountain Bicycle Club, and towns to encourage safe bicycling as a transportation alternative in the Region.	TRORC	Low	Ongoing	Medium	VTrans
<b>Thermal Energy</b>					
TRORC should work with local energy committees, planning commissions, and developers in identifying potential users of district heating, Thermal Energy Networks (TENs), and combined heat and power systems—schools, college campuses, apartment complexes, shopping centers, industrial parks, and village centers—and incorporate this information into local plans.	TRORC	Low	Ongoing	Medium	DPS
TRORC will work with other organizations to distribute information regarding the available financing mechanisms, rebates, and incentives for weatherization assistance, electrification, and fuel-switching, focusing on those most in need.	TRORC	Low	Ongoing	Medium	DPS
TRORC will partner with Efficiency Vermont, Green Mountain Power, Washington Electric Coop, HVAC contractors, and others to promote cold climate heat pumps.	TRORC	Low	Ongoing	Medium	DPS
TRORC should work to expand its shared energy coordinator program and support other RPCs in replicating the program in their own regions.	TRORC	Moderate	Long-term	Low	DPS
TRORC and local energy committees should work with owners of rental housing to educate them on the financial benefits of weatherization investments and should connect owners with contractors to complete weatherization projects.	TRORC/ Local Energy Committees	Low	Ongoing	Medium	State
TRORC and its towns should support programs and initiatives that encourage the development of small homes (less than 1,000 square feet) as a means of reducing energy use.	TRORC/ Municipalities	Low	Long-term	Medium	ACCD



**ENERGY** *(continued)*

Action	Lead/ Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will provide outreach to towns and contractors on the use and enforcement of residential and commercial building energy standards for all new construction.	TRORC	Low	Ongoing	High	DPS
TRORC will encourage communities that have zoning to include a certificate of occupancy when they revise their regulations if they do not already have one.	TRORC	Moderate	Ongoing	High	DPS
TRORC should provide outreach to communities with a COO to ensure that they are tracking submissions of the RBES certificate.	TRORC/ Local Energy Committees	Moderate	Ongoing	High	DPS
TRORC will work to maintain forest health as a prerequisite to a sustainable wood energy fuel supply and carbon sequestration.	TRORC	Low	Ongoing	Medium	DPS
TRORC can assist communities with continued outreach regarding code compliance. We can also support the PSD as they move forward on adoption of more effective energy efficiency codes.	TRORC	Low	Long-term	Medium	DPS
The State should support woodstove change-out programs to lower heat cost and reduce particulate emissions.	State	Moderate	Ongoing	High	State
<b><i>Utility-Scale Renewable Energy Siting</i></b>					
TRORC will encourage communities and residents to identify areas with the potential for renewable energy generation.	TRORC	Moderate	Ongoing	High	DPS
TRORC should provide support for grid improvements that will allow improved renewable energy generation facility coverage in our Region by actively participating in the Act 250 and Section 248 review process.	TRORC	Moderate	Long-term	High	DPS
TRORC encourages ground-mounted solar array facilities to follow accepted best practices for maintaining wildlife-friendly grassland habitat, pollinator habitat <sup>40</sup> , or agrivoltaics within the facility's boundaries.	TRORC	Low	Ongoing	Medium	N/A





**RELATIONSHIP OF TRORC REGIONAL PLAN TO NEIGHBORING PLANS: CHAPTER 13**

Action	Lead/Partner	Estimated Cost	Timeline	Priority	Potential Financing
TRORC will continue to actively coordinate with neighboring commissions and other organizations to achieve planning goals.	TRORC	Low	Ongoing	High	State
TRORC will work with other regional planning commissions to influence state and national policies that support our communities.	TRORC	Low	Ongoing	High	State
TRORC will actively participate in the permitting and planning of development, infrastructure, or services outside the Region that can impact the Region.	TRORC	Low- Medium	Ongoing	High	State
TRORC will work with member towns when updating their Town Plans in order to consider being compatible with plans of neighboring towns.	TRORC	Low	Ongoing	High	State



## Appendix D: Transportation Corridors Overview

### US Route 4

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US Route 4 is one of only three east-west routes across Vermont and carries the highest volumes of the three (the other two are VT Route 9 and US Route 2). In this region the primarily two-lane rural road parallels the Ottawaquechee River along the old railroad alignment and winds through many sensitive natural landscapes and a number of vibrant community centers. US Route 4 is on the national highway system and Vermont's tractor truck network, so mobility and safety issues are a top priority. US Route 4 is also Main Street for a number of villages and hamlets. The road is a gateway into Vermont, a Scenic Byway, and tourism destination for experiencing the region's rural landscapes. Many residents' quality of life and the vitality of commercial businesses greatly depend on preserving this unique road and surrounding landscape. US Route 4 faces difficult challenges of preserving mobility, safety, and traveling efficiency while continuing to support community life and commercial activities. There are no other parallel roads or alternative travel options available and the topographical and environmental constraints would restrict all reasonably feasible roadway expansion projects. As traffic increases and land development intensifies, US Route 4 might be forced to accommodate that growth with little or no further transportation capacity improvements.

In 2008, the Hartford US Route 4 Corridor Management Plan (Appendix C) was developed by TRORC, the Town of Hartford and the Vermont Agency of Transportation that assessed existing and projected future transportation and land use conditions. The Plan resulted in a set of transportation and land use recommendations which the region has adopted for planning guidance. In 2009, the US Route 4 West Corridor Management Plan (Appendix C) was developed as a follow up project to the 2008 Hartford Corridor Plan and did a similar assessment from Hartland to Bridgewater. This Plan built on the Hartford Corridor Plan by defining Access Management Zones and offered recommendations for access management.

### US Route 5

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US Route 5 is one of two north-south arterials in the region that runs adjacent to the Connecticut River. US Route 5 is a two-lane rural road that parallels the river and offers many scenic landscapes and a number of vibrant village and town centers. US Route 5 has become part of the bi-state Scenic Byway and as such is recognized for its "unique historic, cultural, environmental, agricultural and railroading traditions and resources" (Connecticut River Scenic Byway - [www.ctrivertravel.net](http://www.ctrivertravel.net)). While US Route 5 is not included on Vermont's tractor truck network, many logging and other commercial trucks utilize this road to avoid interstate-imposed weight restrictions. US Route 5 serves as a Main Street for a significant number of town centers, villages, and hamlets. The region and the greater bi-state tourist industry rely heavily on US Route 5.

Over the last 5 years, TRORC has evaluated tractor truck traffic along US Route 5 which has averaged 5-8% of the overall traffic volumes. The majority of activity is trucking wood products northbound and these vehicles traditionally carry heavier loads than other forms of trucking. Speed limits have also been monitored within the villages and town centers. In those instances, speeds are shown to average 5-15 mph above posted speed limits although more active

enforcement in Hartford, Norwich, Fairlee, Bradford, and Newbury has been shown to reduce speeds.

The Upper Connecticut River is a nationally renowned destination for bicyclists with US Route 5 and NH Route 10 providing excellent bicycling loops. US Route 5 is a combination of gently rolling hills and flat terrain that challenges but does not overtax a bicyclist. The route does not have striped bike lanes, with the exception of a short stretch in Bradford, between the Waits River and Hannaford Supermarket. No official counts have been conducted along US Route 5, but anecdotally it appears that the highest bicycling activity in the region occurs on these roads. The most popular routes are the Norwich – Thetford and Thetford – Fairlee sections of US Route 5 and NH Route 10 between Hanover, NH and Orford, NH.

### US Route 302

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US Route 302 is a major east-west travel corridor connecting the northern New England region from Portland, ME to Montpelier, VT. US Route 302 was originally part of the old New England interstate system that pre-dates the Eisenhower era national highway system. Of the approximately 170 mile highway there are only 8 miles that fall within the region in the towns of Newbury (5 miles) and Topsham (3 miles). US Route 302 is part of the Vermont's tractor truck network which means that this roadway receives a greater priority for transportation project investments. Within our region, US Route 302 crosses Interstate 91 at the Exit 17 interchange.

### VT Route 14

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Within the TRO Region, VT Route 14 passes through a variety of landscapes, ranging from more developed growth centers in Randolph (a town center) and White River Junction (a regional center) to more rural and agricultural areas, as seen in Royalton and Sharon (village settlements). There has been a great deal of growth throughout the VT Route 14 corridor over the past forty years, in large part due to the proximity of the interstate highways (both I-89 and I-91). The route's corridor has been—and remains—a prime location for residential housing settlements due to highway access that easily links the area with designated centers. Additionally, the towns of Sharon and Royalton have seen an increase in housing due to demand near Vermont Law School in South Royalton. These drivers of growth are projected to continue, and there is also interest in business growth along the corridor. Current and anticipated growth places strain on the entirety of VT Route 14 and its supporting infrastructure. During Tropical Storm Irene, much of the roadway was washed out and portions were destroyed by the White River and its Second Branch breaching their banks.

In 2017, the annual average daily traffic county for the portion of VT Route 14 that lies within the TRO Region was 2,253.<sup>1</sup> The highway is paved throughout, and there are portions of the road equipped with shoulders and pull-off areas. The posted speed limits on the road ranges from 35 to 45 miles per hour, and varies depending on whether the road is passing through town and village centers or areas that are less developed.

### VT Route 66

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VT Route 66 is a short 7.6 mile state roadway entirely within the Town of Randolph. It is a two-lane rural road accessing Interstate 89 and is the primary gateway to East Randolph, Randolph

Center, Randolph Village, and adjacent towns. VT Route 66 is the geographic center of the State of Vermont and connects the Vermont Technical College to the interstate.

The average annual daily traffic volume in 2017 was 4,656,<sup>ii</sup> but these numbers can double under full build out scenarios described in the Randolph Exit 4 studies completed in the 1990s. In 2014, VT66 was fully reconstructed and has been evaluated by transportation engineers as being in good condition; in 2017, it had an average Composite Pavement Condition Index of 90.6.<sup>iii</sup> Most of VT Route 66 is posted at 50 mph despite having numerous geometric and sight distance deficiencies. As a rural low traffic volume road, the alignment challenges do not create any real safety or mobility concerns. With the increased development, however, those balances can be negatively altered. As seen in other regions, it is possible that development can impair traffic operations and/or restrict the full build-out potential of a roadway. The challenge is to preserve mobility and safety while continuing to support and encourage a land use development pattern that is supported by this Regional Plan and the Randolph Town Plan. The additional challenge will be to implement transportation enhancements that protect the ‘scenic vistas’ that are also well supported in the Regional Plan and Randolph Town Plan.

### VT Route 100

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VT Route 100 is a Scenic Byway and Vermont’s primary north-south highway with a 41.3 mile segment traversing the TRO Region. VT Route 100 is a two lane rural road that connects Plymouth and Bridgewater, exits the region, and then continues through, and is the primary access for, the Quintown region of Stockbridge, Pittsfield, Rochester, Hancock, and Granville. VT Route 100 supports a number of transportation users as a major ski highway, travel route for tourism destinations north and south, local access, and—because of its scenic panoramas of rural farming and pasture lands and uninterrupted views of rivers, meadows, and mountains—as its own destination for traveling visitors.

There are relatively low traffic volumes throughout the corridor and rarely any observed traffic congestion. Road conditions vary along the corridor; in 2017, about 79% of the route’s road miles within the region were rated as “fair” or “good” by transportation engineers. The average Composite Pavement Condition Index for VT Route 100 road miles within the region was 73.2 (“fair”).<sup>iv</sup> In 2017, the portion of the route within the region had an average annual daily traffic volume of 1,891, which is below the road’s total traffic carrying capacity.<sup>v</sup> Tractor truck traffic volumes along VT Route 100 fluctuate from 5-11% of the overall traffic volumes. There is a great diversity of truck traffic volumes and activities. Trucks carrying lumber and a multitude of consumer products can be seen going north and south. Posted travel speeds varied from 25-35 mph within settlement areas to 40-50 mph along the peripheries of town. Speed limit data have not been collected along any section of VT Route 100.

### VT Route 107

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A master plan for the Exit 3 interchange was completed in 2000 and its results are reported in the land use section of this Regional Plan. There are a number of transportation and land use factors that strongly support additional development. VT Route 107 has already seen considerable development in recent years and these favorable attributes promise an additional intensifying of land uses. Ensuring that development is not permitted until the infrastructure is in place is



essential. A particularly unique asset in Royalton and Bethel, the road runs parallel to the NECR line and with the interstate connections can readily support rail-based development. The greatest regional challenge will be preserving traffic capacities while allowing development opportunities consistent with the land use policies of Town and Regional Plans.

In Tropical Storm Irene, sections of VT Route 107 between Stockbridge and Bethel were completely destroyed. It was the last State road repaired and was reopened by the end of December 2011.

The average annual daily traffic volume in 2017 was 4,982.<sup>vi</sup> In 2017, transportation engineers evaluated most of the corridor as being in “good” condition; overall, this is one of the better constructed state highways in the region. There were, however, 2 segments in Royalton that were rated “very poor”. The average Composite Pavement Condition Index for the full corridor was 76.5 (“fair”).<sup>vii</sup> Unlike most state highways, a significant portion of VT Route 107 has smooth traveling surfaces, adequate road shoulders, and sufficient sight distances. Posted travel speeds along VT Route 107 are 50 mph throughout the corridor with the exception of a 25-mph posting in the Bethel Village and a 35 mph for Stockbridge Central School. In the few instances where travel speeds were recorded, motorists typically exceeded the posting by 5-10 mph. This is a particular concern within the villages and in areas where intersecting local roads have minimal sight distances. Tractor truck traffic represents 5-10% percent of the overall traffic volumes. VT Route 107 was not identified on the state’s primary truck network, although the high truck traffic volumes absent the local destinations suggest truckers continue to use the road as an alternative east-west facility. The challenge will be to better monitor trucking activity and to be more vigorous in enforcing trucking weights and safety laws. Finally, transportation professionals utilize the VT Route 107 / VT Route 100 corridors to accommodate truck traffic rerouting plans for US Route 4 construction projects.

### Other Priorities and Project Needs

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A full listing of regional priority projects and identified potential project needs are found in Appendix E. Projects 1 to 25 are the prioritized projects in the region and are programmed under the Vermont Agency of Transportation capital plan. Projects 26 to 40 are projects that are under the Vermont Agency of Transportation but have not been prioritized regionally as these project scopes have not been defined. Projects 41 to 66 are identified regional transportation project needs but are currently not under the Vermont Agency of Transportation program.

### Endnotes

<sup>i</sup> Vermont Agency of Transportation Traffic Research Unit, “Annual Average Daily Traffic 2017,” published January 11, 2019,

<https://maps.vtrans.vermont.gov/arcgis/rest/services/Master/General/FeatureServer/56>

<sup>ii</sup> Ibid.

<sup>iii</sup> Vermont Agency of Transportation Asset Management and Performance Bureau, “Pavement Condition One Mile,” last updated June 6, 2017,

<https://maps.vtrans.vermont.gov/arcgis/rest/services/Master/AMP/FeatureServer/12>

<sup>iv</sup> Ibid.; Vermont Agency of Transportation, “Glossary of Terms for the Pavement Condition Summary,” <http://apps.vtrans.vermont.gov/VTransparency/frnPaveCondDetailGlossary.aspx>

<sup>v</sup> Vermont Agency of Transportation Traffic Research Unit, “Annual Average Daily Traffic 2017,” published January 11, 2019,

<https://maps.vtrans.vermont.gov/arcgis/rest/services/Master/General/FeatureServer/56>

<sup>vi</sup> Ibid.

<sup>vii</sup> Vermont Agency of Transportation Asset Management and Performance Bureau, “Pavement Condition One Mile,” last updated June 6, 2017, <https://maps.vtrans.vermont.gov/arcgis/rest/services/Master/AMP/FeatureServer/12>; Vermont Agency of Transportation, “Glossary of Terms for the Pavement Condition Summary,” <http://apps.vtrans.vermont.gov/VTransparency/frmPaveCondDetailGlossary.aspx>

# Appendix E: Energy Targets

## TRORC Region

The following is an explanation of the information displayed in the Municipal Summary Worksheet for the TRORC Region.

The intent of the Municipal Summary is to provide your municipality with energy data that meets PSD's analysis and target standards to ensure your municipality's compliance with the requirements of Act 174 and "Enhanced Energy Planning" (24 V.S.A. § 4352). The worksheet contains data that estimates current energy use and provides targets for future energy use across all sectors (transportation, heating, and electricity). It also sets a target for renewable energy generation within the municipality.

This data is meant to be a starting point for your municipality to begin planning its energy future and to talk about the changes that may need to occur within the municipality to ensure that local, regional, and state energy goals are met. This includes the goal that 90% of all energy demand be met by renewable sources by 2050 (90x50 goal).

Estimates of current energy use and targets for future energy use are reliant upon the Vermont Pathways Model created in the LEAP software model for the region completed for PSD. To estimate the current energy use of your Town, TRORC used PSD's Municipal Consumption.

This tool uses inputs of data from the American Community Survey (ACS), the Vermont Agency of Transportation (VTrans), and the Vermont Department of Labor (DoL).

Targets for both future energy use and energy generation have been generally developed using a "bottom up" method of disaggregating regional data into the municipal level using PSD's Analysis and Targets Aid. PSD also makes certain assumptions within these tools based on statewide averages for energy consumption.

The targets established here show the direction in which change needs to occur to meet local, regional, and state energy goals. It is important to remember that the targets established by LEAP represent only one way to achieve energy goals. There may be other similar pathways your municipality may choose to meet your 90x50 goal. Please keep this in mind when reviewing the worksheet.

For those towns interested in learning more about how these estimates and targets were created, or about creating their own estimates and targets, please see PSD's Guidance for Regional & Municipal Enhanced Energy Planning Standards. Additionally, please refer to our Generation Scenarios Tool spreadsheet used to derive regional and municipality generation targets.<sup>1</sup>

## Data Sources

- American Community Survey (ACS)
- Vermont Department of Labor (DoL)
- Vermont Department of Public Service (PSD)
- Energy Information Administration (EIA)
- Efficiency Vermont (EVT)
- Low Emissions Analysis Platform (LEAP)
- Vermont Energy Investment Corporation (VEIC)
- Vermont Agency of Transportation (VTRANS)

1. Generation Scenarios Tool: [https://www.trorc.org/wp-content/uploads/2024/12/Generation-Scenarios-Tool-April-2024\\_FINAL.xlsx](https://www.trorc.org/wp-content/uploads/2024/12/Generation-Scenarios-Tool-April-2024_FINAL.xlsx)



# Municipal Summary Worksheet

The Municipal Summary worksheet summarizes all data that is required to be in the Municipal Plan if the plan is to meet the “determination” standards established by PSD.

4A. Current Transportation Energy Use in Region	
2022 Transportation Data	
Total Number of Internal Combustion Engine (ICE) Vehicles <sup>1</sup>	43,292
Total Number of Electric Vehicles (EVs) <sup>2</sup>	937
Total Number of ICE Vehicles and EVs	44,244
Average Yearly Miles Driven per Vehicle <sup>3</sup>	12,500
Total Miles Driven per ICE Vehicle	541,337,500
Total Miles Driven per EV	11,712,500
Total Miles Driven per ICE Vehicle and EV	552,862,500
Average Fuel Economy of ICE Vehicles (Miles per Gallon) <sup>4</sup>	22
Average Fuel Economy of EVs (Miles per Kilowatt Hour) <sup>4</sup>	3
Total Gallons Consumed by ICE Vehicles per Year	22,383,932
Total Number of Kilowatt Hours Consumed by EVs per Year	3,904,167
Transportation Energy Consumed by ICE Vehicles (mmBtus) <sup>4</sup>	2,901,773
Transportation Energy Consumed by EVs (mmBtus) <sup>4</sup>	13,321
Transportation Energy Consumed by ICE Vehicles and EVs (mmBtus)	2,915,094
This table calculates the energy use and energy cost of your residents’ light-duty passenger vehicles. This does not include the energy use or energy cost of medium-duty vehicles, heavy-duty vehicles, mass transit, rail, commercial vehicles, or other modes of transportation. The Average Miles per Vehicle and Realized Miles per Gallon are 2021 statewide averages for light-duty passenger vehicles in Vermont as reported in the LEAP model. The Transportation Energy Used is calculated in Million British Thermal Units (mmBtus) using PSD’s LEAP Municipal Consumption Template.	
Data Sources: 1. ACS 2022 5-year Estimates. 2. Efficiency Vermont. 3. VTrans, 2021. 4. LEAP Municipal Consumption Template.	





## 4A. Current Residential Heating Energy Use in Region

Fuel Source <sup>1</sup>	Number of Households <sup>1</sup>	Percentage of Households	Square Footage Heated <sup>2</sup> (mmBtus)
Gas from Bottle or Tank (propane, butane, liquified petroleum gas)	7,304	29.4%	803,440
Electricity	1,326	5.3%	145,860
Fuel Oil, Kerosene, etc.	9,890	39.9%	1,087,900
Coal or Coke	36	0.1%	3,960
Wood	5,446	22.0%	599,060
Solar Energy	171	0.7%	18,810
Other Fuel	573	2.3%	63,030
No Fuel Used	58	0.2%	6,380
<b>Total</b>	<b>24,804</b>	<b>100.0%</b>	<b>2,728,440</b>

This table displays 2022 ACS 5-year Estimates for the sources of fuel for occupied residences within the TRORC Region. The square footage heated figure is calculated in the PSD Municipal Consumption Template based on a statewide average annual heating load for residences, measured in Million British Thermal Units (mmBtus).

Data Source: 1. ACS 2022 5-year Estimates. 2. PSD Municipal Consumption Template.

## 4A. Current Commercial Heating Energy Use in Region

Number of Commercial Establishments <sup>1</sup>	Total Thermal Energy Consumed by Commercial Establishments <sup>2</sup> (mmBtus)	Average Thermal Energy Consumed by Commercial Establishments <sup>2</sup> (mmBtus)
2,039	1,811,275	888

This table displays the number of commercial establishments in 2022 for the TRORC Region as recorded by the Vermont DoL. The thermal energy estimate is calculated in the PSD Municipal Consumption Template based on a statewide average annual heating load for select commercial establishments, measured in Million British Thermal Units (mmBtus).

Data Sources: 1. VT DoL 2022. 2. PSD Municipal Consumption Template.

## 4A. Current Electricity Use in Region

Use Sector	Current Electricity Use
Residential (MWh)	185,994
Commercial & Industrial (MWh)	220,432
<b>Total (MWh)</b>	<b>406,426</b>

This table displays 2022 data from EVT for the commercial & industrial sector and residential sector in the TRORC Region.

Data Source: EVT 2022.



### 4B. Residential Thermal Efficiency Targets

	2025	2035	2050
Weatherized for Increased Efficiency and Conservation	49%	57%	83%

This table displays targets for the cumulative percentage of residences that will be weatherized by the target year, thereby achieving increased thermal efficiency and energy conservation. These targets were developed using the PSD Analysis & Target Municipal Aid in the CAP Central Mitigation Scenario. To be counted, each weatherized residence will have to achieve a 25% reduction in heat energy.

Data Sources: PSD Analysis & Target Aid. ACS 2022 5-year Estimates.

### 4B. Commercial Thermal Efficiency Targets

	2025	2035	2050
Weatherized for Increased Efficiency and Conservation	44%	32%	54%

This table displays targets for the cumulative percentage of commercial establishments that will be weatherized by the target year, thereby achieving increased thermal efficiency and energy conservation. These targets were developed using the PSD Analysis & Target Aid in the CAP Central Mitigation Scenario. To be counted, each weatherized commercial establishment will have to achieve a 25% reduction in heat energy.

Data Sources: PSD Analysis & Target Aid. VT DoL.

### 4B. Thermal Fuel Switching Targets – Heat Pumps

	2025	2035	2050
Heat Pumps – Residences	7,720	20,755	30,587
Heat Pumps – Commercial Establishments	1,198	3,623	4,633
<b>Total</b>	<b>8,918</b>	<b>24,378</b>	<b>35,220</b>

This table displays targets for the cumulative percentage of commercial establishments that will be weatherized by the target year, thereby achieving increased thermal efficiency and energy conservation. These targets were developed using the PSD Analysis & Target Aid in the CAP Central Mitigation Scenario. To be counted, each weatherized commercial establishment will have to achieve a 25% reduction in heat energy.

Data Sources: PSD Analysis & Target Aid. VT DoL.



### 4C. Use of Renewables - Transportation

	2025	2035	2050
Light Duty Electric Vehicles	5%	52%	100%

This table shows the percentage of light duty vehicles that are electric vehicles in the target years for the TRORC Region in the CAP Central Mitigation Scenario.

Data Source: LEAP Analysis & Target Aid. EVT 2022.

### 4C. Transportation Fuel Switching Target – Electric Vehicles

	2025	2035	2050
Battery Electric Vehicles	2,024	24,962	53,894
Plug In Hybrid Vehicles	291	287	69
<b>Total</b>	<b>2,315</b>	<b>25,249</b>	<b>53,962</b>

This table shows the count of light duty vehicles that are electric vehicles in the target years for the TRORC Region in the CAP Central Mitigation Scenario.

Data Source: PSD Analysis & Target Aid. EVT 2022.



### 4D. Electric Efficiency Targets

	2025	2035	2050
Cumulative Electricity Conserved – Residential (MWh)	3,910	22,438	41,392

This table shows the megawatt hours (MWh) of electricity cumulatively conserved by residences within the TRORC Region by 2025, 2035, and 2050 based on modelling completed by EVT’s 2022 Energy Efficiency Market Potential Study and PSD.

Data Source: EVT 2022 Energy Efficiency Market Potential Study. PSD Potential Study Data for RPCs Tool.

### 4D. Renewable Energy Generation Targets

	2025	2035	2050
Total Renewable Energy Generation (MWh)	253,584	259,484	338,533
Incremental Renewable Energy Generation (MWh)	1,504	7,403	86,453

This table shows targets for electric generation from renewable resources in megawatt hours (MWh) for the TRORC Region. This table also reports the incremental generation of new renewable energy needed by each target year. This figure shows the increase in generation needed from the region’s 2022 renewable energy generation levels.

The figures for 2035 and 2050 were developed using Vermont Pathways CAP Mitigation scenario. The figures for 2025 were developed by TRORC equating to a 0.3% increase from 2022 generation figures.

Data Source: LEAP Generation Scenarios Tool.

### 4D. Use of Renewables - Heating

	2025	2035	2050
Residences	30%	76%	100%
Commercial	25%	65%	69%

The figures for 2035 and 2050 were developed using PSD’s Generation Scenario Tool. The 2025 model uses 10% in-state generation, 2035 uses 20% in-state generation, and 2050 uses 25% in-state generation.

Data Source: EVT 2022 Energy Efficiency Market Potential Study. PSD Potential Study Data for RPCs Tool.





## 9A. Existing Renewable Generation

Renewable Type	MW	MWh
Solar	57.0	74,906
Wind	0.1	118
Hydro	39.8	174,233
Biomass	0.5	2,833
Other	0.0	0
<b>Total</b>	<b>97.3</b>	<b>252,080</b>

This table shows existing renewable generation in the TRORC Region for 2022, in both megawatt (MW) and megawatt hours (MWh), based on TRORC's calculation using Generation Scenario Tool and figures provided by PSD.

Data Source: PSD.

## 9B. Renewable Generation Potential

Renewable Type	MW	MWh
Ground-mounted solar	2,376	3,121,876
Rooftop Solar	463	607,973
Wind	393	516,106
Hydro	0	607
Biomass & Methane	40	52,267
Other	0	0
<b>Total</b>	<b>3,272</b>	<b>4,298,829</b>

Renewable generation potential is based on mapping completed by TRORC that is based on the Municipal Determination Standards and associated guidance documents developed by PSD. The renewable generation potential is expressed in MW and MWh by the type of renewable resource (solar, commercial wind, hydro, etc.).

Data Sources: PSD. TRORC.



### 9C. Sufficient Land

Renewable	Land Available	Acreage Needed to Meet 2025 Target		Acreage Needed to Meet 2035 Target		Acreage Needed to Meet 2050 Target	
	Acres	Acres	%	Acres	%	Acres	%
Solar	16,631	400	2.4%	437	2.6%	826	5.0%
Wind	15,711	9	0.1%	5	0.0%	90	0.6%
Biomass	3	3	100.0%	3	100.0%	3	100.0%
Hydro	40	40	100.0%	40	100.0%	40	100.0%
<b>Total</b>	<b>32,385</b>	<b>452</b>	<b>1.4%</b>	<b>485</b>	<b>1.5%</b>	<b>959</b>	<b>3.0%</b>

This table shows there is sufficient land in the TRORC Region to meet the renewable generation targets based on the renewable generation potential. The 'land available' category in this table only includes prime areas for wind and lands for solar generation that have no constraints and are not part of a priority forest block.

Data Source: EVT 2022 Energy Efficiency Market Potential Study. PSD Potential Study Data for RPCs Tool.



# Town Targets



## Renewable Energy Generation

Current and Future Energy Targets (Solar, Wind, Biomass, Hydro + cap energy targets) ..... **10**



## Weatherization

Residential and Commercial ..... **20**



## Heat Pumps

Residential and Commercial ..... **21**



## Electrical Vehicles Targets

Battery Electric, Plug-In Hybrid, and Total E.Vs ..... **22**



Prime Solar and Wind ..... **23**



# Renewable Energy Generation Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)
Barnard	539	2	541	137	676	881	1,420
Bethel	2,862	9	2,871	312	3,174	3,948	6,811
Bradford	2,893	9	2,902	208	3,101	2,545	5,438
Braintree	466	1	467	98	564	742	1,208
Bridgewater	366	1	367	109	475	759	1,125
Brookfield	839	3	841	127	965	857	1,696
Chelsea	281	1	282	108	389	770	1,051
Corinth	585	2	586	105	690	807	1,392
Fairlee	2,035	6	2,041	108	2,143	1,278	3,314
Granville	175	1	175	69	244	230	404
Hancock	116	0	116	37	153	235	351
Hartford	172,370	517	172,887	2,588	174,958	37,967	210,337
Hartland	18,505	56	18,560	412	18,916	4,881	23,386
Newbury	7,080	21	7,101	279	7,359	2,537	9,618
Norwich	4,578	14	4,592	257	4,835	2,944	7,522
Pittsfield	236	1	237	54	291	495	731
Plymouth	383	1	384	117	500	779	1,162
Pomfret	806	2	808	97	903	811	1,617
Randolph	8,403	25	8,428	541	8,943	6,721	15,123
Rochester	679	2	681	137	816	911	1,590
Royalton	5,805	17	5,823	221	6,026	2,739	8,544
Sharon	5,575	17	5,592	153	5,728	1,786	7,361
Stockbridge	307	1	308	90	396	525	832
Strafford	7,713	23	7,736	179	7,893	1,799	9,512
Thetford	4,089	12	4,102	227	4,316	2,534	6,623
Topsham	117	0	117	105	222	623	740
Tunbridge	713	2	715	106	819	855	1,568
Vershire	444	1	446	92	536	424	868
West Fairlee	141	0	142	47	188	383	524
Woodstock	2,980	756	3,736	283	3,263	3,688	6,668
<b>Total</b>	<b>252,080</b>	<b>1,504</b>	<b>253,584</b>	<b>7,403</b>	<b>259,484</b>	<b>86,453</b>	<b>338,533</b>

\* Targets for 2025 were calculated by multiplying each town's 2022 renewable energy generation by 0.3%. Targets for 2035 and 2050 were calculated using PSD's Scenario Generation Tool.



# Solar Generation Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)
Barnard	539.1	1.6	540.7	119.8	658.9	828.1	1,367.2
Bethel	990.9	3.0	993.9	316.9	1,307.8	3,632.6	4,623.5
Bradford	2,893.2	8.7	2,901.9	203.2	3,096.3	2,392.1	5,285.3
Braintree	466.0	1.4	467.4	68.2	534.3	697.2	1,163.3
Bridgewater	366.0	1.1	367.1	80.5	446.5	713.7	1,079.7
Brookfield	831.6	2.5	834.1	209.8	1,041.4	805.9	1,637.5
Chelsea	280.7	0.8	281.5	174.4	455.1	724.0	1,004.7
Corinth	584.6	1.8	586.4	87.8	672.4	758.5	1,343.1
Fairlee	2,035.3	6.1	2,041.4	89.9	2,125.2	1,201.8	3,237.0
Granville	164.3	0.5	164.8	30.1	194.4	215.8	380.1
Hancock	116.0	0.3	116.4	17.2	133.2	220.8	336.9
Hartford	16,432.5	49.3	16,481.8	2,490.4	18,922.9	34,929.4	51,361.9
Hartland	5,154.4	15.5	5,169.8	404.3	5,558.7	4,490.5	9,644.9
Newbury	3,996.6	12.0	4,008.6	217.8	4,214.5	2,334.4	6,331.0
Norwich	4,577.9	13.7	4,591.7	232.8	4,810.7	2,767.1	7,345.0
Pittsfield	236.4	0.7	237.1	38.0	274.4	465.1	701.5
Plymouth	382.6	1.1	383.7	80.4	463.0	732.4	1,115.0
Pomfret	806.0	2.4	808.4	103.1	909.1	762.0	1,568.0
Randolph	5,986.6	18.0	6,004.6	509.0	6,495.6	6,250.3	12,236.9
Rochester	675.9	2.0	678.0	94.5	770.4	856.5	1,532.5
Royalton	5,805.1	17.4	5,822.5	232.4	6,037.5	2,574.2	8,379.3
Sharon	5,575.1	16.7	5,591.8	143.0	5,718.1	1,679.0	7,254.1
Stockbridge	306.6	0.9	307.6	43.6	350.2	493.4	800.1
Strafford	7,684.0	23.1	7,707.1	209.4	7,893.5	1,690.8	9,374.8
Thetford	3,672.4	11.0	3,683.4	187.8	3,860.2	2,356.2	6,028.5
Topsham	117.1	0.4	117.5	103.2	220.4	585.8	702.9
Tunbridge	713.2	2.1	715.3	145.6	858.8	803.6	1,516.8
Vershire	444.3	1.3	445.6	79.3	523.6	398.4	842.8
West Fairlee	141.3	0.4	141.7	27.5	168.8	359.8	501.2
Woodstock	2,930.4	8.8	2,939.2	361.6	3,291.9	3,466.6	6,397.0
<b>Total</b>	<b>74,906.1</b>	<b>224.7</b>	<b>75,130.8</b>	<b>7,101.8</b>	<b>82,007.8</b>	<b>80,186.3</b>	<b>155,092.4</b>

Adopted 2/26/25

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\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.

# Wind Generation Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)
Barnard	-	-	-	2.5	2.5	44.0	44.0
Bethel	9.7	0.0	9.7	6.7	16.3	197.4	207.1
Bradford	-	-	-	4.2	4.2	127.2	127.2
Braintree	-	-	-	1.4	1.4	37.1	37.1
Bridgewater	-	-	-	1.7	1.7	38.0	38.0
Brookfield	6.9	0.0	6.9	4.3	11.2	42.9	49.8
Chelsea	-	-	-	3.6	3.6	38.5	38.5
Corinth	-	-	-	1.8	1.8	40.3	40.3
Fairlee	-	-	-	1.9	1.9	63.9	63.9
Granville	10.5	0.0	10.6	0.6	11.1	11.5	22.0
Hancock	-	-	-	0.4	0.4	11.7	11.7
Hartford	9.5	0.0	9.5	52.4	61.9	1,898.3	1,907.8
Hartland	-	-	-	8.5	8.5	244.0	244.0
Newbury	-	-	-	4.6	4.6	126.9	126.9
Norwich	-	-	-	4.8	4.8	147.2	147.2
Pittsfield	-	-	-	0.8	0.8	24.7	24.7
Plymouth	-	-	-	1.7	1.7	39.0	39.0
Pomfret	-	-	-	2.1	2.1	40.5	40.5
Randolph	-	-	-	10.6	10.6	336.0	336.0
Rochester	2.8	0.0	2.8	1.9	4.7	45.6	48.3
Royalton	-	-	-	4.8	4.8	136.9	136.9
Sharon	-	-	-	2.9	2.9	89.3	89.3
Stockbridge	-	-	-	0.9	0.9	26.2	26.2
Strafford	29.2	0.1	29.3	4.3	33.5	89.9	119.1
Thetford	-	-	-	3.9	3.9	126.7	126.7
Topsham	-	-	-	2.1	2.1	31.2	31.2
Tunbridge	-	-	-	3.0	3.0	42.7	42.7
Vershire	-	-	-	1.6	1.6	21.2	21.2
West Fairlee	-	-	-	0.6	0.6	19.1	19.1
Woodstock	49.4	0.1	49.6	7.5	56.9	184.4	233.8
<b>Total</b>	<b>117.9</b>	<b>0.4</b>	<b>118.3</b>	<b>148.1</b>	<b>266.0</b>	<b>4,322.6</b>	<b>4,440.6</b>

\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.

# Biomass Generation Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)
Barnard	-	-	-	-	-	-	-
Bethel	-	-	-	-	-	-	-
Bradford	-	-	-	-	-	-	-
Braintree	-	-	-	-	-	-	-
Bridgewater	-	-	-	-	-	-	-
Brookfield	-	-	-	-	-	-	-
Chelsea	-	-	-	-	-	-	-
Corinth	-	-	-	-	-	-	-
Fairlee	-	-	-	-	-	-	-
Granville	-	-	-	-	-	-	-
Hancock	-	-	-	-	-	-	-
Hartford	-	-	-	-	-	-	-
Hartland	-	-	-	-	-	-	-
Newbury	-	-	-	-	-	-	-
Norwich	-	-	-	-	-	-	-
Pittsfield	-	-	-	-	-	-	-
Plymouth	-	-	-	-	-	-	-
Pomfret	-	-	-	-	-	-	-
Randolph	2,416.0	7.2	2,423.3	5.3	2,421.3	67.2	2,483.2
Rochester	-	-	-	-	-	-	-
Royalton	-	-	-	-	-	-	-
Sharon	-	-	-	-	-	-	-
Stockbridge	-	-	-	-	-	-	-
Strafford	-	-	-	-	-	-	-
Thetford	417.0	1.3	418.2	2.0	418.9	25.3	442.3
Topsham	-	-	-	-	-	-	-
Tunbridge	-	-	-	-	-	-	-
Vershire	-	-	-	-	-	-	-
West Fairlee	-	-	-	-	-	-	-
Woodstock	-	-	-	-	-	-	-
<b>Total</b>	<b>2,833.0</b>	<b>8.5</b>	<b>2,841.5</b>	<b>7.3</b>	<b>2,840.2</b>	<b>92.5</b>	<b>2,925.5</b>

Adopted 2/26/25

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\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.

# Hydro Generation Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)	Incremental Generation (MWh)	Generation Target (MWh)
Barnard	-	-	-	-	-	-	-
Bethel	1,861.5	5.6	1,867.1	6.7	1,868.2	79.0	1,940.5
Bradford	-	-	-	-	-	-	-
Braintree	-	-	-	-	-	-	-
Bridgewater	-	-	-	-	-	-	-
Brookfield	-	-	-	-	-	-	-
Chelsea	-	-	-	-	-	-	-
Corinth	-	-	-	-	-	-	-
Fairlee	-	-	-	-	-	-	-
Granville	-	-	-	-	-	-	-
Hancock	-	-	-	-	-	-	-
Hartford	155,928.0	467.8	156,395.8	52.4	155,980.4	759.3	156,687.3
Hartland	13,350.2	40.1	13,390.3	8.5	13,358.8	97.6	13,447.9
Newbury	3,083.5	9.3	3,092.8	4.6	3,088.1	50.7	3,134.3
Norwich	-	-	-	-	-	-	-
Pittsfield	-	-	-	-	-	-	-
Plymouth	-	-	-	-	-	-	-
Pomfret	-	-	-	-	-	-	-
Randolph	-	-	-	-	-	-	-
Rochester	-	-	-	-	-	-	-
Royalton	-	-	-	-	-	-	-
Sharon	-	-	-	-	-	-	-
Stockbridge	-	-	-	-	-	-	-
Strafford	-	-	-	-	-	-	-
Thetford	-	-	-	-	-	-	-
Topsham	-	-	-	-	-	-	-
Tunbridge	-	-	-	-	-	-	-
Vershire	-	-	-	-	-	-	-
West Fairlee	-	-	-	-	-	-	-
Woodstock	-	-	-	-	-	-	-
<b>Total</b>	<b>174,223.3</b>	<b>522.7</b>	<b>174,745.9</b>	<b>72.2</b>	<b>174,295.5</b>	<b>986.7</b>	<b>175,209.9</b>

\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.



# Energy Capacity Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)
Barnard	0.4	0.0	0.4	0.1	0.5	0.7	1.1
Bethel	1.2	0.0	1.2	0.2	1.4	2.9	4.1
Bradford	2.2	0.0	2.2	0.2	2.4	1.9	4.1
Braintree	0.4	0.0	0.4	0.1	0.4	0.5	0.9
Bridgewater	0.3	0.0	0.3	0.1	0.3	0.6	0.8
Brookfield	0.6	0.0	0.6	0.2	0.8	0.6	1.3
Chelsea	0.2	0.0	0.2	0.1	0.3	0.6	0.8
Corinth	0.4	0.0	0.4	0.1	0.5	0.6	1.0
Fairlee	1.5	0.0	1.6	0.1	1.6	0.9	2.5
Granville	0.1	0.0	0.1	0.0	0.2	0.2	0.3
Hancock	0.1	0.0	0.1	0.0	0.1	0.2	0.3
Hartford	48.1	0.1	48.3	1.9	50.0	27.7	75.8
Hartland	7.0	0.0	7.0	0.3	7.3	3.6	10.5
Newbury	3.7	0.0	3.8	0.2	3.9	1.9	5.6
Norwich	3.5	0.0	3.5	0.2	3.7	2.2	5.7
Pittsfield	0.2	0.0	0.2	0.0	0.2	0.4	0.5
Plymouth	0.3	0.0	0.3	0.1	0.4	0.6	0.9
Pomfret	0.6	0.0	0.6	0.1	0.7	0.6	1.2
Randolph	5.0	0.0	5.0	0.4	5.3	4.9	9.9
Rochester	0.5	0.0	0.5	0.1	0.6	0.7	1.2
Royalton	4.4	0.0	4.4	0.2	4.6	2.0	6.4
Sharon	4.2	0.0	4.3	0.1	4.4	1.3	5.6
Stockbridge	0.2	0.0	0.2	0.0	0.3	0.4	0.6
Strafford	5.9	0.0	5.9	0.2	6.0	1.3	7.2
Thetford	2.9	0.0	2.9	0.1	3.0	1.9	4.7
Topsham	0.1	0.0	0.1	0.1	0.2	0.5	0.6
Tunbridge	0.5	0.0	0.5	0.1	0.7	0.6	1.2
Vershire	0.3	0.0	0.3	0.1	0.4	0.3	0.7
West Fairlee	0.1	0.0	0.1	0.0	0.1	0.3	0.4
Woodstock	2.3	0.0	2.3	0.3	2.5	2.7	5.0
<b>Total</b>	<b>97.3</b>	<b>0.3</b>	<b>97.6</b>	<b>5.5</b>	<b>102.8</b>	<b>63.5</b>	<b>160.8</b>

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\* Targets were calculated by multiplying each town's Energy Capacity targets by a capacity factor given in PSD's Generation Scenario Tool.

# Solar Capacity Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)
Barnard	0.4	0.0	0.4	0.1	0.5	0.6	1.0
Bethel	0.8	0.0	0.8	0.2	1.0	2.8	3.5
Bradford	2.2	0.0	2.2	0.2	2.4	1.8	4.0
Braintree	0.4	0.0	0.4	0.1	0.4	0.5	0.9
Bridgewater	0.3	0.0	0.3	0.1	0.3	0.5	0.8
Brookfield	0.6	0.0	0.6	0.2	0.8	0.6	1.2
Chelsea	0.2	0.0	0.2	0.1	0.3	0.6	0.8
Corinth	0.4	0.0	0.4	0.1	0.5	0.6	1.0
Fairlee	1.5	0.0	1.6	0.1	1.6	0.9	2.5
Granville	0.1	0.0	0.1	0.0	0.1	0.2	0.3
Hancock	0.1	0.0	0.1	0.0	0.1	0.2	0.3
Hartford	12.5	0.0	12.5	1.9	14.4	26.6	39.1
Hartland	3.9	0.0	3.9	0.3	4.2	3.4	7.3
Newbury	3.0	0.0	3.1	0.2	3.2	1.8	4.8
Norwich	3.5	0.0	3.5	0.2	3.7	2.1	5.6
Pittsfield	0.2	0.0	0.2	0.0	0.2	0.4	0.5
Plymouth	0.3	0.0	0.3	0.1	0.4	0.6	0.8
Pomfret	0.6	0.0	0.6	0.1	0.7	0.6	1.2
Randolph	4.6	0.0	4.6	0.4	4.9	4.8	9.3
Rochester	0.5	0.0	0.5	0.1	0.6	0.7	1.2
Royalton	4.4	0.0	4.4	0.2	4.6	2.0	6.4
Sharon	4.2	0.0	4.3	0.1	4.4	1.3	5.5
Stockbridge	0.2	0.0	0.2	0.0	0.3	0.4	0.6
Strafford	5.8	0.0	5.9	0.2	6.0	1.3	7.1
Thetford	2.8	0.0	2.8	0.1	2.9	1.8	4.6
Topsham	0.1	0.0	0.1	0.1	0.2	0.4	0.5
Tunbridge	0.5	0.0	0.5	0.1	0.7	0.6	1.2
Vershire	0.3	0.0	0.3	0.1	0.4	0.3	0.6
West Fairlee	0.1	0.0	0.1	0.0	0.1	0.3	0.4
Woodstock	2.2	0.0	2.2	0.3	2.5	2.6	4.9
<b>Total</b>	<b>57.0</b>	<b>0.2</b>	<b>57.2</b>	<b>5.4</b>	<b>62.4</b>	<b>61.0</b>	<b>118.0</b>

Adopted 2/26/25

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\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.

# Wind Capacity Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)
Barnard	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bethel	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Bradford	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Braintree	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bridgewater	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brookfield	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chelsea	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Corinth	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fairlee	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Granville	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hancock	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hartford	0.0	0.0	0.0	0.0	0.0	1.0	1.4
Hartland	0.0	0.0	0.0	0.0	0.0	0.1	0.2
Newbury	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Norwich	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Pittsfield	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plymouth	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pomfret	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Randolph	0.0	0.0	0.0	0.0	0.0	0.2	0.3
Rochester	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Royalton	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Sharon	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Stockbridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Strafford	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Thetford	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Topsham	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tunbridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vershire	0.0	0.0	0.0	0.0	0.0	0.0	0.0
West Fairlee	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Woodstock	0.0	0.0	0.0	0.0	0.0	0.1	0.2
<b>Total</b>	<b>0.1</b>	<b>0.0</b>	<b>0.2</b>	<b>0.1</b>	<b>0.2</b>	<b>2.2</b>	<b>3.3</b>

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\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.

# Biomass Capacity Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)
Barnard	-	-	-	-	-	-	-
Bethel	-	-	-	-	-	-	-
Bradford	-	-	-	-	-	-	-
Braintree	-	-	-	-	-	-	-
Bridgewater	-	-	-	-	-	-	-
Brookfield	-	-	-	-	-	-	-
Chelsea	-	-	-	-	-	-	-
Corinth	-	-	-	-	-	-	-
Fairlee	-	-	-	-	-	-	-
Granville	-	-	-	-	-	-	-
Hancock	-	-	-	-	-	-	-
Hartford	-	-	-	-	-	-	-
Hartland	-	-	-	-	-	-	-
Newbury	-	-	-	-	-	-	-
Norwich	-	-	-	-	-	-	-
Pittsfield	-	-	-	-	-	-	-
Plymouth	-	-	-	-	-	-	-
Pomfret	-	-	-	-	-	-	-
Randolph	0.4	0.0	0.4	0.0	0.4	0.0	0.4
Rochester	-	-	-	-	-	-	-
Royalton	-	-	-	-	-	-	-
Sharon	-	-	-	-	-	-	-
Stockbridge	-	-	-	-	-	-	-
Strafford	-	-	-	-	-	-	-
Thetford	0.1	0.0	0.1	0.0	0.1	0.0	0.1
Topsham	-	-	-	-	-	-	-
Tunbridge	-	-	-	-	-	-	-
Vershire	-	-	-	-	-	-	-
West Fairlee	-	-	-	-	-	-	-
Woodstock	-	-	-	-	-	-	-
<b>Total</b>	<b>0.5</b>	<b>0.0</b>	<b>0.5</b>	<b>0.0</b>	<b>0.5</b>	<b>0.0</b>	<b>0.5</b>

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\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.



# Hydro Capacity Targets

		2025 Target		2035 Target		2050 Target	
Town	2022 Existing Generation (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)	Incremental Capacity (MWh)	Installed Capacity (MWh)
Barnard	-	-	-	-	-	-	-
Bethel	0.4	0.0	0.4	0.0	0.4	0.0	0.4
Bradford	-	-	-	-	-	-	-
Braintree	-	-	-	-	-	-	-
Bridgewater	-	-	-	-	-	-	-
Brookfield	-	-	-	-	-	-	-
Chelsea	-	-	-	-	-	-	-
Corinth	-	-	-	-	-	-	-
Fairlee	-	-	-	-	-	-	-
Granville	-	-	-	-	-	-	-
Hancock	-	-	-	-	-	-	-
Hartford	35.6	0.1	35.7	0.0	35.6	0.2	35.8
Hartland	3.0	0.0	3.1	0.0	3.0	0.0	3.1
Newbury	0.7	0.0	0.7	0.0	0.7	0.0	0.7
Norwich	-	-	-	-	-	-	-
Pittsfield	-	-	-	-	-	-	-
Plymouth	-	-	-	-	-	-	-
Pomfret	-	-	-	-	-	-	-
Randolph	-	-	-	-	-	-	-
Rochester	-	-	-	-	-	-	-
Royalton	-	-	-	-	-	-	-
Sharon	-	-	-	-	-	-	-
Stockbridge	-	-	-	-	-	-	-
Strafford	-	-	-	-	-	-	-
Thetford	-	-	-	-	-	-	-
Topsham	-	-	-	-	-	-	-
Tunbridge	-	-	-	-	-	-	-
Vershire	-	-	-	-	-	-	-
West Fairlee	-	-	-	-	-	-	-
Woodstock	-	-	-	-	-	-	-
<b>Total</b>	<b>39.8</b>	<b>0.1</b>	<b>39.9</b>	<b>0.0</b>	<b>39.8</b>	<b>0.2</b>	<b>40.0</b>

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\*2035 and 2050 MWh calculated in Generation Scenario Tool - April 2024\_12-13-2024.

# Weatherization

	<i>Residential</i>			<i>Commercial</i>		
<i>Town</i>	<i>2025</i>	<i>2035</i>	<i>2050</i>	<i>2025</i>	<i>2035</i>	<i>2050</i>
Barnard	212	267	432	11	11	24
Bethel	355	310	182	25	19	34
Bradford	593	734	1,154	37	26	42
Braintree	203	162	99	4	3	6
Bridgewater	285	459	974	12	11	24
Brookfield	356	550	1,122	9	10	23
Chelsea	250	256	278	12	9	16
Corinth	398	621	1,280	10	10	22
Fairlee	279	396	742	18	12	17
Granville	77	98	160	3	3	5
Hancock	94	128	230	5	4	8
Hartford	2,278	2,795	4,342	234	209	437
Hartland	802	1,061	1,833	26	24	51
Newbury	463	523	706	15	10	12
Norwich	599	610	651	76	72	157
Pittsfield	91	95	107	11	9	19
Plymouth	124	159	266	4	1	1
Pomfret	194	224	316	15	14	29
Randolph	1,045	1,453	2,665	66	47	74
Rochester	331	500	999	20	19	41
Royalton	536	537	546	34	30	64
Sharon	279	301	367	11	10	19
Stockbridge	189	274	526	7	6	11
Strafford	254	327	545	9	5	5
Thetford	636	876	1,587	34	30	64
Topsham	193	193	197	4	3	3
Tunbridge	277	352	574	9	9	21
Vershire	187	281	562	4	3	5
West Fairlee	211	325	663	2	1	2
Woodstock	680	833	1,293	117	99	197
<b>Total</b>	<b>12,468</b>	<b>15,700</b>	<b>25,397</b>	<b>848</b>	<b>720</b>	<b>1,432</b>

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\*All units are number of residences or commercial establishments to be weatherized. Targets were calculated using PSD's Analysis & Target.

# Heat Pumps

	<i>Residential</i>			<i>Commercial</i>		
<i>Town</i>	<i>2025</i>	<i>2035</i>	<i>2050</i>	<i>2025</i>	<i>2035</i>	<i>2050</i>
Barnard	171	459	676	16	54	77
Bethel	286	532	285	35	97	110
Bradford	477	1,261	1,807	52	133	137
Braintree	163	279	154	6	16	20
Bridgewater	230	789	1,525	17	56	76
Brookfield	287	945	1,756	13	49	74
Chelsea	201	440	435	17	47	51
Corinth	320	1,067	2,005	15	50	71
Fairlee	225	680	1,162	26	60	54
Granville	62	168	251	4	13	17
Hancock	76	221	359	7	21	26
Hartford	1,834	4,805	6,799	331	1,051	1,413
Hartland	646	1,824	2,870	37	120	164
Newbury	373	900	1,105	22	49	39
Norwich	482	1,049	1,019	108	361	509
Pittsfield	73	163	168	15	47	61
Plymouth	100	274	416	5	6	2
Pomfret	156	385	495	21	69	95
Randolph	841	2,498	4,173	94	237	239
Rochester	267	859	1,565	29	95	133
Royalton	431	922	855	47	152	207
Sharon	225	517	575	16	48	60
Stockbridge	152	470	823	10	29	36
Strafford	204	562	854	13	27	16
Thetford	512	1,505	2,486	48	153	208
Topsham	155	332	308	6	13	10
Tunbridge	223	605	898	13	46	67
Vershire	150	483	879	6	16	18
West Fairlee	169	558	1,037	3	7	8
Woodstock	547	1,433	2,025	165	499	637
<b>Total</b>	<b>10,039</b>	<b>26,987</b>	<b>39,767</b>	<b>1,198</b>	<b>3,623</b>	<b>4,633</b>

\*Targets were calculated using PSD's Analysis & Target Aid.

# Electric Vehicles Targets

	Battery Electric			Plug-In Hybrid			Total E.Vs		
Town	2025	2035	2050	2025	2035	2050	2025	2035	2050
Barnard	34	392	760	5	5	1	39	397	761
Bethel	64	649	966	9	7	1	73	656	967
Bradford	97	1,217	2,675	14	14	3	111	1,231	2,678
Braintree	33	234	119	5	3	-	38	237	119
Bridgewater	44	682	1,919	6	8	2	50	690	1,921
Brookfield	55	757	1,869	8	9	2	63	766	1,871
Chelsea	42	428	644	6	5	1	48	433	645
Corinth	67	992	2,665	10	11	3	77	1,003	2,668
Fairlee	45	619	1,529	6	7	2	51	626	1,531
Granville	13	158	331	2	2	-	15	160	331
Hancock	22	375	1,118	3	4	1	25	379	1,119
Hartford	327	3,933	8,117	47	45	10	374	3,978	8,127
Hartland	139	1,812	4,211	20	21	5	159	1,833	4,216
Newbury	73	811	1,454	11	9	2	84	820	1,456
Norwich	105	1,090	1,681	15	13	2	120	1,103	1,683
Pittsfield	13	101	119	2	1	-	15	102	119
Plymouth	19	214	398	3	2	1	22	216	399
Pomfret	34	366	628	5	4	1	39	370	629
Randolph	155	2,037	4,771	22	23	6	177	2,060	4,777
Rochester	53	795	2,153	8	9	3	61	804	2,156
Royalton	91	982	1,685	13	11	2	104	993	1,687
Sharon	49	521	851	7	6	1	56	527	852
Stockbridge	30	402	982	4	5	1	34	407	983
Strafford	48	624	1,425	7	7	2	55	631	1,427
Thetford	117	1,609	3,987	17	19	5	134	1,628	3,992
Topsham	30	231	119	4	3	-	34	234	119
Tunbridge	48	571	1,181	7	7	2	55	578	1,183
Vershire	35	539	1,496	5	6	2	40	545	1,498
West Fairlee	33	493	1,323	5	6	2	38	499	1,325
Woodstock	111	1,328	2,716	16	15	3	127	1,343	2,719
<b>Total</b>	<b>2,026</b>	<b>24,962</b>	<b>53,892</b>	<b>292</b>	<b>287</b>	<b>66</b>	<b>2,318</b>	<b>25,249</b>	<b>53,958</b>

\* Targets were calculated using PSD's Analysis & Target Aid.

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# Prime Solar and Wind

<i>Town</i>	<i>Prime Solar</i>	<i>Prime Wind</i>
Barnard	368	842
Bethel	1,023	338
Bradford	728	127
Braintree	361	78
Bridgewater	280	347
Brookfield	1,145	1,763
Chelsea	596	1,763
Corinth	476	258
Fairlee	125	51
Granville	252	46
Hancock	31	24
Hartford	1,747	439
Hartland	1,080	901
Newbury	980	213
Norwich	884	102
Pittsfield	94	43
Plymouth	215	371
Pomfret	321	659
Randolph	1,243	470
Rochester	546	167
Royalton	637	531
Sharon	267	328
Stockbridge	123	94
Strafford	372	1,403
Thetford	610	21
Topsham	426	799
Tunbridge	577	1,158
Vershire	210	782
West Fairlee	64	21
Woodstock	850	1,572
<b>Total</b>	<b>16,631</b>	<b>15,711</b>

\* These prime areas for wind and solar generation were calculated by the Vermont Center for Geographic Information. TRORC excluded the acres of priority forest blocks mapped by the Vermont Agency of Natural Resources.

## Appendix F: Homes in the Region Chapter Tables

<b>Town</b>	<b>Total Housing Units, 1980</b>	<b>Total Housing Units, 1990</b>	<b>Total Housing Units, 2000</b>	<b>Total Housing Units, 2010</b>	<b>% Change, 1980-1990</b>	<b>% Change, 1990-2000</b>	<b>% Change, 2000-2010</b>
Barnard	555	607	629	716	9.4	3.6	13.8
Bethel	823	888	956	1043	7.9	7.7	9.1
Bradford	955	1,075	1217	1281	12.6	13.2	5.3
Braintree	507	570	567	645	12.4	-0.5	13.8
Bridgewater	486	571	582	688	17.5	1.9	18.2
Brookfield	457	565	602	702	23.6	6.5	16.6
Chelsea	510	610	657	695	19.6	7.7	5.8
Corinth	512	618	728	803	20.7	17.8	10.3
Fairlee	460	551	575	625	19.8	4.4	8.7
Granville	201	210	218	244	4.5	3.8	11.9
Hancock	198	201	214	208	1.5	6.5	-2.8
Hartford	3,483	5,026	5502	5816	44.3	9.5	5.7
Hartland	955	1,270	1382	1584	33.0	8.8	14.6
Newbury	977	1,132	1153	1378	15.9	1.9	19.5
Norwich	1,027	1,382	1505	1553	34.6	8.9	3.2
Pittsfield	298	401	393	435	34.6	-2.0	10.7
Plymouth	495	736	773	864	48.7	5.0	11.8
Pomfret	404	490	535	544	21.3	9.2	1.7
Randolph	1,669	1,830	1905	2076	9.6	4.1	9.0
Rochester	662	737	768	832	11.3	4.2	8.3
Royalton	975	1,161	1281	1471	19.1	10.3	14.8
Sharon	413	578	663	735	40.0	14.7	10.9
Stockbridge	413	488	528	553	18.2	8.2	4.7
Strafford	412	494	542	586	19.9	9.7	8.1
Thetford	1,085	1,136	1193	1288	4.7	5.0	8.0
Topsham	395	504	582	661	27.6	15.5	13.6
Tunbridge	499	655	679	764	31.3	3.7	12.5
Vershire	275	302	378	435	9.8	25.2	15.1
West Fairlee	249	355	340	368	42.6	-4.2	8.2
Woodstock	1,548	1,755	1775	1893	13.4	1.1	6.6
<b>Region</b>	<b>21898</b>	<b>26898</b>	<b>28822</b>	<b>31486</b>	<b>22.8</b>	<b>7.2</b>	<b>9.2</b>
<b>State</b>	<b>223,198</b>	<b>271214</b>	<b>294382</b>	<b>322539</b>	<b>21.5</b>	<b>8.5</b>	<b>9.6</b>

Source: U.S. Census Bureau - Census of Population & Housing, 2010

<b>Town</b>	<b>Median household income</b>	<b>Purchase price affordable</b>	<b>Cash needed at closing</b>	<b>Affordability gap?</b>
Granville	\$53,125.00	\$181,500.00	\$15,382.00	n/a
Hancock	\$35,313.00	\$120,000.00	\$10,954.00	\$14,400.00
Bradford	\$44,500.00	\$151,500.00	\$13,222.00	\$1,500.00
Braintree	\$42,105.00	\$143,500.00	\$12,646.00	n/a
Brookfield	\$61,641.00	\$211,000.00	\$17,506.00	n/a
Chelsea	\$47,841.00	\$163,500.00	\$14,086.00	n/a
Corinth	\$49,375.00	\$168,500.00	\$14,446.00	n/a
Fairlee	\$60,703.00	\$208,000.00	\$17,290.00	\$7,000.00
Newbury	\$50,603.00	\$173,000.00	\$14,770.00	n/a
Randolph	\$48,091.00	\$164,000.00	\$14,122.00	n/a
Strafford	\$52,457.00	\$179,000.00	\$15,202.00	\$71,000.00
Thetford	\$71,329.00	\$245,500.00	\$19,990.00	n/a
Topsham	\$50,000.00	\$170,500.00	\$14,590.00	n/a
Tunbridge	\$54,231.00	\$185,000.00	\$15,634.00	\$14,000.00
Vershire	\$42,438.00	\$144,500.00	\$12,718.00	n/a
West Fairlee	\$49,375.00	\$168,500.00	\$14,446.00	\$20,500.00
Pittsfield	\$62,125.00	\$213,000.00	\$17,650.00	\$77,500.00
Barnard	\$71,429.00	\$245,500.00	\$19,990.00	n/a
Bethel	\$51,000.00	\$174,000.00	\$14,842.00	n/a
Bridgewater	\$51,750.00	\$176,500.00	\$15,022.00	n/a
Hartford	\$52,455.00	\$179,000.00	\$15,202.00	\$19,750.00
Hartland	\$63,147.00	\$216,500.00	\$17,902.00	n/a
Norwich	\$87,833.00	\$302,000.00	\$24,058.00	\$80,000.00
Plymouth	\$60,208.00	\$206,500.00	\$17,182.00	n/a
Pomfret	\$64,844.00	\$222,000.00	\$18,298.00	n/a
Rochester	\$45,385.00	\$154,500.00	\$13,438.00	n/a
Royalton	\$35,395.00	\$120,500.00	\$10,990.00	\$34,500.00
Sharon	\$52,727.00	\$180,000.00	\$15,274.00	\$46,250.00
Stockbridge	\$46,458.00	\$158,000.00	\$13,690.00	n/a
Woodstock	\$77,863.00	\$268,000.00	\$21,610.00	\$22,440.00
<b>Region</b>	<b>\$54,524.87</b>	<b>\$186,450.00</b>	<b>\$15,738.40</b>	<b>\$44,870.00</b>
<b>Vermont</b>	<b>\$53,422.00</b>	<b>\$183,875.00</b>	<b>\$15,728.00</b>	<b>n/a</b>

*Data sources : VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on median primary home sales price by town in 2012. "n/a" represents a lack of adequate data from small sampling sizes.*

<b>Table 18: Housing Affordability, Median Value, and Home Sales Price</b>						
<b>Town</b>	<b>30% or more for Owners Costs (2013-17)</b>	<b>30% or more for Renters Costs (2013-17)</b>	<b>Total Owner Occupied Units (2013-17)</b>	<b>Total Rental Units (2013-17)</b>	<b>Median Monthly Gross Rent (2013-17)</b>	<b>Median Value of Owner-occupied Housing Units (2013-17)</b>
Barnard	41.8%	65.0%	300	32	\$975	\$380,300
Bethel	35.4%	39.2%	614	250	\$679	\$181,600
Bradford	42.4%	56.7%	943	283	\$861	\$171,700
Braintree	32.8%	76.9%	466	54	\$900	\$165,600
Bridgewater	38.6%	64.6%	311	126	\$1,050	\$242,100
Brookfield	50.7%	29.4%	507	74	\$928	\$217,600
Chelsea	28.5%	49.0%	423	129	\$690	\$161,500
Corinth	40.0%	49.2%	501	83	\$825	\$162,500
Fairlee	34.3%	43.7%	356	119	\$1,026	\$222,800
Granville	32.2%	42.9%	97	47	\$825	\$172,700
Hancock	28.3%	32.0%	103	30	\$725	\$144,600
Hartford	33.8%	49.2%	2,924	1,523	\$1,008	\$227,400
Hartland	31.6%	50.4%	1,244	259	\$964	\$210,700
Newbury	44.4%	40.5%	767	235	\$715	\$165,000
Norwich	30.7%	38.1%	1,021	276	\$1,078	\$454,500
Pittsfield	49.0%	55.0%	141	43	\$950	\$202,500
Plymouth	43.0%	54.5%	187	39	\$575	\$314,000
Pomfret	29.5%	37.2%	373	46	\$1,672	\$373,400
Randolph	41.3%	54.2%	1,322	484	\$755	\$190,300
Rochester	41.8%	63.7%	394	106	\$702	\$186,300
Royalton	36.7%	52.5%	614	596	\$898	\$181,800
Sharon	26.8%	50.4%	433	182	\$1,203	\$231,800
Stockbridge	31.7%	34.3%	292	38	\$1,018	\$205,100
Strafford	51.4%	10.3%	423	46	\$1,203	\$281,500
Thetford	30.6%	40.3%	1,016	142	\$786	\$262,800
Topsham	28.3%	25.5%	375	57	\$861	\$154,800
Tunbridge	26.2%	48.4%	445	109	\$906	\$211,100
Vershire	37.1%	59.4%	254	34	\$943	\$168,500
West Fairlee	37.4%	48.4%	264	68	\$820	\$172,900
Woodstock	33.1%	21.6%	1,000	325	\$1,074	\$358,900
<b>Region</b>	<b>36.31%</b>	<b>46.08%</b>	<b>18,110</b>	<b>5,835</b>	<b>\$921</b>	<b>\$225,877</b>
<b>Vermont</b>	<b>33.70%</b>	<b>51.30%</b>	<b>182,321</b>	<b>76,214</b>	<b>\$945</b>	<b>\$220,600</b>

Source: U.S. Census Bureau, American Community Survey, 2013-2017



**Table 19: Housing Units by Structure, 2016**

Town	# of Units	Single Family Units	% of Single Family	Two Family Units	% of Two Family Units	Multi-family Units	% of Multi-family Units	Mobile Homes	% of Mobile Homes
Barnard	724	709	97.9%	12	1.66%	0	0.0%	3	0.4%
Bethel	1,053	722	68.6%	58	5.51%	136	12.9%	137	13.0%
Bradford	1,363	992	72.8%	51	3.74%	268	19.7%	52	3.8%
Braintree	646	482	74.6%	0	0.00%	10	1.5%	154	23.8%
Bridgewater	687	540	78.6%	52	7.57%	51	7.4%	44	6.4%
Brookfield	737	635	86.2%	17	2.31%	4	0.5%	81	11.0%
Chelsea	711	596	83.8%	31	4.36%	46	6.5%	38	5.3%
Corinth	820	694	84.6%	27	3.29%	14	1.7%	85	10.4%
Fairlee	600	502	83.7%	44	7.33%	35	5.8%	19	3.2%
Granville	265	234	88.3%	8	3.02%	5	1.9%	18	6.8%
Hancock	193	147	76.2%	0	0.00%	12	6.2%	34	17.6%
Hartford	5,839	3,450	59.1%	297	5.09%	1,684	28.8%	408	7.0%
Hartland	1,665	1,261	75.7%	73	4.38%	111	6.7%	220	13.2%
Newbury	1,387	1,105	79.7%	26	1.87%	129	9.3%	127	9.2%
Norwich	1,561	1,337	85.7%	93	5.96%	76	4.9%	55	3.5%
Pittsfield	407	336	82.6%	23	5.65%	40	9.8%	8	2.0%
Plymouth	844	666	78.9%	27	3.20%	130	15.4%	21	2.5%
Pomfret	563	538	95.6%	13	2.31%	5	0.9%	7	1.2%
Randolph	2,168	1,592	73.4%	132	6.09%	268	12.4%	176	8.1%
Rochester	817	682	83.5%	33	4.04%	63	7.7%	39	4.8%
Royalton	1,472	844	57.3%	67	4.55%	345	23.4%	216	14.7%
Sharon	761	566	74.4%	35	4.60%	48	6.3%	112	14.7%
Stockbridge	504	433	85.9%	4	0.79%	22	4.4%	45	8.9%
Strafford	621	581	93.6%	4	0.64%	3	0.5%	33	5.3%
Thetford	1,308	1,161	88.8%	48	3.67%	21	1.6%	78	6.0%
Topsham	618	501	81.1%	12	1.94%	3	0.5%	102	16.5%
Tunbridge	732	659	90.0%	15	2.05%	9	1.2%	49	6.7%
Vershire	428	370	86.4%	14	3.27%	10	2.3%	34	7.9%
West Fairlee	452	323	71.5%	15	3.32%	23	5.1%	91	20.1%
Woodstock	2,025	1,635	80.7%	157	7.75%	144	7.1%	89	4.4%
<b>Region</b>	<b>31,971</b>	<b>24,293</b>	<b>76.0%</b>	<b>1,388</b>	<b>4.3%</b>	<b>3,715</b>	<b>11.6%</b>	<b>2,575</b>	<b>8.1%</b>
<b>State</b>	<b>321,284</b>	<b>224,899</b>	<b>70.0%</b>	<b>20,562</b>	<b>6.4%</b>	<b>53,333</b>	<b>16.6%</b>	<b>22,490</b>	<b>7.0%</b>

Source: U.S. Census Bureau, American Community Survey, 200-2011

**Table 20: Occupancy Status by Town, 1990 - 2010**

Town	1990			2000			2010		
	Vacancy Rate for Primary Residences	Vacancy Rate for Total Units	# of Vacant Seasonal Units	Vacancy Rate for Primary Residences	Vacancy Rate for Total Units	# of Vacant Seasonal Units	Vacancy Rate for Primary Residences	Vacancy Rate for Total Units	# of Vacant Seasonal Units
Barnard	4.30%	45.50%	250	1.70%	39.10%	235	4.02%	42.32%	268
Bethel	5.10%	19.70%	130	3.60%	14.50%	105	3.33%	16.78%	113
Bradford	7.30%	15.60%	89	8.40%	15.50%	87	4.46%	13.82%	93
Braintree	4.40%	21.40%	97	2.80%	15.00%	69	2.68%	17.67%	85
Bridgewater	9.10%	40.10%	177	4.60%	32.10%	160	4.27%	37.35%	220
Brookfield	8.50%	30.60%	125	3.50%	21.10%	106	3.15%	24.79%	131
Chelsea	9.30%	29.70%	124	5.00%	24.70%	129	1.90%	22.16%	115
Corinth	4.50%	32.70%	174	4.40%	26.50%	161	4.03%	30.76%	208
Fairlee	5.40%	37.00%	174	6.60%	31.30%	142	4.30%	31.36%	160
Granville	3.30%	46.20%	90	4.60%	41.70%	81	5.59%	44.26%	83
Hancock	3.50%	32.30%	58	2.80%	23.40%	44	4.35%	27.88%	47
Hartford	6.70%	23.90%	862	2.60%	17.90%	839	5.07%	23.56%	1,039
Hartland	6.10%	12.40%	80	3.40%	8.10%	65	2.81%	10.54%	90
Newbury	5.50%	32.30%	304	5.60%	29.20%	272	2.56%	28.45%	323
Norwich	6.80%	13.50%	93	4.90%	9.20%	65	2.99%	10.75%	83
Pittsfield	4.70%	58.90%	217	3.10%	51.70%	191	5.73%	43.68%	173
Plymouth	3.30%	73.20%	515	2.60%	67.50%	502	6.71%	66.44%	536
Pomfret	4.10%	30.60%	130	3.50%	25.70%	121	2.68%	27.76%	133
Randolph	7.00%	12.00%	92	3.70%	7.10%	65	4.51%	11.99%	101
Rochester	5.80%	36.50%	226	3.60%	33.50%	229	7.33%	36.06%	232
Royalton	8.30%	15.90%	89	4.60%	9.80%	67	3.56%	12.44%	96
Sharon	7.10%	20.10%	75	2.90%	16.60%	91	3.78%	15.51%	74
Stockbridge	6.10%	50.20%	215	3.60%	46.80%	228	3.33%	38.70%	193
Strafford	8.70%	32.80%	119	2.20%	22.50%	110	1.47%	22.70%	111
Thetford	4.80%	17.20%	141	3.70%	13.50%	117	1.83%	14.83%	138
Topsham	7.50%	33.90%	133	3.80%	27.70%	139	2.57%	29.95%	156
Tunbridge	6.70%	35.30%	187	4.70%	24.40%	134	3.15%	27.23%	160
Vershire	5.00%	33.40%	86	7.90%	31.00%	87	5.90%	31.03%	96
West Fairlee	6.50%	34.60%	100	5.00%	18.20%	45	4.30%	25.27%	66
Woodstock	10.30%	26.00%	275	5.10%	21.80%	297	7.38%	26.47%	362
<b>Region</b>	<b>6.60%</b>	<b>26.80%</b>	<b>5,427</b>	<b>4.00%</b>	<b>21.30%</b>	<b>4,983</b>	<b>3.99%</b>	<b>27.08%</b>	<b>5,685</b>
<b>Vermont</b>	<b>5.60%</b>	<b>22.30%</b>	<b>45,405</b>	<b>3.60%</b>	<b>18.30%</b>	<b>43,060</b>	<b>3.39%</b>	<b>16.66%</b>	<b>50,198</b>

Source: U.S. Census Bureau, Census of Population and Housing, 2010

**Table 21: Housing Tenure & Change by Town, 1990-2010**

Town	1990		2000		2010		Change 1990-2000		Change 2000-2010	
	Owner Occupied Units	Renter Occupied Units	Owner Occupied Units	Renter Occupied Units	Owner Occupied Units	Renter Occupied Units	% Change in Units Owned 1990 - 2000	% Change in Units Rented 1990 - 2000	% Change in Units Owned 2000 - 2010	% Change in Units Rented 2000 - 2010
Barnard	549	58	563	66	628	80	2.55%	13.79%	11.55%	21.21%
Bethel	665	198	701	236	773	239	5.41%	19.19%	10.27%	1.27%
Bradford	772	303	855	362	893	388	10.75%	19.47%	4.44%	7.18%
Braintree	504	66	488	79	568	77	-3.17%	19.70%	16.39%	-2.53%
Bridgewater	452	119	469	113	570	118	3.76%	-5.04%	21.54%	4.42%
Brookfield	498	67	520	82	608	94	4.42%	22.39%	16.92%	14.63%
Chelsea	495	115	520	137	567	128	5.05%	19.13%	9.04%	-6.57%
Corinth	547	71	650	78	716	87	18.83%	9.86%	10.15%	11.54%
Fairlee	431	120	431	144	470	155	0.00%	20.00%	9.05%	7.64%
Granville	178	32	186	32	223	21	4.49%	0.00%	19.89%	-34.38%
Hancock	161	40	172	42	175	33	6.83%	5.00%	1.74%	-21.43%
Hartford	3,479	1,547	3,957	1,545	4,174	1,642	13.74%	-0.13%	5.48%	6.28%
Hartland	1,018	252	1,149	233	1,292	292	12.87%	-7.54%	12.45%	25.32%
Newbury	934	198	926	227	1,113	265	-0.86%	14.65%	20.19%	16.74%
Norwich	1,065	317	1,172	333	1,225	328	10.05%	5.05%	4.52%	-1.50%
Pittsfield	345	56	341	52	367	68	-1.16%	-7.14%	7.62%	30.77%
Plymouth	686	50	734	39	794	70	7.00%	-22.00%	8.17%	79.49%
Pomfret	398	92	436	99	459	85	9.55%	7.61%	5.28%	-14.14%
Randolph	1,276	554	1,362	543	1,488	588	6.74%	-1.99%	9.25%	8.29%
Rochester	584	153	610	158	679	153	4.45%	3.27%	11.31%	-3.16%
Royalton	738	423	765	516	875	596	3.66%	21.99%	14.38%	15.50%
Sharon	475	103	521	142	559	176	9.68%	37.86%	7.29%	23.94%
Stockbridge	431	57	488	40	493	60	13.23%	-29.82%	1.02%	50.00%
Strafford	429	65	469	73	517	69	9.32%	12.31%	10.23%	-5.48%
Thetford	889	247	970	223	1,077	211	9.11%	-9.72%	11.03%	-5.38%
Topsham	453	51	522	60	602	59	15.23%	17.65%	15.33%	-1.67%
Tunbridge	578	77	574	105	668	96	-0.69%	36.36%	16.38%	-8.57%
Vershire	259	43	311	67	368	67	20.08%	55.81%	18.33%	0.00%
W. Fairlee	294	61	259	81	299	69	-11.90%	32.79%	15.44%	-14.81%
Woodstock	1,253	502	1,333	442	1,440	453	6.38%	-11.95%	8.03%	2.49%
<b>Region</b>	<b>20,836</b>	<b>6,037</b>	<b>22,454</b>	<b>6,349</b>	<b>24,680</b>	<b>6,767</b>	<b>7.77%</b>	<b>5.17%</b>	<b>9.91%</b>	<b>6.58%</b>
<b>Vermont</b>	<b>200,654</b>	<b>70,560</b>	<b>220,448</b>	<b>73,934</b>	<b>241,869</b>	<b>80,670</b>	<b>9.86%</b>	<b>4.78%</b>	<b>9.72%</b>	<b>9.11%</b>

Source: U.S. Census Bureau, Census of Population and Housing, 2010

<b>Table 22: VSHA Subsidized Rental Housing Developments - 2013</b>		
<b>Town or Village</b>	<b>Housing Development</b>	<b># of Units</b>
Bethel:	Bethel - Depot Apartments (I and II)	25
Bradford:	Bradford - Colonial Village	21
	Bradford - Bradford Village Apartments	21
	Bradford - Waits River Apartments	29
Bridgewater:	Bridgewater - Mill Village Apartments	14
Chelsea:	Chelsea - Chelsea Court	24
	Chelsea - Hillside Lane	12
Hancock:	Hancock - Mountain View Apartments	5
Hartford:	Hartford - Anna Pluhar House	3
	Hartford - The Briars	24
	Hartford - Colodny Building	8
	Hartford - Hillcrest Manor	9
	Hartford - School Street	8
	Quechee - Quechee Pines	9
	Quechee - Quechee Sunrise	22
	White River Junction – Village Apartments	14
	White River Junction - Graystone Village	34
	White River Junction - Northwoods (I and II)	28
	White River Junction - Overlook Housing	13
	White River Junction - Prospect Street	7
	White River Junction - Windsor Hollow	27
	Wilder - Brookview Apartments	34
Wilder - Hollow Drive	18	
Newbury and the Village of Wells River:	Newbury - Montebello Hill Apartments	15
	Village of Wells River - Baldwin Block	7
	Village of Wells River - Spear House	3
	Village of Wells River - Spear House Apartments	15
	Village of Wells River - Wells River Housing	22
Norwich:	Norwich Senior Housing	24
Randolph:	Randolph - Branchwood Apartments	12
	Randolph – Hedding Drive	16
	Randolph - Joslyn House	19
	Randolph - Prospect-Forest Homes	9
	Randolph - Randolph Circle	20
	Randolph - Randolph House	48
	Randolph - Red Lion Inn	20



<b>Table 22: VSHA Subsidized Rental Housing Developments - 2013</b>		
<b>Town or Village</b>	<b>Housing Development</b>	<b># of Units</b>
	Randolph - Safe Haven	6
	Randolph – Salisbury Square	14
	Randolph - Sass Apartments	16
	Randolph - South Pleasant Street Apt	8
	Randolph - The Pleasant St. Group Home	5
Rochester:	Rochester - Brookside Apartments	6
	Rochester - Park House	17
Royalton:	Royalton - Brightwood House	15
Woodstock:	Woodstock - Mellishwood (I and II)	26
<b>Region</b>		<b>752</b>



# Housing needs in East Central Vermont



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## Summary

Some residents of the East Central Vermont region face extraordinary challenges finding housing that is both affordable and located near their jobs and needed services. Prevailing median home prices of \$173,000 during the first six months of 2013 are out of reach for thousands of area households making less than the area median income. The scarce rental options in many East Central Vermont communities make the search for affordable housing even tougher. Both homeownership and rental housing prices are in part driven higher by Windsor County's high proportion of vacation homes which limits the stock available for year-round residents and brings wealthier households into the region to compete for units. In a recent survey of residents, the East Central Vermont Consortium found that most respondents (74%) believe "ensuring housing is available and affordable" is the best tool for the region to use to attract young people and families.

A household that spends more than 30% of their income for monthly housing expenses is considered "cost burdened", according to HUD standards. An estimated 11,000 households living in Orange and Windsor counties paid this much in 2011 for their housing-related expenses (a combination of their mortgage or rent, utilities, taxes, and insurance). Of these households, an estimated 4,500 spent 50 percent or more of their income for housing, placing a considerable drain on the funds these residents have available for other basic life necessities. Households with heavy housing cost burdens are likely to be at the lowest end of the income spectrum.

Although these challenges are not unique to this region, they are no less confounding for the residents who face them and for the communities these cost-burdened residents call home. Working toward the following goals as a regional team can help municipal players maximize their impact on local housing markets:

- Expand the perpetually affordable housing stock available to the region's lowest income residents of all ages. Demand is high for subsidized rental housing in which tenants pay rent amounts that are adjusted to their income. Since current public funding realities make the likelihood of new rental assistance nearly impossible, the region is limited to tools such as:
  - Preserving existing affordable housing,
  - Renovating existing housing with public funding to create more high quality rental units affordable to extremely low-income residents,
  - Adaptively reusing non-housing properties to create more housing units, and
  - Increasing the number of affordable homeownership units through shared equity of existing homes in towns where the median home prices and incomes are out of balance.
- Target new housing development in municipalities with existing water and sewer infrastructure and through downtown development that follows historic settlement patterns.
- Embrace existing statewide and federal priorities, such as affordable, safe housing that encourages aging in place, accessibility, housing equity fairness, integration and smart growth.

Capitalizing on a variety of available tools and approaches can assist local and regional players in reaching these goals. As a work group of housing experts from East Central Vermont has already demonstrated in its initial recommendations, expanding and revising municipal plans and zoning regulations, pursuing affordable housing funding sources, and providing education and outreach to residents are the types of tools that will prove most useful.

The towns of East Central Vermont vary significantly from one another in characteristics such as the existence of zoning, degree of existing infrastructure, proximity to employment centers, and the level of community support. Ultimately, each community's unique features will determine which tools most effectively help residents live their lives affordably and sustainably.

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*This report was prepared for Two Rivers-Ottawaquechee Regional Commission on behalf of the East Central Vermont Sustainability Consortium and funded by the U.S. Housing and Urban Development Sustainable Community Regional Planning Grant Program.*

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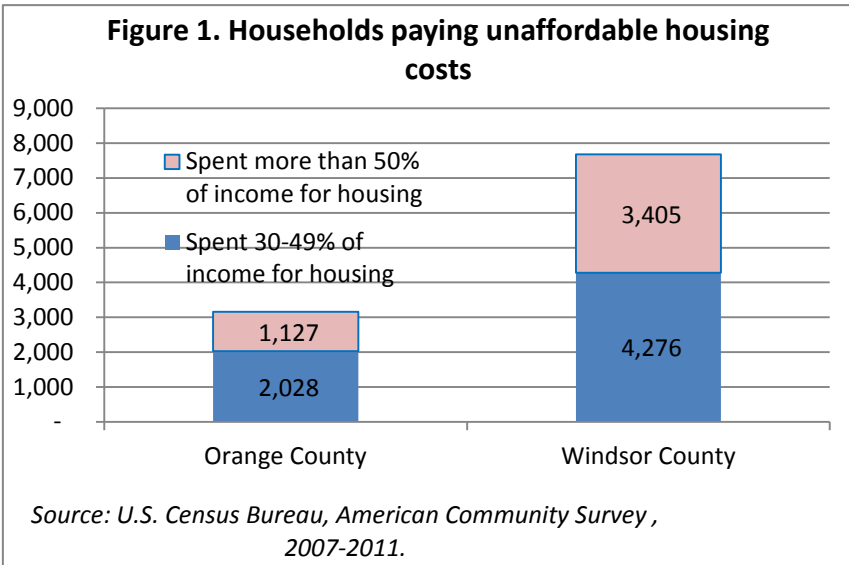


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## Household income

For most households, the costs of housing consume more of their income than any other type of expense. If a household's housing expenses rise and become out of balance with its income, its members have fewer dollars for other critical needs.



A median income household in Orange County made an estimated \$52,000 in 2011 and in Windsor, \$53,000—almost identical to the statewide median. By town, median household income in the region ranges from a low of \$35,000 in Hancock and Royalton to \$88,000 in Norwich.

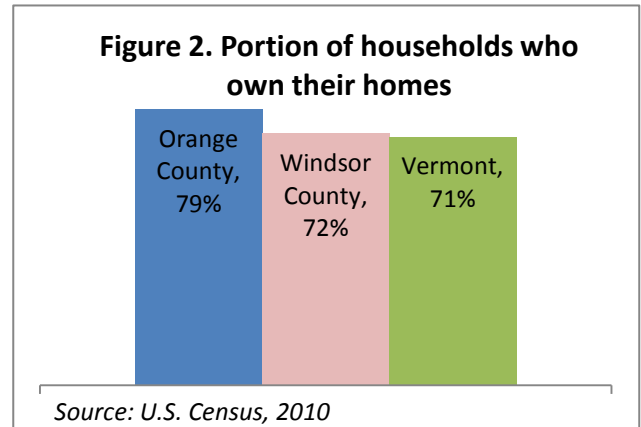
Unfortunately, the income of thousands of households in these counties was not sufficient to cover the cost of housing in a manner that leaves enough left over for other basic necessities. An estimated 3,155 (27%) of Orange's households and 7,681 (31%) of Windsor's spent more than 30% of their income housing. At the town level, Hartford and Springfield, the region's largest towns housed the greatest number of cost burdened

households. However, the percentage of resident households bearing high housing cost burdens was highest in Royalton.

## Affordability of buying and owning a home

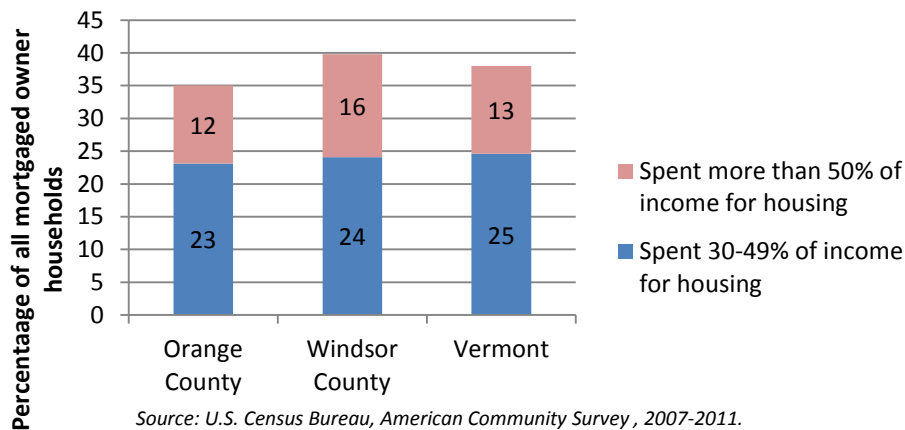
As with the rest of the state, the vast majority of East Central Vermont residents own their homes. In fact, Windsor and Orange County households are even more likely than the average Vermonter to be homeowners (rather than renters). Several forces affect the homeownership rate of particular towns and counties, including the availability of adequate rental housing options and the affordability of home purchase prices.

Recent declines in primary home sale prices and interest rates have put the median priced home in both Windsor and Orange counties within reach of median income households at the county level. The median income household in each county could likely afford the median primary home price of \$173,000 in Windsor County and \$156,000 in Orange County in 2012 assuming a five percent down payment, average taxes, insurance, and interest rates. However, some individual towns had home prices out of reach of the median income resident, with the most extreme being Hancock, Strafford, Pittsfield, and Norwich.



As in other parts of the state, 35-40 percent of mortgaged Orange and Windsor county home owners spent more than 30 percent of their income for their mortgage and other housing expenses. The most dire consequences are felt by the homeowners paying more than half of their income for housing. Sixteen percent of the mortgaged homeowners in Windsor County as compared to 13 percent statewide and 12 percent in neighboring Orange County faced housing costs

**Figure 3. Mortgaged home owners paying unaffordable housing costs**



this high. This translates to an estimated 1,540 East Central Vermont households paying mortgages and associated expenses that consume at least half of their income.

At the town level, Cavendish and Royalton had the highest incidence of cost burden among mortgaged owner residents

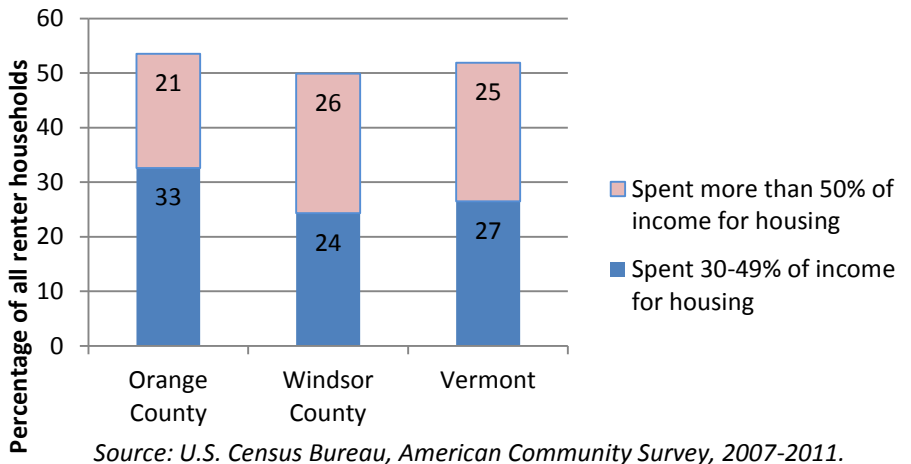
Unfortunately, the likelihood of foreclosure increases dramatically when a household's mortgage and other housing expenses consume a high portion of their income. Between 2010 and the first half of 2013, Orange and Windsor counties had 948 foreclosures, primarily among single family home owners.<sup>1</sup>

### Affordability of renting a home

Although less than a third of the region's households rent their homes, this portion of the housing stock is particularly important in light of the recent national upturn in the prevalence of households who would prefer to rent rather than own. Ensuring sufficient rental housing choices also helps provide more affordable options when house purchase prices are high. The incidence of housing cost burden is typically higher among renters than among owners due to the lower average income of renting households.

Similar to the remainder of the state, about half of the renters in the East Central Vermont region are spending more than 30 percent of their income for rent and utilities. Of these 4,000 cost burdened renter households, an estimated 2,000 households are spending at least half of their income for housing. Given the severe strain this places on a household's budget, these households are at a much higher risk of eviction, homelessness, and frequent moving—all of which harm residents and the community.

**Figure 4. Renters paying unaffordable housing costs**

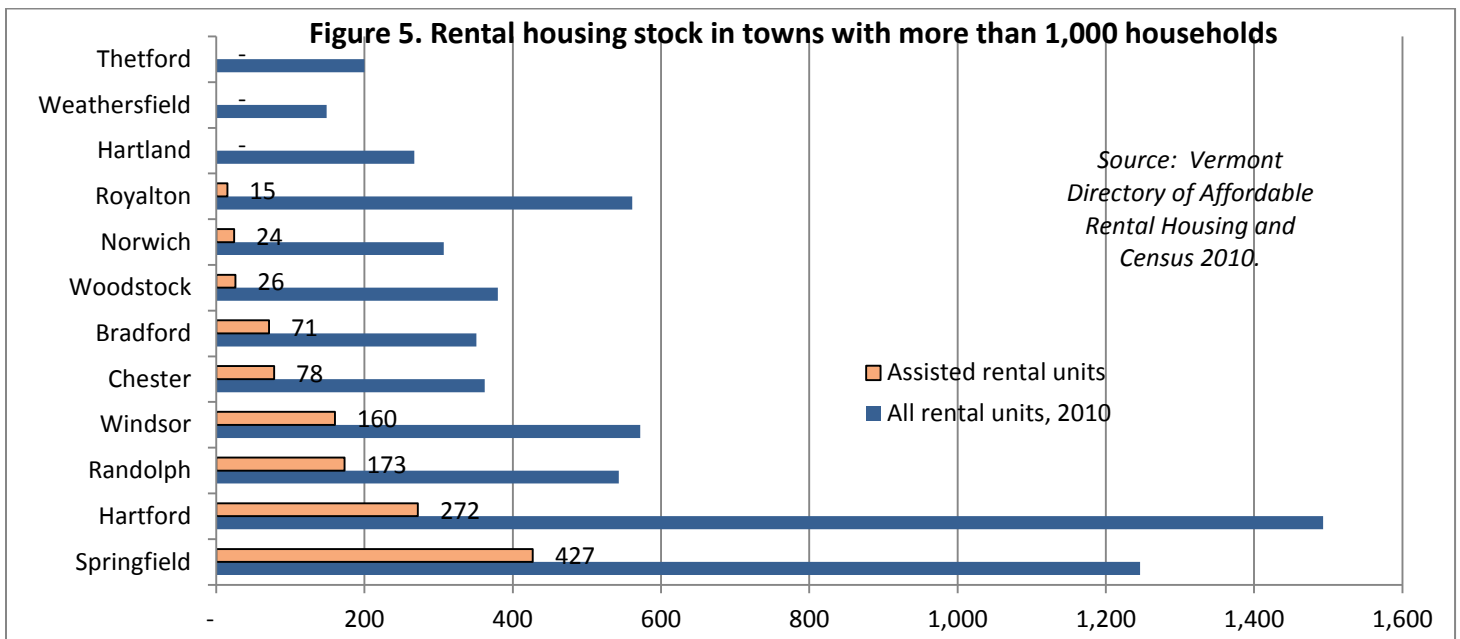


<sup>1</sup> [Vermont Department of Financial Regulation](#), Banking Division.

At the town level, renters were most likely to be cost burdened by their housing expenses in Bradford and Sharon.

With about half of all renters in the region paying unaffordable rental housing costs, perpetually affordable apartments funded through the efforts of federal, state, and local governments play a critical role. However, with declining funding available through these programs, only 16 percent of the 9,000 rental units in the East Central Vermont region are in housing projects that received project-based federal or state funding. Project-based housing assistance, such as the federal low-income housing tax credit program, subsidizes the creation of newly built or rehabilitated units. The infusion of capital during the housing’s development reduces the amount of rent that must be charged. These units are also subject to income and housing quality requirements to ensure that they target lower and moderate income households in efficient, aesthetically pleasing buildings in effective locations.

Nearly all of the region’s assisted rental housing is located in its four largest towns-- Springfield, Hartford, Randolph and Windsor. It is likely that these are the areas of the region with existing infrastructure to support residential development and where settlement patterns have occurred historically.

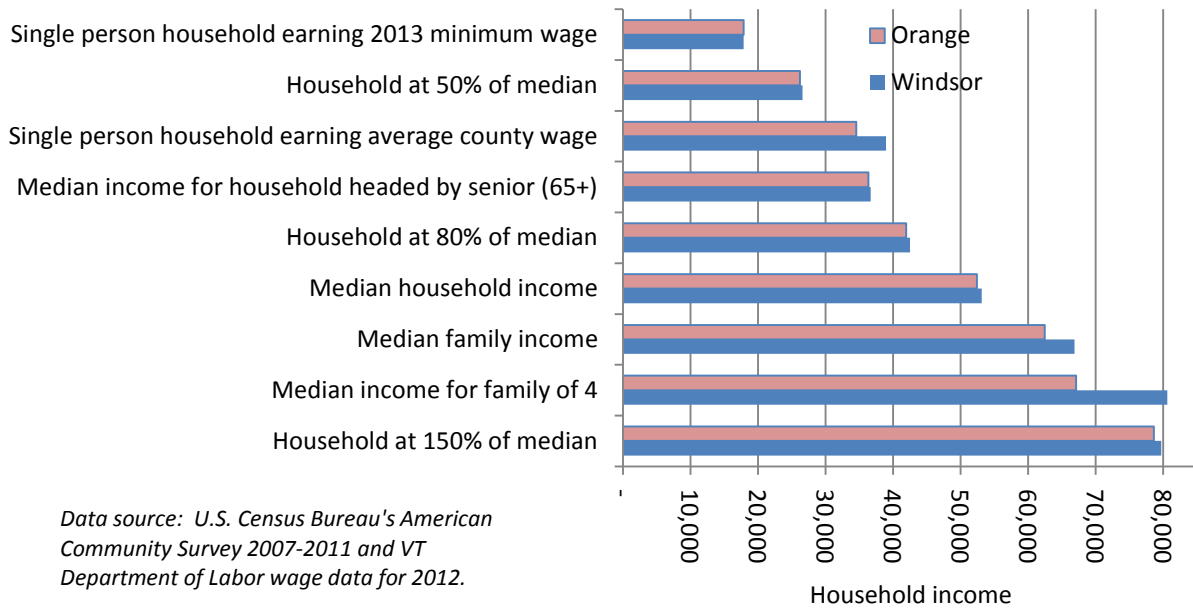


## Housing affordability among different types of households

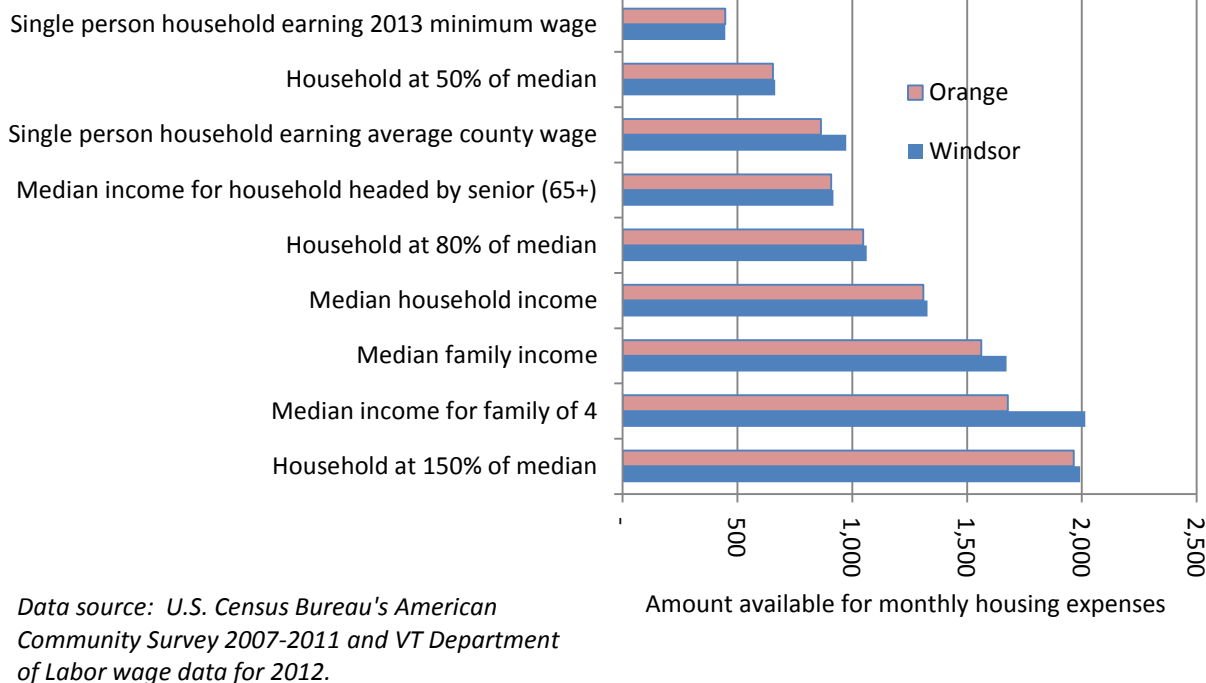
Each household’s ability to afford their housing costs depends on a variety of factors. Income, the availability of affordable appropriately sized and located housing, and the amount of non-housing monetary demands on the household’s budget all affect the capacity of a household to cover its costs. While some types of households are likely to earn enough to cover the costs of owning or renting in the East Central Vermont region, others are not. Households led by a single wage earner paid minimum wage or the average county-wide wage, for example, are not likely to be able to afford to buy a median priced home or pay the region’s median rent, based on standard affordability assumptions. Senior-headed households (aged 65+) are also likely to have difficulty buying and owning homes in the region.



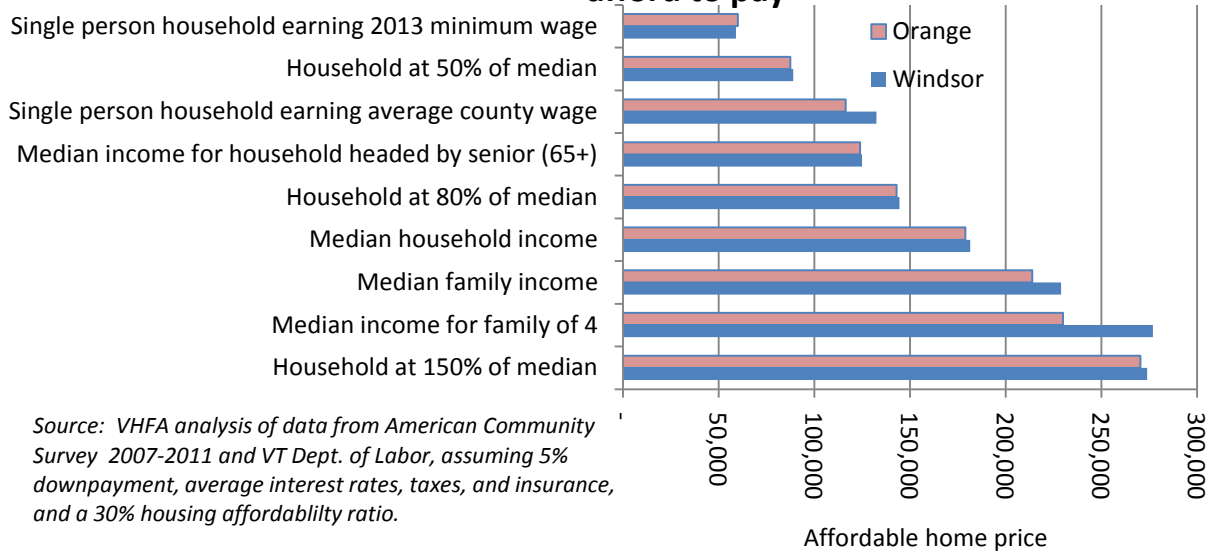
**Figure 6. Income varies dramatically by household type**



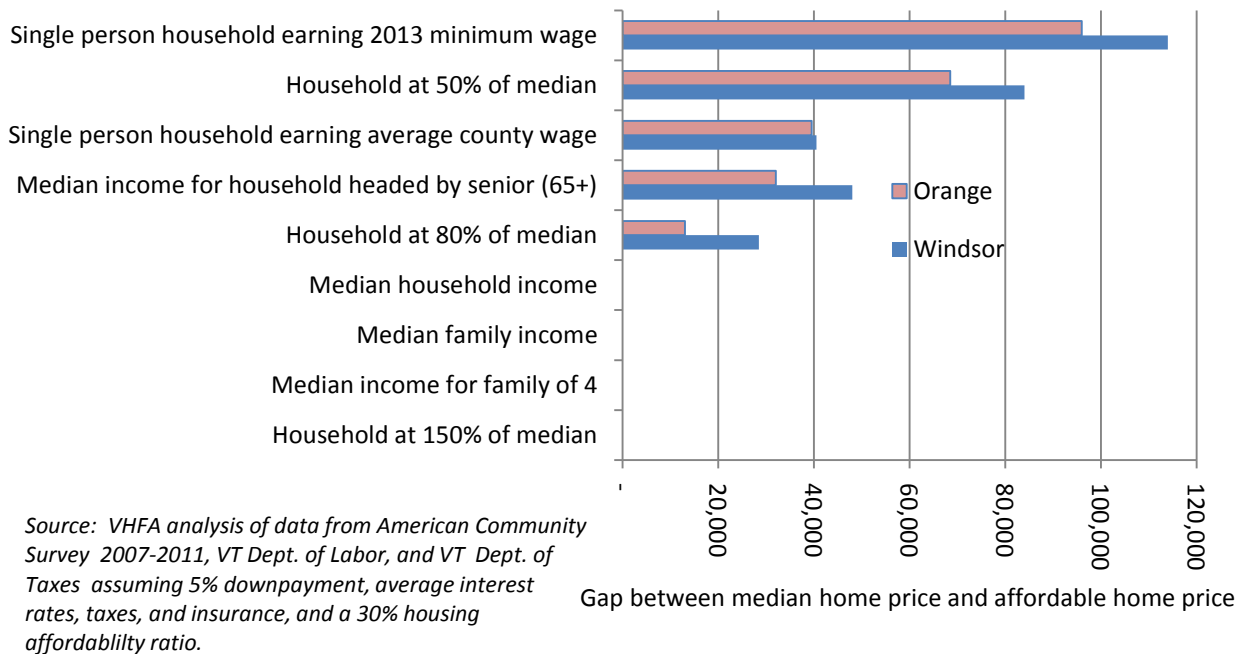
**Figure 7 ..which affects the amount available for monthly housing expenses**



**Figure 8. ...and the purchase price each household can likely afford to pay**



**Figure 9 ...placing local homes for sale out of reach for some residents**



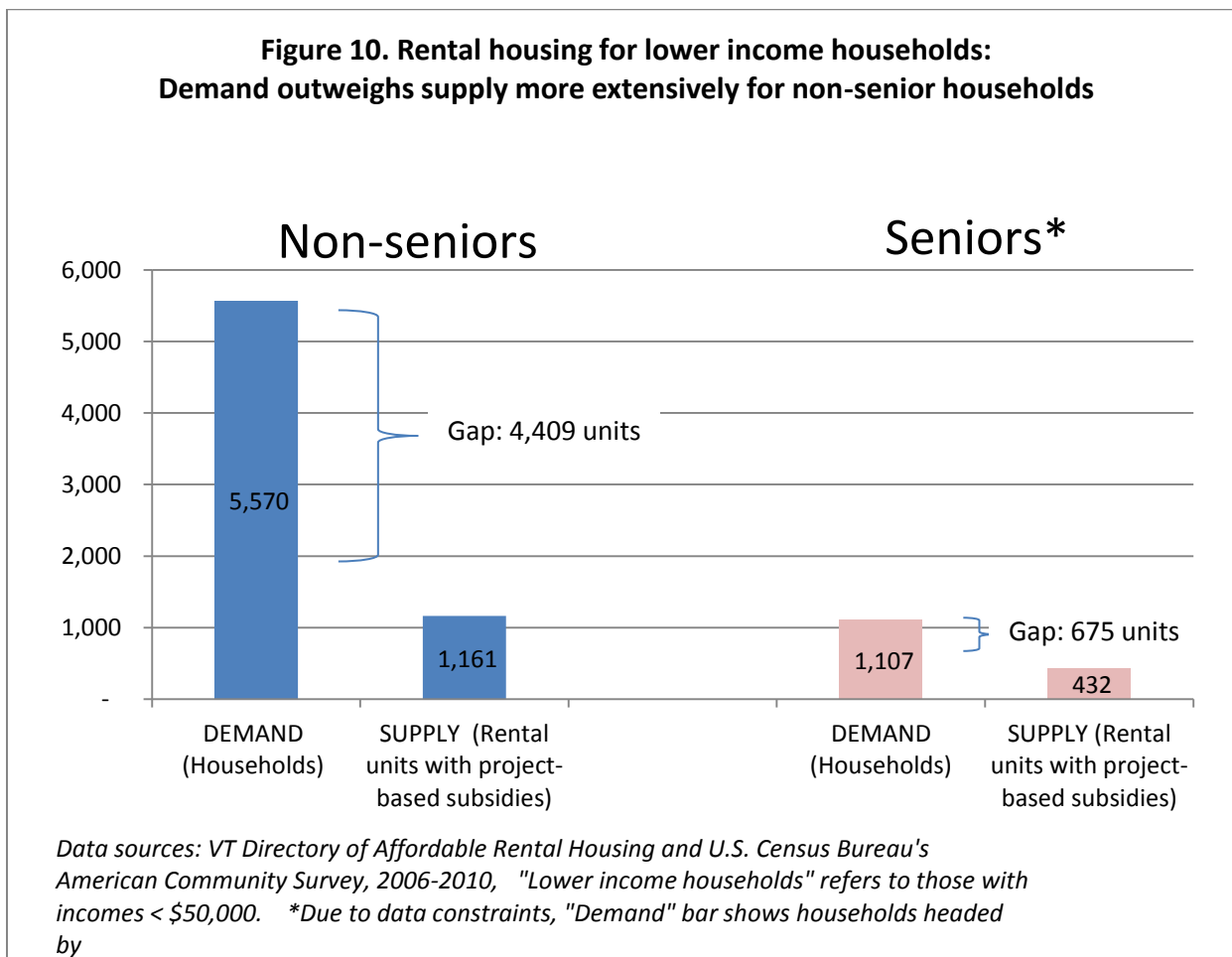
With owned home prices well above what some types of households in the region can afford, ensuring an adequate supply of rental opportunities is paramount. The median monthly rent of approximately \$800 in both Orange and Windsor counties is more affordable than prevailing median purchase prices.<sup>2</sup> Unfortunately, as in virtually every part

<sup>2</sup> US Census Bureau, American Community Survey 2007-2011, median gross rent in 2011 dollars.

of the state, households trying to live on minimum wage are still unable to afford the median rent level. Their annual income of approximately \$18,000 leaves them with a median rent affordability gap of \$331 in Orange and the \$395 for Windsor.

Over a third of the region’s stock of subsidized rental housing is restricted to tenants who are seniors aged 65 and up. These 432 units house an estimated 39% of the region’s low income senior renter households.

Unfortunately, low income households in the region headed by non-senior renters are even less likely to live in subsidized housing. The 1,161 units in the region’s subsidized rental housing stock that are available to non-seniors can only house an estimated 21% of these households.

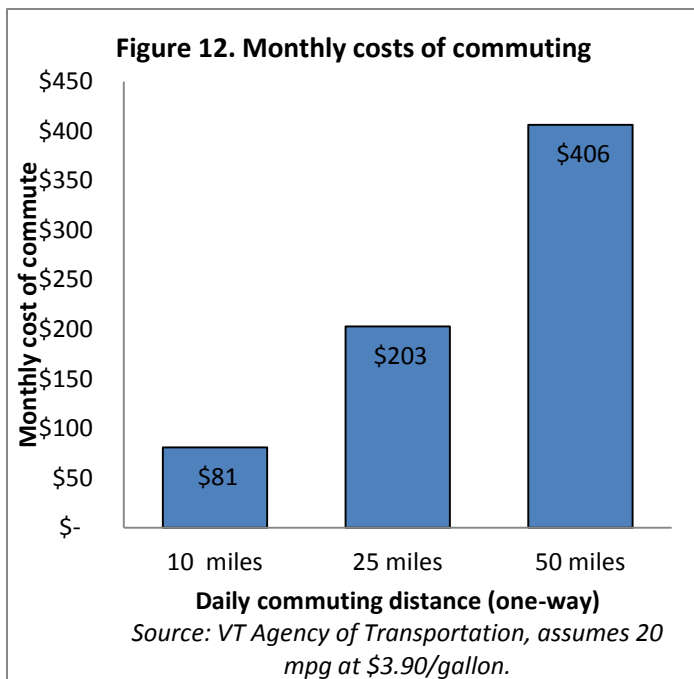
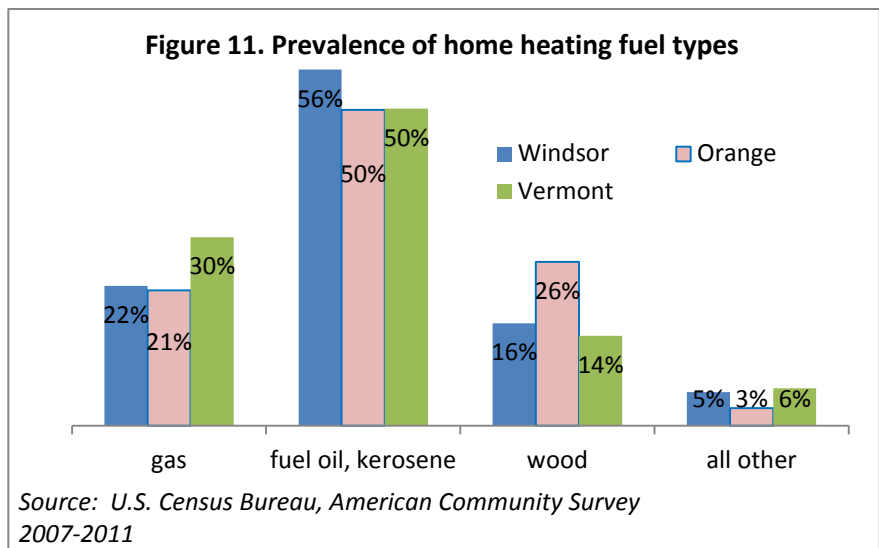


### Effect of home energy efficiency and transportation costs on housing affordability

Home energy efficiency as well as the distance from home to job or other regular destinations have powerful effects on the total costs associated with a particular home. A household that includes the estimated costs of utilities and transportation when comparing the purchase prices and rents of potential homes will best keep all of the costs associated with living there within an affordable range.

In Windsor County, the use of fuel oil and kerosene is more prevalent than the statewide average. While the cost of natural gas is regulated by the state, the private market determines the price of fuel oil and kerosene allowing for greater potential price fluctuations. Unfortunately, this can lead to unanticipated cost burden increases for households using this type of home fuel.

According to a survey this summer of East Central Vermont residents, about half of the respondents said that their home was energy efficient. For the other half, however, the key reasons cited for not improving energy efficiency were (1) not being able to afford the improvements or (2) being renters who didn't have the option to make improvements.



The prevalence of East Central Vermont residents with short commutes of less than 10 miles has decreased dramatically, from 57% in 2000 to 45% in 2010.<sup>3</sup> Not surprisingly, this change has gone hand in hand with an increase in residents with long commutes. The percentage of commuters traveling more than 50 miles to work has grown from 13% in 2000 to 21% in 2010.<sup>4</sup>

Living near employment or other daily destinations has a tremendous impact on the affordability of a household's monthly costs. For a household that lives 10 miles from work, driving to work is likely to cost \$122 less than a household who lives 25 miles away from work. Spending this much less on driving would allow a renting household to spend this much more on rent or mortgage payments. These savings would likely enable the average household in the region looking to buy a home 10 miles from work to afford a purchase price \$4,500 higher than if the home was 25 miles away from work.<sup>5</sup> Furthermore, a household with a shorter commute is likely to have more stable future expenses because it is less vulnerable to increases in future vehicle gasoline prices.

The overwhelming majority of East Central Vermont survey respondents this summer said that they lived where they wanted to live (85%) and 212 of them said that they chose their current location because of the "peace and quiet of the countryside." 72% said that their home was located so they could buy food easily and near schools. Slightly fewer people (67%) said that it was easy to access medical services and social events.

<sup>3</sup> Two Rivers-Ottawaquechee Regional Commission, "Road Travel Patterns in TRORC Region", 2013.

<sup>4</sup> Two Rivers-Ottawaquechee Regional Commission, August 29, 2013 [Press Release](#).

<sup>5</sup> Assuming a 30-year mortgage with average interest rates, taxes, and insurance.



Just over half of the people who work said that their home is conveniently located near workplaces. Yet despite all of this praise for the location of their home, 68% said that they wish they drove less, suggesting that there is a need for greater connection between the location of their home and needed amenities. This could be resolved through better access to transportation options, or more people living in more dense neighborhoods closer to services.

## County demographic projections

After double digit rates of growth during in the 1990s, growth in the number of households living in the East Central Vermont region has slowed considerably. As of the 2010 Census, a total of 36,640 households considered Orange and Windsor counties their home location.<sup>6</sup>

Although *population* fell in Windsor County between 2000 and 2010, the number of *households* continued to rise by roughly 2.4% over the decade due to decreasing household sizes. As more of Vermont’s baby boomers enter their senior years, household size will likely continue declining due to the growing prevalence of single and two person households.

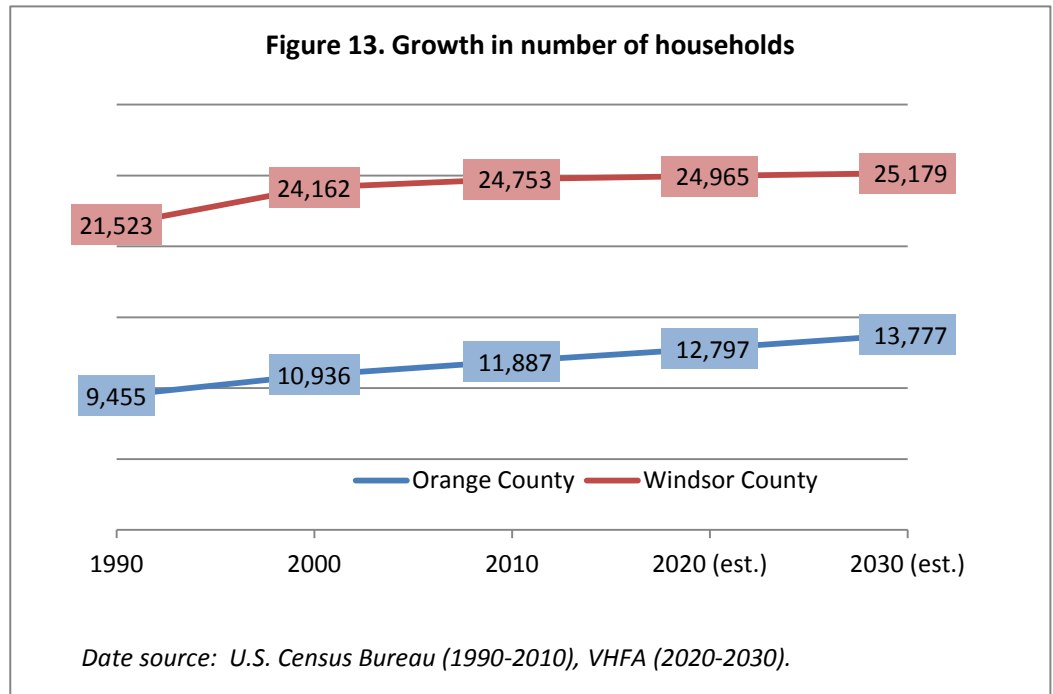
We expect the number of households in Windsor County to increase by roughly 1% between 2010 and 2020. If this rate remains constant during 2020-2030 decade, the total number of households residing in Windsor County will be an estimated 25,179 by 2030.

We expect the number of households in Orange County to increase by roughly 8% between 2010 and 2020, somewhat slower than the 9% growth rate between 2000 and 2010. If this rate remains constant during 2020-2030 decade, the total number of households residing in Orange County will be an estimated 13,777 by 2030.

If these projections hold true, Orange County will become the home of an additional 90 households each year on average and Windsor County, an additional 20 households.

## Regional housing market conditions

The East Central Vermont region contains a variety of housing sub-markets. Windsor County’s ski areas and inclusion in the Lebanon, New Hampshire labor market area make it particularly complex. The presence of many vacation homes and seasonal employees coupled with diverse wage levels among year-round residents are all important factors in identifying this county’s housing needs. Both counties demonstrate a need for more affordably-priced housing options



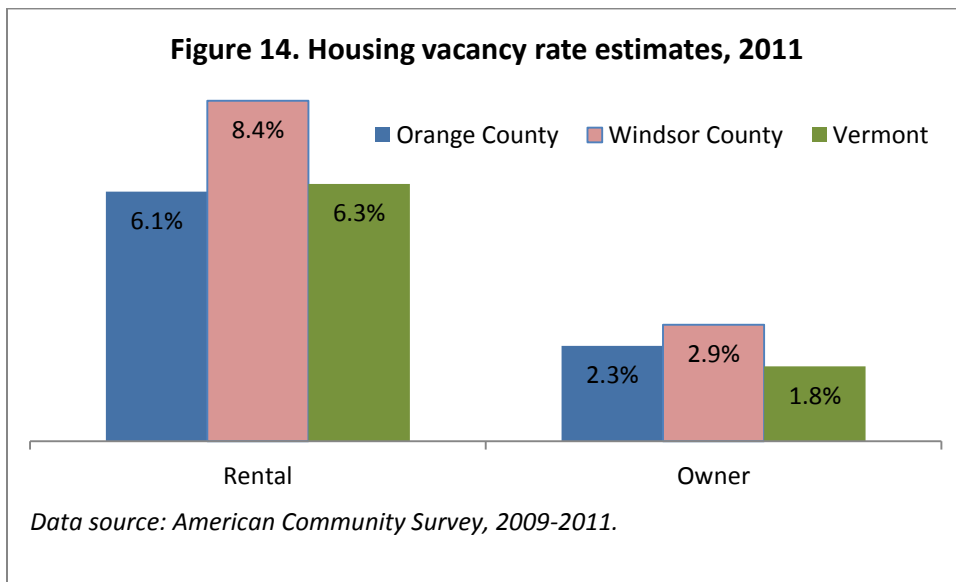
<sup>6</sup> Census respondents who consider the East Central Vermont region their home “most of the time” are counted as residents.

for the region’s lowest income residents. At higher rents and sales prices, however, the market for the region’s rental and owner housing, especially in Windsor County, is less consistent.

### Housing vacancies

Estimating the prevalence of true vacancies in Vermont communities is made difficult by the state’s rural nature, the high proportion of vacation homes and lack of a system to collect and analyze the data. Homes for sale or rent that were initially designed for seasonal use can elevate vacancy rates of resort areas, making it difficult to determine the level of vacancies among primary homes. Since such a large portion of Windsor County’s housing residents are seasonal, its vacancy rate for both rental and owner homes is likely to be higher than in other areas. Furthermore, the county-wide average in diverse Windsor County is also likely to obscure differences that exist from town to town.

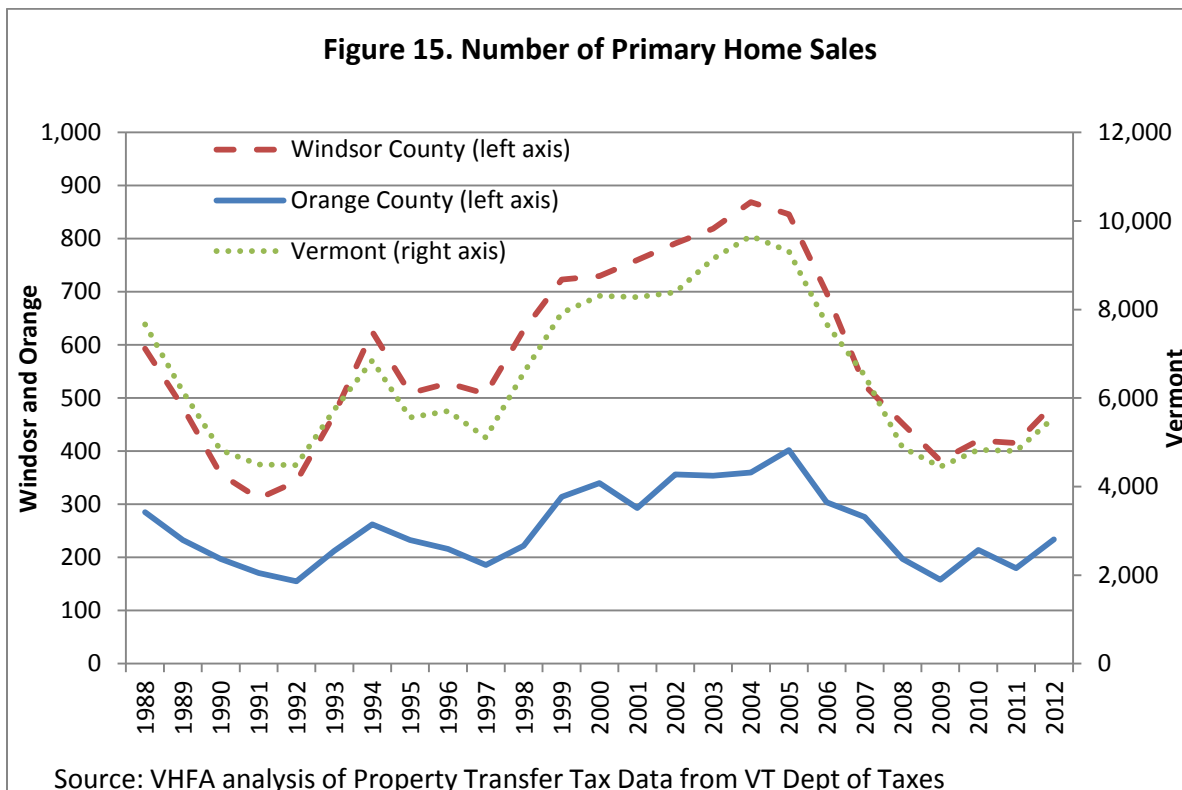
Homeownership units typically have a lower vacancy rate because there is far less turnover than rentals that often rely on annual leases. Vermont historically is among the states with the lowest vacancy rates in the nation.



East Central Vermont property owners and managers interviewed for this study described a steady take-up of conventional and affordable rental units when they became available, with relatively short vacancy periods. Not surprisingly, demand is highest for subsidized units where the rent paid by tenants adjusts to their individual incomes.

### Homeownership Housing

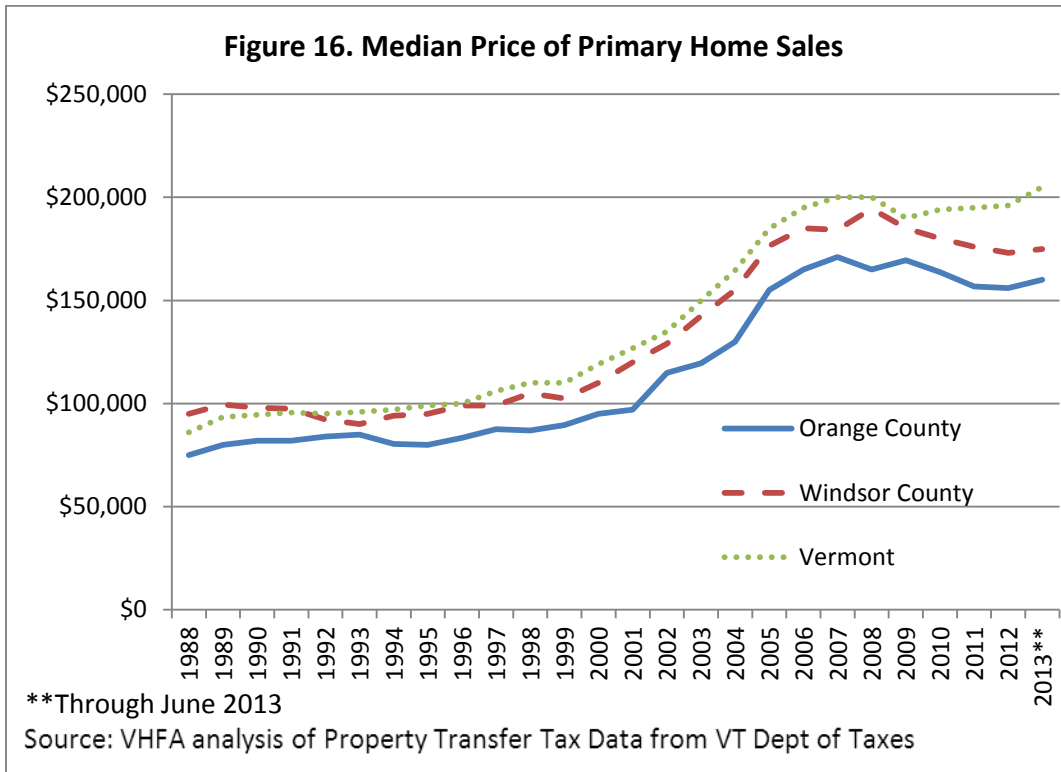
During the 2007-2009 recession, the number of home sales dropped precipitously nationally and in Vermont. The number of sales in both Windsor and Orange counties has followed statewide trends closely over the past 25 years.



Since 2009, home sale volumes have been increasing in both counties and statewide as interest rates remain low and the economy recovers. Additionally, federal tax credits for home buyers available between 2008 and 2010 likely “stole” many would-be buyers from 2011 and 2012 and encouraged them to move sooner than they may have planned because of the benefit of the federal tax credit. Therefore, it is only in 2012 and 2013 that we are likely seeing a return to normal levels of transactions.

Like sales volumes, prices of primary residences sold in Orange and Windsor counties traditionally follow statewide trends, but at lower levels. Historically, Windsor County’s median home prices are usually about \$7,000 less than the state and Orange County’s is about \$25,000 less.

Interestingly, the region’s median home prices began diverging from the state median as we emerged from the recent recession. Statewide, home prices have risen by 8% since 2009 while Windsor County’s has fallen by 5% and Orange County’s has fallen by 6%. During the first six months of 2013, median prices in both counties appear to be on an upward trend relative to 2012 (Orange and Windsor’s prices increased by 3% and 1% respectively). Neither county is keeping pace with the statewide median price increase of 5%, however.



There are currently 1,198 homes on the Realtor’s Multiple Listing Service (MLS) for Windsor County and 357 for Orange County. It takes a long time to sell a home in this region, and according to a Southern Windsor County Realtor, “it’s a buyer’s market.” Looking at how long a home is listed in the Multiple Listing Service of Realtors is one way to determine how “hot” or fast a market is. Both Orange and Windsor counties averaged well over eight months for listing duration. With few homes listed for less than \$100,000, competition for these more affordable homes is tight. However, the remainder of the single-family home market in the region appears less certain.

**Figure 17. Single-family homes in the MLS**

Price	Windsor County		Orange County	
	Active Listings	Sold July 2012 to July 2013	Active Listings	Sold July 2012 to July 2013
0-\$100,000	60	69	47	48
\$100,001-\$200,000	269	200	136	117
\$200,001-\$300,000	306	129	91	40
\$300,001-\$600,000	316	142	67	27
\$600,001-\$1,000,000	129	45	9	3
\$1,000,001-\$2,000,000	70	5	5	0
\$2,000,001+	48	7	2	0
<i>Total</i>	<i>1198</i>	<i>597</i>	<i>357</i>	<i>235</i>

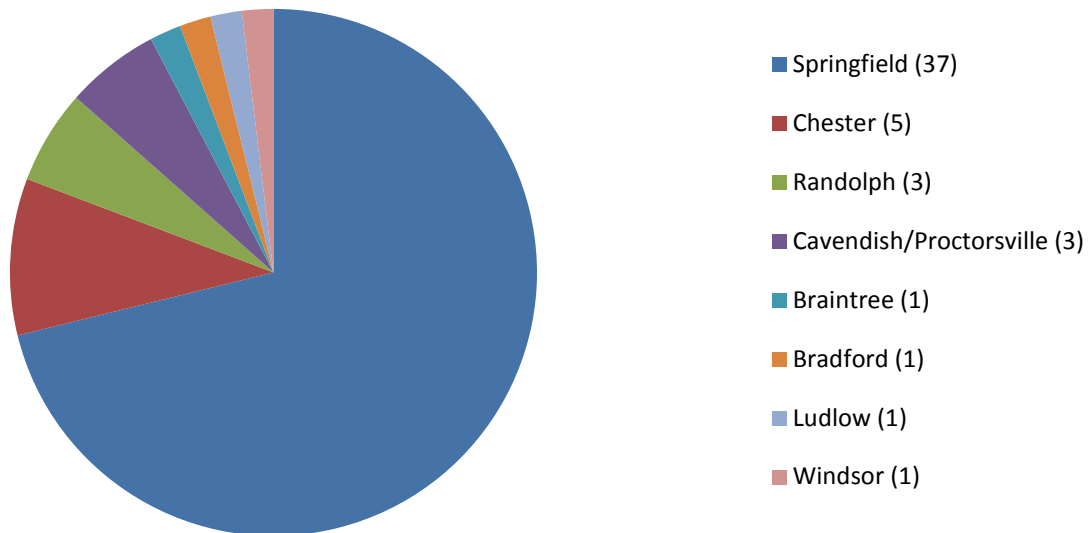


## Shared Equity Homes

A relatively small portfolio of affordable homeownership units in the region are part of the shared equity programs operated through the Central Vermont Community Land Trust (CVCLT) in Orange County and the Windsor-Windham Housing Trust in Windham County. Both entities operate the Homeland Grant Program which provides up to \$40,000 towards the purchase of eligible homes for income-eligible buyers. Participants sign a covenant in which they agree to limit the amount they can sell the property for in the future, and transfer the grant to subsequent buyers of the property so that other low to moderate income households can also benefit from this investment. This ensures that the home sells at a below-market price each time it goes on the market, thereby keeping it affordable. A recent evaluation of a similar program in Northwestern Vermont showed that the average household purchasing a shared equity home earned 69% of the area median income.<sup>7</sup>

The East Central Vermont region's housing stock includes 52 shared equity homes. CVCLT has 5 shared equity homes in Orange County and Windsor-Windham Housing Trust has 47 in Windham County. Springfield has more than all other towns in the region combined.

**Figure 18. Shared equity homes**



*Source: Central VT Community Land Trust and Windham & Windsor Housing Trust. Number of homes is shown in at right of town name.*

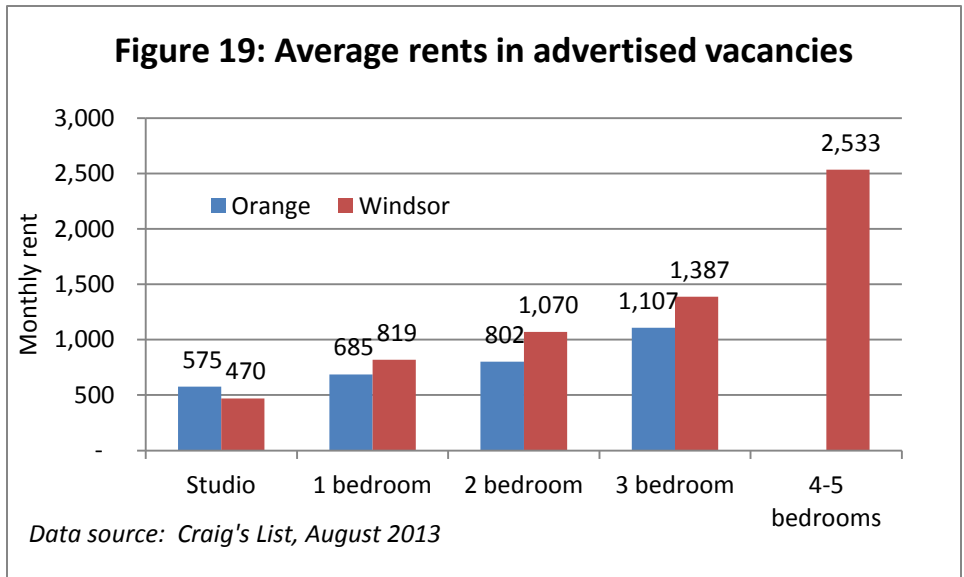
The Windsor-Windham Housing Trust director believes that marketing shared equity homes is challenging in areas like Windsor in which the median home sales price is already affordable to median income households.

<sup>7</sup> [Lands in Trust, Homes that Last](#). Champlain Housing Trust. 2010.

## Rental Housing

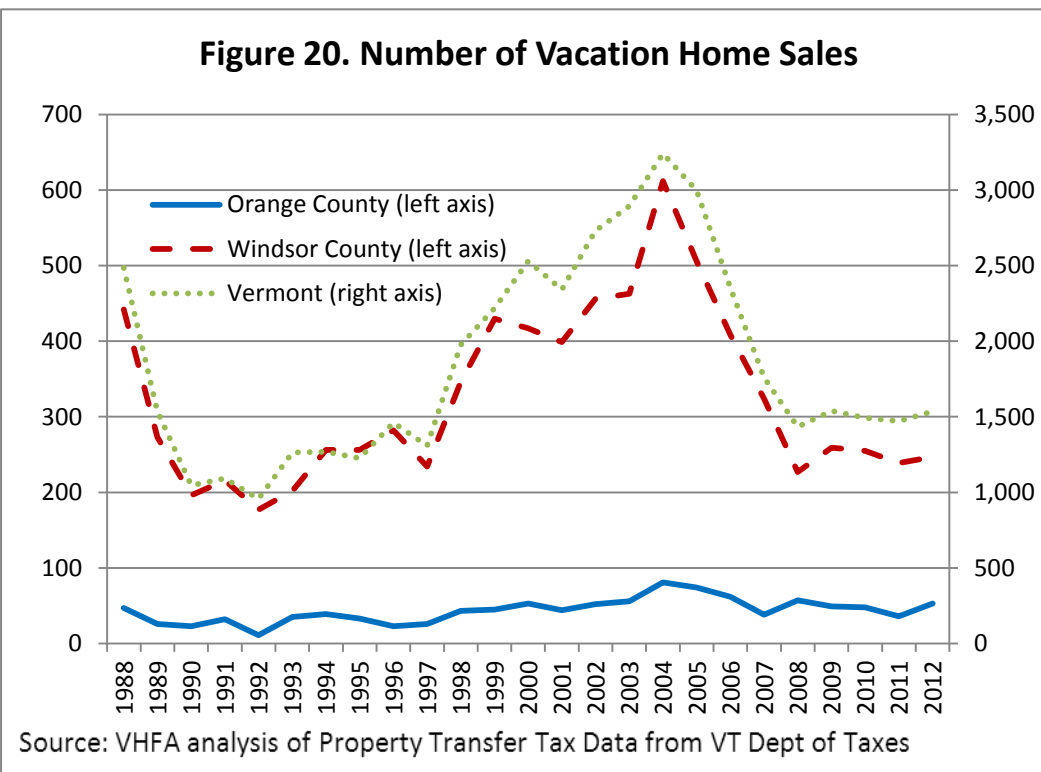
Estimates of the 2011 median gross monthly rent in Orange and Windsor are \$778 and \$842, respectively.<sup>8</sup> Monthly rent can be near \$500 for the smallest apartments and \$2,500 for rental homes with 4 or more bedrooms, according to our recent survey of classified advertisements in the region. A total of 121 rental homes were advertised on Craig's List between July 1<sup>st</sup> and August 15.

The median number of bedrooms in the advertised units was two.



## Vacation Homes

Seasonal and vacation homes comprise 16% of the state's housing stock-- 2<sup>nd</sup> highest in the nation, closely behind Maine. In a typical year, 22% of the state's home sales are vacation homes and that proportion has remained steady since 2000. Relative to vacation home sales statewide, Orange County has a lower proportion (typically 17% of home sales are vacation homes) and Windsor has a much higher proportion (37%). In areas with a great deal of interest from prospective second home buyers, it is important to consider prices of both vacation homes and primary homes since individual buyers and owners choose whether to use their homes as primary or second homes.

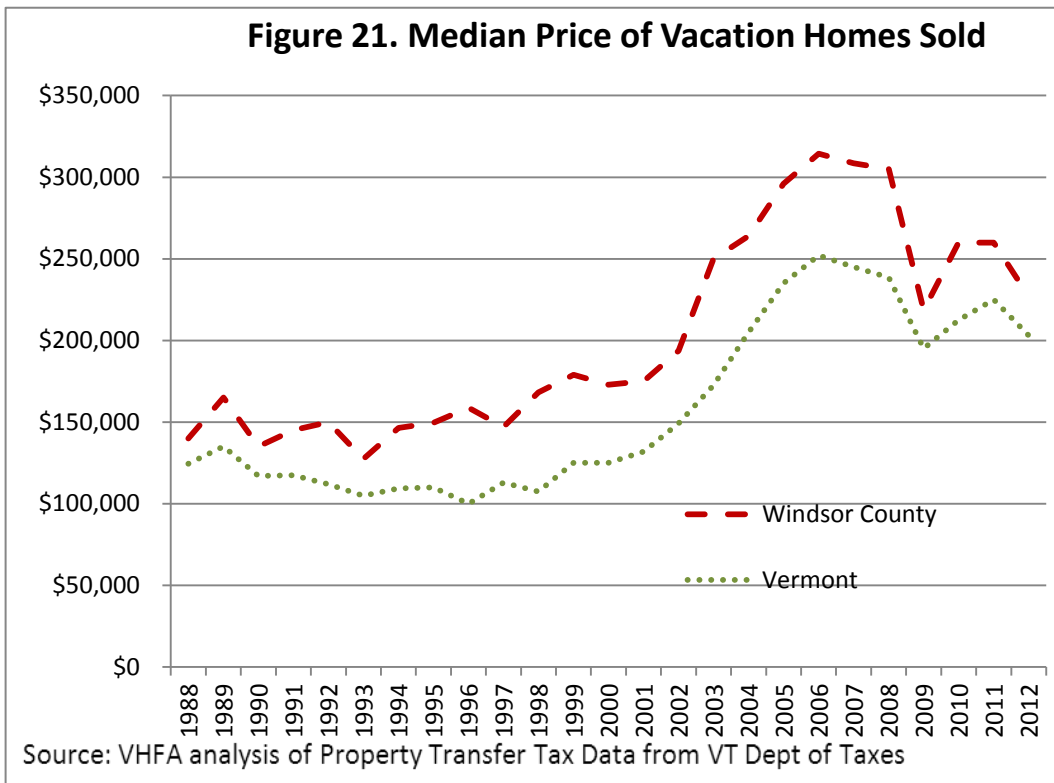


Windsor County's vacation homes are typically sold for about \$40,000 more than vacation homes in the rest of the state. The median sales price of these properties is usually about 30% higher than the state's overall median, although since the recession the difference has been reduced to 15%.

An example of the effect of seasonal homes and employees is Ludlow where a market study for redevelopment of the Black River Overlook rental complex recently took place. The market study report explained that "the town's seasonal

<sup>8</sup> U.S. Census Bureau, American Community Survey 2007-2011. Rent estimates are in 2011 dollars and include utilities.

**Figure 21. Median Price of Vacation Homes Sold**



housing values tend to be toward the high end of the price scale and, because the influence of seasonal buyers extends into the village and the remainder of the community, this market has tended to push pricing upward on a town-wide basis.” The report goes on to explain the resort’s impact on employment: “...the number of persons employed ranges from 140 persons year-round to over 1,300 persons during the peak of the winter ski season.” “75 percent of available rentals are specifically intended for seasonal renters – at rental rates that are *well in excess*

of affordability for low or even moderate income households. ...we

estimate that Ludlow’s current vacancy rate – among units that are available to year-round renters – is lower than the statewide rate.”

The Black River Overlook property manager reported that approximately 70% of the households inquiring about renting in Ludlow have insufficient household income . He explained that “applicants tend to have incomes in the 20 to 50 percent of median range... and because of the presence of Okemo Mountain Resort, many applicants/tenants’ incomes vary significantly during the course of the year; sufficient during the resort’s primary operating season, but insufficient during the non-skiing portion of the year.”

**Housing Development**

According to Betty McEnaney of the Bean Group Realtors, there is currently little development of new owner homes in Windsor County. She allowed that there may be some custom built homes being constructed, but no speculative building in the area has happened for several years.

Additionally, we identified no recent multifamily rental housing construction in the region. The four affordable rental housing projects funded in the area recently were redevelopment of existing affordable units, rather than new construction:

**Figure 22. Recent multifamily rental housing construction**

Development	Town	Development Type	Number of Units	Occupancy
Greystone Village	Hartford	Redevelopment of existing affordable units	31 1-bedroom 3 2-bedroom	Restricted to elderly or disabled tenants
Depot II	Bethel	Redevelopment of existing affordable units	4 1-bedroom 6 2 or 3 bedroom	1-bedroom units are restricted to elderly or disabled tenants; others are general occupancy
Black River Overlook	Ludlow	Redevelopment of existing affordable units	15 2-bedroom 10 3-bedroom	General occupancy
Olde Windsor Village	Windsor	Redevelopment of existing affordable units	58 1-bedroom 19 2-bedroom	67 or 77 units are elderly only

As part of the proposals for these redevelopment projects, a market study was done for each community analyzing the experience of the projects themselves before redevelopment, as well as studying the market demands for similar housing within the surrounding market. Some highlights of those trends are listed below:

- In Hartford, “only one unit becomes available every 12 months, and there is a 14 day turn time on occupancy for new tenants,” the market study reads. This points to an extremely tight housing market in this area.
- Similarly, the report for Bethel reads, “The project has experienced strong demand throughout its operating history and particularly strong demand during the past few years. During recent years, the project has experienced full occupancy and averaged only one turnover on an annual basis. ... The project currently has a significant waiting list, as follows: 25 households for the 4 one-bedroom units and 21 households for the two- and three-bedroom units.”

The Hartford-based market study completed in October 2010 confirmed these findings when it stated, “Although occupancy and demand for multi-family properties is considered to be strong, there appears to be lack of interest from developers and investors for new development. Some individuals have commented that they have curbed any new plans as the current economic environment has led to financial uncertainty.”

71% of the towns in the study area have zoning, and half have some kind of state designation of being a designated downtown, village center, growth center, or new town center.

## Conclusions, recommendations and policy tools to address gaps

The following policies were formulated by a community-level process that included seven participants representing a wide range of interests as the East Central Vermont Sustainability Consortium Housing Workgroup.<sup>9</sup> The majority of the Workgroup’s recommendations align with the findings of this study, although some need further attention if they are to match state housing priorities and this study’s conclusions.

<sup>9</sup> Kristi Morris, Housing Workgroup Chair and Springfield Selectboard Chair; Ray Brewster, RuralEdge; Lori Hirshfield, Town of Hartford; Julie Iffland, Randolph Area Community Development Corporation; Lorelee Morrow, Two Rivers-Ottawaquechee Regional Commission; Andrew Winters, Twin Pines Housing Trust; Dan Potter, Southern Windsor County Regional Planning Commission; Anne Duncan Cooley, Upper Valley Housing Coalition; and Kate Cruickshank, Champlain College.



## Housing Workgroup Recommendation:

1. Municipalities should evaluate their role in supplying the region's housing stock by assessing their capacity for growth.
  - Suitable locations in both towns with infrastructure as well as those without.
  - Collaboration with neighboring towns, regional planning commissions, housing trusts, and other non-profit housing groups (e.g., housing authorities).

Consideration should be given to:

- Aging in Place
- Accessible, Safe Housing
- Low-income Housing
- Work-force Housing
- Fair Housing that advances integration and inclusion
- Energy Efficiency
- Connection to transit routes or walkable to services

### *VHFA Response*

The need to ensure affordable, safe, and decent housing opportunities for all residents in each community is crucial. Our nation has a long history of housing discrimination that can still occur across the country, including Vermont. Additionally, the power of neighborhood opposition to housing development (often termed Not in My Back Yard, or NIMBYism) remains strong. Because this can be a key factor in limiting housing development and redevelopment opportunities, it is appropriate for every municipality to “evaluate their role in supplying the region's housing stock by assessing their capacity for growth.” That said, the idea of a fair share distribution of housing across all municipalities without a deeper examination of employment opportunities, community amenities, or demand from residents can potentially lead to underutilized housing and even sprawl.

With a region that is expecting little growth in the near future, municipalities should be challenged to examine opportunities beyond encouraging new housing development. This includes the recommendations noted in the summary:

- Preserving existing affordable housing,
- Renovating existing housing with public funding to create more rental units affordable to extremely low-income residents,
- Adaptively reusing non-housing properties to create more housing units, and
- Increasing the number of affordable homeownership units through shared equity of existing homes in towns where the median home prices and incomes are out of balance.

This Workgroup recommendation will be strengthened if it clearly reflects the state's priorities of focusing development in areas with historic settlement patterns, ideally clustered in downtowns, village centers, and reduces rural, sprawling development. This type of compact design and development will improve affordability, energy efficiency, reduce transportation costs for both residents and municipalities, and improve health outcomes. Public affordable housing funding already considers the location of housing as a key consideration, and limits projects to community centers.

Finally, the bullet points listed for consideration are all worthy and important criteria for consideration. Each will require a firmer definition, set regionally so that the area can examine if it is indeed meeting the goals set out here. In the end, it will be up to the individual municipalities to commit to set their priorities and regulations along these lines, if this type of housing will be supported.

## Housing Workgroup Recommendation:

2. Encourage multi-family housing, assisted living facilities and group homes (including Single Room Occupancy facilities), and senior housing in close proximity to services in village and town centers, along public transport routes, in areas with adequate public sewer and water service, or in areas of soils suited to onsite wastewater technology.

### *VHFA Response*

Developing dense housing is typically less expensive than housing that takes up more land because of the cost of that land. Additionally, encouraging “housing in close proximity to services in village and town centers, along public transportation routes,” and in areas served by infrastructure necessary for development are goals that align well with the state’s overall housing policies. Clustering development in these communities is not only desired by residents (as can be seen by the “What We Want” survey results), but it also is the most ecologically efficient approach to land use.

This recommendation is strong because it focuses on a myriad of housing options, from multifamily housing to assisted living facilities to single room occupancy units. The data in this analysis has shown, though, that the region does not need to expand its portfolio of age-restricted senior housing but does need to increase its general occupancy housing affordable to the lowest income households with no age restrictions . As shown above, the region needs 675 more units for elderly households and 4,409 more units for younger renters. Since lower income elderly households are eligible to live in non-age restricted units, many live in the existing general occupancy affordable units available and others could if new non-age restricted housing were developed.

57% of the respondents to the East Central Vermont Consortium’s recent survey said that their community was not set up to support Vermont’s aging population’s desire to continue living in their homes and communities as they age. Implementing this recommendation would help address this concern.

## Housing Workgroup Recommendation:

3. Provide incentives to property owners to rehabilitate existing vacant structures for housing in town and village centers that are compatible with existing neighborhoods.

### *VHFA Response*

As stated in response to recommendation #1, this region of Vermont has a need to create more affordable housing options for its residents, and one way to do this is to rehabilitate and renovate existing housing units and bring them into the subsidized housing inventory.

Additionally, rehabilitating existing structures, will bring more housing up to meet basic life safety codes, reduce the incidence of lead based paint, increase home energy efficiency, and possibly increase the property values which could increase municipal tax collections to support community infrastructure.

The benefits of rehabilitating housing are not limited to already vacant properties. Vermont has some of the oldest housing stock in the nation, and 47% of the homes in Orange and Windsor counties were built before 1970. While not all older homes are in need of rehabilitation, the age of housing can indicate housing quality in the absence of any better information.

In addition, the recent wave of foreclosed homes that the state has seen as a result of the Great Recession has likely taken its toll on housing quality. It is highly probable that most of the 948 foreclosed homes in Orange and

Windsor counties since 2010 are in need of rehabilitation in order to make them habitable and “compatible with existing neighborhoods.”<sup>10</sup>

This recommendation would be strengthened by striking the word “vacant” and allowing the incentives created to be applied to all existing housing in need of rehabilitation.

### Housing Workgroup Recommendation:

4. Provide a balance of housing for a mixture of incomes that is driven by the housing market through a variety of mechanisms such as:
  - Raising awareness and support of affordable housing issues among the public
  - Transfer of Development Rights (TDRs),
  - Cluster development/waivers,
  - Planned unit development,
  - Inclusionary zoning,
  - Density bonuses,
  - Accessory dwelling units (including educating homeowners about their right to build ADUs),
  - Adaptive reuse of larger buildings to multi-family
  - Reductions in development fees, and
  - Conversion of single-family to multi-family homes.

### *VHFA Response*

In addition to the list above, there other opportunities to consider:

- All towns could:
  - Write up a strong housing component in the town plan that is based on current data proven needs and not only updates the highlighted topics from years past but ensures that the headings and data captures the highest needs currently;
  - Actively help identify land suitable for development and work with developers and existing property owners to highlight opportunities for partnership;
  - Help the community to visualize density so that they understand existing zoning so that they might be less upset when housing developments that fit within the allowable density is proposed for a neighborhood. This also could allow the community to potentially become comfortable with raising density allowances;
  - Actively work with the Regional Planning Commission to ensure local planning is in support of regional goals;
  - Strongly support housing development throughout the process such as adopting “on the record” review, creating predictability and minimizing timing delays for developers<sup>11</sup>; and
  - Make sure all communities allow for the approval of ADUs at the municipal staff level, and not require ADU approvals to go before a Planning Commission or other board. This leads to delays, and a higher possibility that eligible ADU developments may not be approved.
- For the 29 towns with zoning:
  - In addition to the density bonuses, consider higher lot coverage or height bonuses for affordable housing;
  - Consider reductions in parking requirements, waiving requirements or lowering them for downtown housing or mixed use developments; and

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<sup>10</sup> [Vermont Department of Financial Regulation](#), Banking Division.

<sup>11</sup> The towns of Chester, Ludlow, Randolph, Springfield and Windsor already have on the record review.

- Look closely at infrastructure requirements for roads, recreation, schools, and consider how much cost they might be adding to the housing developed.
- For communities with a high proportion of rental housing stock such as Royalton, Windsor, Ludlow, Hartford, Fairlee, Springfield, Bradford, and Randolph:
  - Consider creating a local rental housing registry so that towns know where the existing rental housing is within a community, and create a database to communicate with landlords when necessary. Additionally, consider having additional rental codes or local enforcement of minimum state requirements, like 11 communities in Vermont already do.

Because the tools listed by the Workgroup can be complex to implement, each needs to be defined and examples given of places that have successfully implemented them in order for this to be a useful menu of options for towns.

It would be inappropriate to recommend any one of these approaches over any other for the entire region since adoption would require local participation and buy in to the process and outcomes. That said, some of these will have far greater impact on affordability and availability of housing and so the additional tools listed above are roughly in order of impact, starting with the lowest and moving up towards higher cost and potential impact.

VHFA, in partnership with the Agency of Commerce and Community Development and the state’s Regional Planning Commissions, are hoping to roll out a model of presenting this information. Hopefully, in 2014, RPC partners will start to work with municipalities to walk through this list of recommendations and begin to work with local partners. They will be armed with online resources, and contacts within the state who have implemented these steps.

### Housing Workgroup Recommendation:

5. Create additional state housing credits to supplement the limited supply of federal credits, which can finance the creation of senior housing units.

#### *VHFA Response*

This recommendation gets at the heart of why this state has limited affordable rental housing: the public resources to support these units have not kept up with demand.

State housing credits are only one of several tools that can support the creation of affordable housing in our state. It is recommended that the reference to “state housing credits” be changed to “resources” to include important opportunities such as fully funding the state’s housing trust fund, called the Vermont Housing and Conservation Fund. Increasing funding through that channel could lead to more funding for the Homeland program which supports the shared equity model of perpetually affordable homeownership. It also could lead to more money for the Vermont Home Access Program which flows to the Vermont Center for Independent Living and supports accessibility modifications in homes of people with physical disabilities. Also, demand is highest for deeply subsidized rental housing with rental assistance that adjusts to tenant income. State housing credits do not provide that deep subsidy but instead create units that rent for about 78% of the median. The state does fund a limited number of rental subsidies that, if expanded, could make existing rental housing affordable to extremely low-income households.

Additionally, as discussed above, there is greater need to finance the creation of general occupancy affordable rental housing units, rather than age-restricted senior housing. Not only are there already more senior housing units than those with no age limitations, but elderly housing often has an easier time being approved locally, and often faces fewer NIMBYism complaints. Because of this, by recommending that the additional resources finance the creation of all housing units, and not just those that are age restricted, it helps to level that playing field.



That said, there is a subset of “senior housing” in need of expansion in this region. Research shows that Vermonters are not utilizing senior housing once they reach the age of eligibility (typically 55 or 62). Instead, most 55 or 62 year olds are still healthy and living independently and are not interested in moving into “senior housing” until and unless they have some kind of need that needs to be addressed. For example, they may need to stop driving and become isolated; they may need help with their medication management; or want to have a meal or two made available to them daily. The age in which households are moving into elderly housing developments is increasing, as is the number of “activities of daily living” that they need help with. Therefore, instead of needing more age restricted housing which excludes younger, working households, what the region, and the state, really need are more service enriched housing opportunities for elders, such as affordable assisted living.

### Housing Workgroup Recommendation:

6. Incentivize affordable housing through a variety of methods:
  - Expedited permitting review (if specific conditions are met-e.g. a percentage of fair share housing included).
  - Investigate consolidated permitting methods (that is, consider how multiple layers of required permitting might be satisfied).
  - Bonus densities (and fee waivers)
  - A review of uses, minimum lot sizes, lot coverage, heights and densities in districts.

#### *VHFA Response*

Similar to the tools in recommendation #4, this list focuses on incentives for affordable housing, specifically. These recommendations would be appropriate for the 29 communities with zoning. Below are a few additional items for municipalities either with or without zoning to consider specifically for affordable housing:

- Apply for Community Development Block Grants on behalf of affordable housing developers;
- Create an active affordable housing commission charged with continual attention to the issue similar to a Cemetery Commission, a Conservation Commission, and others;
- Identify targets of affordable housing units for low or moderate income households;
- Apply to be a “designated downtown,” “village center,” or “town center” by the state to trigger housing incentives for the developer;<sup>12</sup> and
- Create a housing trust fund, either along the lines of the three that exist already in Vermont, or consider a new approach.

Merging this recommendation with #4 above would provide the full range of tools and incentives and could highlight the opportunities for affordable housing where appropriate. Increasing the availability of all housing stock will help relieve some pressure on prices, thereby potentially increasing the affordability of units across the market, although in communities with strong demand for affordable housing will likely need additional focused efforts to create subsidized housing.

### Housing Workgroup Recommendation:

7. Support higher density neighborhoods and mixed-income housing (including multi-family) in rural areas by: Encourage mixed income housing development to avoid concentrating affordable units in a limited number of areas
  - Creating funding mechanisms and alternatives for infrastructure (at least wastewater) in smaller, rural towns,

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<sup>12</sup> 20 towns have some kind of state designation within them, as stated in the table on page 16.

- Going to smaller lots and reducing other requirements in larger town areas with public sewer or water
- Encouraging infill and second story residential in mixed residential and commercial-use districts in town and village centers.

### *VHFA Response*

While higher density neighborhoods and mixed income housing, including multifamily housing, are ideal models, developing in rural areas can cause unintended negative impacts. Without examining individual market studies that are often commissioned to examine the potential demand for a specific proposed development, it doesn't make sense at this point to encourage housing development in rural areas outside of designated downtowns, village centers, or outside of historic settlement patterns. This recommendation needs more data collection and detailed analysis before it can be widely supported and adopted.

### Housing Workgroup Recommendation:

8. Promote innovative construction and renovation design techniques that enhance affordability, energy efficiency, occupants' health and environmental suitability near employment, transportation lines and/or service centers.

### *VHFA Response*

Promoting innovation in construction and design are wonderful tools that should be encouraged by all levels of government and all partners in housing development. These innovations in energy efficiency and enhancing occupants' health and environmental suitability are probably very different than any tools that could be used to improve affordability, which would be improved more by increasing density and limiting infrastructure requirements or permitting fees as discussed in recommendations #4 and #6 above. Finally, the idea of siting housing near "employment, transportation lines and/or service centers" is crucial, and hopefully can be addressed in recommendation #1, as recommended by this study. By separating out the multiple goals identified in this one recommendation will show a clearer priority for communities to act upon and developers to respond to.

Additionally, it is difficult to imagine what incentives a municipality could provide that would be beneficial to a housing developer that could help enhance energy efficiency or occupants' health and safety. Already, builders are naturally inclined to ensure construction practices and design that will be most efficient and marketable since more consumers are demanding this. While promoting techniques, or creating incentives, could be a great benefit for the region, it is important that municipalities' desire for innovation doesn't come at the expense of affordability for the housing units. As discussed in the study's additions to recommendation #4, municipalities should "look closely at infrastructure requirements for roads, recreation, schools, and consider how much cost they might be adding to the housing developed." This will have to be done in close collaboration with existing developers to ensure that everyone agrees on the cost of implementing any of these measures.

### Housing Workgroup Recommendation:

9. Ensure that newly developed or rehabilitated housing that has been subsidized with public funds (such as grants, loans, or subsidies) remains perpetually affordable for a period of at least 30 years.

### *VHFA Response*

This recommendation speaks to the need to use limited public funds judiciously and to ensure that the benefit of using those funds lasts for generations. That said, the state's housing funding agencies, legislature, and policy leaders completely agrees with this philosophy and therefore has already instituted a policy of perpetual affordability for all limited housing funds. It's important to note that perpetual affordability is very different than a 30 year affordability covenant. The largest federal funding programs already require 30 year affordability

restrictions, but in Vermont policy leaders realized that it needed even longer commitments to avoid the loss of affordable housing units from the inventory available. Therefore, the state began its process of making sure that programs required perpetual affordability (meaning that the project remains affordable for as long as it remains housing) more than 25 years ago.

For example, the largest source of housing funding that creates affordable housing in Vermont (and nationally), is the federal Low Income Housing Tax Credit program. This program has two options: 1) a limited pool of more valuable credits that result in higher equity available for the development (called “allocated credits” because they are allocated from a limited pool of credits awarded to Vermont); and 2) a much larger pool of credits that, while valuable, result in less equity for the development (called “bond credits” because they come automatically when a developer receives a bond-funded loan through VHFA).

In Vermont, projects funded with allocated credits have been required to remain perpetually affordable since 2000, which is well beyond the 30 year requirements that the federal tax credit program requires. Bond credits still allow for projects to convert to market rate at the end of their 30 year use period, although this has not yet happened as far as VHFA is aware. Additionally, there is a Preservation Council focused on monitoring all “at risk” projects and working with owners to negotiate either extended affordability or a transfer of the project to a non-profit housing partner who will agree to maintain perpetual affordability. In reality, most projects also have funding from the Vermont Housing and Conservation Board (VHCB), which has required perpetual affordability of all projects since the organization was created in 1987. In addition, VHCB’s Homeland program, described above, which creates affordable homeownership opportunities using a shared equity model, also requires perpetual affordability.

# Appendix 1: Community profiles



## Estimated prevalence of residents who are cost burdened by housing expenses

	Households spending more than 30% of income for housing	Households spending more than 50% of income for housing	% spending more than 30% of income for housing	% spending more than 50% of income for housing
<b>Addison County</b>	<b>4240</b>	<b>1626</b>	<b>30.1%</b>	<b>11.5%</b>
Granville	*	14	*	10.3%
Hancock	*	*	*	*
<b>Orange County</b>	<b>3155</b>	<b>1127</b>	<b>26.5%</b>	<b>9.5%</b>
Bradford	423	155	38.3%	14.0%
Braintree	149	51	28.1%	9.6%
Brookfield	*	37	*	7.0%
Chelsea	126	36	23.3%	6.7%
Corinth	*	33	*	5.9%
Fairlee	*	*	*	*
Newbury	285	113	28.9%	11.5%
Randolph	451	219	24.7%	12.0%
Strafford	*	38	*	8.4%
Thetford	265	*	24.2%	*
Topsham	*	*	*	*
Tunbridge	*	58	*	10.4%
Vershire	*	*	*	*
West Fairlee	*	27	*	9.8%
Pittsfield	65	*	26.5%	*
<b>Windsor County</b>	<b>7681</b>	<b>3405</b>	<b>31.0%</b>	<b>13.8%</b>
Andover	*	*	*	*
Baltimore	*	12	*	13.3%
Barnard	*	55	*	13.3%
Bethel	291	93	33.5%	10.7%
Bridgewater	*	*	*	*
Cavendish	181	87	30.3%	14.5%
Chester	569	233	40.6%	16.6%
Hartford	1701	698	38.3%	15.7%
Hartland	308	113	21.7%	8.0%
Ludlow	274	140	29.5%	15.1%
Norwich	287	123	20.7%	8.9%
Plymouth	*	40	*	13.8%
Pomfret	*	52	*	13.2%
Reading	79	25	27.2%	8.6%
Rochester	*	*	*	*
Royalton	515	365	40.0%	28.3%
Sharon	*	137	*	22.1%
Springfield	1231	521	31.5%	13.3%
Stockbridge	*	33	*	9.7%
Weathersfield	267	101	21.3%	8.1%
West Windsor	*	*	*	*
Windsor	563	213	37.7%	14.3%
Woodstock	358	168	25.7%	12.1%

Data source: U.S. Census Bureau, American Community Survey 2007-2011, aggregation of mortgaged owner and renter estimates.

\* indicates the absence of a reliable survey estimate due to small sample size. Shading represents exceeding county average.

## Median home sales price and estimated median rent

	Median home sales price, 2012	Median monthly gross rent, 2011
<b>Addison County</b>	<b>201,298</b>	<b>856</b>
Granville	99,500	912
Hancock	264,000	713
<b>Orange County</b>	<b>156,000</b>	<b>778</b>
Bradford	153,000	912
Braintree	130,000	713
Brookfield	135,000	955
Chelsea	145,000	691
Corinth	140,000	1,042
Fairlee	215,000	955
Newbury	130,000	737
Randolph	151,000	758
Strafford	250,000	962
Thetford	207,500	952
Topsham	153,450	*
Tunbridge	199,000	860
Vershire	141,200	725
West Fairlee	189,000	1,042
Pittsfield	290,500	850
<b>Windsor County</b>	<b>173,000</b>	<b>842</b>
Andover	150,000	*
Baltimore	No sales	817
Barnard	195,000	1,326
Bethel	130,000	767
Bridgewater	73,850	795
Cavendish	139,000	747
Chester	150,000	804
Hartford	198,750	924
Hartland	177,000	905
Ludlow	210,000	684
Norwich	382,000	1,104
Plymouth	121,000	*
Pomfret	192,500	1,058
Reading	184,250	*
Rochester	130,900	659
Royalton	155,000	818
Sharon	226,250	1,066
Springfield	115,000	777
Stockbridge	145,000	720
Weathersfield	155,950	*
West Windsor	168,000	*
Windsor	133,750	780
Woodstock	290,440	1,063

Data sources: U.S. Census Bureau, American Community Survey 2007-2011 (Median and rent), VT Property Transfer Tax records for primary homes (Median home sales price). \* indicates the absence of a reliable American Community Survey estimate due to small sample size. Shading represents exceeding county average. Shading represents exceeding county average.

## Estimated prevalence of owner households cost burdened by their mortgage and other housing costs

	Households spending more than 30% of income for housing	Households spending more than 50% of income for housing	% of households spending more than 30% of income for housing	% of households spending more than 50% of income for housing
<b>Addison County</b>	<b>2700</b>	<b>809</b>	<b>38</b>	<b>11.4</b>
Granville	*	*	*	*
Hancock	*	*	*	*
<b>Orange County</b>	<b>2139</b>	<b>731</b>	<b>35</b>	<b>11.9</b>
Bradford	222	*	39.2	*
Braintree	107	*	36.8	*
Brookfield	87	31	37.7	13.4
Chelsea	78	*	27.9	*
Corinth	91	*	33.3	*
Fairlee	82	*	42.7	*
Newbury	209	*	39.1	*
Randolph	308	164	36.3	19.3
Strafford	91	*	40.3	*
Thetford	156	*	29.1	*
Topsham	145	*	49.2	*
Tunbridge	104	*	38.7	*
Vershire	*	*	*	*
West Fairlee	*	*	*	*
Pittsfield	*	*	*	*
<b>Windsor County</b>	<b>4546</b>	<b>1795</b>	<b>39.8</b>	<b>15.7</b>
Andover	*	*	*	*
Baltimore	*	*	*	*
Barnard	*	*	*	*
Bethel	222	*	44.5	*
Bridgewater	56	*	41.8	*
Cavendish	116	54	50.4	23.5
Chester	372	*	49.1	*
Hartford	756	317	40.3	16.9
Hartland	262	*	36.5	*
Ludlow	142	*	41.9	*
Norwich	179	*	30.9	*
Plymouth	77	*	55.4	*
Pomfret	102	*	53.1	*
Reading	55	*	36.7	*
Rochester	*	*	*	*
Royalton	276	200	50.4	36.5
Sharon	104	54	31.8	16.5
Springfield	680	220	36.4	11.8
Stockbridge	51	*	42.1	*
Weathersfield	235	*	32.5	*
West Windsor	107	47	41.3	18.1
Windsor	252	*	40.1	*
Woodstock	289	125	40.4	17.5

Data source: U.S. Census Bureau, American Community Survey 2007-2011. \* indicates the absence of a reliable survey estimate due to small sample size.

Shading represents exceeding county average.

## Estimated prevalence of renter households cost burdened by their housing costs

	Households spending more than 30% of income for housing	Households spending more than 50% of income for housing	% of households spending more than 30% of income for housing	% of households spending more than 50% of income for housing
<b>Addison County</b>	<b>1540</b>	<b>817</b>	<b>48.9</b>	<b>25.9</b>
Granville	*	*	*	*
Hancock	*	*	*	*
<b>Orange County</b>	<b>1016</b>	<b>396</b>	<b>53.5</b>	<b>20.9</b>
Bradford	201	*	83.4	*
Braintree	*	*	*	*
Brookfield	*	*	*	*
Chelsea	*	*	*	*
Corinth	*	*	*	*
Fairlee	*	*	*	*
Newbury	76	*	44.7	*
Randolph	*	*	*	*
Strafford	*	*	*	*
Thetford	*	*	*	*
Topsham	*	*	*	*
Tunbridge	*	*	*	*
Vershire	*	*	*	*
West Fairlee	*	*	*	*
Pittsfield	*	*	*	*
<b>Windsor County</b>	<b>3135</b>	<b>1610</b>	<b>49.9</b>	<b>25.6</b>
Andover	*	0	*	0
Baltimore	*	*	*	*
Barnard	*	*	*	*
Bethel	*	*	*	*
Bridgewater	*	*	*	*
Cavendish	*	*	*	*
Chester	*	*	*	*
Hartford	945	381	56.5	22.8
Hartland	*	*	*	*
Ludlow	132	75	48.7	27.7
Norwich	*	*	*	*
Plymouth	*	*	*	*
Pomfret	*	*	*	*
Reading	*	*	*	*
Rochester	*	*	*	*
Royalton	239	*	59.2	*
Sharon	*	83	*	52.9
Springfield	551	301	51	27.8
Stockbridge	*	*	*	*
Weathersfield	*	*	*	*
West Windsor	*	0	*	*
Windsor	311	*	57.4	*
Woodstock	*	*	*	*

Data source: U.S. Census Bureau, American Community Survey 2007-2011. \* indicates the absence of a reliable survey estimate due to small sample size.

Shading represents exceeding county average.

## Affordability of median priced home for median income household

	Median household income	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>57,203</b>	<b>196,000</b>	<b>16,426</b>	<b>5,298</b>
Granville	53,125	181,500	15,382	n/a
Hancock	35,313	120,000	10,954	144,000
<b>Orange County</b>	<b>52,407</b>	<b>179,000</b>	<b>15,202</b>	<b>n/a</b>
Bradford	44,500	151,500	13,222	1,500
Braintree	42,105	143,500	12,646	n/a
Brookfield	61,641	211,000	17,506	n/a
Chelsea	47,841	163,500	14,086	n/a
Corinth	49,375	168,500	14,446	n/a
Fairlee	60,703	208,000	17,290	7,000
Newbury	50,603	173,000	14,770	n/a
Randolph	48,091	164,000	14,122	n/a
Strafford	52,457	179,000	15,202	71,000
Thetford	71,329	245,500	19,990	n/a
Topsham	50,000	170,500	14,590	n/a
Tunbridge	54,231	185,000	15,634	14,000
Vershire	42,438	144,500	12,718	n/a
West Fairlee	49,375	168,500	14,446	20,500
Pittsfield	62,125	213,000	17,650	77,500
<b>Windsor County</b>	<b>53,129</b>	<b>181,500</b>	<b>15,382</b>	<b>n/a</b>
Andover	49,000	167,500	14,374	n/a
Baltimore	*	*	*	*
Barnard	71,429	245,500	19,990	n/a
Bethel	51,000	174,000	14,842	n/a
Bridgewater	51,750	176,500	15,022	n/a
Cavendish	42,250	144,000	12,682	n/a
Chester	45,750	156,000	13,546	n/a
Hartford	52,455	179,000	15,202	19,750
Hartland	63,147	216,500	17,902	n/a
Ludlow	46,094	157,000	13,618	53,000
Norwich	87,833	302,000	24,058	80,000
Plymouth	60,208	206,500	17,182	n/a
Pomfret	64,844	222,000	18,298	n/a
Reading	59,625	204,500	17,038	n/a
Rochester	45,385	154,500	13,438	n/a
Royalton	35,395	120,500	10,990	34,500
Sharon	52,727	180,000	15,274	46,250
Springfield	46,397	158,000	13,690	n/a
Stockbridge	46,458	158,000	13,690	n/a
Weathersfield	62,029	212,500	17,614	n/a
West Windsor	76,250	262,000	21,178	n/a
Windsor	48,095	164,000	14,122	n/a
Woodstock	77,863	268,000	21,610	22,440

Data sources: VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012.

Shading represents exceeding county average.



## Affordability of median priced home for median income family

	Median family income	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>69,759</b>	<b>240,000</b>	<b>19,594</b>	<b>n/a</b>
Granville	59,750	204,500	17,038	n/a
Hancock	47,708	163,000	14,050	101,000
<b>Orange County</b>	<b>62,463</b>	<b>214,000</b>	<b>17,722</b>	<b>n/a</b>
Bradford	65,378	224,000	18,442	n/a
Braintree	46,944	160,500	13,870	n/a
Brookfield	69,583	239,500	19,558	n/a
Chelsea	56,250	192,500	16,174	n/a
Corinth	58,173	199,500	16,678	n/a
Fairlee	62,188	213,000	17,650	2,000
Newbury	66,298	227,000	18,658	n/a
Randolph	61,875	212,000	17,578	n/a
Strafford	60,714	208,000	17,290	42,000
Thetford	79,706	274,000	22,042	n/a
Topsham	52,232	178,500	15,166	n/a
Tunbridge	62,344	213,500	17,686	n/a
Vershire	41,597	141,500	12,502	n/a
West Fairlee	60,000	205,500	17,110	n/a
Pittsfield	56,771	194,500	16,318	96,000
<b>Windsor County</b>	<b>66,890</b>	<b>229,000</b>	<b>18,802</b>	<b>n/a</b>
Andover	57,500	197,000	16,498	n/a
Baltimore	73,333	252,000	20,458	*
Barnard	80,278	276,000	22,186	n/a
Bethel	67,813	232,500	19,054	n/a
Bridgewater	74,167	255,000	20,674	n/a
Cavendish	56,250	192,500	16,174	n/a
Chester	64,813	222,000	18,298	n/a
Hartford	65,875	225,500	18,550	n/a
Hartland	77,652	267,000	21,538	n/a
Ludlow	59,531	204,000	17,002	6,000
Norwich	124,050	427,000	33,058	n/a
Plymouth	91,094	313,500	24,886	n/a
Pomfret	67,292	230,500	18,910	n/a
Reading	63,125	216,500	17,902	n/a
Rochester	52,976	181,000	15,346	n/a
Royalton	49,605	169,500	14,518	n/a
Sharon	66,583	228,000	18,730	n/a
Springfield	55,857	191,500	16,102	n/a
Stockbridge	47,083	160,500	13,870	n/a
Weathersfield	68,958	237,000	19,378	n/a
West Windsor	86,375	297,000	23,698	n/a
Windsor	54,074	184,500	15,598	n/a
Woodstock	97,917	337,000	26,578	n/a

*Date sources: VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012. Shading represents exceeding county average.*

## Affordability of median priced home for median income family of four

	Median income	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>78,859</b>	<b>271,000</b>	<b>21,826</b>	<b>n/a</b>
Granville	*	*	*	*
Hancock	56,250	192,500	16,174	71,500
<b>Orange County</b>	<b>67,099</b>	<b>230,000</b>	<b>18,874</b>	<b>n/a</b>
Bradford	*	*	*	*
Braintree	53,250	182,000	15,418	n/a
Brookfield	77,500	266,500	21,502	n/a
Chelsea	57,813	198,000	16,570	n/a
Corinth	*	*	*	*
Fairlee	65,625	225,000	18,514	n/a
Newbury	67,500	231,500	18,982	n/a
Randolph	57,155	196,000	16,426	n/a
Strafford	*	*	*	*
Thetford	113,929	392,000	30,538	n/a
Topsham	*	*	*	*
Tunbridge	*	*	*	*
Vershire	*	*	*	*
West Fairlee	*	*	*	*
Pittsfield	*	*	*	*
<b>Windsor County</b>	<b>80,603</b>	<b>277,000</b>	<b>22,258</b>	<b>n/a</b>
Andover	57,917	198,500	16,606	n/a
Baltimore	98,333	338,500	26,686	*
Barnard	89,500	308,000	24,490	n/a
Bethel	69,250	238,000	19,450	n/a
Bridgewater	*	*	*	*
Cavendish	89,583	308,000	24,490	n/a
Chester	*	*	*	*
Hartford	77,089	265,000	21,394	n/a
Hartland	119,310	410,500	31,870	n/a
Ludlow	75,714	260,500	21,070	n/a
Norwich	132,273	455,000	35,074	n/a
Plymouth	96,964	333,500	26,326	n/a
Pomfret	*	*	*	*
Reading	*	*	*	*
Rochester	*	*	*	*
Royalton	*	*	*	*
Sharon	*	*	*	*
Springfield	61,548	211,000	17,506	n/a
Stockbridge		*	*	*
Weathersfield	73,125	251,500	20,422	n/a
West Windsor	89,766	309,000	24,562	n/a
Windsor	*	*	*	*
Woodstock	*	*	*	*

*Date sources: VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012. Shading represents exceeding county average.*

## Affordability of median priced home for median income senior-headed household (65+)

	Median income	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>42,204</b>	<b>143,500</b>	<b>12,646</b>	<b>57,798</b>
Granville	52,813	180,500	15,310	n/a
Hancock	51,875	177,000	15,058	87,000
<b>Orange County</b>	<b>36,356</b>	<b>124,000</b>	<b>11,242</b>	<b>32,000</b>
Bradford	31,364	106,000	9,946	47,000
Braintree	38,125	130,000	11,674	n/a
Brookfield	45,625	155,500	13,510	n/a
Chelsea	31,250	105,500	9,910	39,500
Corinth	36,818	125,500	11,350	14,500
Fairlee	72,614	249,500	20,278	n/a
Newbury	30,208	102,000	9,658	28,000
Randolph	36,061	123,000	11,170	28,000
Strafford	44,583	152,000	13,258	98,000
Thetford	*	*	*	*
Topsham	*	*	*	*
Tunbridge	36,563	124,500	11,278	74,500
Vershire	28,333	95,500	9,224	45,700
West Fairlee	*	*	*	*
Pittsfield	*	*	*	*
<b>Windsor County</b>	<b>36,703</b>	<b>125,000</b>	<b>11,314</b>	<b>48,000</b>
Andover	*	*	*	*
Baltimore	28,250	95,500	9,224	*
Barnard	73,750	253,500	20,566	n/a
Bethel	28,679	97,000	9,321	33,000
Bridgewater	32,917	111,000	10,306	n/a
Cavendish	35,446	120,500	10,990	18,500
Chester	35,991	122,500	11,134	27,500
Hartford	29,972	101,000	9,586	97,750
Hartland	42,900	146,000	12,826	31,000
Ludlow	29,773	100,500	9,550	109,500
Norwich	*	*	*	*
Plymouth	*	*	*	*
Pomfret	44,688	152,000	13,258	40,500
Reading	58,026	199,000	16,642	n/a
Rochester	33,889	114,500	10,558	16,400
Royalton	31,957	108,000	10,090	47,000
Sharon	43,750	149,000	13,042	77,250
Springfield	30,291	102,500	9,694	12,500
Stockbridge	39,875	136,000	12,106	9,000
Weathersfield	42,000	143,000	12,610	12,950
West Windsor	*	*	*	*
Windsor	26,625	90,000	8,869	43,750
Woodstock	76,094	261,500	21,142	28,940

*Date sources: VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012. Shading represents exceeding county average.*

## Affordability of median priced home for household with 50% median income

	Household income	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>28,602</b>	<b>96,500</b>	<b>9,288</b>	<b>104,798</b>
Granville	26,563	89,000	8,805	10,500
Hancock	17,657	58,500	6,837	205,500
<b>Orange County</b>	<b>26,204</b>	<b>87,500</b>	<b>8,708</b>	<b>68,500</b>
Bradford	22,250	74,500	7,869	78,500
Braintree	21,053	70,500	7,611	59,500
Brookfield	30,821	104,000	9,802	31,000
Chelsea	23,921	80,000	8,224	65,000
Corinth	24,688	82,500	8,385	57,500
Fairlee	30,352	102,500	9,694	112,500
Newbury	25,302	84,500	8,514	45,500
Randolph	24,046	80,500	8,256	70,500
Strafford	26,229	88,000	8,740	162,000
Thetford	35,665	121,500	11,062	86,000
Topsham	25,000	83,500	8,450	69,950
Tunbridge	27,116	91,500	8,966	107,500
Vershire	21,219	71,000	7,644	70,200
West Fairlee	24,688	82,500	8,385	106,500
Pittsfield	31,063	105,000	9,874	185,500
<b>Windsor County</b>	<b>26,565</b>	<b>89,000</b>	<b>8,805</b>	<b>84,000</b>
Andover	24,500	82,000	8,353	68,000
Baltimore	*	*	#N/A	*
Barnard	35,715	121,500	11,062	73,500
Bethel	25,500	85,500	8,579	44,500
Bridgewater	25,875	86,500	8,643	n/a
Cavendish	21,125	70,500	7,611	68,500
Chester	22,875	76,500	7,998	73,500
Hartford	26,228	88,000	8,740	110,750
Hartland	31,574	106,500	9,982	70,500
Ludlow	23,047	77,000	8,031	133,000
Norwich	43,917	149,500	13,078	232,500
Plymouth	30,104	101,500	9,622	19,500
Pomfret	32,422	109,500	10,198	83,000
Reading	29,813	100,500	9,550	83,750
Rochester	22,693	76,000	7,966	54,900
Royalton	17,698	58,500	6,837	96,500
Sharon	26,364	88,500	8,772	137,750
Springfield	23,199	77,500	8,063	37,500
Stockbridge	23,229	77,500	8,063	67,500
Weathersfield	31,015	104,500	9,838	51,450
West Windsor	38,125	130,000	11,674	38,000
Windsor	24,048	80,500	8,256	53,250
Woodstock	38,932	132,500	11,854	157,940

*Date sources: VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012.*

*Shading represents exceeding county average.*

## Affordability of median priced home for household with 80% median income

	Household income	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>45,762</b>	<b>156,000</b>	<b>13,546</b>	<b>45,298</b>
Granville	42,500	144,500	12,718	n/a
Hancock	28,250	95,500	9,224	168,500
<b>Orange County</b>	<b>41,926</b>	<b>143,000</b>	<b>12,610</b>	<b>13,000</b>
Bradford	35,600	121,000	11,026	32,000
Braintree	33,684	113,500	10,486	16,500
Brookfield	49,313	168,500	14,446	n/a
Chelsea	38,273	130,500	11,710	14,500
Corinth	39,500	134,500	11,998	5,500
Fairlee	48,562	166,000	14,266	49,000
Newbury	40,482	138,000	12,250	n/a
Randolph	38,473	131,000	11,746	20,000
Strafford	41,966	143,000	12,610	107,000
Thetford	57,063	195,500	16,390	12,000
Topsham	40,000	136,000	12,106	17,450
Tunbridge	43,385	147,500	12,934	51,500
Vershire	33,950	114,500	10,558	26,700
West Fairlee	39,500	134,500	11,998	54,500
Pittsfield	49,700	169,500	14,518	121,000
<b>Windsor County</b>	<b>42,503</b>	<b>144,500</b>	<b>12,718</b>	<b>28,500</b>
Andover	39,200	133,500	11,926	16,500
Baltimore	*	*	*	*
Barnard	57,143	196,000	16,426	n/a
Bethel	40,800	139,000	12,322	n/a
Bridgewater	41,400	141,000	12,466	n/a
Cavendish	33,800	114,000	10,522	25,000
Chester	36,600	124,500	11,278	25,500
Hartford	41,964	143,000	12,610	55,750
Hartland	50,518	172,500	14,734	4,500
Ludlow	36,875	125,500	11,350	84,500
Norwich	70,266	241,500	19,702	140,500
Plymouth	48,166	164,500	14,158	n/a
Pomfret	51,875	177,000	15,058	15,500
Reading	47,700	163,000	14,050	21,250
Rochester	36,308	123,500	11,206	7,400
Royalton	28,316	95,500	9,224	59,500
Sharon	42,182	143,500	12,646	82,750
Springfield	37,118	126,500	11,422	n/a
Stockbridge	37,166	126,500	11,422	18,500
Weathersfield	49,623	169,500	14,518	n/a
West Windsor	61,000	209,000	17,362	n/a
Windsor	38,476	131,000	11,746	2,750
Woodstock	62,290	213,500	17,686	76,940

*Date sources: VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012.*

*Shading represents exceeding county average.*



## Affordability of median priced home for household with 150% median income

	Household at 150% of median	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>85,805</b>	<b>295,000</b>	<b>23,554</b>	<b>n/a</b>
Granville	79,688	274,000	22,042	n/a
Hancock	52,970	181,000	15,346	83,000
<b>Orange County</b>	<b>78,611</b>	<b>270,500</b>	<b>21,790</b>	<b>n/a</b>
Bradford	66,750	229,000	18,802	n/a
Braintree	63,158	216,500	17,902	n/a
Brookfield	92,462	318,000	25,210	n/a
Chelsea	71,762	247,000	20,098	n/a
Corinth	74,063	254,500	20,638	n/a
Fairlee	91,055	313,000	24,850	n/a
Newbury	75,905	261,000	21,106	n/a
Randolph	72,137	248,000	20,170	n/a
Strafford	78,686	270,500	21,790	n/a
Thetford	106,994	368,000	28,810	n/a
Topsham	75,000	258,000	20,890	n/a
Tunbridge	81,347	280,000	22,474	n/a
Vershire	63,657	218,000	18,010	n/a
West Fairlee	74,063	254,500	20,638	n/a
Pittsfield	93,188	320,500	25,390	n/a
<b>Windsor County</b>	<b>79,694</b>	<b>274,000</b>	<b>22,042</b>	<b>n/a</b>
Andover	73,500	253,000	20,530	n/a
Baltimore	*	*	*	*
Barnard	107,144	368,500	28,846	n/a
Bethel	76,500	263,000	21,250	n/a
Bridgewater	77,625	267,000	21,538	n/a
Cavendish	63,375	217,000	17,938	n/a
Chester	68,625	236,000	19,306	n/a
Hartford	78,683	270,500	21,790	n/a
Hartland	94,721	326,000	25,786	n/a
Ludlow	69,141	238,000	19,450	n/a
Norwich	131,750	453,500	34,966	n/a
Plymouth	90,312	310,500	24,670	n/a
Pomfret	97,266	334,500	26,398	n/a
Reading	89,438	307,500	24,454	n/a
Rochester	68,078	233,500	19,126	n/a
Royalton	53,093	181,500	15,382	n/a
Sharon	79,091	272,000	21,898	n/a
Springfield	69,596	239,500	19,558	n/a
Stockbridge	69,687	239,500	19,558	n/a
Weathersfield	93,044	320,000	25,354	n/a
West Windsor	114,375	393,500	30,646	n/a
Windsor	72,143	248,000	20,170	n/a
Woodstock	116,795	402,000	31,258	n/a

*Date sources: VHFA analysis of American Community Survey estimates of median household income in 2011, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012.*

*Shading represents exceeding county average.*

## Affordability of median priced home for single-person household earning average county wage

	Household earning average county wage	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>38,778</b>	<b>132,000</b>	<b>11,818</b>	<b>69,298</b>
Granville	38,778	132,000	11,818	n/a
Hancock	38,778	132,000	11,818	132,000
<b>Orange County</b>	<b>34,530</b>	<b>116,500</b>	<b>10,702</b>	<b>39,500</b>
Bradford	34,530	116,500	10,702	36,500
Braintree	34,530	116,500	10,702	13,500
Brookfield	34,530	116,500	10,702	18,500
Chelsea	34,530	116,500	10,702	28,500
Corinth	34,530	116,500	10,702	23,500
Fairlee	34,530	116,500	10,702	98,500
Newbury	34,530	116,500	10,702	13,500
Randolph	34,530	116,500	10,702	34,500
Strafford	34,530	116,500	10,702	133,500
Thetford	34,530	116,500	10,702	91,000
Topsham	34,530	116,500	10,702	36,950
Tunbridge	34,530	116,500	10,702	82,500
Vershire	34,530	116,500	10,702	24,700
West Fairlee	34,530	116,500	10,702	72,500
Pittsfield	34,530	116,500	10,702	174,000
<b>Windsor County</b>	<b>38,967</b>	<b>132,500</b>	<b>11,854</b>	<b>40,500</b>
Andover	38,967	132,500	11,854	17,500
Baltimore	38,967	132,500	11,854	*
Barnard	38,967	132,500	11,854	62,500
Bethel	38,967	132,500	11,854	n/a
Bridgewater	38,967	132,500	11,854	n/a
Cavendish	38,967	132,500	11,854	6,500
Chester	38,967	132,500	11,854	17,500
Hartford	38,967	132,500	11,854	66,250
Hartland	38,967	132,500	11,854	44,500
Ludlow	38,967	132,500	11,854	77,500
Norwich	38,967	132,500	11,854	249,500
Plymouth	38,967	132,500	11,854	n/a
Pomfret	38,967	132,500	11,854	60,000
Reading	38,967	132,500	11,854	51,750
Rochester	38,967	132,500	11,854	n/a
Royalton	38,967	132,500	11,854	22,500
Sharon	38,967	132,500	11,854	93,750
Springfield	38,967	132,500	11,854	n/a
Stockbridge	38,967	132,500	11,854	12,500
Weathersfield	38,967	132,500	11,854	23,450
West Windsor	38,967	132,500	11,854	35,500
Windsor	38,967	132,500	11,854	1,250
Woodstock	38,967	132,500	11,854	157,940

Date sources: VHFA analysis of American Community Survey estimates of median county wage data for 2012 from the VT Dept. of Labor, assuming a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012.

Shading represents exceeding county average.

## Affordability of median priced home for single-person household earning minimum wage

	Household earning minimum wage	Purchase price affordable	Cash needed at closing	Affordability gap?
<b>Addison County</b>	<b>17,888</b>	<b>59,000</b>	<b>6,870</b>	<b>142,298</b>
Granville	17,888	59,000	6,870	40,500
Hancock	17,888	59,000	6,870	205,000
<b>Orange County</b>	<b>17,888</b>	<b>59,000</b>	<b>6,870</b>	<b>97,000</b>
Bradford	17,888	59,000	6,870	94,000
Braintree	17,888	59,000	6,870	71,000
Brookfield	17,888	59,000	6,870	76,000
Chelsea	17,888	59,000	6,870	86,000
Corinth	17,888	59,000	6,870	81,000
Fairlee	17,888	59,000	6,870	156,000
Newbury	17,888	59,000	6,870	71,000
Randolph	17,888	59,000	6,870	92,000
Strafford	17,888	59,000	6,870	191,000
Thetford	17,888	59,000	6,870	148,500
Topsham	17,888	59,000	6,870	94,450
Tunbridge	17,888	59,000	6,870	140,000
Vershire	17,888	59,000	6,870	82,200
West Fairlee	17,888	59,000	6,870	130,000
Pittsfield	17,888	59,000	6,870	231,500
<b>Windsor County</b>	<b>17,888</b>	<b>59,000</b>	<b>6,870</b>	<b>114,000</b>
Andover	17,888	59,000	6,870	91,000
Baltimore	17,888	59,000	6,870	*
Barnard	17,888	59,000	6,870	136,000
Bethel	17,888	59,000	6,870	71,000
Bridgewater	17,888	59,000	6,870	14,850
Cavendish	17,888	59,000	6,870	80,000
Chester	17,888	59,000	6,870	91,000
Hartford	17,888	59,000	6,870	139,750
Hartland	17,888	59,000	6,870	118,000
Ludlow	17,888	59,000	6,870	151,000
Norwich	17,888	59,000	6,870	323,000
Plymouth	17,888	59,000	6,870	62,000
Pomfret	17,888	59,000	6,870	133,500
Reading	17,888	59,000	6,870	125,250
Rochester	17,888	59,000	6,870	71,900
Royalton	17,888	59,000	6,870	96,000
Sharon	17,888	59,000	6,870	167,250
Springfield	17,888	59,000	6,870	56,000
Stockbridge	17,888	59,000	6,870	86,000
Weathersfield	17,888	59,000	6,870	96,950
West Windsor	17,888	59,000	6,870	109,000
Windsor	17,888	59,000	6,870	74,750
Woodstock	17,888	59,000	6,870	231,440

Date sources: VHFA analysis of VT 2013 minimum wage (\$8.60/hr.), assuming employment 40 hours/week, 52 weeks/year, a 5% down payment, average insurance and property tax rates, and a 30% housing affordability ratio. "Affordability gap" is based on the median primary home sales price by town in 2012.

Shading represents exceeding county average.

## Vermont designations pertaining to real estate development

	Downtown Designation	Village Designation <sup>13</sup>	Growth Center	New Town Center
Andover				
Baltimore				
Barnard				
Bethel		yes		
Bradford	yes			
Braintree				
Bridgewater				
Brookfield		yes		
Cavendish		Yes/yes		
Chelsea		yes		
Chester		yes		
Corinth				
Cornwall				
Fairlee				
Granville		yes/yes		
Hancock				
Hartford	yes	yes/yes/yes	yes	
Hartland		yes		
Ludlow		yes		
Newbury				
Norwich		yes		
Pittsfield		yes		
Plymouth				
Pomfret				
Randolph	yes	yes		
Reading				
Rochester		yes		
Royalton		yes/yes		
Sharon		yes		
Springfield	yes			
Stockbridge				
Strafford		yes		
Thetford				
Topsham				
Tunbridge		yes/yes		
Vershire				
Weathersfield				
West Fairlee		yes		
West Windsor				
Windsor	yes			
Woodstock		yes		

<sup>13</sup> Multiple “yes” indicates the presence of more than one village designation.



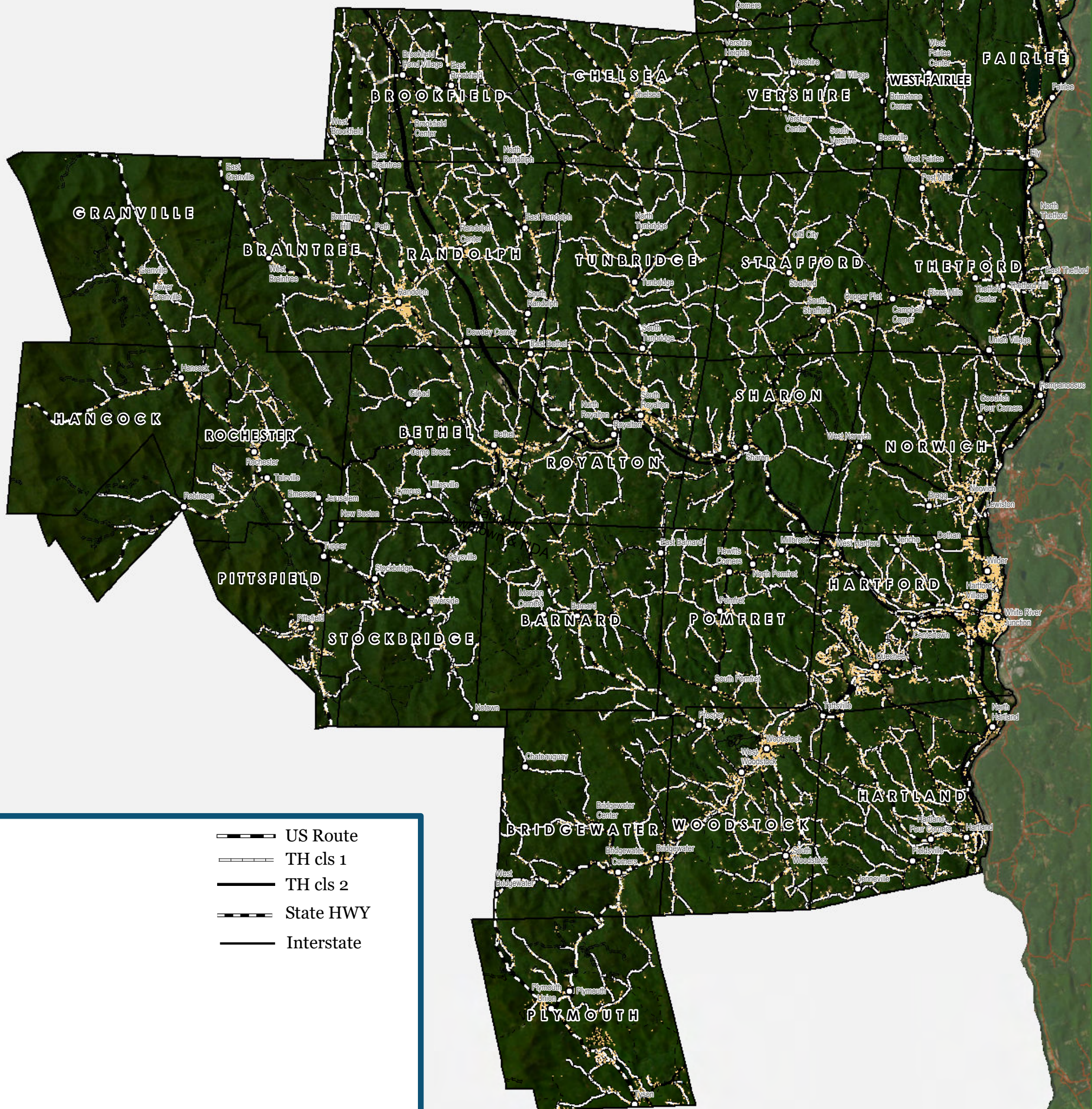
# Two Rivers-Ottauquechee Region of Vermont

## CURRENT LAND USE

- BEST AVAILABLE AERIAL IMAGERY
- HIGHWAYS
- HIGHLIGHTED BUILDING FOOTPRINTS
- VILLAGES AND HAMLETS

Map 1 of 14  
 2025 Regional Plan  
 Adopted 2/26/2025

- data current to 2024 posting on VTGEODATA portal  
 - portal should be checked for most recent data



Building Footprints

0 2 4 8 Miles  
 Source: VTGEODATA

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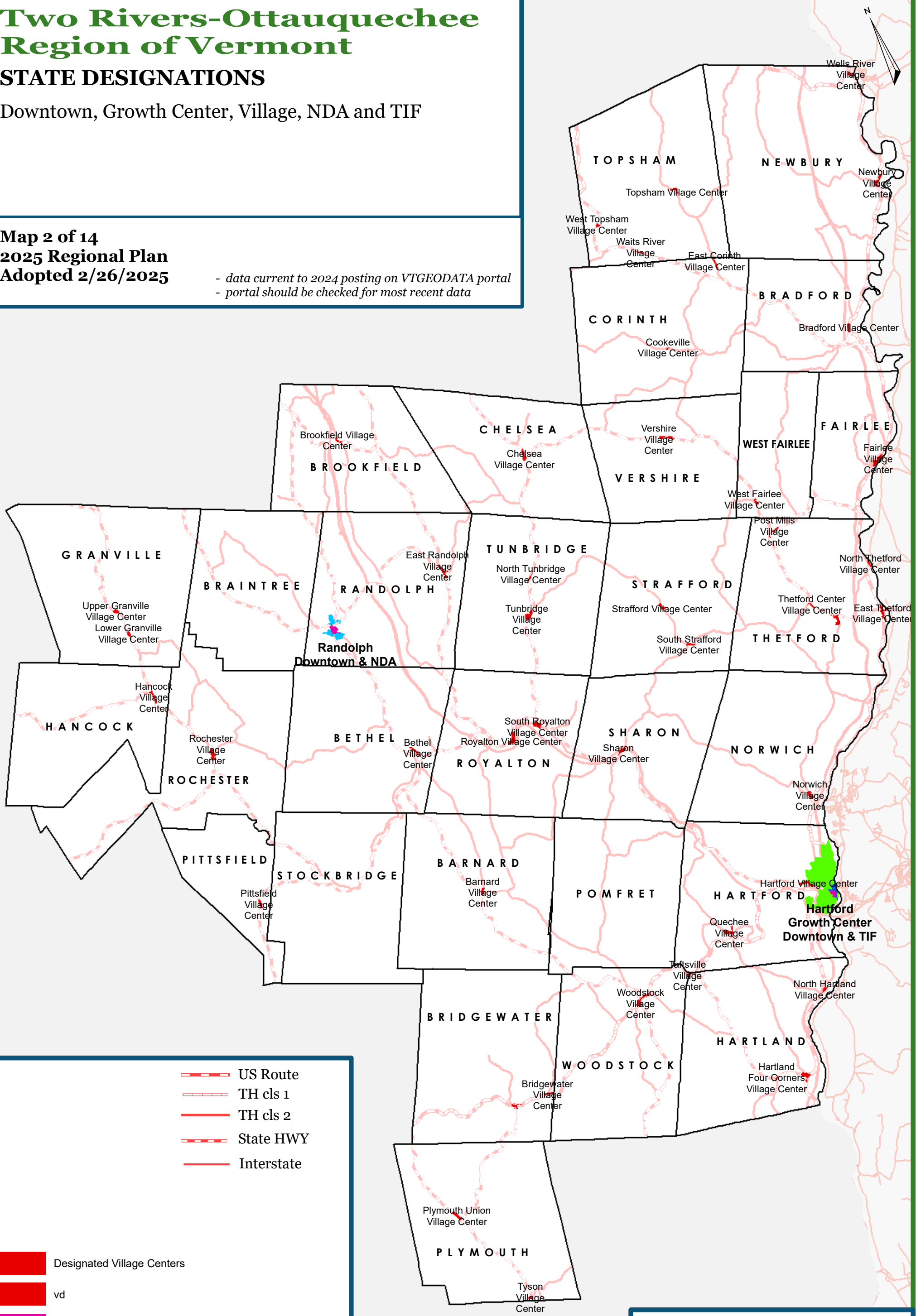
# Two Rivers-Ottauquechee Region of Vermont

## STATE DESIGNATIONS

Downtown, Growth Center, Village, NDA and TIF

**Map 2 of 14**  
**2025 Regional Plan**  
**Adopted 2/26/2025**

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- US Route
- TH cls 1
- TH cls 2
- State HWY
- Interstate

- Designated Village Centers
- vd
- Designated Downtown (Randolph, Hartford)
- Tax Increment Financing (TIF) Hartford
- Neighborhood Development Area (Randolph)
- Designated Growth Center (Hartford)

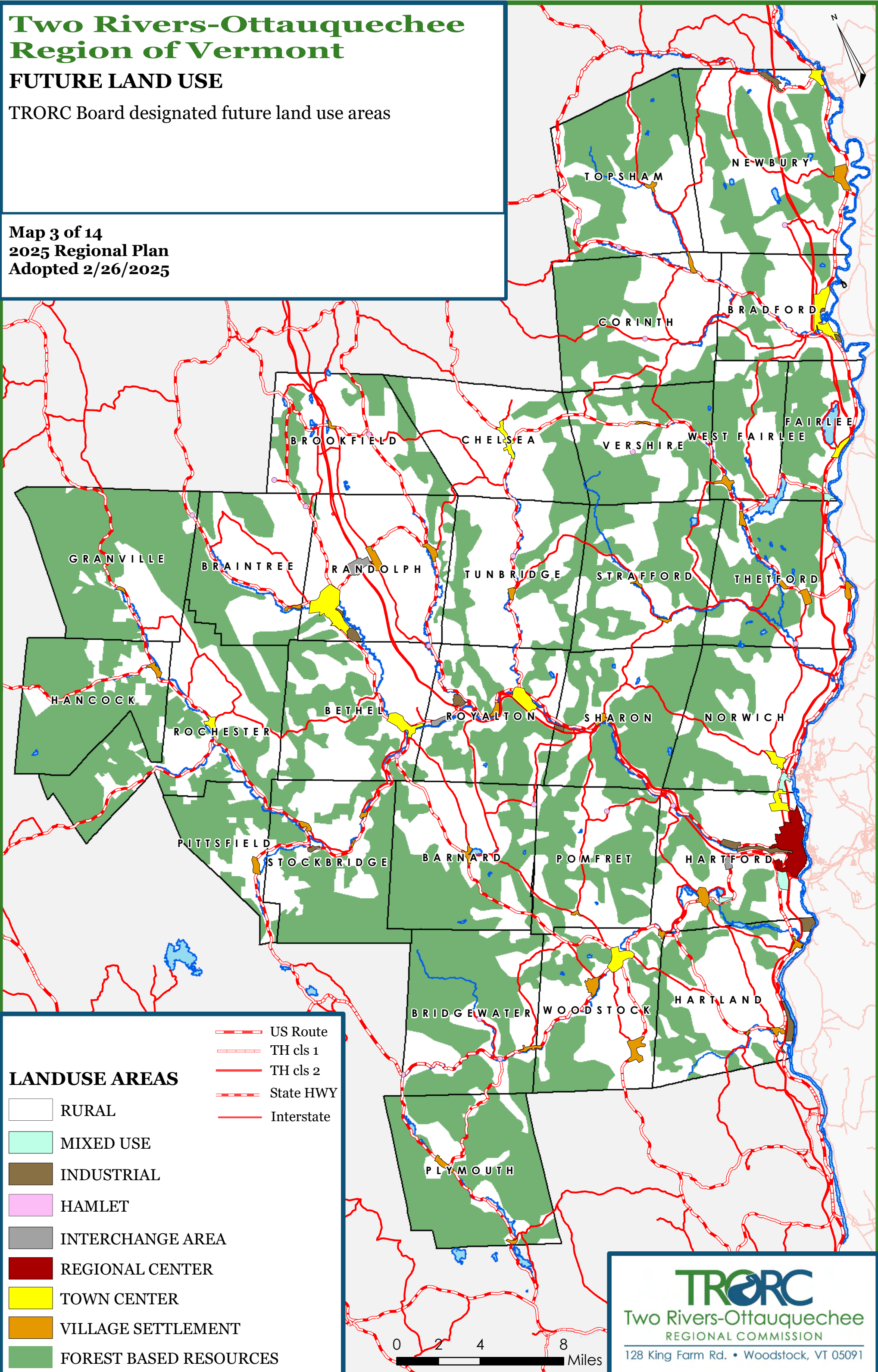


# Two Rivers-Ottawaquechee Region of Vermont

## FUTURE LAND USE

TRORC Board designated future land use areas

Map 3 of 14  
2025 Regional Plan  
Adopted 2/26/2025





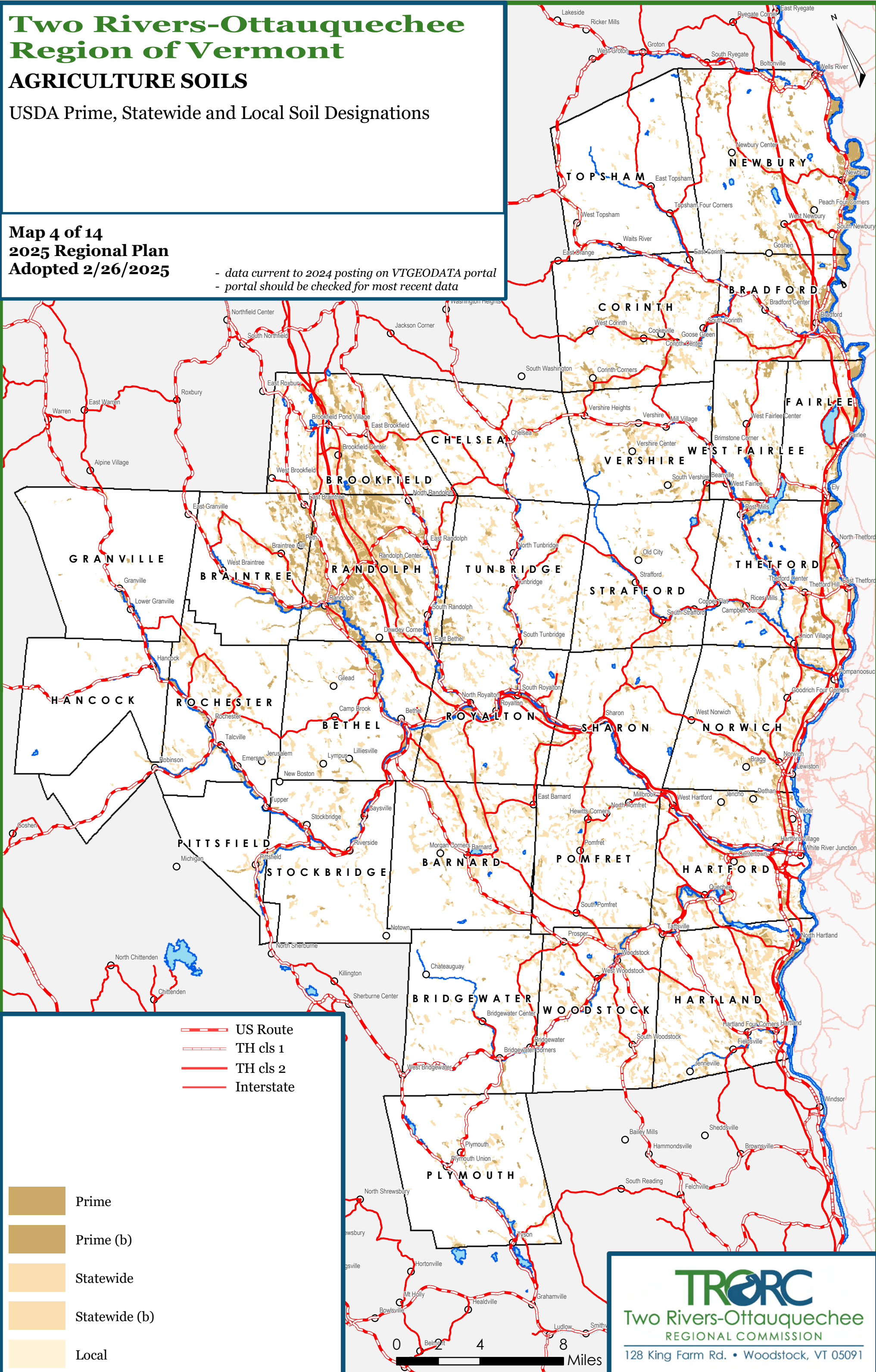
# Two Rivers-Ottauquechee Region of Vermont





## AGRICULTURE SOILS






USDA Prime, Statewide and Local Soil Designations

**Map 4 of 14**  
**2025 Regional Plan**  
**Adopted 2/26/2025**

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-  US Route
-  TH cls 1
-  TH cls 2
-  Interstate

-  Prime
-  Prime (b)
-  Statewide
-  Statewide (b)
-  Local



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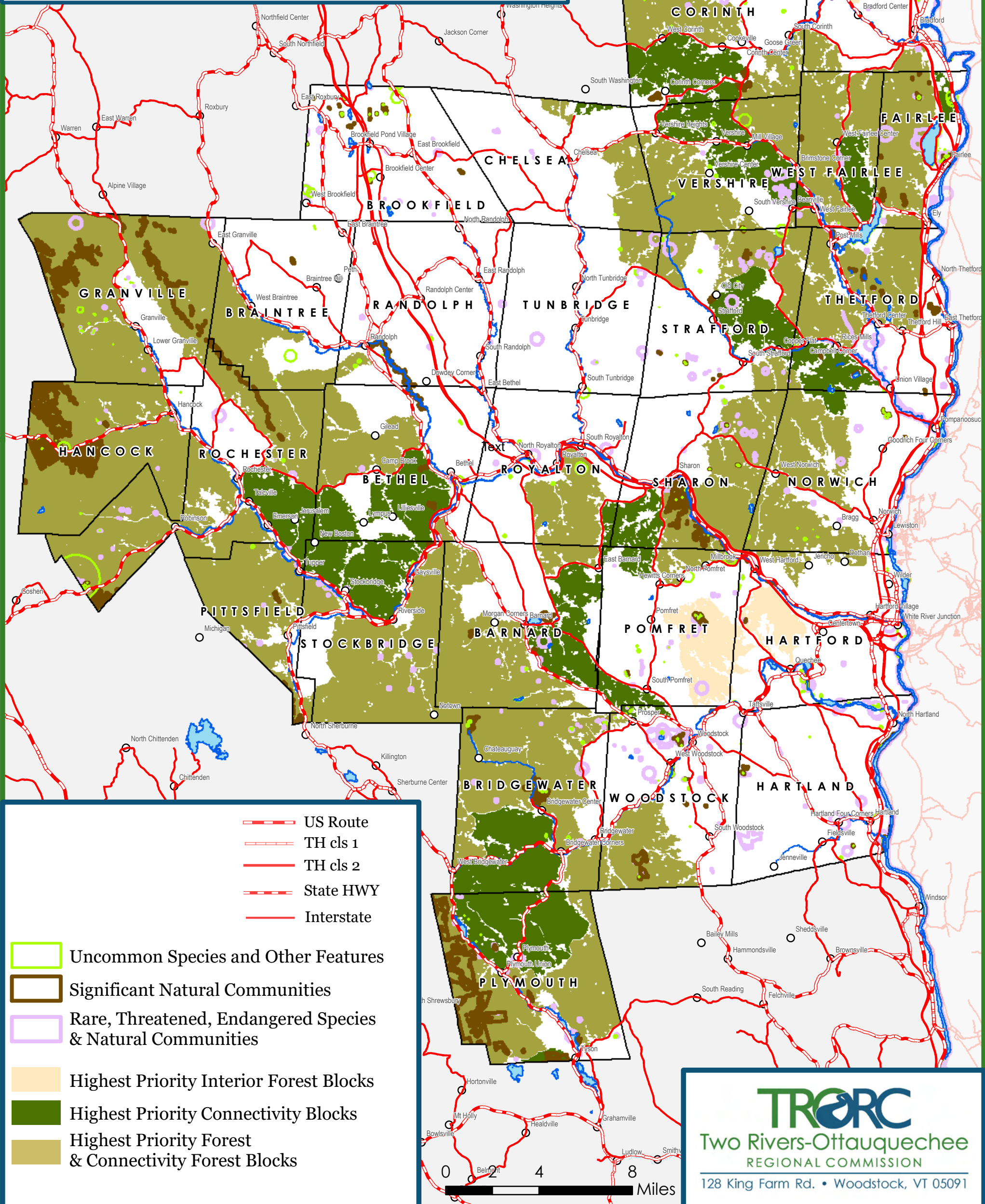
# Two Rivers-Ottawaquechee Region of Vermont

## NATURAL RESOURCES

- Rare, Threatened, Endangered Species & Natural Communities
- Significant Natural Communities
- Uncommon Species and Other Features
- Highest Priority Interior Forest Blocks
- Highest Priority Connectivity Blocks

Map 5 of 14  
2025 Regional Plan  
Adopted 2/26/2025

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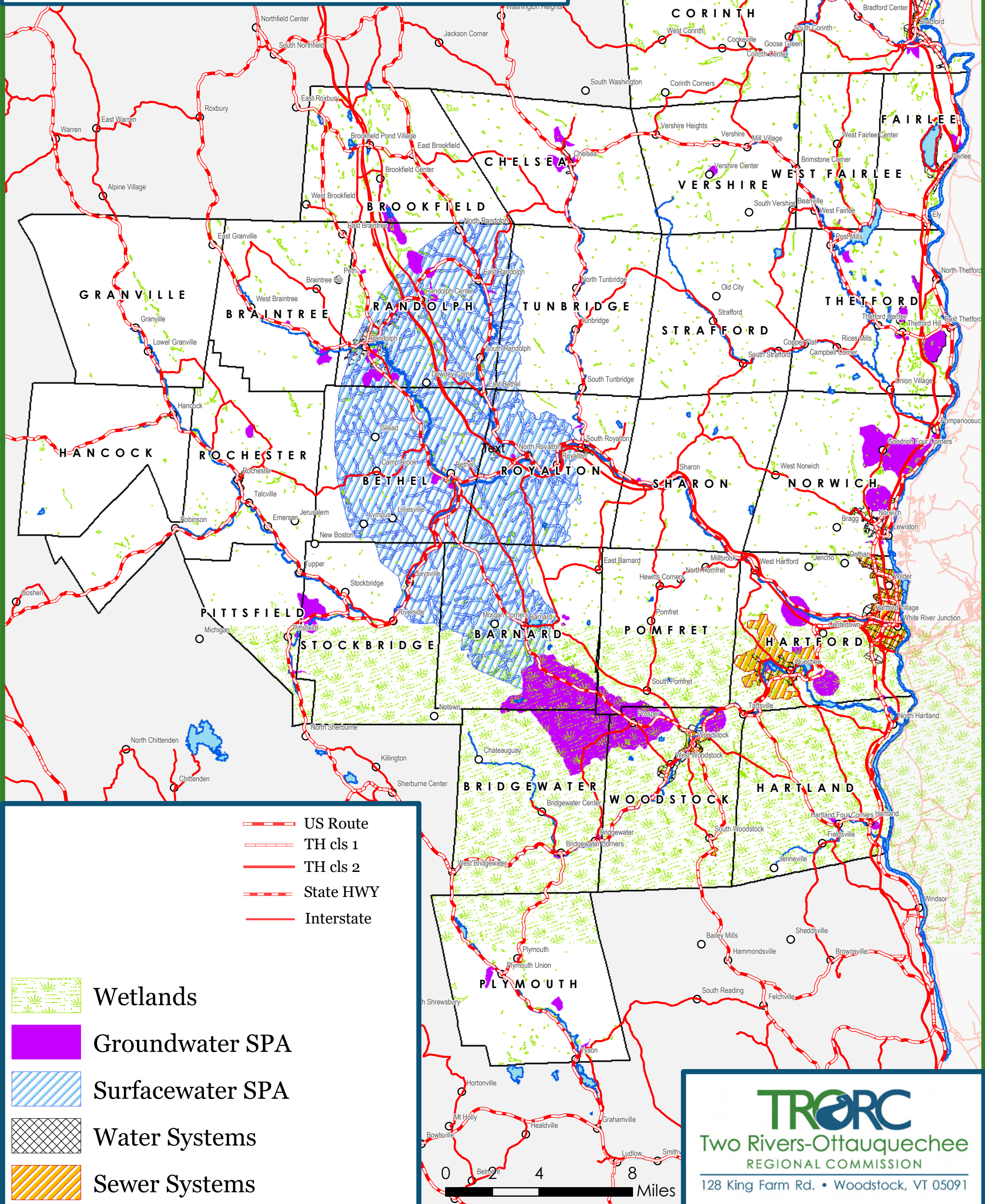
# Two Rivers-Ottawaquechee Region of Vermont

## Water Resources and Protection

- Surface Source Protection Areas
- Groundwater Source Protection Areas
- Vermont Significant Wetlands Inventory
- Water Systems
- Sewer Systems

**Map 7 of 14**  
**2025 Regional Plan**  
**Adopted 2/26/2025**

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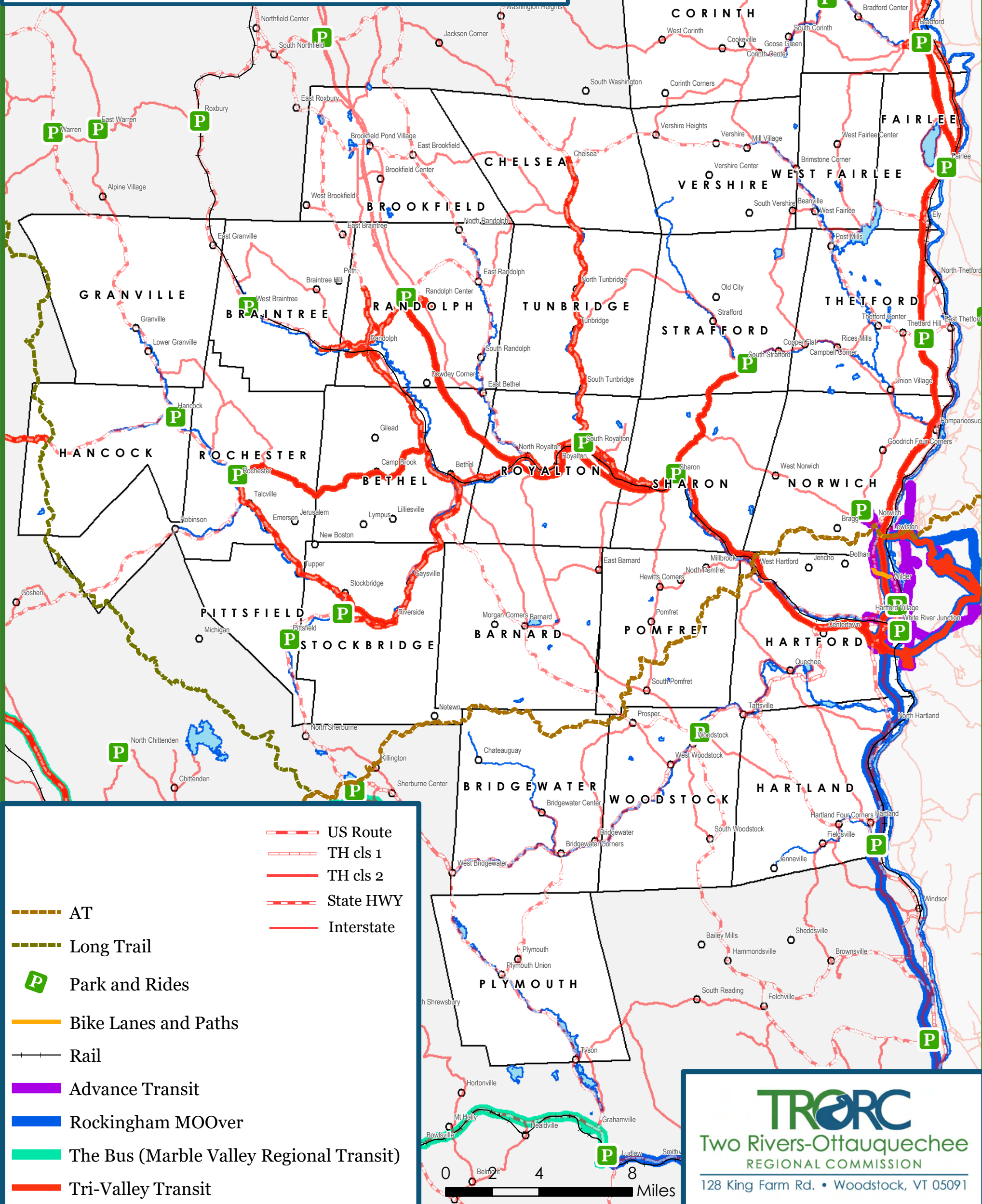
# Two Rivers-Ottauquechee Region of Vermont

## Regionally Significant Transportation Facilities

- Park and Rides
- Transit Providers & Rail
- AT and Long Trails
- Bike Lanes and Paths
- Federal & State Highway Systems

**Map 8 of 14**  
**2025 Regional Plan**  
**Adopted 2/26/2025**

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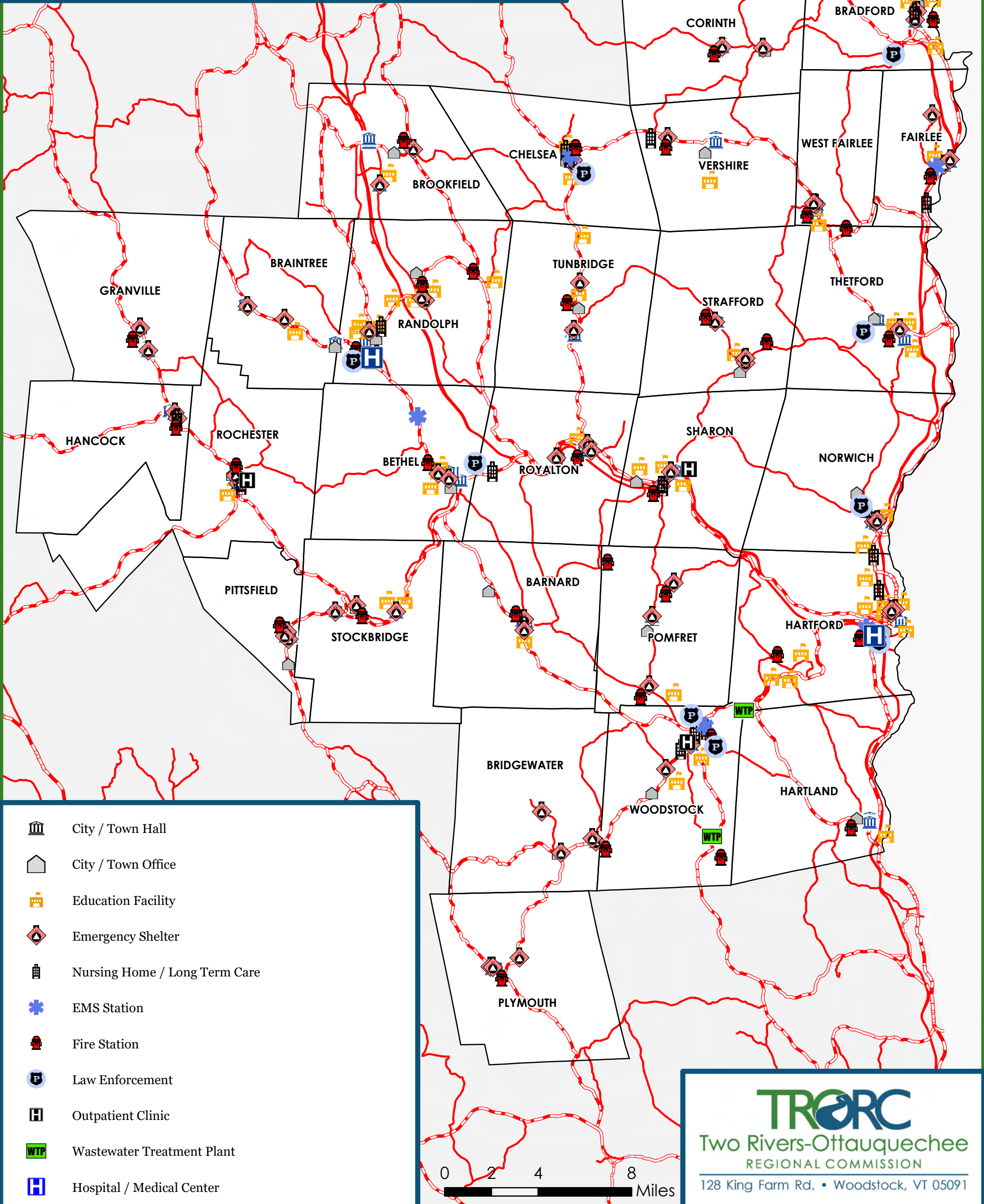
# Two Rivers-Ottauquechee Region of Vermont

## Regional Facilities

- Municipal Facilities and WWTF
- EOC/Shelters
- Fire/EMS Services
- Police Stations
- Hospitals and Clinics

Map 9 of 14  
 2025 Regional Plan  
 Adopted 2/26/2025

- data current to 2024 posting on VTGEODATA portal  
 - portal should be checked for most recent data



- City / Town Hall
- City / Town Office
- Education Facility
- Emergency Shelter
- Nursing Home / Long Term Care
- EMS Station
- Fire Station
- Law Enforcement
- Outpatient Clinic
- Wastewater Treatment Plant
- Hospital / Medical Center



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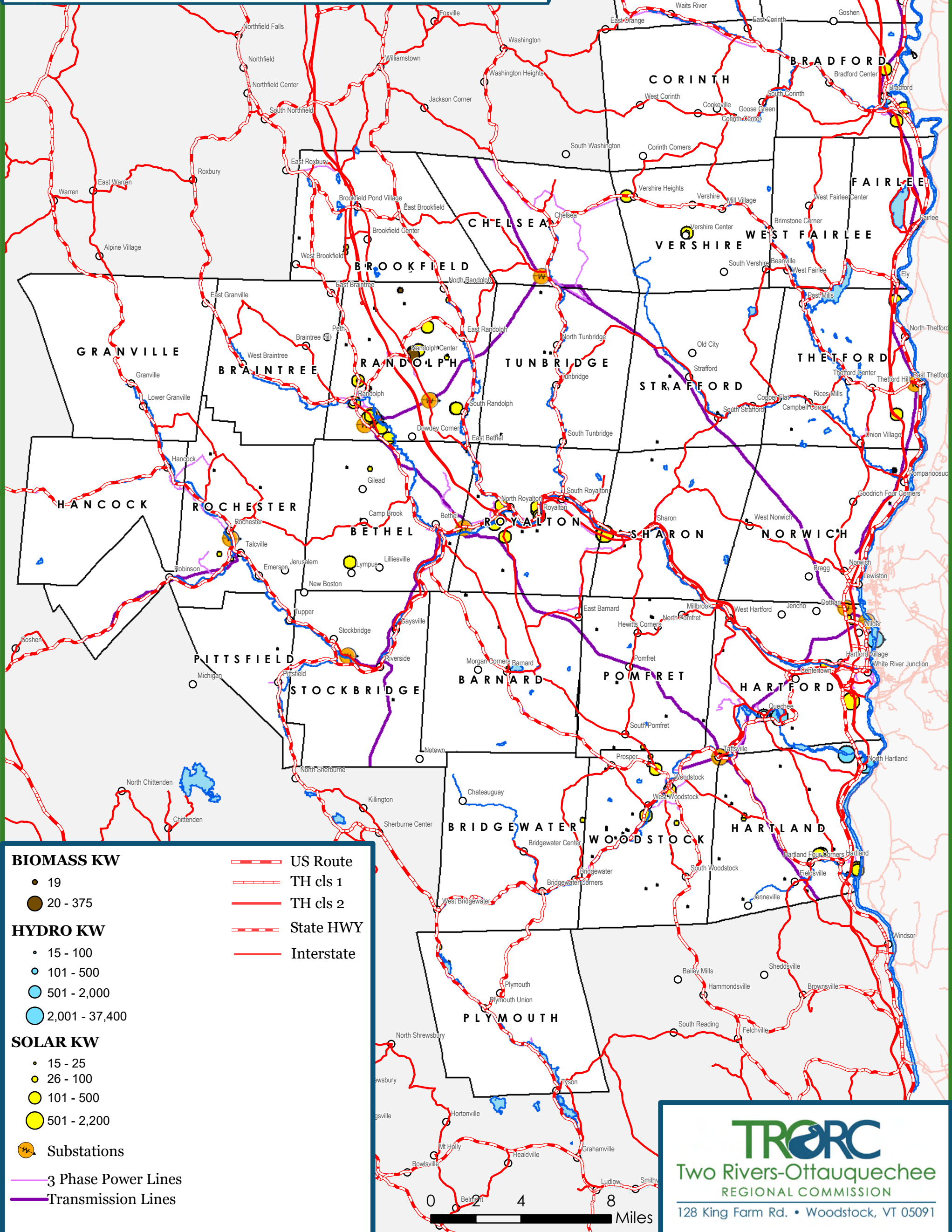
# Two Rivers-Ottauquechee Region of Vermont

## Existing Energy Generation

Biomass, Hydroelectric, Solar, Substations, 3-Phase Power Lines, and Transmission Lines

Map 10 of 14  
2025 Regional Plan  
Adopted 2/26/2025

- data current to 2024 posting on VTGEODATA portal  
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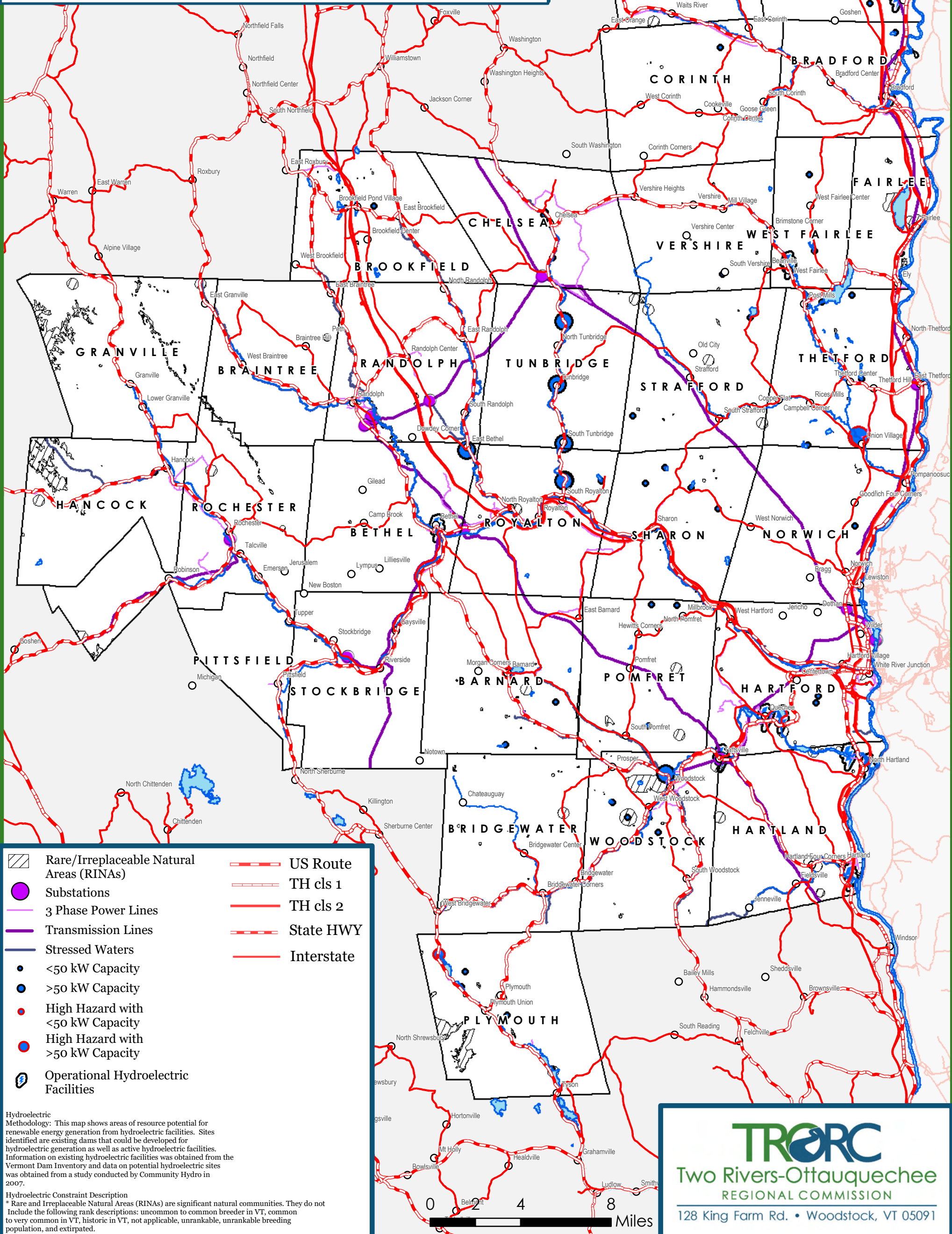
# Two Rivers-Ottawaquechee Region of Vermont

## Hydroelectric Energy Potential

### Operational Hydroelectric Facilities & Potential Hydroelectric Facilities

Map 11 of 14  
2025 Regional Plan  
Adopted 2/26/2025

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- |  |  |  |            |
|--|--|--|------------|
|  | Rare/Irreplaceable Natural Areas (RINAs) |  | US Route   |
|  | Substations                              |  | TH cls 1   |
|  | 3 Phase Power Lines                      |  | TH cls 2   |
|  | Transmission Lines                       |  | State HWY  |
|  | Stressed Waters                          |  | Interstate |
|  | <50 kW Capacity                          |  |            |
|  | >50 kW Capacity                          |  |            |
|  | High Hazard with <50 kW Capacity         |  |            |
|  | High Hazard with >50 kW Capacity         |  |            |
|  | Operational Hydroelectric Facilities     |  |            |

Hydroelectric Methodology: This map shows areas of resource potential for renewable energy generation from hydroelectric facilities. Sites identified are existing dams that could be developed for hydroelectric generation as well as active hydroelectric facilities. Information on existing hydroelectric facilities was obtained from the Vermont Dam Inventory and data on potential hydroelectric sites was obtained from a study conducted by Community Hydro in 2007.

Hydroelectric Constraint Description  
\* Rare and Irreplaceable Natural Areas (RINAs) are significant natural communities. They do not include the following rank descriptions: uncommon to common breeder in VT, common to very common in VT, historic in VT, not applicable, unrankable, unrankable breeding population, and extirpated.

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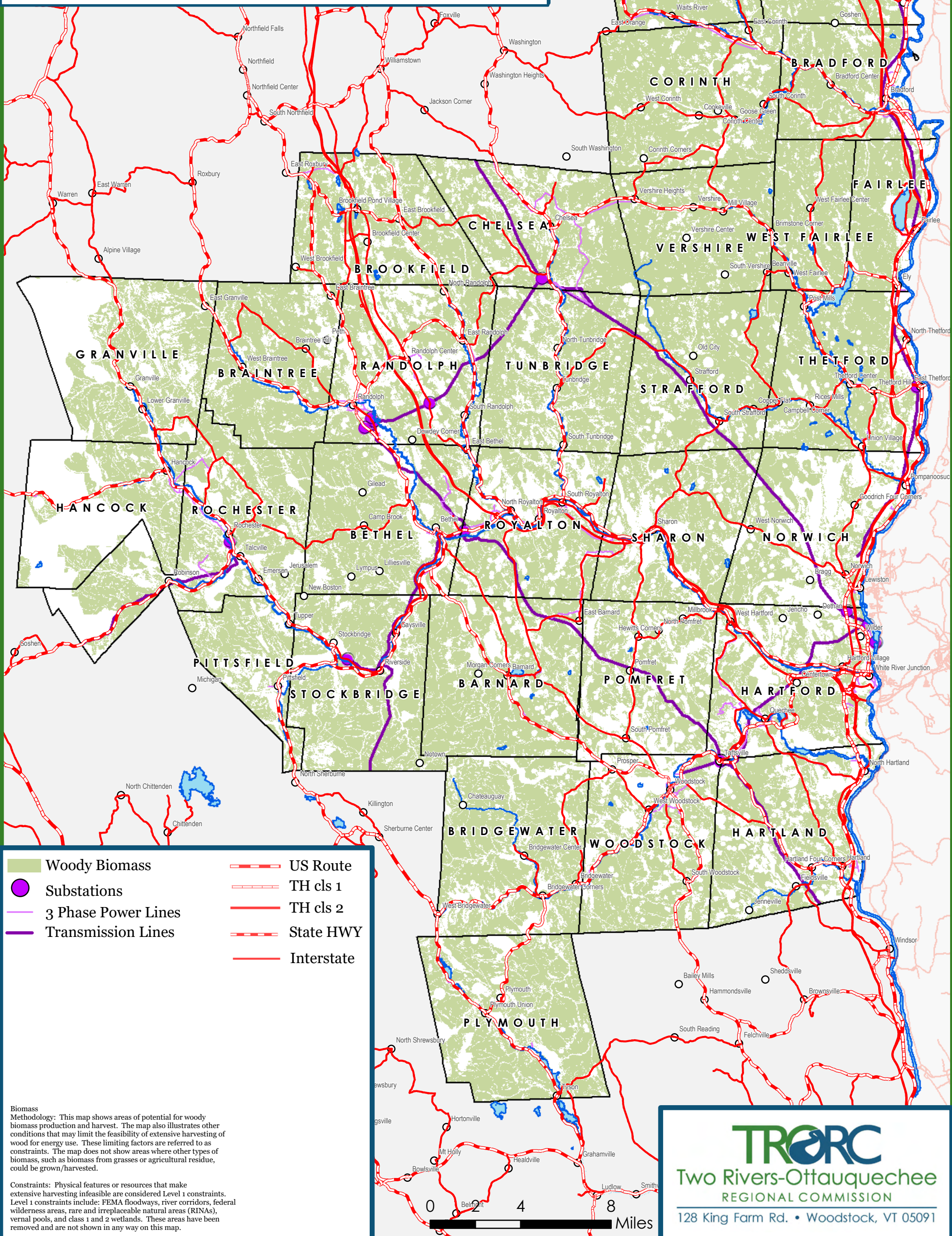
# Two Rivers-Ottauquechee Region of Vermont

## Biomass Energy Potential

### Woody Biomass

Map 12 of 14  
2025 Regional Plan  
Adopted 2/26/2025

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**Biomass Methodology:** This map shows areas of potential for woody biomass production and harvest. The map also illustrates other conditions that may limit the feasibility of extensive harvesting of wood for energy use. These limiting factors are referred to as constraints. The map does not show areas where other types of biomass, such as biomass from grasses or agricultural residue, could be grown/harvested.

**Constraints:** Physical features or resources that make extensive harvesting infeasible are considered Level 1 constraints. Level 1 constraints include: FEMA floodways, river corridors, federal wilderness areas, rare and irreplaceable natural areas (RINAs), vernal pools, and class 1 and 2 wetlands. These areas have been removed and are not shown in any way on this map.

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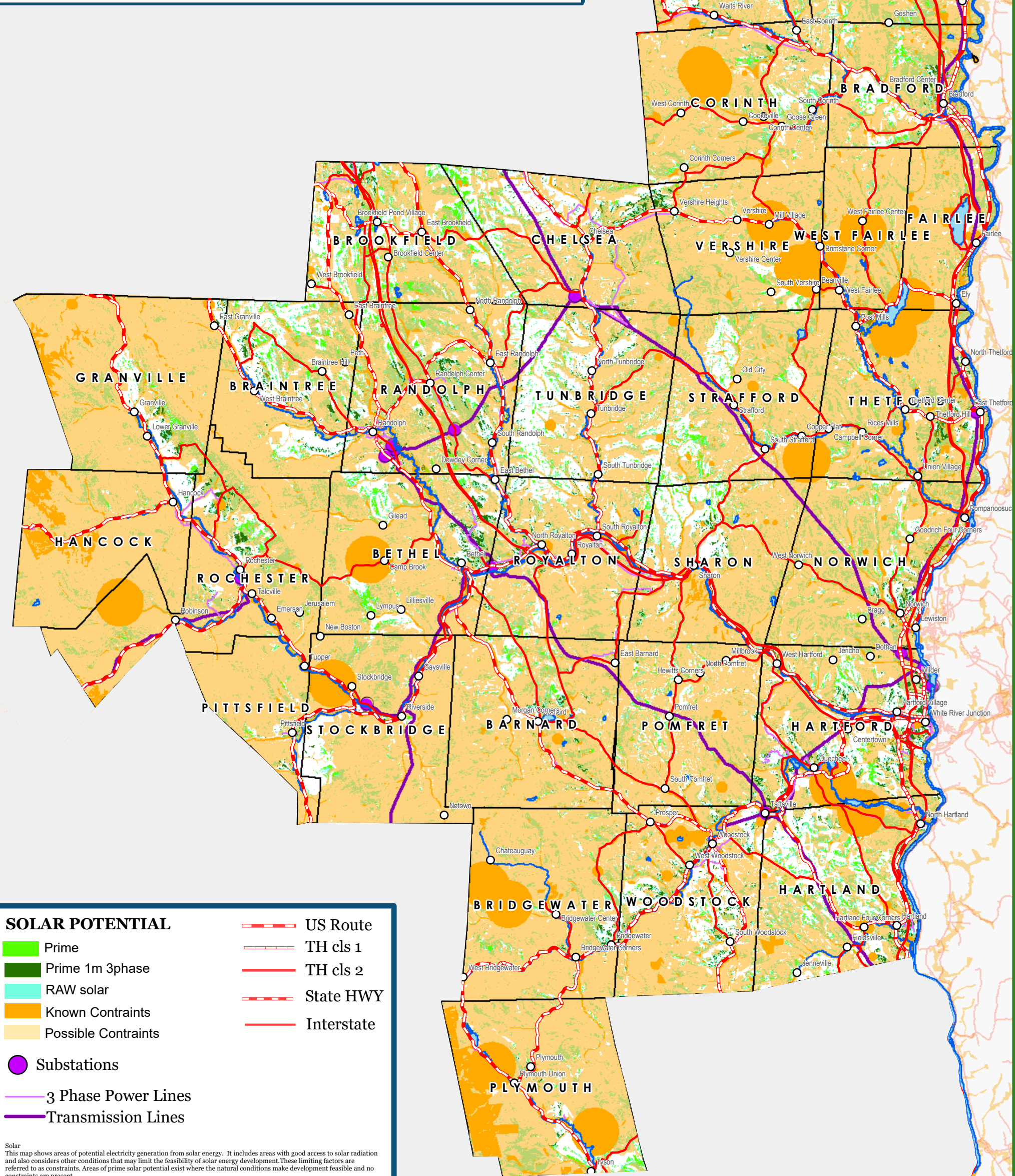
# Two Rivers-Ottawaquechee Region of Vermont

## Solar Energy Potential

Prime solar, solar with constraints, prime solar within 1 mile of 3 phase transmission lines, and RAW solar

Map 13 of 14  
2025 Regional Plan  
Adopted 2/26/2025

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### SOLAR POTENTIAL

- Prime
- Prime 1m 3phase
- RAW solar
- Known Constraints
- Possible Constraints

- US Route
- TH cls 1
- TH cls 2
- State HWY
- Interstate

- Substations
- 3 Phase Power Lines
- Transmission Lines

**Solar**  
This map shows areas of potential electricity generation from solar energy. It includes areas with good access to solar radiation and also considers other conditions that may limit the feasibility of solar energy development. These limiting factors are referred to as constraints. Areas of prime solar potential exist where the natural conditions make development feasible and no constraints are present.

**DARK GREEN** Prime: No Constraints within 1 mile 3 phase power  
**GREEN** Prime: No Constraints no known or possible constraints present  
**ORANGE** Constraints no known but at least one or more possible constraints  
**BLUE GREEN** Raw potential with constraints

**Known Constraints**  
Vernal Pools (confirmed and unconfirmed layers), DEC River Corridors, FEMA Floodways, State-significant Natural Communities and Rare, Threatened, and Endangered Species  
Wilderness Areas, including National Wilderness Areas, Class 1 and Class 2 Wetlands (VSWI and advisory layers)

**Possible Constraints**  
Agricultural Soils (VT Agriculturally Important Soil Units), FEMA Special Flood Hazard Areas, Protected Lands (Updated 07/26/2016), Act 250 Agricultural Soil Mitigation areas, Deer Wintering Areas  
ANR's Vermont Conservation Design Highest Priority Forest Block Datasets, Forest Blocks - Connectivity, Forest Blocks - Interior Forest Blocks - Physical Land Division, Hydric Soils

**TRORC Unsuitable areas (included in known constraints)**  
FEMA Floodways, Wilderness Areas, including National Wilderness Areas  
Class 1 Wetland



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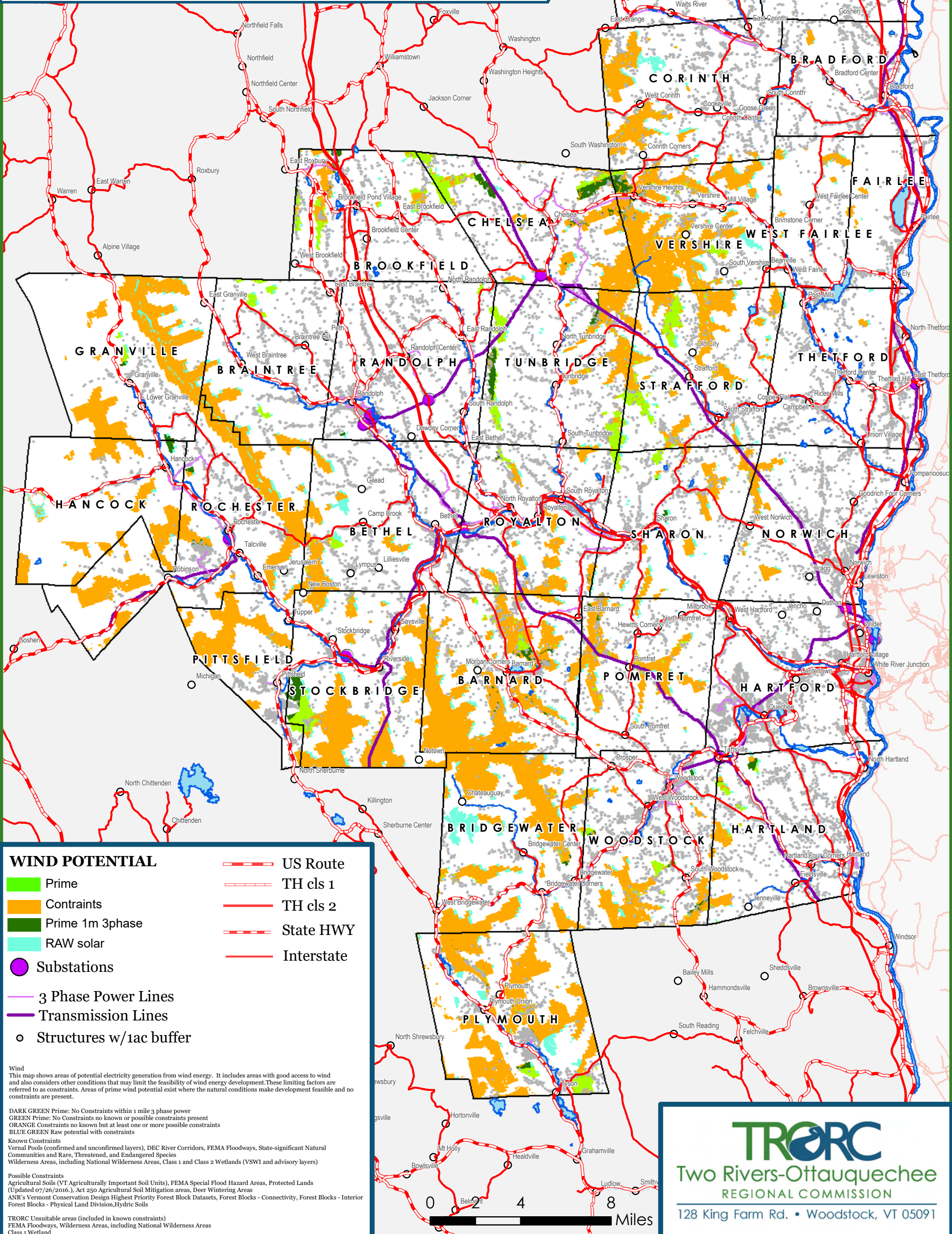
# Two Rivers-Ottawaquechee Region of Vermont

## Wind Energy Potential

Prime wind, wind with constraints, prime wind within 1 mile of 3 phase transmission lines, and RAW wind

Map 14 of 14  
2025 Regional Plan  
Adopted 2/26/2025

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### WIND POTENTIAL

- Prime
- Constraints
- Prime 1m 3phase
- RAW solar
- Substations
- 3 Phase Power Lines
- Transmission Lines
- Structures w/1ac buffer

- US Route
- TH cls 1
- TH cls 2
- State HWY
- Interstate

Wind  
This map shows areas of potential electricity generation from wind energy. It includes areas with good access to wind and also considers other conditions that may limit the feasibility of wind energy development. These limiting factors are referred to as constraints. Areas of prime wind potential exist where the natural conditions make development feasible and no constraints are present.

DARK GREEN Prime: No Constraints within 1 mile 3 phase power  
GREEN Prime: No Constraints no known or possible constraints present  
ORANGE Constraints no known but at least one or more possible constraints  
BLUE GREEN Raw potential with constraints

Known Constraints  
Vernal Pools (confirmed and unconfirmed layers), DEC River Corridors, FEMA Floodways, State-significant Natural Communities and Rare, Threatened, and Endangered Species  
Wilderness Areas, including National Wilderness Areas, Class 1 and Class 2 Wetlands (VSWI and advisory layers)

Possible Constraints  
Agricultural Soils (VT Agriculturally Important Soil Units), FEMA Special Flood Hazard Areas, Protected Lands (Updated 07/26/2016), Act 250 Agricultural Soil Mitigation areas, Deer Wintering Areas  
ANR's Vermont Conservation Design Highest Priority Forest Block Datasets, Forest Blocks - Connectivity, Forest Blocks - Interior Forest Blocks - Physical Land Division, Hydric Soils

TRORC Unsuitable areas (included in known constraints)  
FEMA Floodways, Wilderness Areas, including National Wilderness Areas  
Class 1 Wetland

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