Two Rivers-Ottauquechee Regional Commission

2026

DRAFT REGIONAL PLAN

TRORC

TRORC First Hearing Draft

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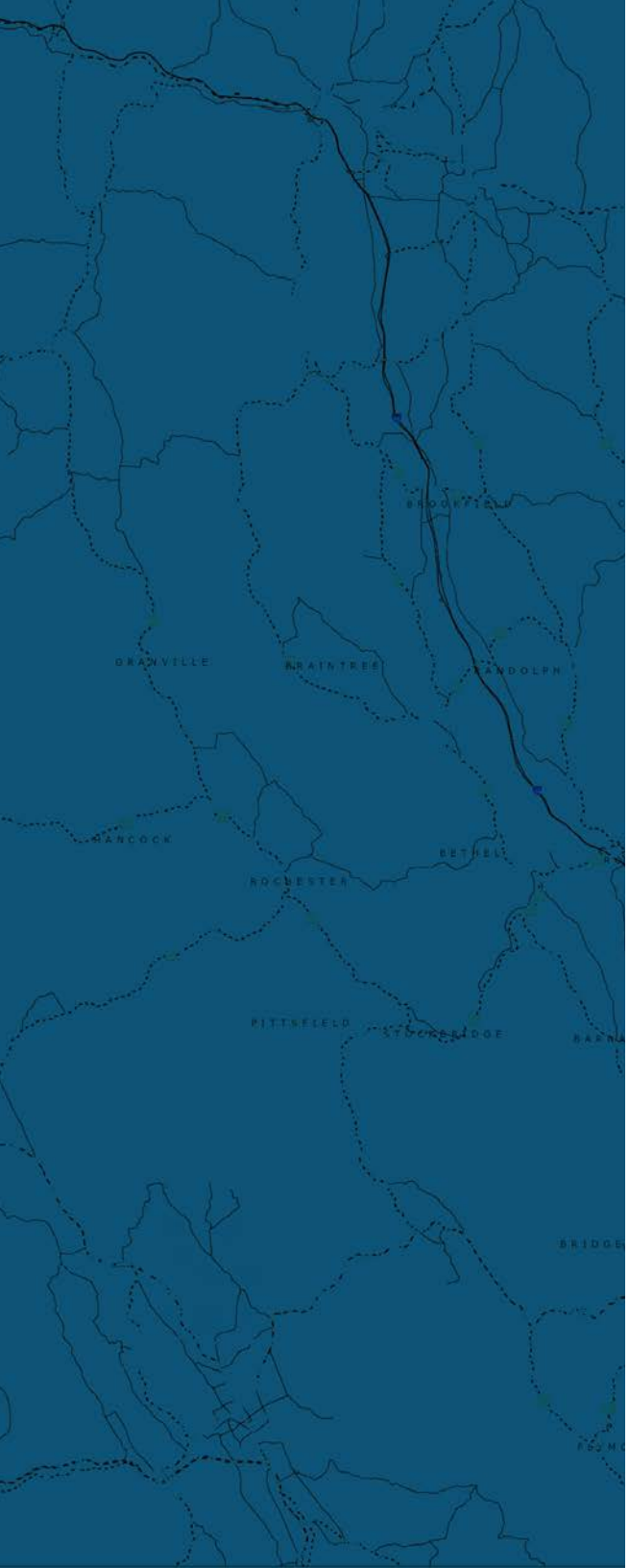

Two Rivers-Ottauquechee
REGIONAL COMMISSION

TWO RIVERS-OTTAUQUECHEE REGIONAL PLAN

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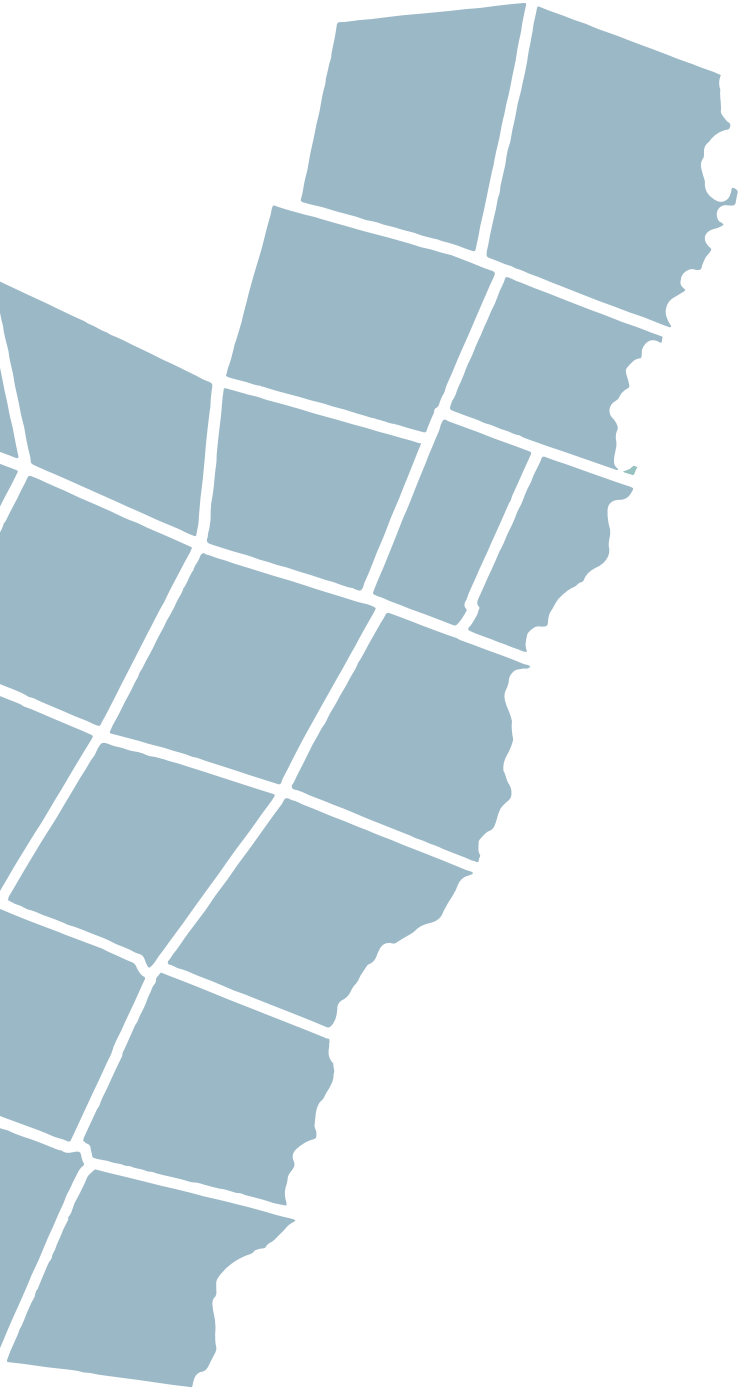
TRORC FIRST HEARING DRAFT - 2026 REGIONAL PLAN



Acknowledgement

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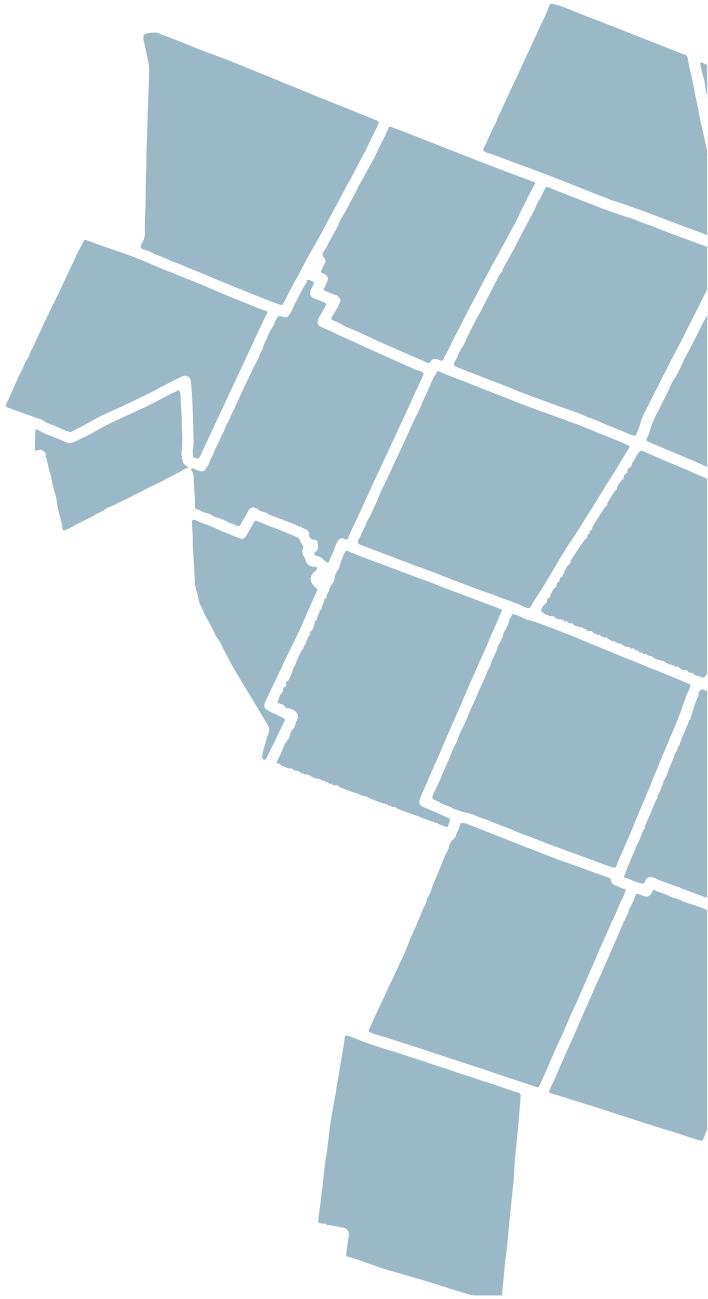

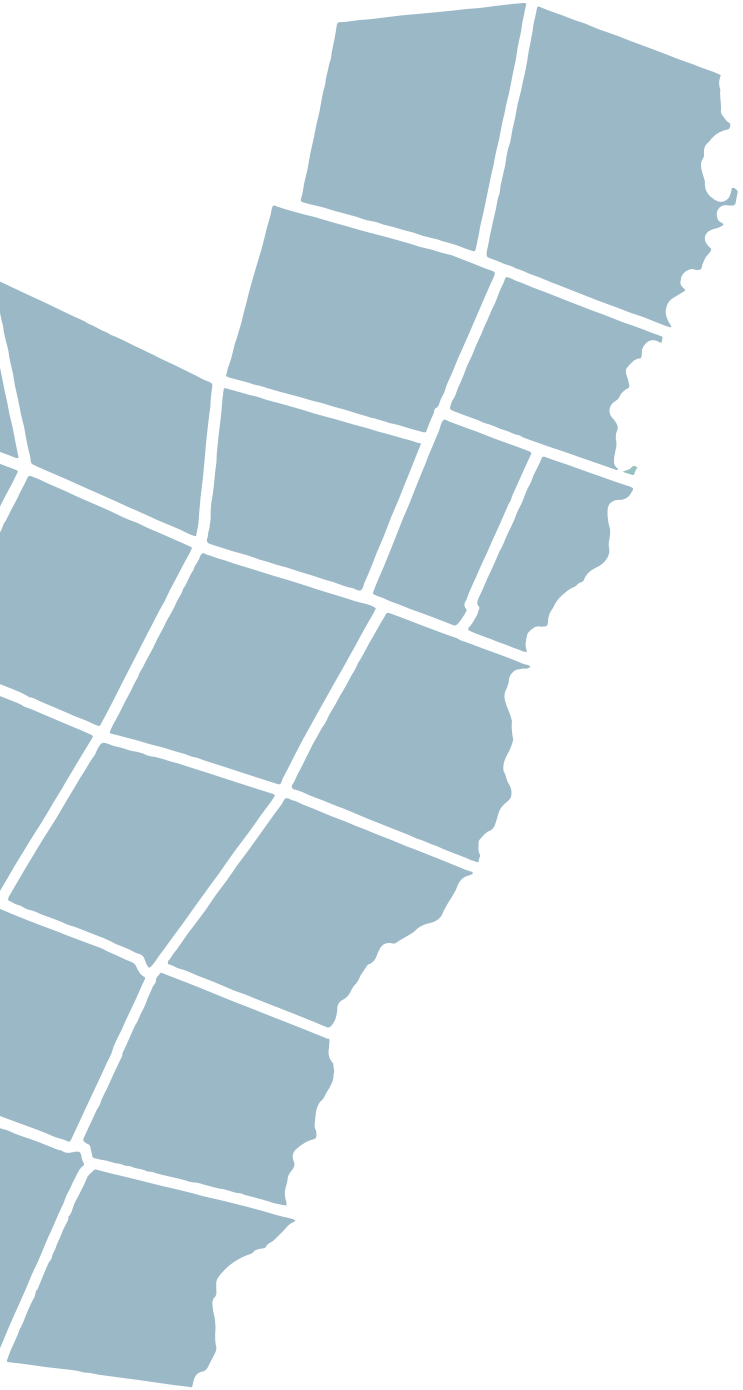

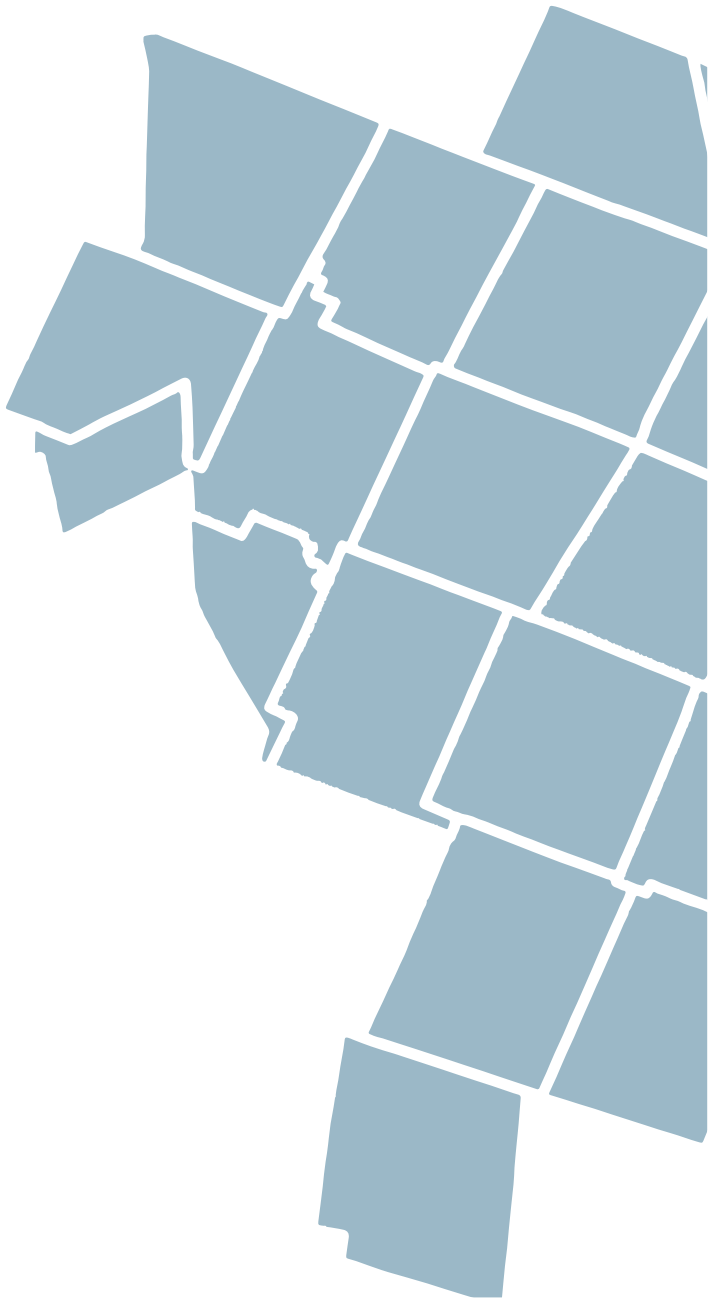

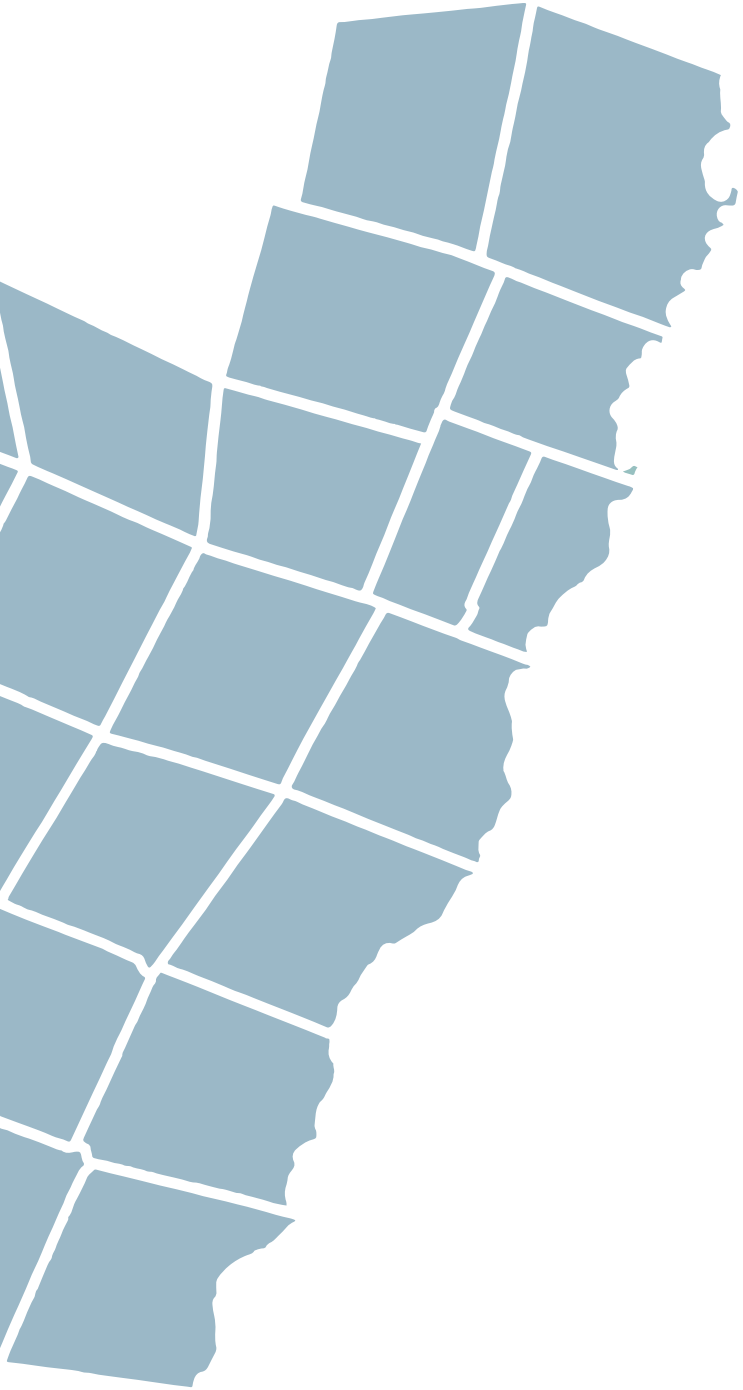

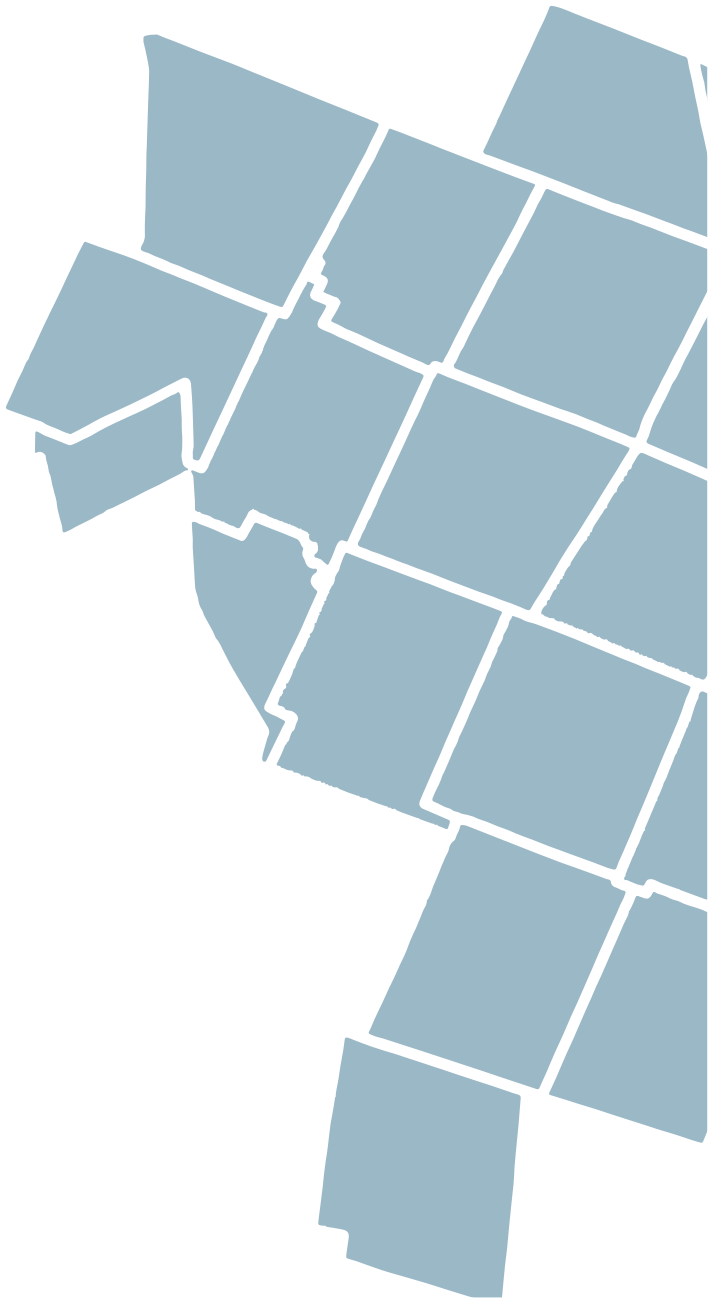

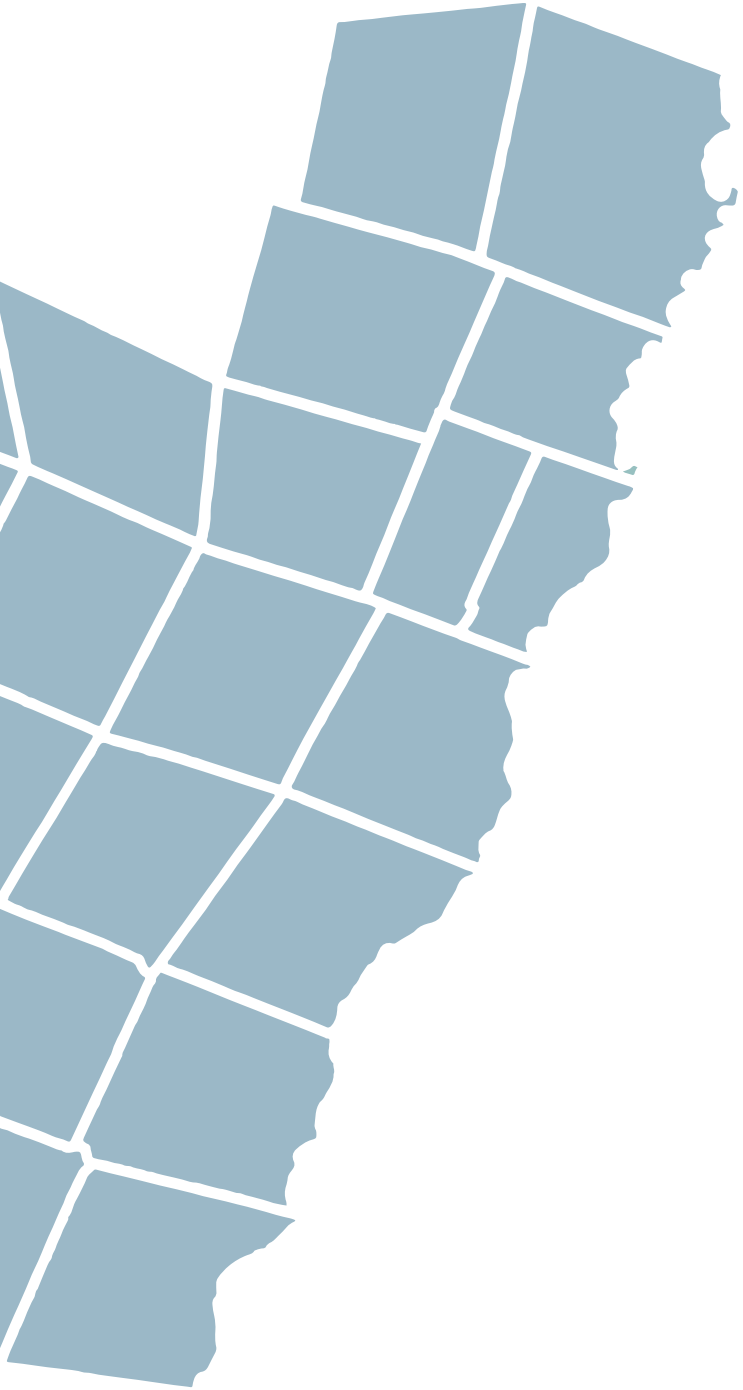

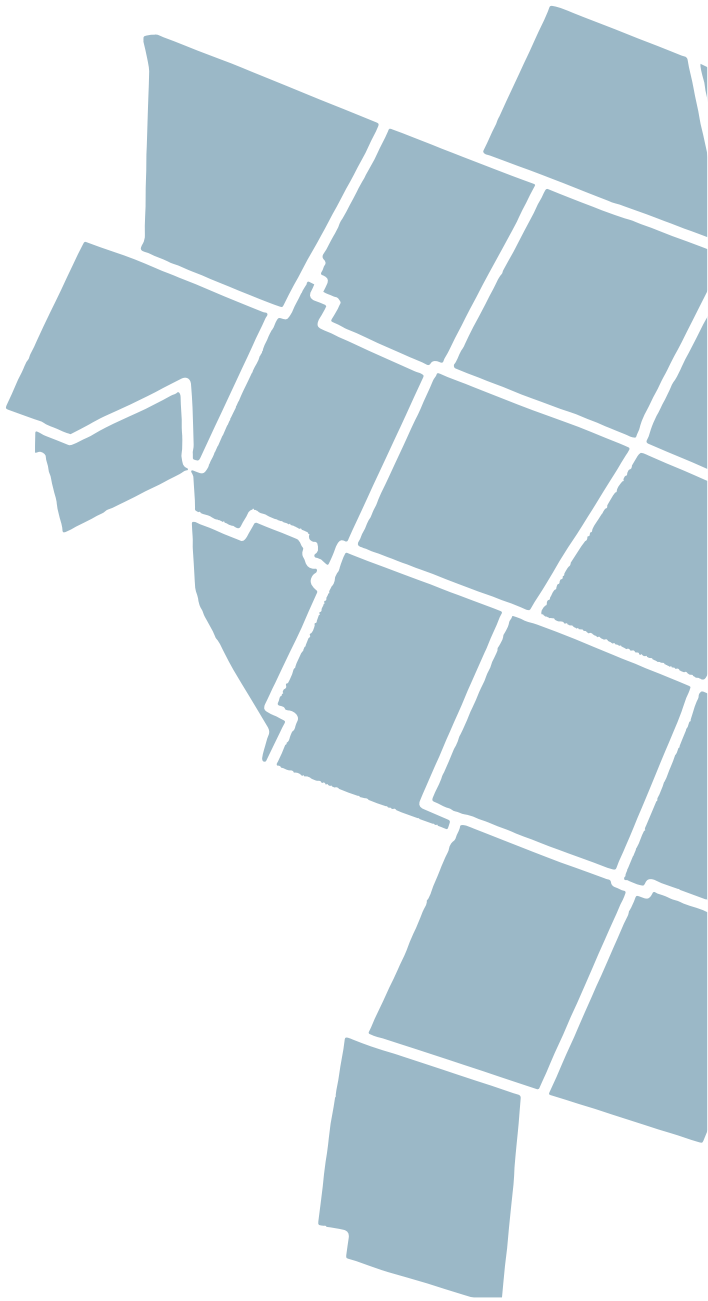

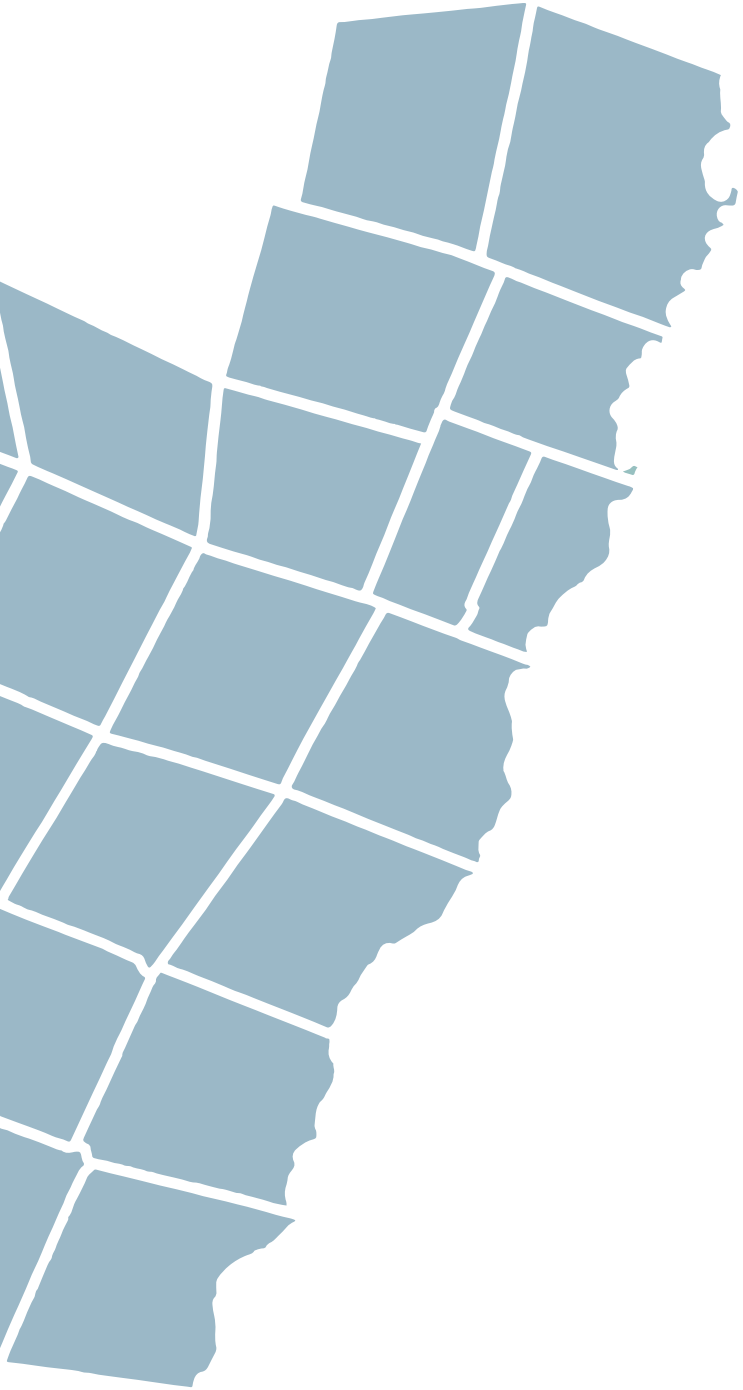

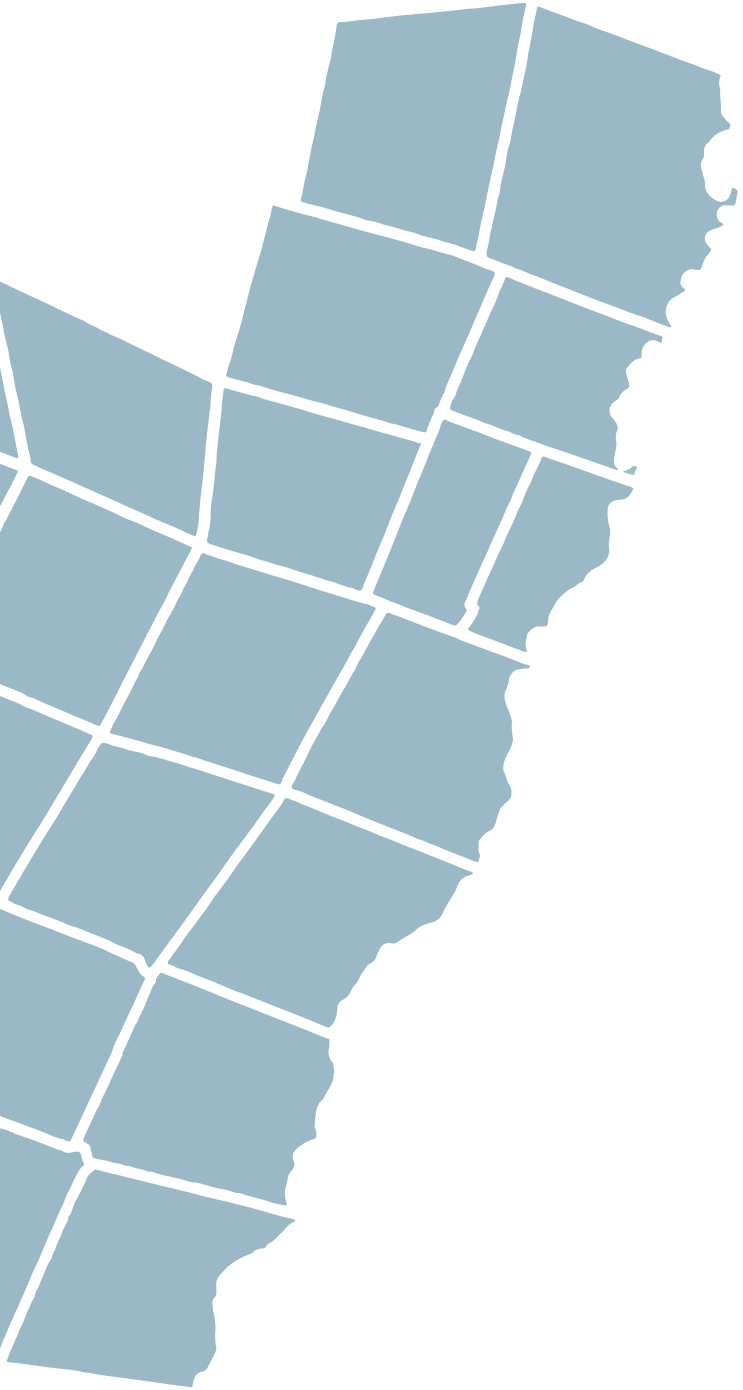

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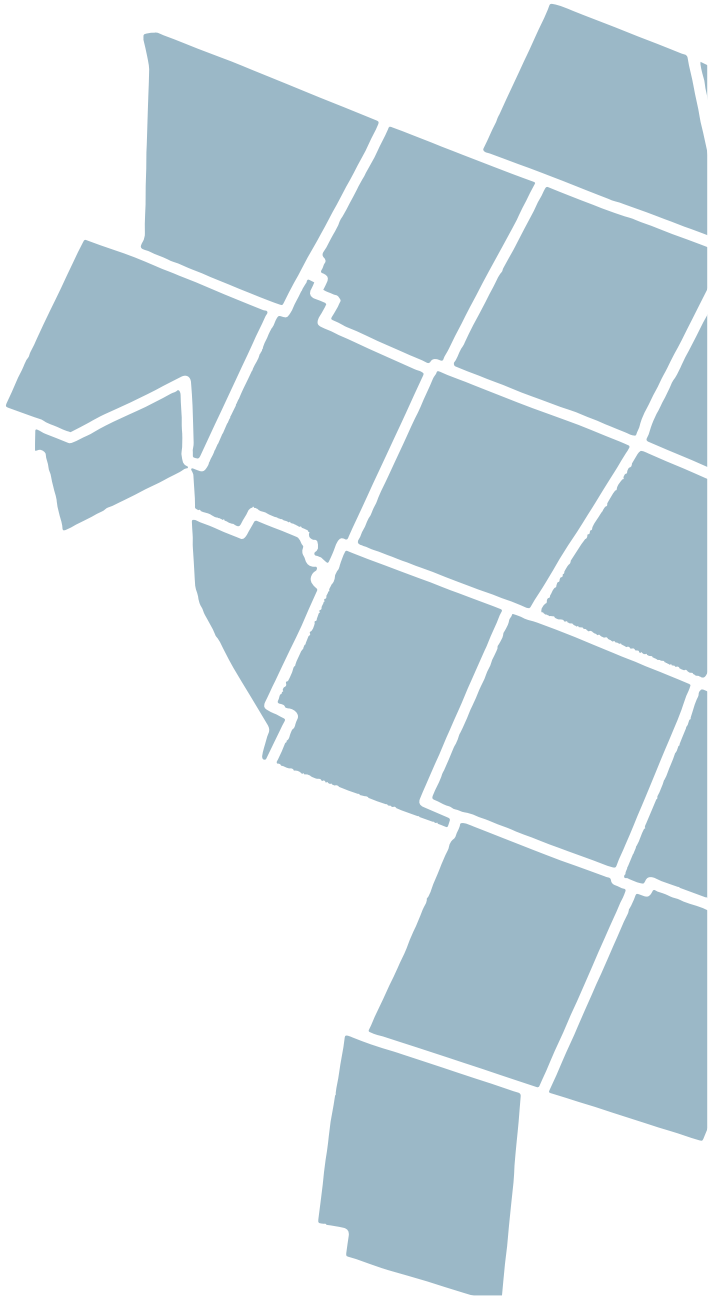


01 | Introduction

Bethel | © John Knox

A. TRORC and This Plan

This Regional Plan has been created by the Two Rivers-Ottauquechee Regional Commission (TRORC), which is a regional planning commission covering thirty municipalities in east-central Vermont (the Region). TRORC has a set of statutory duties, 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. 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 recommended actions that move us toward that vision. It is not a static or inflexible document.

B. Plan Process

TRORC has developed this Plan with multiple rounds of outreach, these include:

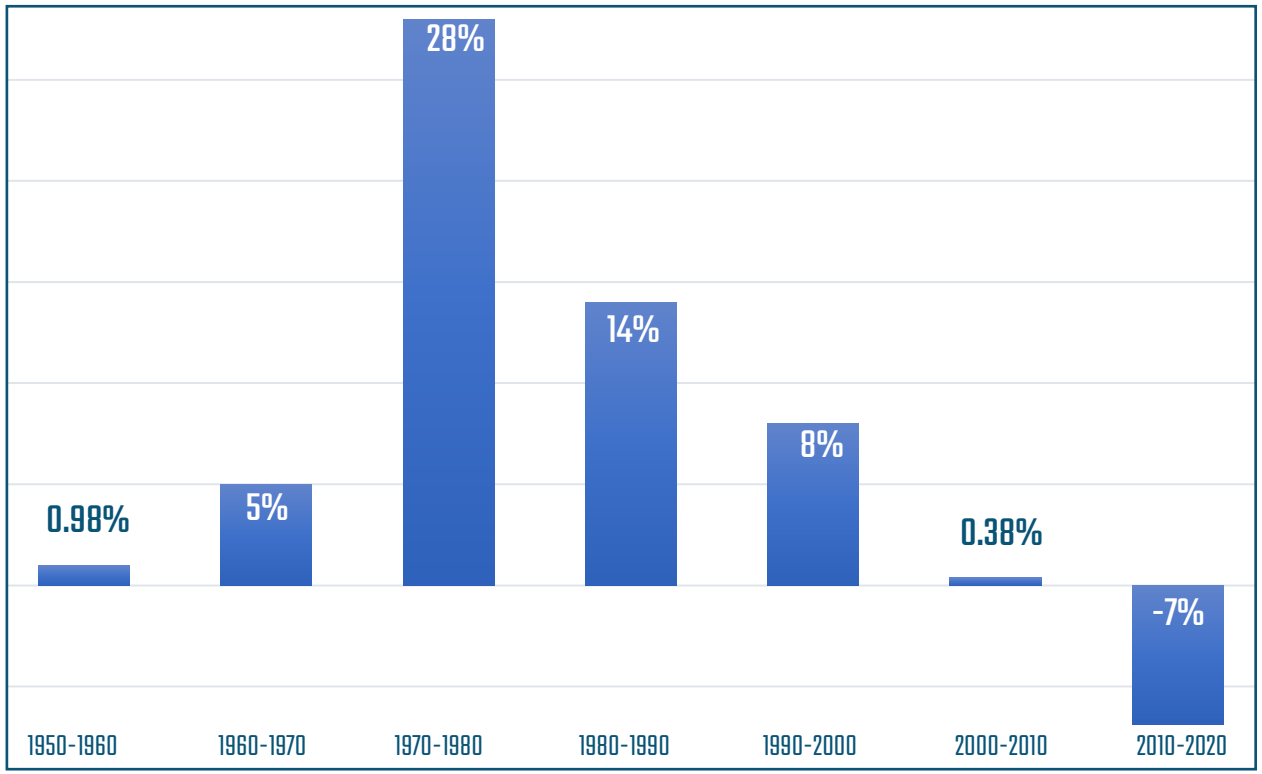
- Holding four regional sessions on what a Regional Plan is;
- Reviewing edits to several chapters with our Executive Committee at public meetings;
- Reviewing more heavily edited draft chapters with our full Board of Directors at public meetings;
- Reviewing the draft Future Land Use Map with each of our 30 Planning Commissions.
- Reviewing the entire hearing draft with our Board of Directors at public meetings;
- Reviewing draft Tier 1B areas and requests with Selectboards of towns (and one Board of Village Trustees) with such potential areas;
- Holding four focus groups centered on our less populous towns;
- Reaching out to various interest groups on relevant chapters, including COVER, the Haven, Twin Pines, Vital Communities, and others for the

Homes in the Region Chapter;

- Reaching out to organizations that deal with or represent marginalized populations, including Capstone Community Action and Hartford Dismas House. Meetings were also held throughout the region with the goal of bringing underrepresented members of the community into the process;
- Holding group discussions with groups typically not contacted;
- Holding additional public outreach meetings once the first hearing draft was ready;
- Sending the first hearing draft to the chair of all legislative bodies in the Region and all Town Managers, as well as to all neighboring regional planning commissions;
- Sending the first hearing draft to several state agencies, including the Land Use Review Board, Agency of Transportation, Agency of Natural Resources, Agency of Agriculture, Food and Markets, Department of Public Service, Department of Public Safety's Division of Emergency Management, Department of Housing and Community Development in the Agency of Commerce and Community Development, the Community Investment Board; and
- Holding two required public hearings with public notice in each of our four area newspapers.

We are required by statute in our process to be consistent the state planning goals. These focus on a variety of topic areas. State planning goal #15 is more overarching, and requires the Regional Plan to "equitably distribute environmental benefits and burdens as described in 3 V.S.A. chapter 72." In practice, this means that all individuals are afforded equitable access to the good parts of the Region and equitable avoidance of the bad parts. In short, our Plan must further the fair distribution of access to:

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



transit, jobs, a healthy environment, clean natural resources, safe and affordable housing, social services, food, education, or cultural resources. And it must also do the opposite and not inequitably expose people to the downsides of any economy – the traffic, pollution, noise, cost, etc.

TRORC has reviewed goals, policies, and recommendations throughout this Plan to ensure that such access to benefits and equitable distribution of any burdens is supported. This is done in many places, but especially in the chapters on health, housing, and transportation. An analysis of how we have met this goal is included in Appendix F.

Not only must the Plan address planning issues through an equity lens, but the drafting of the Plan must have meaningful participation by our residents. In particular, statute requires that TRORC pay attention to "environmental justice focus populations" (EJFPs), which means any census block group in which the annual median household income is not more than 80 percent of the State median household income, persons of Color and Indigenous Peoples comprise at least six percent or more of the population, or at least one

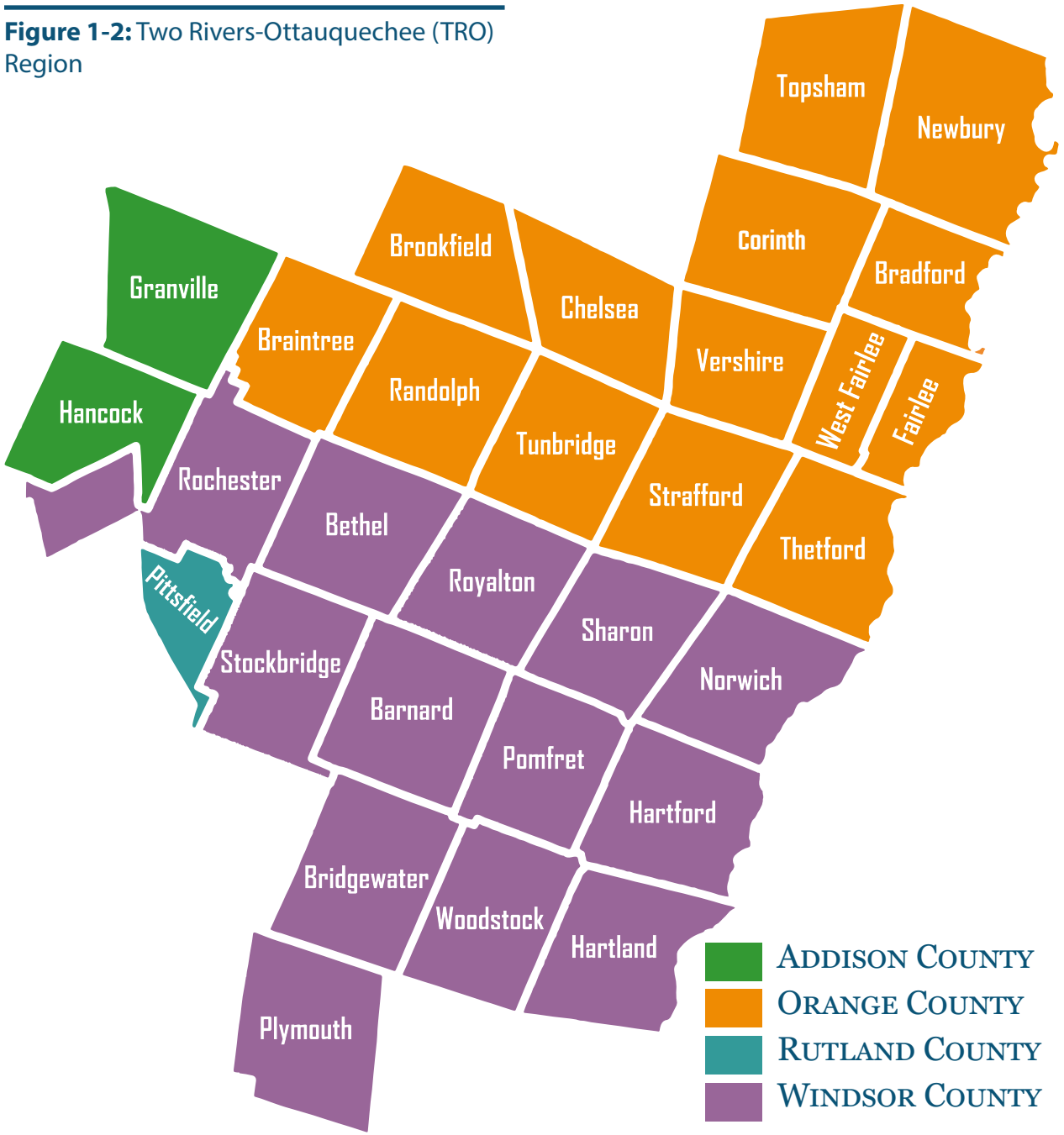
percent or more of households have limited English proficiency.

TRORC does have a few such qualifying Census blocks according to some data, and according to some other data sources nearly all towns would qualify. But a cursory knowledge of the Region says that some of the data is wrong in places. In addition, the margin of error at the block group is so large that all of our Census blocks may or may not actually qualify. (See the EJFP mapping in Appendix F.) Therefore, there is no particular town that we can call out with confidence as comprising an environmental justice focus population. That is not to say that the TRORC Region is homogenous, but there are no statistically significant patterns in distribution of demographic characteristics or environmental burdens *at the town scale*.

Lacking spatial data to focus our environmental justice outreach efforts, we turned to outreach to social service agencies that are serving our most marginalized residents, and on towns that are geographically distant from service centers, with the understanding that marginalized residents living in isolated towns are often experiencing compounded burdens relative to the rest of our region's population. Our outreach efforts sought those community organizations' and members' input on how to improve quality of life in our region, and their helpful feedback has been incorporated into the goals, policies, and recommendations of our Health Chapter, Housing Chapter, Economic Development Chapter, and Transportation chapter.

Another equity issue is capacity at the town level. All towns in the Region, but especially the smaller

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



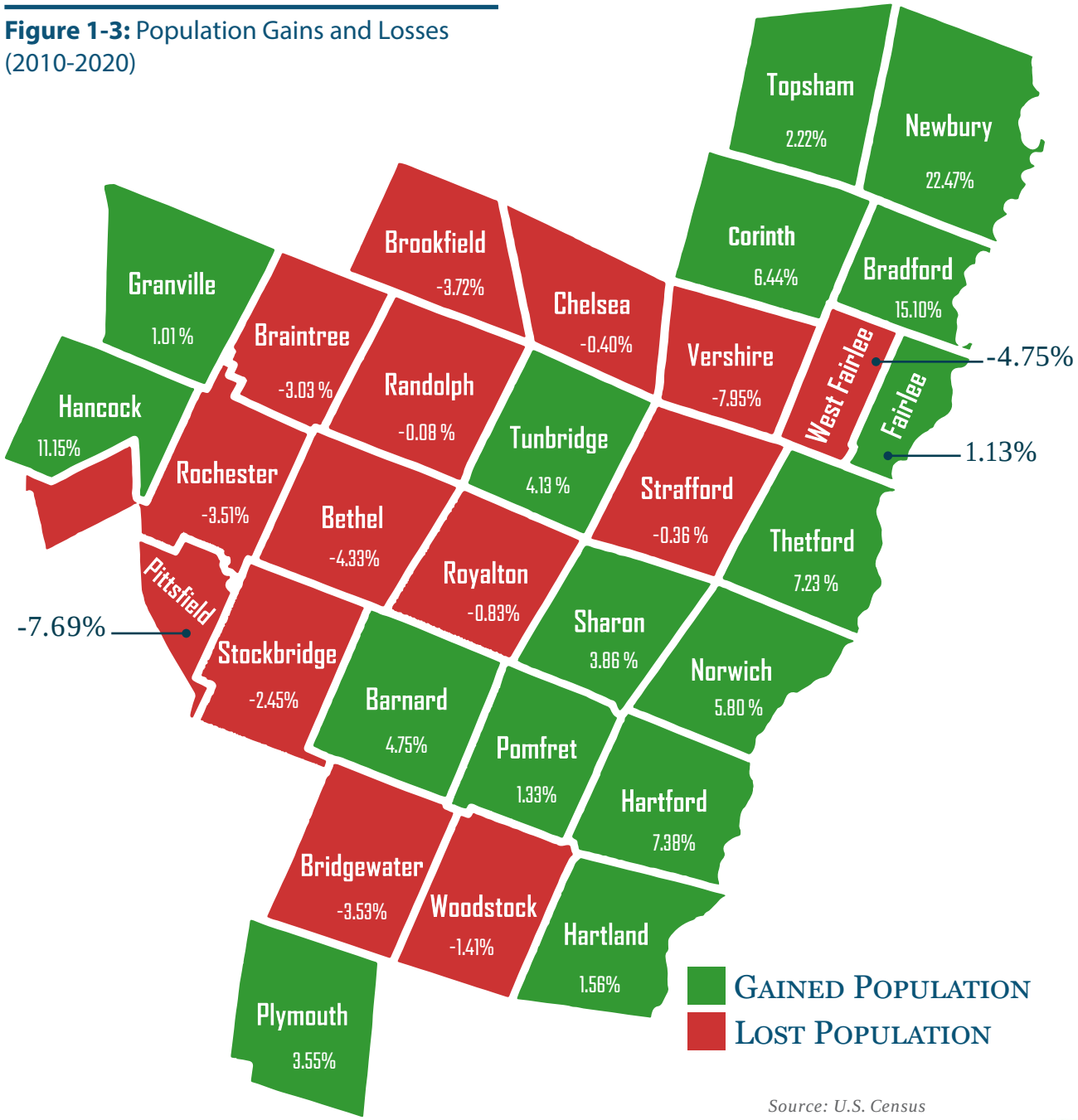
ones, struggle with being able to access grants and programs that would improve their community. This includes being able to manage cumbersome financial and reporting requirements. Throughout this Plan there are recommendations that support TRORC's longstanding commitment to augmenting towns' capacities with those of TRORC staff versed in grant writing, project management, local bylaw administration, writing plans and capital budgets, and just performing basic administrative assistance to Selectboards. TRORC's efforts to provide shared services as an efficient way to offer part-time help to towns is an example of ensuring smaller towns gain capacity.

C. State Planning Goals

As noted above, this Plan, like all municipal plans and bylaws, must further the state planning goals. These goals don't cover *how* Vermont will achieve them, but rather what it wants to achieve in several broad areas. Vermont wants to have strong community core areas, protect fields and forests, keep waters clean, have a strong economy (with a 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 they tend to get progressively more detailed as planning moves from the regional to the local level. This Plan must also contain at a minimum certain elements (or sections) dealing with land use, transportation,

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



Source: U.S. Census

housing, economic development, energy, utilities and facilities, natural resources, flood resiliency, and implementation measures. In general, each of the required elements is addressed in a chapter of the Plan, but they have been combined in places.

In addition to environmental justice and the required elements as noted above, 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 floods and will come in heat waves. Therefore, this Plan primarily deals with the *effects* of climate change in sections on emergency management and hazard resilience. But the Plan also addresses the *causes* of climate change in the chapters on energy, housing, land use, and transportation.

Our demographics create equally challenging conditions. As a Region and state we are unusually old and getting older. Vermont as a whole is losing population, especially in school age children, resulting in school closings. An aging workforce threatens the viability of employers, and those same aging people stress health care and emergency services. We are also overwhelmingly white as a Region and state in a nation that is less and less so. Lacking diversity threatens our economy.

Topic areas, trends, overarching goals, and subjects that are too big for one specific area mean that this Plan has overlapping areas of interest and policies. That is simply the way planning works. For example, increasing the amount of sidewalks as transportation facilities reduces greenhouse gas emissions and is a precursor to better health; preserving stretches of forest serves economic interests in tourism and forest products, and natural resource needs for species and aquifer recharge. It makes no sense to repeat all the overlapping parts of the Plan in each of the several places they apply. Rather, the Plan works as a whole. To make it easier to find the myriad places that this Plan addresses a subject, an Index has been added at the end. 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.

D. Parts of the 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. Goals are aspirational and usually general in nature. They have no regulatory effect. But they are essential, as they set a direction and create momentum by envisioning a desirable future. We are confident that the vast majority of our residents seek these goals.

A **policy** is an expression of how to meet a goal. Policies in the Plan are clearly labeled as such, and by and large aspirational, meaning they generally do not create any requirement. Consequently, many policies use advisory words such as "should" and "encourage." Where this Plan intends to be proscriptive, creating a mandatory limitation, it strives to be very clear on what is required by using words such as "shall" or "must."

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.

A **recommendation** is a suggested means by which to implement a policy through an action by a person or group. Most of the recommendations of the Plan are self-directed, containing many recommendations to ourselves about TRORC actions. This serves as a reminder as to where we should focus our efforts on projects.

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. No specific goal in the Plan shall be applied in isolation from the other goals of the Plan. Each mandatory policy, however, does stand alone and must be followed in regulatory proceedings.

This Plan also has a series of maps. Most of these are simply informational. A few maps include existing and proposed facilities, but there are very few new facilities proposed. The Future Land Use map is the most conceptual as it creates areas where differing policies apply. The Future Land Use Map generally meshes with local maps. It is not necessary they match exactly.

E. Effect and Uses of this Plan

This Plan has many uses, most of them non-binding, because it is just a plan. The main use of this Plan, like any plan, is to set a direction, to begin to move toward a desired future. This Plan 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. 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 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. Towns are welcome to use the Plan in their local planning, and Vermont law even provides that towns can simply adopt this Plan as their local plan.

This Plan also has recommendations about what the State, and even the federal government should do that would bring the goals of this Plan to fruition. Lacking county government, it can take the place of what might be a county comprehensive plan in other parts of the country, and it can be used in federal planning efforts such as management of national forests or in federal dam relicensing.

The policies contained in this Plan are advisory unless stated as mandatory, but even when this Plan uses mandatory language, conformance is only required in very limited cases, primarily Act 250. If one is not creating development that triggers a regulatory action that refers to this Plan, then this Plan does not create a requirement at the personal level. However, if the wishes of this Plan are fulfilled by the towns and residents of the Region, it would have a huge beneficial effect at the personal level.

Use in Act 250

The effect of policies in this Plan in Act 250 has to be clearly understood so that the Plan is not misinterpreted. Foremost, any policy (or lack of policy) except one that is clear, specific, and mandatory has the same effect in Act 250 - none. For example, if the Plan encourages, discourages, or is silent on a matter, those stances all have no effect in Act 250.

Act 250 permits are required for all major subdivision and development projects in Vermont. Prior to granting approval, a District Environmental Commission must find that the proposed subdivision or development satisfies several criteria. 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 then faced with determining which portions of a local or Regional Plan apply. Municipal conformance will override regional conformance in such cases, except for when projects defined by the TRORC as having "substantial regional impact", in which case, the project must be in accord with the Regional Plan (see Chapter 12 for the 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. See TRORC's Town Planning Page.

It must be noted that 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 zoning permit may fail to get an Act 250 permit due to a policy in the Regional Plan, just like a project with an Act 250 permit that conforms to the Regional Plan may not be able 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) is the body that permits new electrical or gas transmission or generation facilities in the State (30 VSA §248) as well as telecommunication facilities (30 VSA §248a), 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). 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.

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. TRORC will continue to undertake regional studies and projects in addition to this Plan.

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. Given the new nature of some statute around Tiers (see Chapter 3), a process has been created for minor amendments that would enable the Plan to change slightly without going through the full standard adoption process.

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.

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.

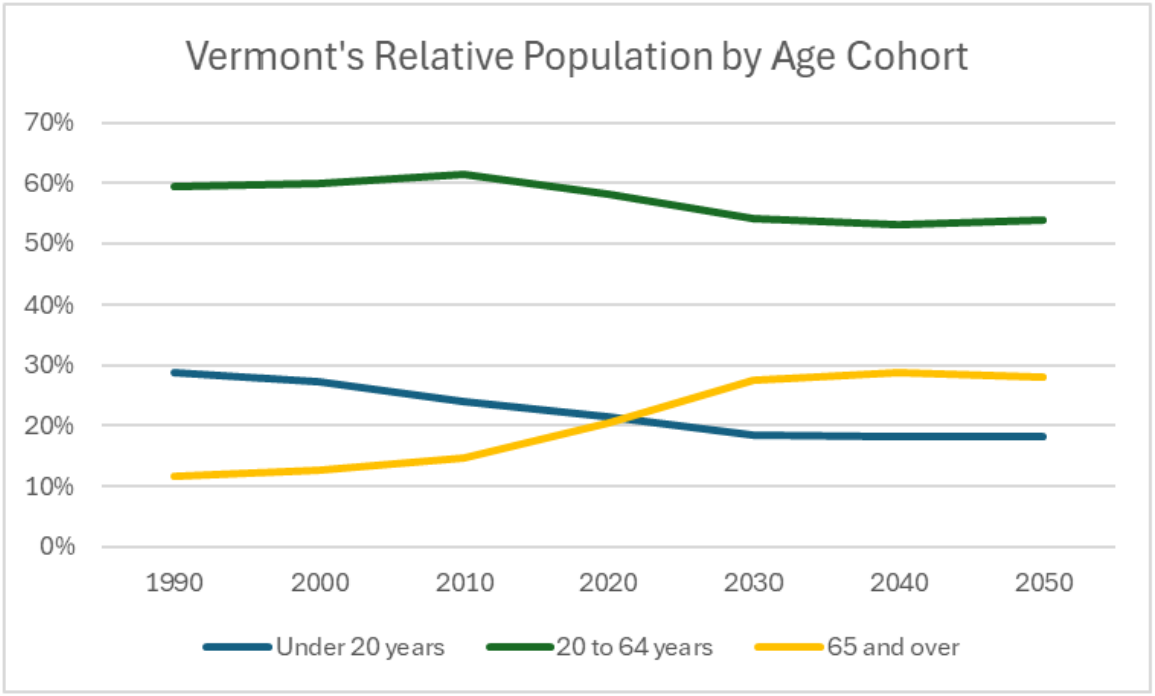
The American Planning Association has determined that including a specific chapter explicitly focused on public health ensures that a greater emphasis is placed on health throughout other chapter elements. TRORC has worked with public health partners to develop a template for town plans[1] on this important subject.

B. Dimensions of Health

Addressing the Needs of an Aging Population

Our region's demography is similar to that of the state as a whole.[2] Both are experiencing a disproportionate increase in the number of older residents, a trend that is expected to continue in coming decades (see Figure 2-1).[3] Between 2019 and 2023, the US Census Bureau's American Community

Figure 2-1: Projected Demographic Changes



Source: US Census Bureau Decennial Census (1990-2020) ; VHFA Population Projections (2030-2050)

Survey (ACS) data show that the proportion of our region's population aged 65 and older increased by 14%, compared to a mere 3% increase for residents younger than 65. 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[4] such as cancer, heart disease, and neurodegenerative diseases. Healthy lifestyle choices like partaking in moderate aerobic exercise and getting regular sleep may increase cognitive function for older people.[5] 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.[6]

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[7] (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 those with disabilities, 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 support 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. Community nurses have medical training and licensure while community health workers do not. Although community health workers cannot provide direct medical care, both community health workers and community nurses work to provide patients with information and support them in accessing resources critical to their wellbeing. 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, Hartford, Norwich,

Strafford, Tunbridge, and the greater Woodstock area (via the Ottauquechee Health Foundation/Mt. Ascutney Hospital Center[8]).

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.

In 2023, there were 10,620 people in Orange and Windsor Counties who were recognized as food insecure (approximately 12% of the total population).[9] To apply for Vermont's Supplemental Nutrition Assistance Program (SNAP) program, 3SquaresVT,[10] applicants must meet 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.

There are a variety of 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 called Willing Hands[11] that rescues unwanted produce from farms and delivers it to social service organizations, which in turn distribute it those in need. On a state-wide level, The Vermont Food Security: Roadmap to 2035[12] 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 2035.

Farm to school programs[13] 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 that improve community access to locally-grown food, such as community gardens, regional food hubs, farmers markets that accept Electronic Benefit Transfer (EBT) cards,[14] and new farms for new Americans.[15] 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, particularly in rural areas with no or limited transit (see Chapter 4 for more information on transit). People face this challenge if their vehicle fails, if they are not able to drive, or if they cannot afford to purchase and maintain a vehicle. To help alleviate this problem, Good News Garage[16] is an organization that provides refurbished vehicles to individuals and families who are at risk of unemployment and do not have transportation to access essential services, such as grocery stores. There are also a variety of programs that deliver groceries and/or meals directly to peoples' homes.

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 spaces 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 threat 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 pipes and PCB contamination in schools. Various contaminants are also found in soil, air, and water as a result of past human activity.

Contaminants or unsafe conditions in our communities can go unnoticed or ignored for long periods of time due to lack of awareness or resources. State statute (18 V.S.A. § 601,602a) mandates the appointment of a local health officer in each town who helps monitor for public health hazards, or conditions that could create hazards, and finds ways to mitigate them. Regional, state, and federal partners often contribute technical and financial assistance for local public health hazard mitigation.

In addition to addressing environmental harms, it is important to expand access to environmental benefits. 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. Trees are critical components of developed landscapes because they reduce summer heat

(thereby reducing energy usage for cooling), improve air and water quality, and reduce stormwater runoff.

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 is any form of human-powered transportation such as walking, cycling, using a wheelchair, inline 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[17] 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,[18] support active transportation and provide safe access to essential goods and services. 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. 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 that do not necessarily warrant a Complete Streets concept still afford safe spaces for walking and biking . E-bikes are making biking more attractive and accessible in hilly areas.

Participating in outdoor activities may not be an option for everyone. Therefore, indoor recreational facilities (e.g., gyms, indoor ball courts, etc.) should be included in local planning. Access accommodations for low-income, elderly, and disabled residents need to be integrated into facility designs and programming.

When designing for active living, those facing the greatest barriers to accessing such opportunities (particularly elderly, disabled, and low-income residents) must be involved in helping to assess a community's strengths and deficiencies. Input from these key stakeholders can be solicited by municipalities in partnership with trusted local social service organizations . These residents can 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 maintaining one's dignity and sense of purpose. Maintaining contact with family and friends, participating in cultural and community activities, and using skills all contribute to social inclusion. Without these things, mental and physical health suffer severe negative impacts. Digital engagement through devices and social media platforms cannot fully meet our needs for social inclusion, and in some cases

South Royalton Business Block | © TRORC

may exacerbate mental health challenges. In-person public events and welcoming spaces like libraries or community halls support residents in building connections and contributing to the community.

The risk of social isolation is greater for people living alone and the very elderly, and it can be increased by bereavement, loss of work, lack of easily available transit services, poor health, and age discrimination. 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. The US Census Bureau's 2024 ACS data indicate that roughly 17% of Orange and Windsor County residents have a disability. 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

According to federal data from 2022-2023, Vermont had the highest percentage of people who reported using cannabis of any state in the nation, and some of the highest rates of binge drinking and substance use disorder.[19] According to Vermont's 2023 Behavioral Risk Factor Surveillance System Report, Windsor and Orange counties have rates of binge drinking, heavy drinking, and cannabis use that are similar to the statewide rates.[20]

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.

Mentoring programs represent one strategy for addressing young people's early exposure to drug and alcohol use. Some examples of mentoring programs serving our region include: Empower Up!, The Mentoring Project of the Upper Valley, and Windsor County Mentors.

In order to address severe substance use disorders, people can participate in treatment and recovery support services. Treatment services have inpatient and outpatient options for people who are at the beginning stages of treating their substance misuse; recovery centers are for people continuing their lives after treatment.

In our Region, we have multiple treatment centers, including: Clara Martin Center,[21] Valley Vista,[22] and the Health Care & Rehabilitation Services of Vermont.[23] The primary center for opioid use disorder treatment lies outside of our region (West Lebanon Comprehensive Treatment Center in New Hampshire), but there are satellite facilities at Gifford Hospital and Good Neighbor Health Clinic. As for the recovery programs, we have the Upper Valley Turning Point.[24]

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

> "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

Healthcare Facilities

Healthcare is critical for the residents of the Region. As in many other parts of the country, healthcare staffing shortages and rising healthcare costs are reducing residents' access to care, especially for primary care, mental health care, and dentistry. It is also challenging for limited-mobility residents of rural areas to travel to health care centers and pharmacies in larger towns. Gifford Medical Center[25] in Randolph and the White River Junction branch of the Veteran's Affairs Medical Center[26] are the largest medical facilities located in the Region. For major medical issues, residents in our Region use Central Vermont Medical Center[27] in Berlin, VT and Dartmouth-Hitchcock Medical Center[28] 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.

Medical services are available to lower income residents in several locations in the Region. Gifford Medical Center in Randolph, Little Rivers Health Care[29] in Newbury, Bradford, and Corinth, and the Good Neighbor Health Clinic[30] in White River Junction can provide free primary medical care to nearby residents whose household incomes are below the poverty level. Unfortunately, wait lists for free services can be very long, which significantly delays care for many in need.

When older adults are less able to manage their home, they can turn to an elderly housing program. If constant care is required, seniors will need to enter a nursing home or a residential care facility. 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 unavailable or 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 are within community centers (villages and downtowns) because they are often walkable and have existing services and utilities.

In locations outside of designated growth areas, new facilities are less desirable because of their development impacts. 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.

Cornerschool Schoolhouse, Granville | © Corner School Resource Center

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. They are a critical component of the services network needed to foster good quality of life in our region for all people. 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.

Emergency Medical Response

Our region has 6 ambulance services. However, response times can be lengthy for those living in remote areas. Fourteen towns in our region have

established first responder teams with the capacity to provide emergency medical assistance that can stabilize a patient while waiting for an ambulance to arrive. Some ambulance and local first responder teams are experiencing financial stress and staffing challenges as operating costs rise and it becomes increasingly difficult to recruit and retain young volunteers and employees.

The Dartmouth-Hitchcock Advanced Response Team (DHART), based in Lebanon, NH at Dartmouth-Hitchcock Medical Center, serves our region with emergency air medical transport. They bring trauma patients to the closest trauma center in New England.

Goals, Policies, and Recommendations: **Healthy Places**

Goal

1. The physical places in which we live and work support our health. **(E=)**
2. The relationship between our Region's built environment and the health and wellness of our communities is understood.

Policy

1. TRORC supports communities in designing both their physical form and services to support physical and mental health. **(E=)**
2. TRORC encourages the development and maintenance of healthy, affordable, and energy efficient buildings.

Recommendations

1. TRORC will support 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 will continue to assist municipalities in assessing and remediating brownfields, especially those with hazardous building materials. **(E=)**
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.
5. TRORC will support towns in planning for built environments that are ADA compliant. **(E=)**
6. TRORC will continue to participate in regional meetings of health partners, and help to connect local public health champions with partners and resources.

Goal, Policy, and Recommendations: Healthy Food Access

Goal

1. Healthy and affordable food is accessible to everyone. **(E=)**

Policy

1. TRORC supports increased access to affordable healthy foods for all people, especially in more rural areas and through local food networks. **(E=)**

Recommendations

1. TRORC will support municipalities and school districts in connecting 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.
2. Municipalities should promote and expand farmers markets and community gardens by identifying locations for such activities and letting potential organizers know of these sites.
3. Municipalities should support the preservation of large and small blocks of productive agricultural land, and collaborate with other municipalities to nurture a sustainable system of food production and distribution.
4. TRORC will support ongoing efforts to map and analyze food systems in the Region.
5. TRORC will support towns in planning for development of new and diverse food retail operations.
6. TRORC will support towns in establishing community spaces where those who are unhoused or low-income can access equipment for food storage and preparation, to make healthy food options more accessible for all. **(E=)**

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

Goal

1. A balanced and equitable transportation system provides for the safety and mobility of pedestrians, cyclists, strollers, and wheelchairs. **(E=)**

Policy

1. TRORC encourages the incorporation of active transportation features into new development projects.

Recommendations

1. When requested, the State and/or TRORC will 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, rollability, and accessibility 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 implement Complete Streets principles.
6. Municipalities should promote joint use of park and recreation facilities between communities and ensure that residents without cars and those with disabilities have access to outdoor recreation opportunities. **(E=)**

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. TRORC encourages increased affordable and reliable public transit options to essential services and recreational and social opportunities. **(E=)**
3. TRORC encourages improved parks, recreational facilities, and open spaces for accessibility and community mingling.
4. TRORC encourages equitable community-building. **(E=)**

Recommendations

1. Municipalities should actively work to diversify the voices representing towns in local government and promote equitable access to public meetings and events. **(E=)**
2. Municipalities should evaluate how to establish more public gathering spaces and make them more accessible and welcoming to people of all abilities and identities. **(E=)**
3. Public health professionals should educate decision makers on the link between social support and health.
4. TRORC should work with the Vermont League of Cities and Towns and state partners to ensure that all residents have access to training and support to participate in boards and commissions, and to improve public outreach efforts so that community conversations include a greater diversity of voices. **(E=)**
5. Municipalities should support diversity, equity, inclusion, and justice initiatives such as audits or surveys, committees, celebration events, support programs / services, etc. **(E=)**

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

Goal

1. Substance misuse is eliminated in all segments of society.

Policies

1. TRORC assistance helps towns reduce concentrated exposure to alcohol, drugs, and tobacco.
2. TRORC helps towns provide opportunities for substance-free recreation and community involvement.

Recommendations

1. With the help of public health professionals, municipalities should assess the types of substance misuse problems within their community.
2. Municipalities should continue to raise awareness of the nature and seriousness of health issues related to substance misuse.
3. Municipalities should assess community readiness for prevention, review current programs already in place, and identify and address service gaps and barriers with the assistance of TRORC, regional health partners, and the state Department of Health.
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. TRORC will assist municipalities in drafting regulations for 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. Everyone in the region is able to access medical and elderly care services. **(E=)**

Policies

1. TRORC encourages all medical and care facilities to locate 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 strengthen and build more medical and 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 and travel distance, service gaps and redundancy, education, language, cost of services, immigration status, and providers' competency and sensitivity in working with underserved populations. Cross-sector and multi-town collaborations will be supported.
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.
4. TRORC will support regional efforts to improve access to transportation for medical care, particularly for residents who cannot drive or don't have access to vehicles. **(E=)**
5. TRORC will support towns' efforts to ensure that emergency medical responders have the staff, training, and resources needed for rapid and well-coordinated response.
6. TRORC will assist municipalities in identifying opportunities to establish and expand locally-based health care services, in order to provide more diverse and accessible entry points to assistance. **(E=)**
7. TRORC will support regional efforts to expand access to no-cost care for those in financial need. **(E=)**
8. TRORC will support towns in establishing and expanding community nursing / community health worker services, and will explore opportunities for multi-town collaborations around such services.

Healthy Communities Endnotes

1 https://www.trorc.org/healthpolicyclearinghouse/template-town-plan-health-chapter/
2 https://accd.vermont.gov/housing/plans-data-rules/needs-assessment
3 https://housingdata.org/profile/population-household/pyramid
4 https://www.consumerreports.org/health/seniors-health/how-to-stay-healthy-longer-a1999397973/
5 https://greatergood.berkeley.edu/article/item/five_ways_to_keep_your_brain_healthy_as_you_age
6 https://myhealthmycommunity.org/wp-content/uploads/2019/05/MHMC_SocialConnections_web.pdf
7 https://dail.vermont.gov/resources/legislative/older-vermonters-act
8 https://www.mtascutneyhospital.org/locations-directions/ottauquechee-health-center
9 https://map.feedingamerica.org/county/2023/overall/vermont
10 https://dcf.vermont.gov/benefits/3SquaresVT/SNAP
11 https://willinghands.org/
12 https://www.vtfarmtoplate.com/resources/vermont-food-security-roadmap-2035
13 https://agriculture.vermont.gov/development/farm-school-early-childhood-and-institution/farm-school-resources
14 https://www.nofavt.org/services-resources/consumers/community-food-access/crop-cash
15 https://www.aalv-vt.org/farms
16 https://goodnewsgarage.org/programs/vermont
17 https://vtrans.vermont.gov/planning/bikeplan
18 https://vnrc.org/community-planning-toolbox/tools/complete-streets/
19 https://datatools.samhsa.gov/saes/state
20 https://www.healthvermont.gov/sites/default/files/document/hsi-brfss-2023-datasummary.pdf
21 https://www.claramartin.org/
22 https://valleyvistarecovery.com/
23 https://hcrs.org/
24 https://www.uppervalleyturningpoint.org/
25 https://giffordhealthcare.org/
26 https://www.va.gov/white-river-junction-health-care/locations/white-river-junction-va-medical-center/
27 https://www.uvmhealth.org/locations
28 https://www.dartmouth-hitchcock.org/
29 https://www.littlerivers.org/
30 https://goodneighborhealthclinic.org/

03 | Land Use

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

A. Background Issues

Land use planning in Vermont by regional planning commissions is required, and TRORC has done so for several decades. Vermont requires that regional (and local) land use planning adhere to a statewide set of planning goals.[1] One of the planning goals is that development result in "compact village and urban centers separated by rural countryside."[2] That pattern of development will also further many of the other state goals. It will help to preserve farmland, since agricultural areas tend to be easier to develop, and scattered development across fields would ruin them for farming. Concentrating development preserves our woods, and with them the forest products industry, the creatures that rely on large forests, and our sustained groundwater supply. Compact settlements also make it more efficient to provide services such as sewer or transit.

However, what this planning can actually achieve has to be clearly understood. Most of this chapter, as well as the rest of this Plan is *guidance* – it is a wish or hope. Outside of a few state permitting processes such as Act 250, individuals don't have to follow it. Towns are already bound by the same planning goals as TRORC, so their land use planning should work in concert with the Regional Plan, but that can often be a loose fit. Municipal planning by its nature will be more detailed than regional planning. And, unlike TRORC, towns have the option of turning their plans into zoning or subdivision regulations that are very specific.

Planning begins with what we have. We have inherited a landscape, road system, and sprinkling of towns and villages built over centuries. Much of this was done before there were cars or even electricity. We cleared almost all of the original forest for timber and to create fields, leaving only 30% or so of the land with trees. In the late 1800s, land started to revert to forest, and our population fell until after World War II. Then, in the last four decades of the twentieth century, the TRO Region and Vermont entered a time of rapid economic

growth and profound changes to its landscape. During that time, planning focused on mitigating the impacts of uncontrolled growth.

As the Region looks to the future, it will need to adapt land use policy to new technology, a changing business environment, and a better understanding of the natural one. The impact of broadband and online sales has changed the way we access entertainment, commute to work, buy goods, and even receive services. The generation of renewable energy by solar panels and the burgeoning electrification of our transportation and heat systems will engender new services and facilities and help to meet urgent climate goals.

Despite all of this change, we still feel we have kept a lot, and much of that feeling is due to having retained the historic settlement pattern of compact village and town centers surrounded by fields and forests.

While this landscape 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. Residents did not travel much and did not have cars and commute. Today, the luxury of having a home in a rural setting is why many choose to live here. But our choice to live in more rural areas means that many of us must use cars and trucks to get to work, access goods and services, and be part of our communities. As TRORC conducts regional planning, we must 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.

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, create our wonderful water supply, are a driver for economic activity, and provide us with a backdrop that is distinctly rural. However, we should not take them for granted as 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. We continue to fragment the shrinking forest we do have with roads and 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 understand where we have already impacted forests beyond repair as functional habitat for many species, and the places where good forests yet remain in order to conserve our natural populations of these animals.

White River Junction | © Kevin Geiger

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

This chapter is matched with the Regional Future Land Use Area map, where specific goals, policies, and recommendations apply to one of several future land use areas. TRORC has had such a map for decades. Due to legislation that passed in 2024 (Act 181),[3] regional planning commissions now have to use a common set of names for future land use areas,[4] and this has led TRORC to rename some areas that were in our previous Plan, and create others to make sure they are meeting the intent of the new law. This change was made to create some uniformity across the 11 regional plans in the state and to geographically unify regional planning, some state tax credit programs, and some new Act 250 reforms. Overall, the effect of these changes compared to the previous Plan is relatively minor, with the two largest changes being that agricultural lands and smaller working forestlands now drive the new Agriculture and Forestry future land use area and that village areas have gotten slightly larger to accommodate additional housing development due to the housing targets (see Homes in the Region chapter).

Another new issue this Plan addresses is the equitable dispersion of any benefits or burdens resulting from its policies, in this case land use. While this Plan intends to create only benefits and no burdens, there are impacts from all development – traffic, noise, stormwater runoff, etc. These occur more in some towns than others, as do the benefits of jobs and services that development brings. This Plan recognizes that some places are more urbanized and will have the benefits and burdens that come with development, and that others will have the different benefits and burdens that come from being more remote. However, this Plan does not intentionally place these on any particular town or place due to the makeup (racial, income level, etc.) of its population.

B. Overall Land Use Goals

These goals are intended to be applied throughout the Region. Subsequent sections on individual types of land use areas have additional specific goals, policies, and recommendations.

Overall Land Use Goals

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 maintain 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 state planning goals (VSA Title 24, Chapter 117, §4302).

C. Future Land Use Areas

For the purposes of this Plan and in accordance with state law,[5] eleven types of Future Land Use Areas have been established. These Areas have characteristics that identify them within the Region. They are designed to accommodate future growth based on the capacity of infrastructure and land suitability without threatening critical resources or creating sprawl. These Areas as set out in statute are:

- Downtown Centers
- Village Centers
- Planned Growth Areas
- Transition Areas
- Village Areas
- Hamlet Areas
- Enterprise Areas
- Resource-based Recreation Areas
- Rural General Areas
- Rural Agriculture and Forestry Areas
- Rural Conservation Areas

These Future Land Use Areas are largely *described* in statute, and that language has been used as the basis for our goals for each, but they have little or no state policies. This Plan creates further detail on how we see these Areas fitting in the Region, as well as creates policies for each specific to this Region. The Region's Future Land Use Areas are depicted on Map 4. All of the Future Land Use Areas, except Hamlet 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. As noted on the Future Land Use Map, boundaries that appear to follow parcel boundaries, road centerlines, streams or other findable areas should be interpreted as following those, as they existed when this Plan was adopted.

To meet state planning goals, growth throughout the Region must primarily be concentrated in six Future Land Use Areas that collectively are our 'core settlements'. These core settlements are:

- Downtown Centers
- Village Centers
- Planned Growth Areas
- Transition Areas
- Village Areas
- Hamlets

This Plan acknowledges that there are many attributes of land that should be taken into account when planning for development at the site level, but that are too small (and often too poorly mapped) to take into account at the landscape level and thus do not drive their placement into a Future Land Use Area. For example, a particular parcel, or part of one, may be steep, wet, subject to flooding, or have some other very site-specific characteristic. However, that does not warrant creating a regional Future Land

Use Area. Rather, these particular development constraints are dealt with on a *policy* basis elsewhere in this Plan versus through mapping.

Downtown Centers

Downtown Centers are areas where public sewer and water utilities exist, roads are capable of handling significant volumes of commuting and commercial traffic, sidewalks create a walkable landscape, and a public transportation system provides other mobility options. Downtown Centers contain a variety of employment and business opportunities, governmental and judicial functions, hospitals, schools, and cultural and civic activities. Downtown Centers are very dense, with buildings often covering the entire lot and often having three or more stories.

White River Junction and Randolph's business district are the only Downtown Centers in our Region. They are also, through adoption and subsequent approval of this Plan by the State's Land Use Review Board,[6] our state-designated Downtown Centers that can receive benefits[7] under the State Community Investment Program.[8]

These two Downtown Centers are also the only areas in our Region that have the potential to be approved by the Land Use Review Board (LURB) as newly created Tier 1A areas. To gain such approval, they have to be listed and mapped as candidate areas in the Regional Plan, meet the requirements for Tier 1A areas,[9] and have such status requested by the municipality's legislative body. If approved as Tier 1A, these areas would have Act 250 jurisdiction removed from them. (See the section on Tiers later in this chapter.)

Goals, Policies and Recommendations: **Downtown Centers**

Goals

1. Downtown Centers are the Region's largest urban areas where development is highly concentrated, multi-story, and a diverse mix of uses creates a vibrant place to live and work.
2. Downtown Centers are fully accessible and aesthetically pleasing.

Policies

1. Downtown Centers should support the highest housing densities in the Region, including multi-family housing, apartment buildings, as well as upper floor housing over commercial spaces.
2. Hospitals or large civic, cultural, or governmental uses, that serve regional needs and markets shall be located in Downtown Centers or adjacent Planned Growth or Transition Areas when feasible.
3. Intense growth in Downtown Centers is appropriate. To accommodate additional development, continued maintenance or expansion of water and sewer facilities must occur.
4. Local capital planning programs, land use regulations, and public investment strategies must encourage renovation of existing buildings and in-filling within Downtown Centers, including allowing several stories in height.
5. Principal retail establishments that provide goods and services to a regional clientele must be located within Downtown Centers or immediately adjacent to them in Transition or Planned Growth Areas to ensure that the vitality of these economic centers is maintained.
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 encouraged in Downtown Centers. See the Historic Resources section for more information.
7. In historic districts, or areas with a concentration of buildings with architectural or industrial significance, in Downtown Centers, new development must be visually compatible with the existing character of the district or historic buildings but should not be required to replicate the historic features exactly.

Goal, Policies and Recommendations: Downtown Centers

Policies (continued)

8. Industrial, warehousing, truck terminals, vehicle sales, self-storage and other land intensive commercial uses shall not locate in Downtown Centers.
9. Highway investments within Downtown Regional Centers must include multi-modal transportation, pedestrian circulation, traffic calming, and streetscaping.
10. New development of federal or state governmental offices shall locate in Downtown or Village Centers, or Planned Growth Areas.
11. New commercial or residential development shall not occur within the state-mapped river corridors in Downtown Centers, except where such lands are removed from river corridors as allowable infill development under the Vermont Flood Hazard Area and River Corridor Rule.
12. New development in this Area must be planned to be fully accessible to those with limited mobility and existing development should be retrofitted when undertaking redevelopment.
13. New development and the creation of public spaces should incorporate shade trees and other plantings. **(E=)**

Recommendations

1. TRORC will work with towns and developers to site larger housing complexes in this area.
2. The State must support these dense areas with increased infrastructure funding.
3. Towns and the State should ensure that streetscapes are accessible, and TRORC will support accessibility projects with management services.
4. Towns should maintain and enhance street trees and parks in Downtown Centers so as to provide beauty, shade, and improved air quality. **(E=)**

Village Centers

Village Centers are less urban than Downtown Centers but also contain a concentrated mix of uses in a walkable layout and at a high level of density commensurate with available or planned public water and/or sewer (though such services may not currently exist). Those Village Centers that do not have water or sewer are prime candidates for future infrastructure investments in these services. Village Centers are a central location for commercial activities, schools, and cultural and civic activities for their respective town and the surrounding communities, but are not regional markets. As these areas initially formed as agricultural centers on flatter land, it is not surprising that they often overlay agricultural soils.

Village Center Future Land Use Areas, through adoption and subsequent approval of this Plan by the State's Land Use Review Board, are also our state-designated Village Centers that can receive benefits under the State Community Investment Program.

In addition, Village Centers have the potential to be approved by the Land Use Review Board as newly created Tier 1B areas. To gain such approval, they have to be listed and mapped as candidate areas in the Regional Plan, meet the requirements for Tier 1B areas,[10] and have such status requested by the municipality's legislative body. Once approved as Tier 1B, these areas would have Act 250 jurisdiction removed from them for housing projects of 50 units or less. (See the section on Tiers later in this chapter.)

E. Planned Growth Area

South Royalton | TRORC

Goal, Policies and Recommendations: Village Centers

Goals

1. Village Centers remain critical community cores that provide housing, a local sense of place, and a variety of services.

Policies

1. Village 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, light industry, transport facilities, and community facilities and services are appropriate to locate in these areas.
3. Intense growth is appropriate in Village 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 Village Centers.
5. Principal retail establishments must be located in Village Centers 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 in Village Centers (particularly those with historic merit) to newer, more economical uses, such as offices and multi-unit housing, is encouraged. See the Historic Resources section for more information.
7. New development in Village Centers 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. New development of federal offices, postal facilities, schools, and similar governmental offices or buildings should locate in Downtown or Village Centers, or Planned Growth Areas where other public services are available or planned.
9. Highway investments within Village Centers must give significant consideration to multi-modal transportation, and include accessible pedestrian circulation, traffic calming, and streetscaping. **(E=)**
10. New commercial or residential development shall not occur within the state-mapped river corridors in Village Centers, except where such lands are removed from river corridors as allowable infill development under the Vermont Flood Hazard Area and River Corridor Rule.
11. Street trees, parks, and public gathering spaces should be incorporated into plans for Village Centers.

Recommendations

1. TRORC will work with towns and developers to site housing in Village Centers.
2. The State and towns should support Village Centers with increased infrastructure funding and capital programs.
3. Towns should ensure through zoning that Village Centers enable higher densities and can have a variety of uses and retain a clear edge to more rural lands outside of them.
4. Towns should plan for trees and parks to provide outdoor shaded space in Village Centers.
5. Towns should provide community gardens within or next to Village Centers. **(E=)**

Planned Growth Areas are exactly what they sound like. These areas border established centers and have existing residential and commercial development, public sewer or water, sidewalks (or planned sidewalks), and are planned for significant development in towns' plans and zoning and subdivision bylaws.

Planned Growth Areas, through adoption and subsequent approval of this Plan by the State's Land Use Review Board, will be state-designated Neighborhood Areas[11] that can receive benefits under the State Community Investment Program.

Planned Growth Areas have the potential to be approved by the Land Use Review Board as newly created Tier 1B areas. To gain such approval, they have to be listed and mapped as candidate areas in the Regional Plan, meet the requirements to Tier 1B areas, and have such status requested by the municipality's legislative body. Once approved as Tier 1B, these areas would have Act 250 jurisdiction removed from them for housing projects of 50 units or less. (See the section on Tiers later in this chapter.)

Goal, Policies and Recommendations: **Planned Growth Area**

Goal

1. Planned Growth Areas create space for Downtown and Village Centers to grow in a dense pattern, helping to increase jobs, services, and population in these areas.

Policies

1. Planned Growth Areas should support a mixture of single-family, two-family, and multi-family structures. Residential floors over first-floor commercial space is encouraged.
2. Planned Growth Areas should infill with multi-story buildings.
3. New development of federal or state governmental offices shall locate in Downtown or Village Centers, or Planned Growth Areas.
4. Highway investments within Planned Growth Areas must give significant consideration to multi-modal transportation, and include accessible pedestrian circulation, traffic calming, and streetscaping.
5. New commercial or residential development shall not occur within the state-mapped river corridors in Planned Growth Areas, except where such lands are removed from river corridors as allowable infill development under the Vermont Flood Hazard Area and River Corridor Rule.
6. Planned Growth Areas should incorporate natural elements into planned public and private spaces.

Recommendations

1. TRORC will work with towns and developers to site housing in Planned Growth Areas.
2. The State and towns should support Planned Growth Areas with increased infrastructure funding and capital programs.
3. Towns should ensure their zoning enables higher densities and can have a variety of uses in Planned Growth Areas.
4. Towns should plan for parks, shade trees, and community garden space in this Area. **(E=)**

Transition Areas

Given the regional need for increased housing and local needs for commercial establishments that are not best suited to core settlements due to their impacts, low value, or large use of land, a Transition Area can supply needed space for these land uses along state highways without creating sprawl. Transition Areas are meant to have increased residential and commercial infill over time, in order to become higher-density mixed-use settlements.

Transition Areas are in the process of becoming more dense, mixed commercial and residential areas but lack some infrastructure. Commercial 'land-intensive commercial uses' as defined in this Plan take up large amounts of land and generate few jobs on a per acre basis. These uses do not make the best use of the limited amount of land in core areas. Locating them in Transition Areas can serve to protect the desired aspects of both rural and more urbanized areas.

Village Areas

Village Areas consist of a mix of residential uses at medium to high densities adjacent to and within walking distance to Downtown and Village Centers. Small commercial uses may be present, but are not dominant. Density in Village Areas varies according to local zoning and subdivision bylaws and the availability of municipal water and sewer. Those Village Areas that do not have water or sewer are prime candidates for future infrastructure investments. Village Areas are walkable with sidewalks or low traffic volumes along side roads.

Village Areas, through adoption and subsequent approval of this Plan by the State's Land Use Review Board, will be state-designated Neighborhood Areas that can receive benefits under the State Community Investment Program.

Village Areas also have the potential to be approved by the Land Use Review Board as newly created Tier 1B areas. To gain such approval, they have to be listed and mapped as candidate areas in the Regional Plan, meet the requirements to Tier 1B areas, and have such status requested by the municipality's legislative body. Once approved as Tier 1B, these areas would have Act 250 jurisdiction removed from them for housing projects of 50 units or less. (See the section on Tiers later in this chapter.)

Goal, Policies and Recommendations: **Transition Areas**

Goal

1. Transition Areas over time are filled in with residential and commercial uses to create additional core settlements without sprawl.

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. Reasonable efforts shall be made to provide pedestrian connections between uses, interconnect parking lots, and limit access points onto the state highway in order to create a less vehicle-centric environment.

Recommendations

1. TRORC will work with towns and developers to create infill development in this area.
2. Towns should plan for public greenspace in this Area.

Goal, Policies and Recommendations: Village Areas

Goal

1. Village Areas are lively neighborhoods that are walkable to their Downtown or Village Centers, providing great places to live.

Policies

1. Village Areas should support a mixture of single-family, two-family, and multi-family structures at high-density (5 units per acre) given existing sewer and water capacity. Village Areas 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 encouraged in Village Areas. See the Historic Resources section for more information.
3. Principal retail establishments, services, lodging, public facilities, offices and light industrial enterprises in Village Areas must be at a residential scale and design that fits the context of the area.
4. Local capital planning programs and public investment strategies must support sidewalks, parks, renovation of existing buildings and in-filling within Village Areas.
5. New development in Village Areas must not place undue burdens on municipal or regional facilities, utilities, and services, including transportation systems.
6. New development in Village Areas 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 Village Areas to accommodate future growth is encouraged.
8. Highway investments within Village Areas must include pedestrian circulation, traffic calming, and streetscaping.
9. New commercial or residential development shall not occur within the state-mapped river corridors in Village Areas, except where such lands are removed from river corridors as allowable infill development under the Vermont Flood Hazard Area and River Corridor Rule.

Recommendations

1. TRORC will work with towns and developers to site housing in Village Areas.
2. The State should support Village Areas with increased infrastructure funding.
3. Towns should ensure that accessible sidewalks and traffic calming reinforce the pedestrian-centered nature of Village Areas. **(E=)**
4. Towns should keep Village Areas primarily residential and more dense than adjacent Rural areas through zoning.
5. Towns should work with residents to maintain public shade trees along roads.

Hamlet Areas

Hamlet Areas were significantly more prevalent throughout the communities in the TRO Region in the distant 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 Centers. 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.

Enterprise Areas

Enterprise areas by their nature need good access to road/rail and generate truck traffic. They contain uses that traditionally create noise or other impacts that don't mesh well with residential uses. These areas include industrial parks and districts and are a way to encourage economic growth and high-wage businesses to locate in the Region without adversely affecting neighboring land uses. Industrial uses often produce off-site impacts, such as noise and truck traffic, that can be mitigated if these businesses are located in areas designated specifically for industrial development. Commonly, Enterprise Areas are located where there is direct access to transportation via major roads and/or rail, three-phase power, and other municipal infrastructure.

Resource-based Recreation Areas

Large recreational areas provide a unique set of circumstances where seasonal outdoor recreational assets create employment and a draw to the area, housing is often located nearby because of that asset, and seasonal variations create busier and slower times. While the Region has many recreational opportunities, only four areas (Saskadena Six, Lake Morey, Lake Fairlee, and Quechee Lakes) in the Region are large enough to merit this Future Land Use category and have built components.

Goal and Policies: **Hamlet Areas**

Goal

1. Hamlet Areas retain their historic function as a small, local community hub.

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 may contain residential-scale small business enterprises
2. Major traffic thoroughfares through Hamlet Areas must be planned with traffic calming elements.
3. Existing postal facilities, and similar governmental offices, must be retained in Hamlet Areas and not be relocated into Rural Areas.
4. Commercial establishments in Hamlet Areas must be at a residential scale, fit the context of the immediate, primarily serve local markets, and have impacts commensurate with residential uses. No formula stores or formula restaurants are allowed.

Goal, Policies and Recommendations: Enterprise Areas

Goal

1. Enterprise Areas create needed space for industrial uses that provide jobs and products in a way that minimizes outside impacts.

Policies

1. Industrial development, land-intensive commercial uses, and service businesses should be the primary uses within Enterprise Areas, provided that the scale and intensity of the development does not have an undue adverse impact on the surrounding area.
2. Traffic and pedestrian safety must be a strong consideration in the design of development within Enterprise Areas, particularly those areas with a large trucking component.
3. Principal retail establishments shall not be located in Enterprise Areas, but secondary retail may be.

Recommendations

1. TRORC will work with towns and GMEDC to locate industrial uses in this area.
2. TRORC will work with towns and the State to create safe truck and rail access, as well as other infrastructure, that supports these areas.

Goal, Policies and Recommendations: Resource-based Recreation Areas

Goal

1. Resource-based Recreation Areas protect their natural resource base while providing employment and outdoor recreation.

Policies

1. Principal retail shall not be located in Resource-based Recreation Areas.
2. Where residential development is dense in Resource-based Recreation Areas, provisions should be made for walking and biking.
3. Recreational activities in Resource-based Recreation Areas shall be compatible with adjacent residential uses.

Recommendations

1. Towns should ensure that transportation systems in Resource-based Recreation Areas can handle anticipated traffic.
2. Towns and VTDEC should ensure that water quality is protected in Resource-based Recreation Areas through careful regulation and enforcement.

Rural General Areas

Rural General Areas make up roughly 15% of the Region and are where many of us live. These are lands that form the principal visual backdrop along many roads, consisting 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 newer forest, scattered smaller plots of active agricultural land, or fallow agricultural lands transitioning back to forest.

While over a quarter of the prime and statewide important agricultural soils in the Region are in this Future Land Use Area, they are largely small pastures or lawn, and have often been divided into small lots. Though these lots are often not large enough to support commercial crop production, they can still provide ample garden space or community garden plots.

The Rural General Area is a pastoral version of residential suburbia that lacks public sewer and water and does not appear dense (lots are largely greater than one acre). In fact, this area has roughly one house every 11 acres right now.

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

It is in the interest of the Region and in conformance

Goals, Policies and Recommendations: **Rural General 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 residential scale and type that conforms to historical patterns and does not detract from core settlements.

Policies

1. Development shall be at a residential scale that is less dense than adjacent core settlements.
2. Except along paved roads, development density shall not be greater than one principal structure (which could contain several housing units) per two acres to maintain rural character. Density is not minimum lot size. Lot sizes are encouraged to be as small as private wells and septic systems allow in portions of subdivisions so as to preserve a larger portion of the remaining lot as undeveloped and still meet overall density goals. **(E=)**
3. New freestanding, individual multi-unit residential buildings containing five units or less per structure may be located along Class 3 or better roads in order to stay in keeping with rural scale. A development may contain more than one such multi-unit building. New Individual buildings with more than five residential units shall not be located 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. 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).
5. In Rural General Areas on lots that abut state highways and that are no greater than a quarter mile to core settlements, land-intensive commercial uses may be appropriate, provided that they do not have an adverse impact on the character of the adjacent core settlements and that they mitigate the impacts of sprawl and strip development.

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

Policies (continued)

6. Projects on lots with over 5 acres of prime or statewide agricultural soils utilize compact development design to configure lots and locate new development away from productive fields.
7. Development should minimize buildings, utilities, or structures blocking or interrupting scenic vistas as viewed from a public highway, and give consideration to burying power and phone lines, if cost effective, when new roads are being constructed.
8. New development shall take reasonable steps to protect historic features, wetlands, stream buffers, and wildlife crossing areas.
9. On lots over 10 acres in Rural General Areas with multiple structures planned, the 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.
10. Non-residential uses, including small service businesses, light industrial operations, small professional offices, and inns are acceptable land uses for Rural General 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.
11. Principal retail shall not be permitted in Rural General Areas.
12. Subdivisions in the Rural General Areas 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 shall not be located in Rural General Areas.
13. Gardens and small-scale agriculture are encouraged in this Area.

Recommendations

1. TRORC will work with towns and developers to site housing in Rural General Areas to meet housing needs. (See also the Housing chapter.)
2. TRORC will work with member towns on Town Plans and bylaws to address development in the Rural General Areas so that it meets state planning goals and the desires of towns, including allowing most housing planned for outside of core settlements.
3. Towns should use larger lot frontage, setbacks, and screening for larger uses in order to retain a rural visual feel along roads.

with our towns' plans that scattered development not continue unabated. 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."[12] However, Rural General Areas in the Region can continue to provide substantial amounts of new housing opportunities, both to reuse existing structures and to locate new homes. In fact, this Plan assumes that thousands of new homes will be built in the Rural General Area over the next decades. But without careful planning and regulation the overall effect of such growth in certain locations and at a certain scale will transform the landscape from something recognizable as "rural" in Vermont into something that is not. Rural General 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.

Rural General Areas can also 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 General 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. By law, they must use less of the building than the home uses and can have a variety of small commercial operations.

Rural General 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 light 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.

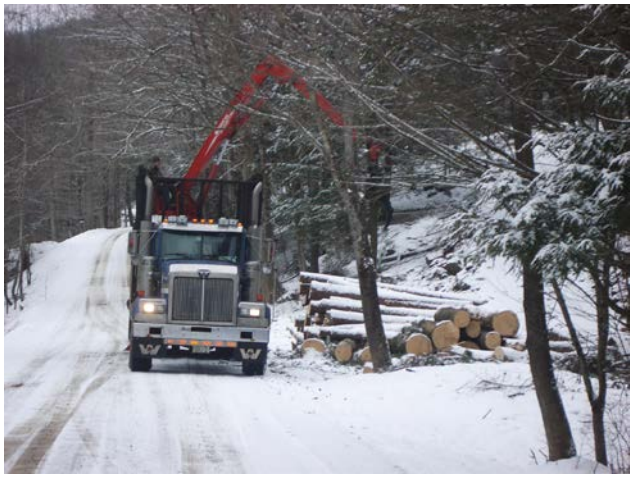
While commercial enterprises in the Rural General Areas are smaller and scattered, there are two somewhat intensive commercial uses that make sense to locate in Rural General Areas. These are either based on resources found there or are uses that take up a lot of space but don't employ many people or depend on services. "Resource-based commercial uses" provide economic benefits and jobs that support the rural landscape, and they are uses that would largely detract from developed core settlements if located within them. Such uses have a traditional rural role in Rural General Areas, as do recreational fields.

"Land-intensive commercial uses" do not make the best use of the limited amount of land in core settlements that have sewer and/or public water supply. Locating these uses nearby in Rural General Areas along major roads can serve to protect most of the desired aspects of both rural and more urbanized areas while providing a location for desired land uses.

Rural Agricultural and Forestry Areas

Forty-eight percent (48%) of the Region lies in this Area of sparsely settled larger tracts of fields, forests, and farms (often in the Current Use program) along town and state highways. This area is currently developed at a very low density of roughly one house every 77 acres. Preventing development that scatters across and fragments these lands is necessary if the lands in this Area are to remain working farms and forests, providing us with food and fiber. However, the limits of this Plan must be understood. Its policies only apply in limited permit proceedings (Act 250 and Section 248 and 248a). Most development does not trigger any of these. For example, everywhere in the Region one could subdivide fields or forests into five lots, or build five homes in the middle of active farm fields or highest priority forest blocks, and neither would trigger Act 250. As there is no general statewide permitting that protects farms or forests (at least below 2,500 feet), the only mechanism that can actually protect these lands in a more thorough manner is local zoning or subdivision bylaws.

One of the main desired land uses in the Rural Agricultural and Forestry Area is agriculture, either in cropland or in pasture. These open lands are part of the aesthetic appeal of the Region, underlie an agrarian culture, provide some food security, and form the basis for a significant part of our economy. Forestry is another important and desired use. Agricultural and forestry lands are addressed in this chapter, while their business aspect is addressed in the Economic Development chapter, and their ability to provide food security is addressed in the Health chapter.



Logging Operation | *TRORC*

While commercial enterprises in the rural areas generally are smaller and scattered, there are somewhat intensive commercial/industrial uses that make sense to locate in the Rural Agricultural and Forestry Areas. These use depend on the material resources found there. This plan defines "resource-based commercial uses" (see Definitions) that provide economic benefits and jobs that support the rural landscape. They are uses that would largely detract from developed areas if located within them. Such uses have a traditional role in these areas.

Not every bit of forest or field is a working forest or farm, and many smaller tracts of forest, as well as small farms or open fields are located elsewhere in the Rural General Areas (those areas were all forest or agricultural in earlier stages of settlement). Still, 59% of the prime and statewide important agricultural soils are located in the Rural

Goals, Policies and Recommendations: Rural Agriculture and Forestry

Goals

1. Agriculture continues to form an important visual, economic, and cultural part of the landscape. **(E=)**
2. Working forest lands sustainably provide forest products.

Policies

1. Buildings in the Rural Agriculture and Forestry Areas other than barns, greenhouses, riding arenas, or wood/mineral-processing facilities shall be at a residential scale.
2. Except along paved roads, development density in the Rural Agriculture and Forestry Areas shall not be greater than one principal structure (which may contain more than one use or unit) per five acres 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 development in Rural Agriculture and Forestry Areas shall take reasonable steps to protect stone walls, wetlands, stream buffers, identified priority and high priority forest blocks, wildlife crossing areas, necessary wildlife habitat, and identified priority habitat connectors.
4. Subdivisions in Rural Agriculture and Forestry Areas subject to Act 250 shall be designed to configure any drives, roads, power lines, or lots such that the majority of agricultural fields or forests remain in contiguous acreage as usable crop fields, pasture land, or managed woodland.
5. New principal retail, self-storage, warehousing, office buildings, as well as projects that would create traffic demand that requires the paving of rural gravel roads, shall not be located in Rural Agriculture and Forestry Areas.
6. Non-agricultural development is discouraged on agricultural soils and active fields in Rural Agriculture and Forestry Areas, and shall locate new development only along field or forest edges to conserve the maximum feasible amount of usable farm, pasture land, or managed woodland.
7. Development of resource-based commercial uses is appropriate in the Rural Agriculture and Forestry 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).
8. Accessory on-farm businesses (AOFBs) regulated under Act 250 in the Rural Agriculture and Forestry Areas shall not host more than twenty social events (concerts, weddings, etc.) a year, generate daily truck traffic, or be principal retail.

Recommendations

1. TRORC will work to ensure that agriculture and forestry in these areas remain an important part of our economy. (See also the Economic Development)
2. TRORC will work with landowners, towns, state and federal agencies, and conservation organizations to conserve important forest and agricultural lands.
3. TRORC will work with towns to craft local zoning and subdivision bylaws that protect agricultural lands and forests.

Agriculture and Forestry Area, whose purpose is to support the working aspect of these lands and help to reduce development pressure that would impinge on these activities, primarily subdivision of lots into areas too small to work, or conversion to residential use. Forestry works best on larger lots where it is economical to manage them for timber. This will typically be on lots of 25 acres and larger.

Agriculture such as dairy farming relies on large lots for pasture and corn, but many other kinds of agriculture can take place on smaller lots. However, it is not practical to create regional future land use areas for very small farms here and there. Rather, the Rural Agriculture and Forestry Area covers lands with concentrations of agricultural use as well as good soils. Policies around development in more isolated but important agricultural lands outside of this Area in the separate Rural General Areas still help to protect those lands. Accessory on-farm businesses (AOFBs) present opportunities for farms to augment their income beyond traditional production, but also can create standard commercial impacts of noise, lights, traffic, etc. Regulating AOFBs through zoning or Act 250 is very limited but will ensure that the rural feel of these areas is not overpowered by a commercial use.

Rural Conservation Areas

Even more remote, the Rural Conservation Area is made up of very large tracts of forest land that approach the feeling of wilderness and create the necessary habitat for many forest species. Most of these lands have very few roads. Conserved lands, public lands, large parcel size, and the data on high priority forest block and high priority habitat connectors help drive which lands are placed in this Area. Development on these lands, unless done very carefully and in a very limited fashion, will destroy their irreplaceable function as travel corridors and habitat for wide-ranging or interior forest species in the Region. The lands in the Rural Conservation Area cover 35% of the region and only have a density of one house every thousand acres at this time.

The lands within this area – 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, and these must be connected to each other through habitat connectors (also called wildlife corridors).

The best available data on where the priority interior forest blocks, as well as priority habitat connectors exist (see maps below) has been produced by the Vermont Conservation Design (VCD)[13] joint project of the Vermont Department of Fish and Wildlife, Vermont Department of Forests, Parks and Recreation, and the Vermont Land Trust. Habitat connectors are critical to connect large forest 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 (see Table 3-1). As noted in the report Vermont Conservation

The Pogue, Woodstock | TRORC

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 priority 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 ranked as some form of either a forest block or a wildlife corridor block.

The main threats to such areas and their functions are fragmentation and parcelization. Forest fragmentation is the division or conversion of

Figure 3-1: Highest Priority and Priority Interior Forest Blocks in the TRO Region

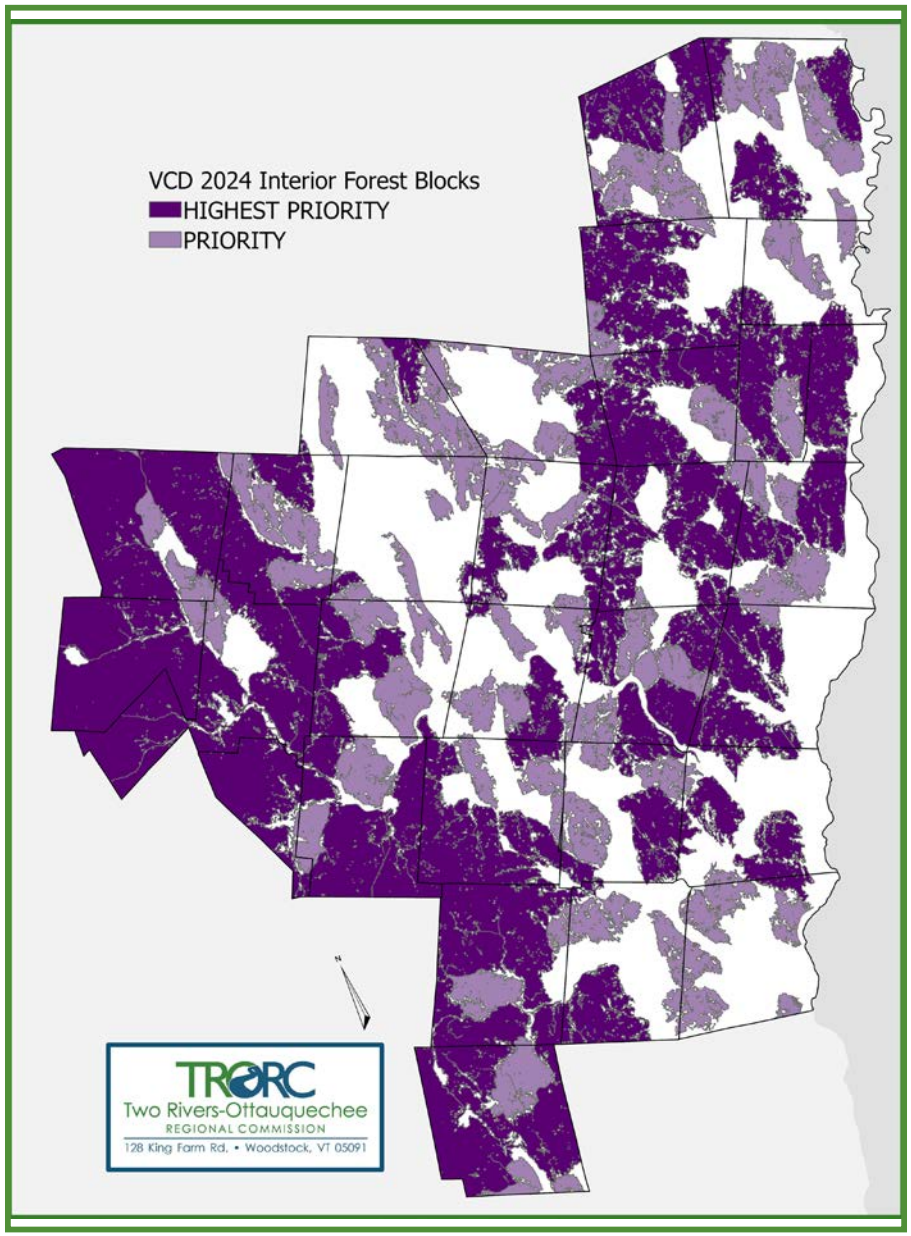


Figure 3-2: Highest Priority and Priority Connectivity Blocks in the TRO Region

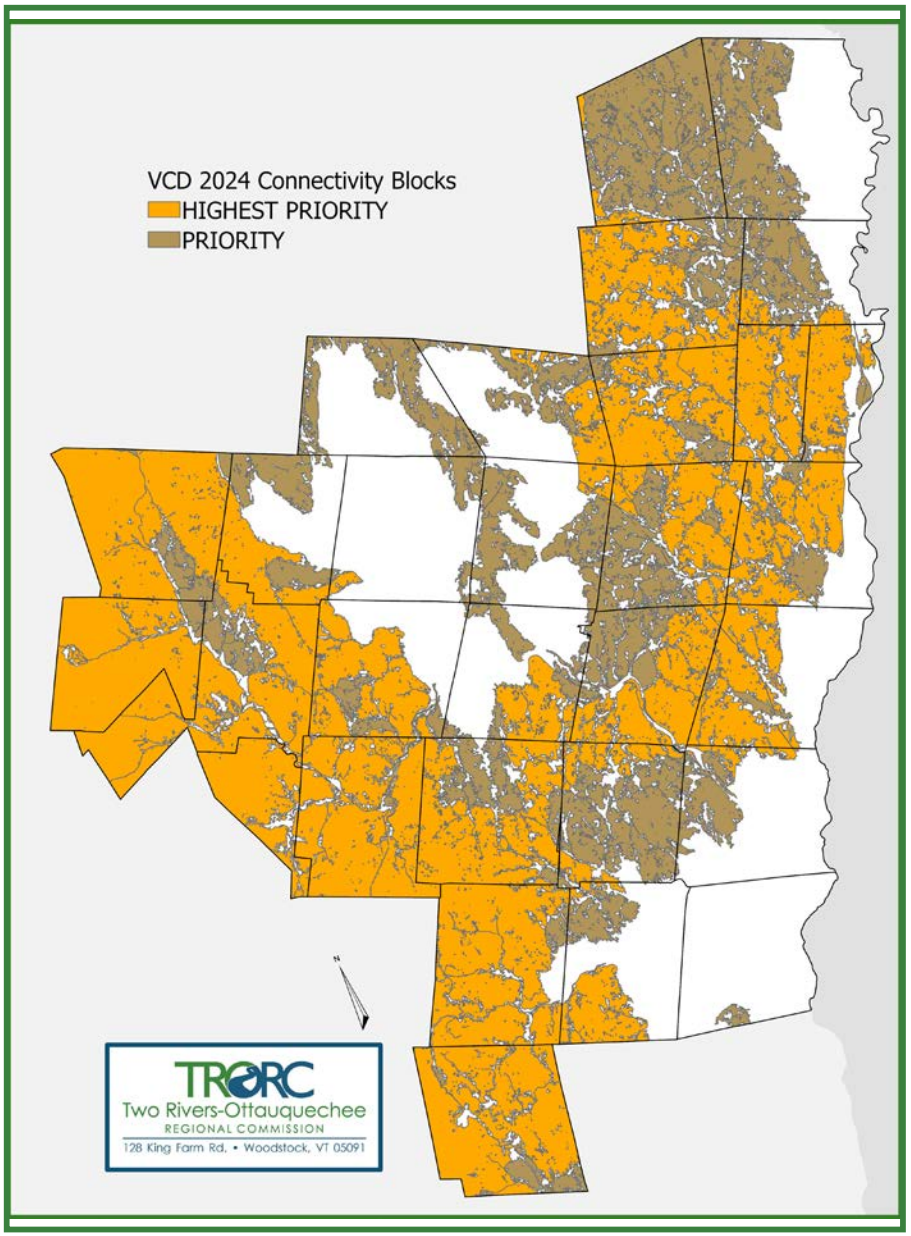


Table 3-1: Wildlife Present in Forest Patches

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				

forest blocks through the clearing of land, building of structures, and other activities associated with development. Even the seemingly simple act of installing driveways and roads affects wildlife movement and increases entry points for 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 is the subdividing of forest parcels to smaller lots but does not necessarily involve further development. Parcelization makes continued management for forestry or conservation more difficult or even impossible due to the logistics of dealing with many small owners. (See the Natural Resources Chapter for more information on wildlife and forests.)

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.

Encouraging the lands in these Areas to remain largely undeveloped will help to maintain their ability to provide timber production, outdoor

Goals, Policies and Recommendations: Rural Conservation Area

Goals

1. Healthy forests remain the dominant feature in this Area and an important part of the Region's landscape that continues 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 in the Rural Conservation Area 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 in the Rural Conservation Area, 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 in the Rural Conservation Area provided these uses do not unduly impact other significant resources of the site.
4. Timber production is encouraged in the Rural Conservation 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.

Goals, Policies and Recommendations: **Rural Conservation Area**

Policies (continued)

6. New structures capable of being occupied year-round should not be located in interior (greater than 300 feet from the forest edge) parts of the Rural Conservation Area, but noncommercial seasonal camps serving hunters, snowmobilers, and other outdoor recreational users are appropriate.
7. Any use deemed appropriate to elevations over 2,500 feet in the Rural Conservation Area should be sensitive to slow vegetative recovery and severe soil limitations and must avoid erosion.
8. Subdivisions and other new development subject to Act 250 on lots over 30 acres in the Rural Conservation Area shall minimize impacts on forestry potential and habitat values of undeveloped areas by concentrating development at the forest edge or near existing 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. Subdivisions in the Rural Conservation Area shall not contain of more than ten principal structures in total.
10. Outdoor recreation is encouraged in the Rural Conservation Area. Development of snowmobile, hiking, and cross-country ski trails and similar recreational facilities are appropriate uses subject to meeting acceptable management practices that are protective of interior forest species, Class A1 water quality, and applicable state law. Shooting ranges shall not be located in this area.
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 new development in its built-out state shall create more than one acre of impervious surface, including roads and parking.
13. New developments in the Rural Conservation Area 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. Woody biomass should be increased in this area in order to store carbon.
15. Solar farms over 15 Kw shall not be located in this area, and cell towers shall not locate in this area unless no other reasonable alternative location or technology exists to meet coverage objectives.
16. No uses except agriculture, residential, forestry, outdoor recreation, and conservation shall be established in the Rural Conservation 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 with the State to ensure that the natural functions of the Rural Conservation Area 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 lands in the Rural Conservation Area 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 in the Rural Conservation Area so that it is done in ways that preserve the functions of these areas while allowing compatible development.

recreation, flood storage and aquifer recharge, scenic beauty, and wildlife habitat, and contribute to our economic well-being and quality of life. However, it is not a regional goal to have nearly entire towns developed at a very low density. Allowing some careful development in these areas 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.

The goals, policies, and recommendations for this Future Land Use Area, as well as the regional mapping, should be of use to conservation efforts, as well as local planning and regulation, but they have no direct regulatory impact. They also have no effect on the eventual creation of Tier 3 areas[14] by the Land Use Review Board. This Plan will mainly have effect in Act 250, mostly through projects triggered by the reenacted 'road rule'[15] that does not prohibit development, but does bring it under Act 250 review. Importantly, forestry operations are exempt from Act 250. The other area this section of the Plan may have effect is in permitting the siting of cell towers under a 248a proceeding[16] deep in forests.

D. Tiers

Vermont's new Land Use Review Board is in the process of creating 'Tiers' for all of the land in the state. These Tiers will determine the level of Act 250 review that takes place. The detailed guidelines for Tiers are being created by the Land Use Review Board (LURB). There will be four Tiers – 1A, 1B, 2, and 3. This Plan does not place any lands in Tiers, but it does set the stage for this by recommending that the LURB consider certain lands for Tier 1A and 1B areas (see Potential Tiers Map). Our Downtown Centers, Village Centers, Village Areas, and Planned Growth Areas are the only lands eligible for these two Tiers, but that is not the only needed qualification. Towns must decide they would like this designation as part of this Plan's adoption and review. Any Tier 1a or 1B area proposed in this Plan have only been done after consultation with the respective towns. This Plan does not recommend or place any lands in Tier 2 or Tier 3 areas. We expect that most of expected Tier 3 lands will be in the Rural Agriculture and Forestry Area.

In approved Tier 1A areas,[17] Act 250 will essentially no longer apply. These areas have robust public infrastructure, advanced land use regulation and administrative capacity, and a dense built environment. In approved Tier 1B areas, housing projects of 50 units or less on lots of 10 acres or less will be exempt from Act 250. These areas are a more modest version of Tier 1A areas, but still must meet a series of legislated criteria. Tier 1A and 1B areas were meant to make it easier to permit housing.

In Tier 2 areas (which most of the state will fall in), Act 250 will largely remain the same except new roads and driveways of a certain length will trigger Act 250 review starting July 1, 2026 (see 10 VSA section 6001(3)(A)(xii)). In Tier 3 areas that are meant to better protect some natural resources of statewide significance, Act 250 will apply to more development than it does now, but agriculture and forestry will remain exempted. Tier 3 areas will be created by the LURB and will not be in effect until after this Plan is adopted.

E. State Designation

Prior to this Regional Plan, towns could seek state designation of[18] certain areas by the Vermont Downtown Development Board. These designated areas were created to funnel tax credits to qualifying development that increases housing and employment that would bolster concentrated development and help fight sprawl. That process was independent of town and regional future land use areas. Beginning with this Plan, however, the regional future land use areas will also serve as the boundaries for a revamped state designation process under Title 24, Chapter 139.[19] These state-designated Downtown Centers and Village Centers will now cover the same lands as our future land use Downtown Center and Village Center areas. Our Village Area and Planned Growth areas will become state-designated Neighborhoods. All of this has elevated local and regional planning into driving economic development. Overall, these legislative and program changes, coupled with the new Future Land Use Map will create greater opportunity in core settlements.

While the Regional Plan lays the groundwork for these areas, they still have to be approved by the LURB as part of its approval of the Regional Plan. As part of its review, the LURB will consider comments by the new Vermont Community Investment Board[20] that has replaced the Vermont Downtown Development Board. The Community Investment Board will manage the state tax credit program.

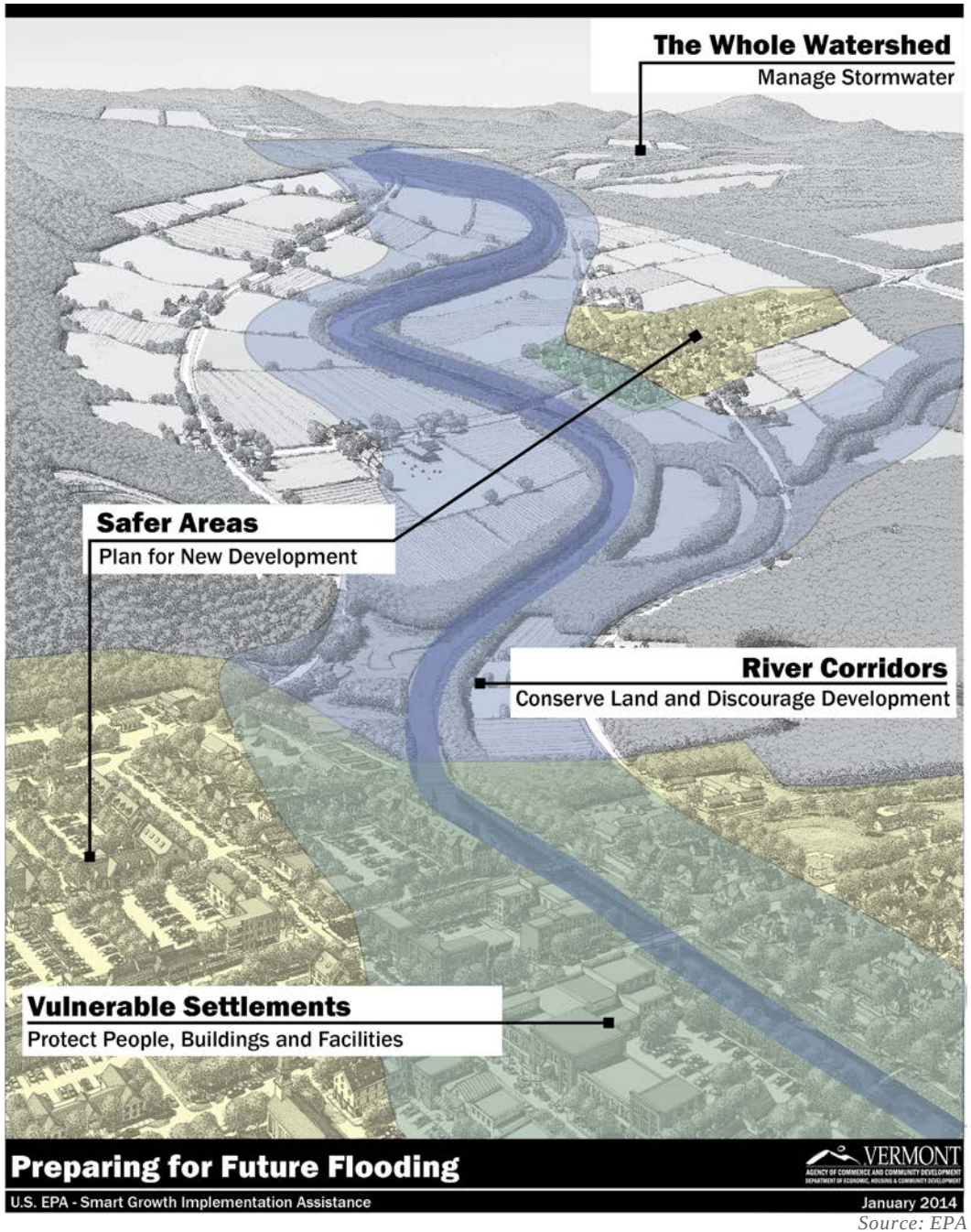
F. State Conservation

The Vermont Legislature passed a bill in 2023 setting the state on a course of having 30% of the land conserved by 2030 (commonly called 30 by 30) and 50% conserved by 2050. This bill, known as Act 59,[21] builds upon state planning goals by providing some specific benchmarks. How close Vermont is to meeting the 2030 target? What should count as conserved? and how should lands be conserved? These are all ongoing subjects of discussion. This Plan's policies have a role to play in moving toward that state target, but State programs, as well as local zoning are much more effective means than the limited application of this Plan in Act 250.

G. Hazard Resilience

Flooding remains the primary natural hazard in the Region, coming in all seasons. Flooding can happen from snowmelt, ice jams, summer storms, or tropical remnants. Flooding typically hits valley floors and the FEMA-mapped flood zones, inundating bottomlands and any development on them. These events usually take a day or two to develop and often have advance warning by the National Weather Service. However, flash flooding can happen on smaller watersheds that respond quickly to rain, sometimes with little warning. Saturated or frozen ground worsen any flash events.

While the FEMA Flood Insurance Rate Maps[22] are a good indication of where flooding is a danger, they need to be updated as they rely on old topographic data and a 'precipitation regime' that does not take into account today's stronger and more frequent storms. They also underestimate the spatial risk. Our risk is not just that the waters will rise, but that



Source: EPA

they will erode. Streams and rivers in flood can both incise (erode downward) and undermine bridge abutments or meander (erode sideways) taking out roads and buildings along the water's edge. In certain areas of the Region, mainly in the Third Branch and Upper White River, lateral erosion can be dramatic. There are areas in the Third Branch where the river has migrated out of the mapped flood zone!

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 thousands of years. 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, 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.

While more intense storms obviously lead to larger floods, the surface that the rain falls on makes a difference as well. Flooding is worsened by land uses that create hard surfaces, which leads to faster runoff. Roofs, roads, and even short lawns create much more runoff than wooded areas. Past stream modifications, such as straightened or dredged channels, increase flood damage as the river has no place to dissipate its energy. Rivers that might have gently flooded fields in the past are now hemmed in in many places and have much more erosive power.

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 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.

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

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

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. 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. FEMA has been working on updating these maps with VTDEC, but the new maps are not yet available.

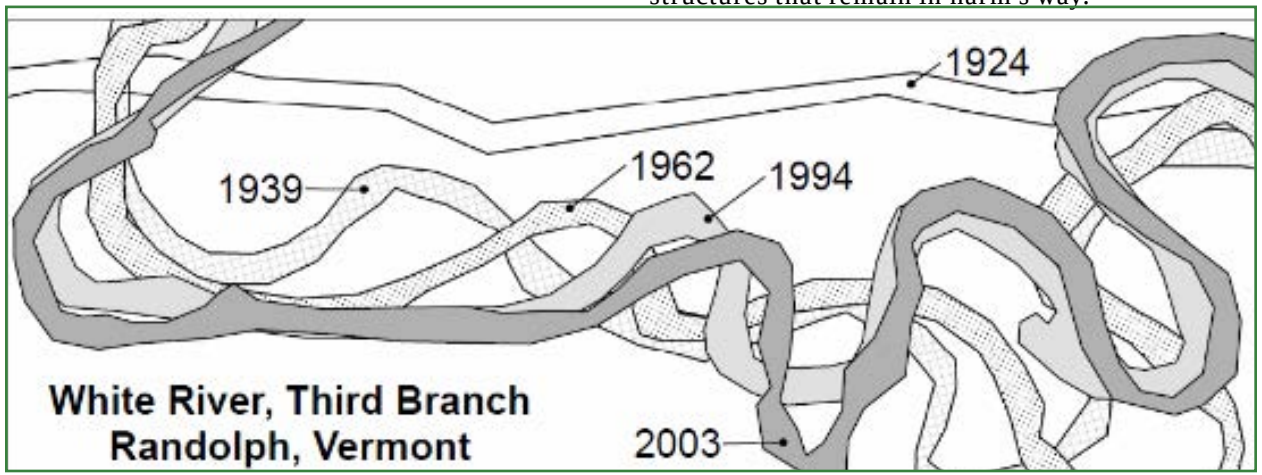
In order to enable property owners to be eligible for federal flood insurance through the National Flood Insurance Program (NFIP), municipalities must adopt and enforce flood hazard area regulations either through their regular zoning bylaws or through a separate bylaw. Municipalities can seek to reduce 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 places people at risk of injury or death, places infrastructure and property at risk of damage or destruction, and can even create liability on the part of the community.

Since FEMA maps in the Region are concerned only with inundation and also assume that river channels never move, they are poor at showing areas at risk from lateral erosion. 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.[23] 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. Due to recent legislation, the state will be creating a statewide permitting system in these river corridor areas that is slated to begin in 2028. Meanwhile, towns are the primary regulator of development in Special Flood Hazard Areas.

Two newly recognized flood-risk areas are not shown well on any map yet, and these are alluvial fans and landslide zones. Alluvial fan areas are where high angle streams hit valley floors. They can carry enormous amounts of stone and debris, violently changing their channel. Money Brook in Plymouth is a prime example of this. Landslides are a growing concern with heavy rains, and several areas in the Region are in the process of bank failure.

Flood Mitigation

Our Region, like the state, has spent centuries building in flood-prone areas and worsening flood risk by creating more impervious surfaces and channelizing rivers. Lessening (mitigating) the risk from flooding will involve a series of mitigation actions that essentially undo many past follies. This will come at enormous cost, but are costs we would otherwise pay in disasters and tragedy. 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. Roughly 70 properties in the Region, and 150 in the State, were involved in the buyout process. Following the 2023-24 floods, another 250 homes in the state are also seeking buyouts. There are thousands of structures that remain in harm's way.



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

Floodplain restoration is the process of recreating a more natural channel by giving the river more room. This can be done on buyout sites, but can also be done when town or state roads are rebuilt, and even can be done in fields adjacent to streams. Such restoration gives the river room to safely meander, dropping sediment, debris, or ice while dissipating its energy.

Since much of the damage from floods is to town roads, activities such as proper ditching, lining ditches with stone, increasing the number and size of culverts, and widening bridges all let water drain away with less damage. At times, the cost to upgrade these structures may be too great and towns may also consider simply abandoning a bridge or road if there is an alternate route or the lands accessed are better conserved instead.

Lands That Help Prevent Flooding

Wetlands provide an array of functions and values that support environmental health and provide benefits to humans, including flood and stormwater control. These are discussed in more detail in Chapter 6. Draining, filling, and development have resulted in the loss of more than 35 percent of Vermont's original wetland acreage, taking away precious flood storage and attenuation and increasing flood risk.

Naturally vegetated stream and riverbanks also provide a number of "ecosystem services", but of importance here is their ability to slow floodwaters and provide river bank support and stabilization, reducing flood and ice damage to adjacent lands and structures.

Moving outside of the riparian buffer, lands adjacent to streams and rivers should flood every few years. Once water overtops banks, 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.

Upland forests 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. 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, all helping to mitigate flood damage.

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.

Other Hazards

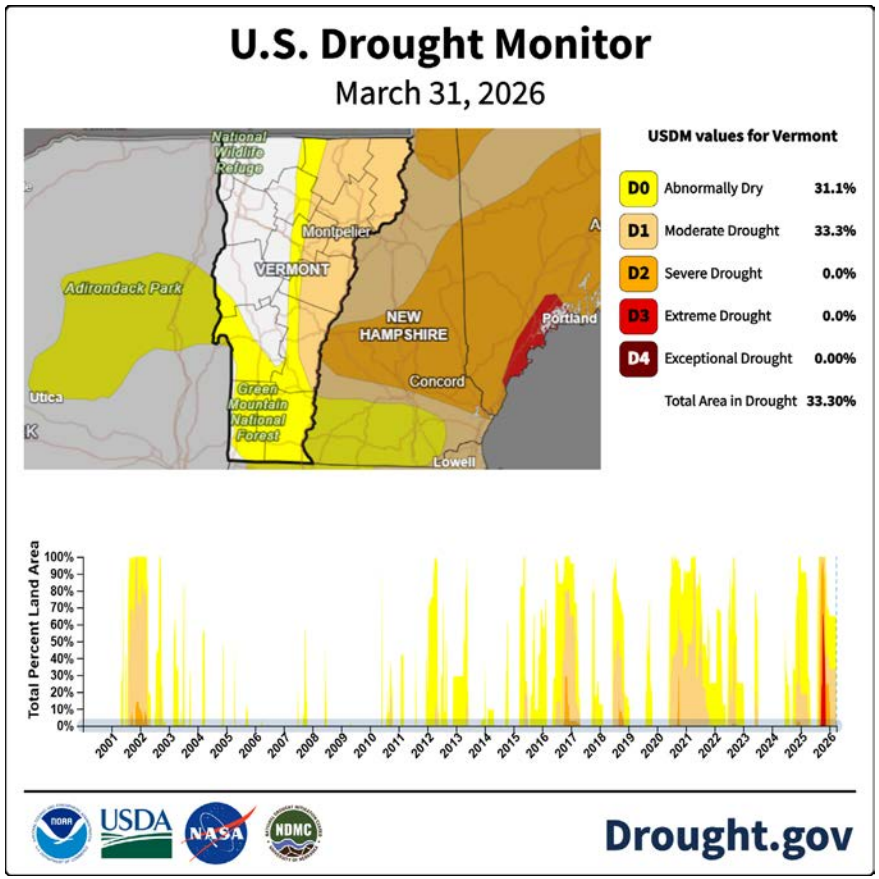
Two other hazards that directly affect us are drought and heat. These hazards are increasing as risks due to climate change, and are worsened by poor development choices.

Drought has caused private wells to run dry, and municipal water supplies to be stressed. The Region has experienced three significant droughts in the last sixty years, with the most recent being in 2025 when Vermont had its driest August on record. While little can be done to make it rain, development practices can help or hurt in times of drought. Actions that improve aquifer recharge, mainly though limiting impervious surfaces, protecting forests, and retaining stormwater, help to ensure that groundwater is replenished. Also, conserving water in its use lessens water demand.

Heat events have less of a history in Vermont, but are expected to increase under all climate change scenarios. Like rain, we cannot directly affect the weather, but we can lessen heat impacts, primarily by reducing 'heat island effects' in more urban areas through limiting of paved and building surfaces that soak up sunlight, and also increasing built and natural shading.

Tree canopy provides shade for built surfaces, helping to keep them cooler. Shade can lower surface temperatures, including the outside of buildings themselves by 20-45 degrees Fahrenheit.[24] Cooler surfaces (sidewalks, roads, building exteriors) will radiate less heat into the surrounding air, and hold less heat into the night. Trees can keep direct sunlight from warming building interiors. Trees also 'sweat' through a process called evapotranspiration. This action additionally can lower the direct air temperature several degrees.[25]

Paved surfaces are notorious heat sinks and are considered as one of the major causes of the urban heat island effect.[26] Reducing the surface area of asphalt, as well as increasing the albedo (reflectivity) of paved surfaces avoids retaining solar heat.



US Drought Monitor | *Source: Drought.gov*

Goals, Policies and Recommendations: **Hazard Resilience**

Goal

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. **(E=)**
2. The Region is able to recover from flooding and other disasters quickly and in a manner that improves its resilience to future disasters.
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 preserves aquifer recharge and does not worsen flooding.
4. Densely developed areas are resistant to heat events through built and natural systems. **(E=)**

Goal, Policies and Recommendations: **Hazard Resilience**

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. **(E=)**
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 core settlements.
4. New buildings within FEMA-mapped floodways shall be prohibited. Replacements of existing buildings must only happen when there are no safer reasonable opportunities.
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. 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.
9. Upland forests and watersheds should be maintained predominately in forest use to ensure groundwater recharge, high-quality valley streams, and to ensure that flood flows are absorbed.
10. Outside of areas of existing compact development, new development must preserve vegetated riparian buffer zones that are consistent with state riparian buffer guidelines to shade waterways and provide bank stabilization.
11. 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 and increase aquifer recharge.
12. In the long term, restoration and enhancement of additional wetlands should be pursued in order to improve the Region's flood and drought resilience.
13. The purchase of flood easements is encouraged to both reduce flood risk to structures and to support owners who leave lands open.
14. Emergency planning for floods, drought, and heat events is encouraged. **(E=)**
15. Water conservation measures are encouraged.
16. Development in Downtown and Village Centers, and Planned Growth and Transition Areas should incorporate heat reducing designs. **(E=)**

Goals, Policies and Recommendations: **Hazard Resilience**

Recommendations

1. TRORC will work with towns to strengthen their Flood Hazard Bylaws and zoning in order to mitigate risks to public safety from inundation, erosion, and extreme heat.
2. TRORC will work with VTrans 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 and other natural hazards, taking into account climate projections.
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, VEM, and TRORC for mitigation actions such as elevation/relocation or purchase and demolition. **(E=)**
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. The state should work to better map risks from landslides and alluvial fans, and TRORC should help towns regulate these areas.
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 https://legislature.vermont.gov/statutes/section/24/117/04302
2 24 V.S.A. § 4302
3 https://legislature.vermont.gov/Documents/2024/Docs/ACTS/ACT181/ACT181%20As%20Enacted.pdf
4 https://www.trorc.org/wp-content/uploads/2025/07/Regional-Future-Land-Use-Areas-in-Act-181-6.2025.pdf
5 24 V.S.A. § 4348a
6 https://act250.vermont.gov/about-us/agenda-minutes
7 https://outside.vermont.gov/agency/ACCD/ACCD_Web_Docs/CD/CPR/State-Designation-Programs/CPR-DT-Designation-Benefits.pdf
8 https://legislature.vermont.gov/statutes/section/24/139/05801
9 https://legislature.vermont.gov/statutes/section/10/151/06034
10 https://legislature.vermont.gov/statutes/section/10/151/06033#:~:text=c,17%2C%202024%2E%29
11 https://legislature.vermont.gov/statutes/section/24/117/04302
12 https://legislature.vermont.gov/statutes/section/24/139/05804
13 https://www.vtfishandwildlife.com/sites/fishandwildlife/files/documents/Conserve/VT%20Conservation%20Landscape-level%20Design/Vermont-Conservation-Design-Summary-Report-February-2018.pdf
14 https://act250.vermont.gov/tier-3-rulemaking-and-report
15 https://act250.vermont.gov/road-construction-jurisdiction
16 https://puc.vermont.gov/document/procedures-applicable-request-construction-or-installation-telecommunications-facilities
18 https://accd.vermont.gov/community-development/designation-programs
19 https://legislature.vermont.gov/statutes/chapter/24/139
20 https://accd.vermont.gov/community-development/designation-programs/downtown-development-board
21 https://legislature.vermont.gov/Documents/2024/Docs/ACTS/ACT059/ACT059 As Enacted.pdf
22 https://www.fema.gov/flood-maps
23 https://dec.vermont.gov/watershed/rivers/river-corridor-and-floodplain-protection/river-corridor-and-floodplain-maps
24 https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands
25 https://www.epa.gov/sites/default/files/2017-05/documents/reducing_urban_heat_islands_ch_2.pdf
26 https://www.fhwa.dot.gov/pavement/sustainability/articles/pavement_thermal.cfm

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 actually 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.

EV Chargers in Bridgewater | Harry Falconer

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.

There are three designated Scenic Byways in the Region: 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.

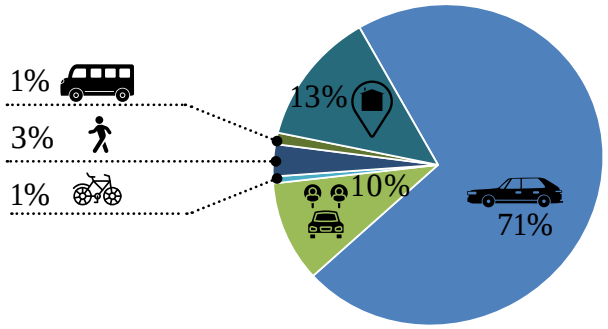
The Vermont Agency of Transportation (VTrans) collects and publishes State Highway pavement conditions in our Region. VTrans prioritizes paving based on their asset management system which looks at implementing the right paving treatment at the right time of the pavement lifecycle.

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, costing 10-20 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, 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). 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 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.

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



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

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.

Walking and bicycling infrastructure is an

important component of meeting 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. All sidewalk infrastructure that currently exists are in village or downtown areas. 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 generally poorly signed and difficult to navigate.

Marked bike lanes are rare and road shoulders in much of the Region are narrow, often creating unsafe conditions. 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.

Land use planning that concentrates growth in areas of existing development, particularly village centers, works well when also married with pedestrian and bicycle infrastructure, and such amenities in turn improve village life. The Region has 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 funding has been curtailed, TRORC continues to support related planning work. Lastly, increasing bicycle and pedestrian travel will require continued community outreach and education. 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 "Vermonter" 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) study recommended the expansion of the existing "Vermonter" 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 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, Thetford, Northboro (Thetford), Ely, Fairlee, Bradford, Hooker (Bradford), Newbury, and Wells River. Additionally, the towns of Hartford and Bradford have industrial parks with rail sidings onsite. During times of emergency, VTrans has 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

"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."

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.

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.

Tracks in Braintree | *Source: Kevin Geiger*

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, municipalities are required to apply for the Municipal Roads General Permit coverage on all town roads every five years. 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 has a huge energy demand, and consequently an enormous amount of greenhouse gas emissions as that demand is still 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 and all-electric 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 "Vermonter" 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. In the last few years, the Region has had several Level 3 EV charging stations installed, including at Bridgewater Mills (Woodstock), Norwich Dan & Whit's and Bradford. 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.

EV Chargers in Bridgewater | *Harry Falconer*

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 healthier transportation options.

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, 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 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."

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 find safe, affordable transportation options within their towns and between towns. Ubiquitous public transit would provide such access.

Tri-Valley Transit Office, Randolph | *Source: TRORC*

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.

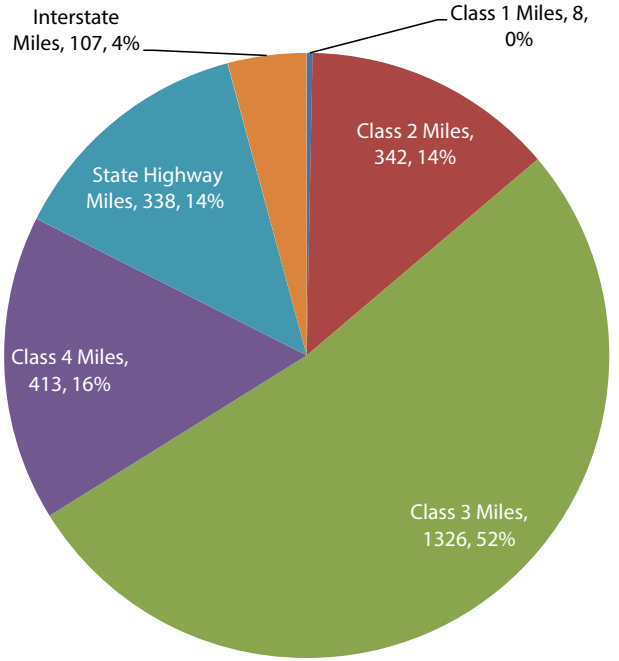
The Region depends on two public transportation providers: Tri-Valley Transit and Advance Transit. Both operate fixed route commuter buses in the Region. To connect transit-dependent residents with shopping and social centers, Tri-Valley Transit offers weekly deviated fixed routes to Lebanon and Randolph, 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 older adults and persons with disabilities clients both through Tri-Valley Transit and through their own network of vehicles and volunteer drivers which help lower the overall cost of rides. There has been a significant drop in volunteer drivers post-Covid which has impacted the ability to serve these clients with rides. There is active recruitment on volunteer drivers statewide.

"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."

Although it appears the Region has redundancy in transit 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

Figure 4-2: Road Miles in the TRO Region



Class 1:
Extension of a state highway, maintained by a town

Class 2:
Primary local roads

Class 3:
Minor local roads maintained year-round

Class 4:
Minor local roads not maintained year-round

Source: TRORC

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 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 and 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 should be (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).

Bradford Park and Ride | Source: TRORC

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. **(E=)**
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, with particular focus on connecting neighborhoods to employment centers.
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 any of the 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 new Interchanges shall not enable development that will have the effect of eroding the economic vitality and quality of life of a core settlement.
7. New development subject to Act 250 in core settlements 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. **(E=)**
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 core settlements, and any place where speed safety concerns exist alongside active pedestrian and biking activity with vehicles. **(E=)**

Goals, Policies, and Recommendations: Transportation

Policies (continued)

13. Increased paratransit and demand-response transit services (transportation services without fixed routes, unlike bus routes) for older persons and persons with disabilities are strongly encouraged. **(E=)**
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. **(E=)**
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 highway 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, and in seeking funding assistance for projects.
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.

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

Recommendations (continued)

9. TRORC shall assist interested communities with studies and planning designed to improve multi-modal networks in Regional and Town Centers, such as developing an Upper Valley U.S. Route 4 commuter bus service and establishing paratransit solutions operated and funded by employers or medical centers.
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, adjusting routes to better connect low-income residents with job and service centers, and streamlining volunteer driver programs. **(E=)**
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).
17. TRORC will support Towns in exploring mutual aid solutions to transportation challenges, such as community garages and carpool systems.
18. TRORC will work with towns to explore the coordination of joint purchasing options for transportation supplies.

Transportation Endnotes

05 | Economic Development

Huntington House Inn, Rochester | © John Knox

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. Many towns in the Region have a low level of commercial development, with mostly small home-based businesses. Regional occupations are diversified across the professional, technical, service, manufacturing, and agricultural sectors so Region's economy is 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 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 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. Average wage rates have been growing but still lag slightly behind the State[1] and nation[2].

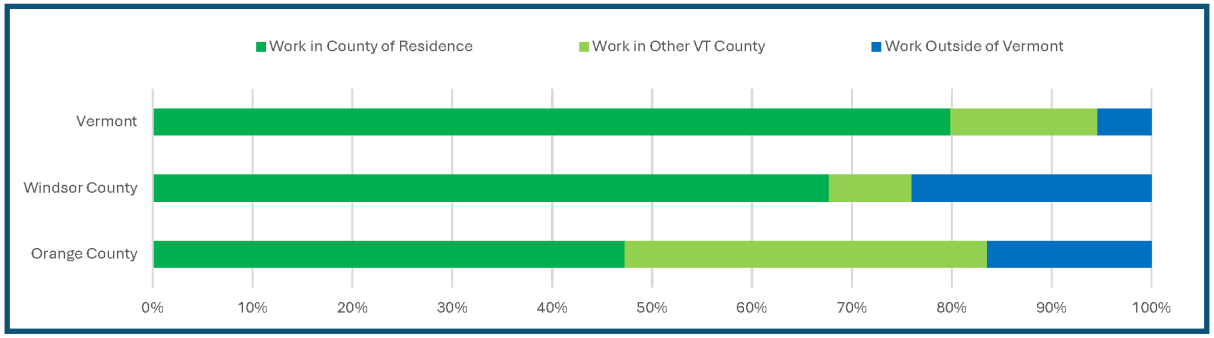
Several smaller towns in the Region are "bedroom communities" that provide housing opportunities for workforces that commute. Many residents in the Region routinely travel outside of their towns for errands, and also for work opportunities. With respect to jobs, 52.7 percent of workers in Orange County and 32.3 percent of workers in Windsor County are employed outside of their county of residence[3]. 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 work enabled by the Internet has allowed many residents to work outside of their towns without the commute.

B. Workforce Composition

A workforce is defined as all adults aged sixteen years and over who are currently employed or unemployed but still able to work. Individuals who are held in an institution (for incarceration, mental health, or other health-related reasons), or who 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 the U.S. Bureau of Labor Statistic's explanation.[4]

Figure 5-1: Place of Work



Source: U.S. Census Bureau, U.S. Department of Commerce. "Means of Transportation to Work by Selected Characteristics." 2023 American Community Survey, ACS 1-Year Estimates Subject Tables, Table S0802

Though our Region includes towns in parts of four counties, using Windsor and Orange Counties' data is a good proxy for the overall Region. The 2025 Economic & Demographic Profile[5] published by Vermont Department of Labor summarizes key statistics for our Region's labor force. To see the most up-to-date labor market information by county, please visit the State of Vermont's Labor Market Data Dashboard[6].

Workforce Age

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. Attracting a young workforce capable of replacing the established workforce is necessary for economic vitality for the Region.

According to the 2023 American Community Survey, Vermont's median age was 44 years old—an increase by three years since 2010, compared to a nationwide median age of 39. Orange and Windsor Counties skew even older, with median ages of 47 and 48 respectively.[7] Many baby boomers (people born between 1946 and 1964) have entered their retirement years, and the number of people in Vermont aged 65-79 increased by 40,000 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 27.2 percent by 2030, while Orange County expects a 39.4 percent increase.[8]

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 quickly attracts thousands of younger replacement workers.

While immigration from other states and other countries could help solve this demographic crisis, Vermont's tight housing market makes it extremely difficult to move here. In 2023 only 4.3% of Vermonters were born outside of the US, and the share of foreign-born residents is 3.8% in Windsor County and only 2% in Orange County.

In agriculture, the aging workforce is dire. The average age of farmers in Orange and Windsor Counties is 58, with over 60% age 55 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 off farm to supplement farm income and maintain access to health insurance.

Workforce Education

Our well-educated workforce bodes well for having a skilled workforce capable of attracting higher-paying, specialized jobs to our 30 towns. According to the 2023 American Community Survey, 48% of Orange County and 50.5% of Windsor residents over age 25 had completed higher education qualifications beyond a high school diploma, higher than the national average of 44.9%.

There are many workforce development and training programs throughout the State that are run through the Agency of Commerce and Community Development (ACCD)[9], the Department of Labor (DOL)[10], and the Agency of Human Services (AHS)[11]. (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 incoming and existing workforces is to promote the creation of continuing adult education opportunities throughout the Region. The workforce needs to gain experience with day-to-day job skills and also with more general business and personnel management skills. Training in these areas can take the form of practical on-site job training opportunities or courses and accreditation programs outside of the workplace that supplement existing job skills.

As previously mentioned, many industries routinely struggle to find qualified workers. This problem is multifaceted in that it reflects an undersized 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). Vermont's average wage is only 85% of the national average wage, but prices are close to national averages[12]. To learn more about the state of working Vermont, see the reports from the Montpelier-based Public Assets Institute.

Income and Poverty Levels

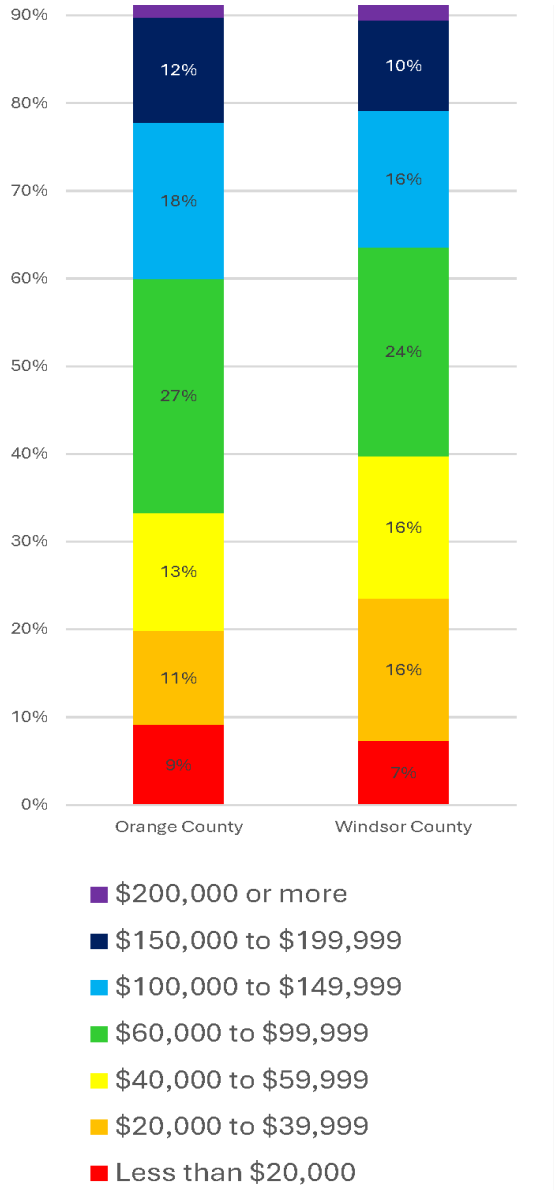
Windsor County has a higher per capita income than the state average and is the fourth highest out of the 14 counties in Vermont. In contrast, Orange County ranks tenth among Vermont counties, with a poverty rate of 9.2% compared to Windsor's 8.7%. As incomes are increasing in the TRO region, the number of households on state public assistance programs is continuing to decrease.[13] However, the federal poverty rate does not capture the full magnitude of Vermont households struggling to meet basic needs on insufficient incomes.[14]

While our Region has lower rates of poverty compared to other counties, the Upper Valley Haven 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 2024 Housing Needs Assessment Report.

In September 2025, 4,871 households[15], representing 12.9% of those in Orange and Windsor Counties, were enrolled in Vermont's food assistance program, which assist those below recognized income levels. However, this is only half of the eligible households that could participate in such programs, so an additional 5,000 low-income households in our region may struggle with food insecurity without assistance.[16]

Additionally, the gender pay gap persists; in 2023 women working full-time in Vermont earned just $0.86 for every dollar earned by men, which translates to $9,000 less per year, This also means that in retirement women get only 65% of what men receive.[17] 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

Figure 5-2: 2024 Household Income Distribution (in Inflation-Adjusted Dollars)



Source: American Community Survey, ACS 1-Year Supplemental Estimates, Table K201901

tend to skew more heavily female) when they reach retirement.

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

The Region had almost the exact same number of jobs in 2023 as 2010[18], with the same proportions of 78% service sector occupations (sales, office, management, business, science and arts) and 22% goods-related occupations (natural resources, construction, maintenance, production, transportation and freight).

According to the American Community Survey, between 2010 and 2023, wholesale trade (selling bulk goods to businesses) jobs decreased by 25%, retail trade (selling goods directly to consumers) jobs decreased by 9% and transportation, warehousing and utilities jobs decreased by 26.7%. Construction and public administration jobs both decreased by about 9%. Manufacturing jobs and professional, scientific, management, administrative and waste management jobs and other service jobs decreased about 3% each. Finance, insurance, real estate and renting and leasing jobs and information jobs increased 4.6% and 6.3% respectively. Agriculture, forestry, fishing, hunting and mining jobs increased 9.7%. Educational services, health care and social assistance jobs increased 10.8%. The largest growth was in arts, entertainment, recreation, accommodation and food service jobs, which increased 12.3%.

Agriculture

Agriculture as an industry is declining locally, with the Region losing on average one farm every two weeks. In 2022 Orange County had 527 farms, down from 748 farms in 2012. The average farm size was 166 acres, with 87,430 acres in farming, down from 110,415 acres in 2002. Orange County farms sold a combined $67 million worth of agricultural products in 2022, but only 40% of farms had net gain farm income. Comparatively, Windsor County had 687 farms in 2022, down from 768 in 2012. The average farm size was 123 acres, with 84,158 acres in farming, down from 112,638 in 2017. In 2022, Windsor County farms sold a combined $33.3 million worth of agricultural products, but only 32.8% of farms had net gain farm income. The average net farm income was $39,253 in Orange County and $4,683 in Windsor County.

Dairy remains a multimillion-dollar industry in both Orange and Windsor Counties, accounting for 64 percent of farm revenue for Orange County and 29 percent for Windsor County. To remain in operation, dairies have had to increase herd size, so while the numbers of dairy farms have decreased, milk sales have increased.

From 2012 to 2022, the number of farms with orchards decreased from 64 to 24 in Orange County, but grew from 46 to 49 in Windsor County. Both

Windsor and Orange Counties lost 15 Christmas tree farms each between 2012 and 2022.

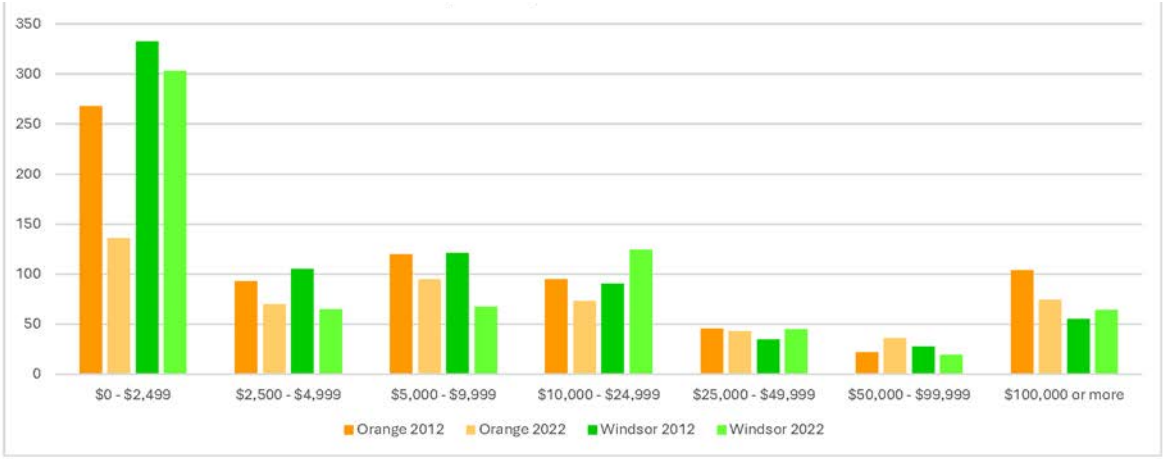
In our Region, the reduction in the number of farms occurred the most with small farms that sold less than 2,500 dollars' worth of products. From 2012 to 2022, the number of small-sized farms dropped nearly 50 percent in Orange County, though the change in Windsor County was less dramatic. While the 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 farmers embracing direct-to-consumer sales, on-farm events, participation in farmers markets, agritourism, and the production of value-added products. The State has limited regulation under local zoning and Act 250 of accessory on-farm businesses (AOFBs) in order to support such alternative income streams. The Court conclusion creates the opportunity for municipalities to regulate all aspects of farming that do not relate to water quality, upsetting the prior understanding that farming was exempt from municipal zoning regulations.[19]

Silviculture

Orange and Windsor counties are both over 75% wooded[20], though the entire state is losing forest cover every year due to development and land use conversion.[21] An estimated 38% of Vermont homes depend upon wood for either their primary or secondary source of heat.[22] There are major regional employers that rely on forestland products, such as Copeland Furniture in Bradford and the

Figure 5-3: Number of Farms by County and Volume of Sales in 2012 and 2022



Source: USDA Census of Agriculture 2012 and 2022

Maple Syrup Production | © Kevin Geiger

ShackletonThomas | ©Sarah Tucker

Pompanoosuc Mills Corporation in Thetford, each with a workforce between 100 and 249 people. Numerous smaller operations exist too, including local sawmills and lumberyards, firewood processors, maple sugaring businesses, and other furniture producers.

While the number of maple sugaring operations in Orange and Windsor Counties has declined by 35% since 2012, the number of taps had increased by 26% in 2022 and the gallons of syrup produced increased by 150%. This remarkable increase in productivity reflects improvements in sugaring technology including more widespread adoption of lines over buckets, vacuum pumps over gravity feed, and reverse osmosis to reduce the boiling time and energy. However, climate change may negatively impact maple syrup production with more unpredictable or shorter sap runs, blowdowns, drought, invasive species and declining sugar maple regeneration.[23]

The forestry industry is facing several headwinds. The Vermont Saw Mill Directory[24] lists 74 mills in operation, but an estimated 150 mills have closed since 2000.[25] Statewide forest harvest data show declining trends, with significantly lower log exports and increasing log imports.[26] Forest fragmentation into smaller parcels and changing public perception have made logging sites harder to come by. Warmer winter weather and increasing invasive species and tree diseases have made logging operations more difficult and less profitable. International demand for Vermont forest products has declined and landowners have less financial incentive to harvest wood. Experienced loggers are aging out of the profession and fewer young people are stepping into this hazardous and precarious, though necessary industry. The Natural Resource chapter provides more context on the role of responsible forest management in protecting and restoring habitat and biodiversity, as well as addressing threats to forests from invasive species.

Initiatives like the 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

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.

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 20 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 2023 the U.S. Bureau of Economic Analysis (BEA) Outdoor Recreation Satellite Account (ORSA) calculated that outdoor recreation generated $2.1 billion[27] for Vermont and employed 16,283 jobs. Vermont ranked 9th for economic activity from snow activities, but 50th for value added to the GDP from other outdoor recreation activities like RVing, boating/fishing.

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.

There is some tension between the housing shortage and the conversion of single-family housing to short-term vacation rentals. Sustainable economic development in our region will require balancing the needs of residents with the economic activity tourism supports.

Major Regional Employers

The TRO Region is home to several important economic activities that employ many of our residents. The largest sector (30%) in the Region is educational services and health care and social assistance, with academic institutions like Vermont Law and Graduate School and Vermont University, and medical centers like Gifford Medical Center and the VA Medical Center among the largest employers in the Region, along with Dartmouth-Hitchcock and Dartmouth College nearby. Retail, arts, entertainment, recreation, accommodation and food services combined are the next largest share of the local economy with 20% of regional jobs. Lake Morey Resort, the Woodstock Inn and Resort, and the Quechee Club are all large employers that contribute to this sector, along with numerous smaller businesses.

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

- **Space on Main (SOM)** – Space on Main (SOM) was 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. In 2025 SOM passed the torch to The Hub Teen & Community Center of Bradford. The transition has enabled The Hub to expand its offerings to local teenagers while still providing the community with access to affordable equipment, workspaces, and classes.

Source: Green Mountain Economic Development Corporation, 2024

D. Regional Challenges and Opportunity Areas for Economic Development

Telecommunications

Over 85% of Orange County and 99% of Windsor County locations are served by high speed internet (at least 100 Mbps download and at least 20 Mbps upload).[28] However, parts of the TRO Region, especially in Corinth, Topsham, and Newbury,[29] still need access to fast, affordable, and efficient Internet, data, and cellular technologies to promote business growth and attract prospective employees.

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 Housing chapter elaborates on this need and strategies to address the housing shortage.

Sewer and Water Supply

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 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 'brownfield' is typically an industrial or commercial property that is abandoned, idled or underused. These sites would likely be viable commercial, industrial or public use properties if they could be cleared of suspected contamination. 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 can help communities and businesses advance the revitalization process.

Municipal Support

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. Vague or poorly administered bylaws hinder developers making investment decisions. Towns that develop clear policies, invest in infrastructure (water, sewer, telecom, etc), facilitate affordable housing and educate well-rounded workforces will likely be successful in attracting and supporting local business development.

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 access to jobs and services difficult for people who are elderly or disabled or simply do not own a car. Many towns in the Region lack even a single transit stop. Only the area of Hartford near the state line has good transit service. For policies addressing this issue, please refer to Chapter 4 of this Plan.

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 Report20 and the Action Plan21 produced by the Vermont Creative Network (VCN)22 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)23 aims to boost economic prosperity and networking for creatives in east central Vermont.

Value-Added Agriculture and Forestry Products

While Vermont's dairy and maple products have successfully reached national, and even international markets, our Region's value-added food and forestry products have room to grow. As identified in the Vermont Agriculture and Food System Plan 2021-2030, opportunities include teaching entrepreneurial skillsets to young farmers, increasing collaboration with restaurants, and supporting processing facilities for small-scale producers. Innovative wood products and markets such as mass timber and advanced wood heat can increase flagging demand for Vermont wood while supporting forest health and forestry jobs.

E. The Future of Economic Development

A Vision for the Future

The 2025-2030 Comprehensive Economic Development Strategy (CEDS)[30], 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 focus 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. 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.

Every two years, the Vermont Department of Labor and the McClure Foundation publish "Vermont's Most Promising Jobs" which features more than 50 occupations expected to pay a median wage of over $30/hour with at least 300 openings over the next decade.[31] The 2025-2026 edition highlights careers as K-12 Teachers, Carpenters, Registered Nurses, and Waitstaff.

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. 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 and retaining 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 water quality and soil and forest health.

Policies

1. Public and private infrastructure shall be planned and funded to support our economy and 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 downtowns and village centers.
4. Economic development strategies between TRORC, ECVEDD, and other regional economic development consortiums should align to support a diverse and resilient regional economy. **(E=)**
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 technical assistance to further the development of desired job growth and workforce housing close to our Region's core economic areas. **(E=)**
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, with particular attention to services and amenities that are needed to attract and retain younger residents, such as childcare facilities and internet connectivity.
5. Public agencies, schools, and private businesses should expand workforce training and education, particularly trades education, that aligns with the strategic needs of our Region's current and future employers. **(E=)**
6. TRORC will work with regional partners to increase local small businesses' access to low-cost training in financial literacy and business management skills.

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

Recommendations (continued)

7. TRORC will work with the Vermont Arts Council to support regional and statewide creative zones.
8. 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.
9. 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.
10. TRORC should give testimony to the State legislature to advise on the matter of municipal zoning and the "agriculture exemption."
11. 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.
12. TRORC will work with regional partners to increase technical assistance and training opportunities for the next generation of working landscape entrepreneurs, including assistance in locating properties, incentives for starting and growing businesses, and inter-generational knowledge transfer.
13. 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.
14. 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 and farmland.
15. TRORC should support dialogue between social service providers, employers, and educators to develop innovative ways of collaborating to support workers, particularly low-wage workers, entry-level workers, and workers with significant barriers to employment (e.g., criminal records, recovery and/or mental health needs, long-term unemployment, racial and ethnic discrimination, etc.). Workers who would benefit from such initiatives should be invited and empowered to participate in their design and implementation. **(E=)**

Economic Development Endnotes

1 https://www.vtlmi.info/profile2025.pdf
2 https://publicassets.org/research-publications/state-of-working-vermont-2024
3 U.S. Census Bureau, U.S. Department of Commerce. "Means of Transportation to Work by Selected Characteristics." 2023 American Community Survey, ACS 1-Year Estimates Subject Tables, Table S0802
4 Concepts and Definitions (CPS) : U.S. Bureau of Labor Statistics https://www.bls.gov/cps/definitions.htm
5 https://www.vtlmi.info/profile2025.pdf
6 https://labor.vermont.gov/labor-market-information/county-data
7 S0101: Age and Sex - Census Bureau Table
8 https://www.vtlmi.info/profile2023.pdf
9 https://accd.vermont.gov/economic-development/programs/vtp
10 https://labor.vermont.gov/workforce-development
11 https://humanservices.vermont.gov/our-work/programs-services/financial-employment-security
12 https://publicassets.org/research-publications/state-of-working-vermont-2024
13 https://www.census.gov/data/datasets/time-series/demo/saipe/model-tables.html "Table: County SNAP benefits recipients Source: U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, December 2024, Project No. P-7502872 / Approval CB-DRB-FY25-0052."
14 https://publicassets.org/research-publications/state-of-working-vermont-2025#:~:text=Many%20Vermonters%E2%80%99%20incomes%20fall%20below%20the%20basic%20needs%20standard%20established%20by%20the%20state
15 https://dcf.vermont.gov/esd/resources/data, 3SqVT-County.pdf
16 https://outside.vermont.gov/dept/DCF/Shared%20Documents/ESD/Reports/3SVT-State-Outreach-Plan-FFY2024.pdf?_gl=1*uq72k2*_ga*M-jU4ODUyMjY4LjE3NjIxOTI3ODg.*_ga_V9WQH77KLW*czE3Njc3MjI1ODEkbzY1JGcxJHQxNzY3NzIyOTQzJGozNCRsMCRoMA
17 https://vtworksforwomen.org/wp-content/uploads/2025/12/WWW-2025-Mini-Report_-12.5.pdf
18 https://data.census.gov/table/ACSDP5Y2010.DP03?t=Industry&g=050XX00US50017,50027; https://data.census.gov/table/ACSDP5Y2023.DP03?t=Industry&g=050XX00US50017,50027
https://www.vermontjudiciary.org/sites/default/files/documents/op24-273.pdf
19 https://www.ruralvermont.org/from-the-statehouse-blog/2025/7/23/the-vermont-supreme-court-rules-that-farming-is-not-exempt-from-municipal-regulation
20 https://fpr.vermont.gov/sites/fpr/files/documents/VT2022resourceUpdateFIA.pdf
21 https://www.uvm.edu/d10-files/documents/2025-03/VTForestCarbonInventory2025.pdf
22 https://fpr.vermont.gov/forest/wood-energy
23 https://www.uvm.edu/uvmnews/news/how-climate-change-impacting-maple-syrup-industry
24 https://anrweb.vt.gov/FPR/vtFPR/SawMill.aspx
25 https://www.sevendaysvt.com/news/vermonts-sawmills-are-closing-which-is-bad-for-forests-43013550/
26 https://fpr.vermont.gov/sites/fpr/files/documents/Harvest_Report_2022.pdf
27 https://apps.bea.gov/data/special-topics/orsa/summary-sheets/ORSA%20-%20Vermont.pdf
28 https://publicservice.vermont.gov/telecommunications-and-connectivity/broadband-high-speed-internet-availability-vermont
29 Vermont 2025 Broadband Availability
30 https://www.ecvedd.org/wp-content/uploads/2025/06/CEDS_ECVEDD_2025_Final.pdf
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06 Natural Resources

Newbury Wells River | ©John Knox

A. Introduction

Natural resources form the foundation of our community, economy and ecosystem. Town Plans throughout the Region express the desire to maintain the rural character of their landscapes 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 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, substantial forest cover, 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. Surface Water

Background

Water is life. The streams, rivers, ponds, lakes and wetlands of the Region are critical resources for aquatic and terrestrial species, as well as our economic vitality and physical health. While some surface waters in the region retain high quality characteristics, many have been impacted negatively by development.

Water Quality and Classification

The Vermont Water Quality Standards (VWQS)[1] are rules that establish the goals of the Vermont

Water Quality Policy and implement the objectives of the federal Clean Water Act, which mandates the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. The 2022 VWQS[2] contain numeric and narrative criteria that describe the State's classification of all waters based on designated uses, which include Aquatic Biota, Aquatic Habitat, Aesthetics, Boating, Fishing, Swimming, Public Water Systems and Irrigation. In Vermont, designated uses are independently classified. This means that a waterbody may be classified by the State at different levels for individual uses, so long as the Class B2 minimum water quality conditions are maintained.

Table 6-1 Water Quality Classifications

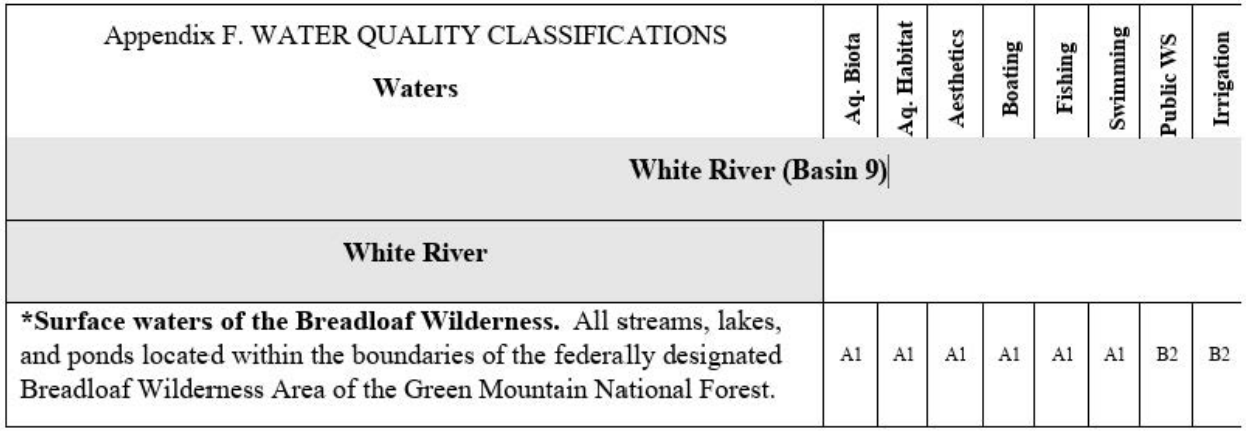
Class	Definition
A1	Excellent: Waters in a natural condition that have significant ecological value.
A2	Public Water Source: Waters that are suitable for a public water source with filtration and disinfection or other required treatment; character uniformly excellent.
B1	Very Good: Waters in which one or more uses are of demonstrably and consistently higher quality than Class B2 waters.
B2	Good: Waters that are suitable for swimming and other primary contact recreation; irrigation and agricultural uses; aquatic biota and aquatic habitat; good aesthetic value; boating, fishing, and other recreational uses and suitable for public water source with filtration and disinfection or other required treatment.

All waters above 2,500 feet are designated Class A1 and all waters below 2,500 feet are designated Class B2 unless specifically designated otherwise for any use. Class A1 waters are managed as very high-quality waters in excellent condition that have significant ecological values. Class A2 waters are managed as public drinking water supplies. Class B1 waters are managed as waters that are in very good condition. Despite data showing many small streams in the Region are B1 quality, most waters in the TRO Region are currently classified as Class B2 for good condition.

Surface waters classified as A1 in the TRO Region include all waters above 2,500 feet in elevation; all streams, lakes and ponds within the Breadloaf Wilderness Area of the Green Mountain National Forest; all streams, lakes and ponds within the Joseph Battell Wilderness Area of the Green Mountain National Forest; 33.3 miles of Bingo Brook and tributaries upstream of Kings Pond; and 6.8 miles of Smith Brook and tributaries upstream of Rt 73. 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 Waters can be designated by the Agency of Natural Resources for exceptional natural, recreational, cultural or scenic values. 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.

Figure 6-1 Example Water Quality Classification



Appendix F. WATER QUALITY CLASSIFICATIONS Waters	Aq. Biota	Aq. Habitat	Aesthetics	Boating	Fishing	Swimming	Public WS	Irrigation
White River (Basin 9)								
White River								
***Surface waters of the Breadloaf Wilderness.** All streams, lakes, and ponds located within the boundaries of the federally designated Breadloaf Wilderness Area of the Green Mountain National Forest.	A1	A1	A1	A1	A1	A1	B2	B2

Sources of Surface Water Degradation

The goals of the Vermont Surface Water Management Strategy (VSWMS)[3] are to:

- Protect, maintain, enhance, and restore the Biological, Chemical & Physical Integrity of all Surface Waters
- Support the Public Use and Enjoyment of Water Resources
- Protect the Public Health and Safety

Left to their own devices, surface waters establish equilibrium that balances inflows and outflows of water, sediments, nutrients and energy. However, Vermont's surface waters have been dramatically altered in recent centuries by deforestation, dams, channelization, and development. The VSWMS identifies 10 major stressors[4] that impact water quality:

1. Acidity[5]: acidification from atmospheric deposition or mine tailing runoff
2. Channel Erosion[6]: sedimentation and nutrient loading from erosion along banks
3. Encroachment[7]: degradation due to development in or along surface water
4. Flow Alteration[8]: degradation due to changing water volume, velocity
5. Invasive Species[9]: loss of habitat or recreation due to impacts of introduced species
6. Land Erosion[10]: sedimentation and nutrient loading from erosion across landscape
7. Nutrient Loading[11]: excess nitrogen and phosphorus from excess fertilization, animal and milk house wastes, or untreated domestic waste
8. Pathogens[12]: disease-causing bacteria, viruses and protozoa from agricultural runoff, malfunctioning septic systems, domestic and wildlife animal waste
9. Thermal Stress[13]: biological, chemical and physical impacts from loss of shading vegetation, impoundment of water and climate change
10. Toxic Substances[14]: harmful chemicals from atmospheric deposition, pesticides, contaminant releases, biological toxins, landfill leachate, mine tailing runoff

Point source pollution can be traced back to a specific pipe or location, such as untreated effluent from a farm or factory. Nonpoint source pollution is caused by runoff carrying contaminants across the landscape. Vermont has largely addressed point sources of pollution, so nonpoint sources are the main cause of surface water degradation. Runoff not only moves toxins, pathogens, sediments and nutrients, but also transfers heat from paved surfaces into waterways. Riparian buffers that protect or restore vegetation alongside surface waters slow runoff and allow for contaminants to filter out of the flow.

The removal of riparian buffer leads to habitat loss, streambank destabilization and erosion and flow alterations. Water withdrawals and hydroelectric dam operations are also causes of flow alterations.

The Wilder Dam, operated by Great River Hydro, is a major hydroelectric facility on the Connecticut River just north of White River Junction. The Wilder Dam's impoundment, or reservoir area, extends 45 miles upstream to the Town of Newbury. The reservoir fluctuates daily as Great Hydro River increases the rate of water to the turbines to generate electricity during peak periods. 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.

Some water quality stressors originate outside of the Region, such as acid rain and deposition of mercury from coal plant operations in the Midwest. However, in most cases, local actions can substantially improve conditions in impaired and altered waters.

Known and suspected problems are often detailed in the DEC's 303(d) List of Impaired Waters[15], but considerably more work is needed to identify problems in sufficient detail to undertake planning to address them.

A number of waters in the TRO Region are listed as impaired or altered on the Vermont Priority Waters List. The First, Second and Third Branches of the White River are listed for consistently elevated E. coli, some streams are impacted by leachate from legacy landfills or drainage from abandoned mines, and several streams are impacted by sedimentation and nutrient loading.

In lakes and ponds, recreational and development activities 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. 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.

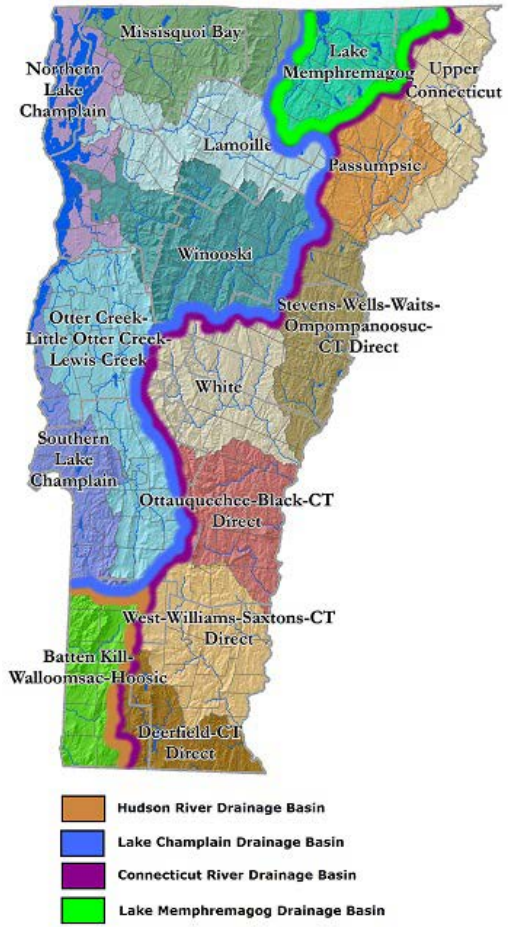
Watershed Management and Basin Planning

A watershed is all of the land that drains into a certain point. At the macro scale, Vermont has 4 major watersheds which drain to the Connecticut River, Lake Champlain, Lake Memphremagog and the Hudson River. The Vermont Watershed Management Division[16] of the Vermont Department of Environmental Conservation has divided these major watersheds into 17 smaller watershed basin areas[17] for tactical basin planning[18] and management purposes.

Almost all of the TRO region drains to the Connecticut River, either directly to the river or through its tributaries. The watershed basin areas in the TRO Region include the Ottauquechee River (part of Basin 10)[19], the White River (Basin 9)[20] and many smaller subwatersheds in Basin 14[21] including Waits River, Ompompanoosuc River, and Upper Connecticut River tributaries. Very small portions of Otter Creek (Basin 3)[22] and the Winooski River (Basin 8)[23] are also in the Region.

The Tactical Basin Plans combine water quality monitoring data, collaboration with natural resource management agencies and watershed stakeholders, watershed modeling, and public outreach in order to develop strategies to protect and restore waters. The result is a five year plan for each watershed and a Watershed Project Database.[24] TRORC is integrated into this basin planning process by statute. The White River Natural Resources Conservation District (WRNRCD)[25] and the Ottauquechee Natural Resources Conservation District (ONRCD)[26] are also involved in water quality planning and improvement. The basin plans form the basis for state implementation actions and should serve to coordinate stakeholders' efforts.

Figure 6-2: Watersheds and Basins



Source: Vermont Agency of Natural Resources

C. Groundwater

Virtually all of the Region relies upon groundwater 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, where surface water percolates into groundwater. 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 systems, where untreated sewage waste is directly discharged to a wetland or stream, are illegal but some are likely still in use. Naturally occurring arsenic and manganese also affect groundwater in parts of the Region.

The Vermont Groundwater Management Plan supports the following goal and three high level objectives:

Goal: Make actionable suggestions that ensure

groundwater resources are sustainable both in quantity and quality and that groundwater use does not harm water quality or unreasonably limit future Vermonters' access to these groundwater resources.

Objectives:

A) improve information available for groundwater management decisions,

B) protect public health and safety and the environment, and

C) expand communications.

The Groundwater Protection Rule and Strategy[27] establishes:

- A groundwater classification system;
- A process for groundwater reclassification;
- A set of standards for groundwater quality protection; and
- A regulatory program to ensure that activities that present a potential threat to groundwater are designed, managed, and permitted to protect groundwater resources, with preventative and corrective actions.

Groundwater sources are categorized into the following classifications:

Table 6-2: Groundwater Sources

Groundwater	Suitable Uses and Characteristics
Class I	Suitable for public water system. Character uniformly excellent. No exposure to activities which pose a risk to its current or potential use as a public water system.
Class II	Suitable for public water system. Character uniformly excellent but exposed to activities which may pose a risk to its current or potential use as a public water system.
Class III	Suitable as a source of water for a potable water supply, irrigation, agricultural use, and general industrial and commercial use.
Class IV	Not suitable as a source of water for a potable water supply but suitable for some agricultural, industrial, and commercial use, provided the Secretary may authorize, subject to conditions, use as a source of potable water supply or other use under a reclassification order issued for the aquifer.

Unless reclassified, all groundwater in the state is Class III. Contamination of groundwater supplies is exceedingly difficult to remediate and should be avoided at all costs. Hazardous materials[28] pose a major risk to water supplies. Remediation of contaminated sites[29], Source Protection Areas[30], well-driller licensing and reporting[31], wastewater permitting[32], required agricultural practices[33] and wetland conservation[34] and restoration[35] all help protect groundwater.

D. Soils and Minerals

Background

Vermont's soil and mineral resources formed over millennia of geologic processes and glacial activity, and have undergone rapid changes in recent centuries. Pre-settlement soils were largely undisturbed, protected by 97% forest cover interspersed with beaver ponds and beaver meadows. The indigenous Abenaki made use of easily accessible chert and floodplain soils. Settlement by European colonizers brought large-scale logging, tilling and grazing, quarrying and related erosion. Vermont has no native earthworm species, and invasive earthworms have changed soil chemistry throughout the state.

Soil Resources

In the wake of the Dust Bowl, the Natural Resources Conservation Service (NRCS)[36] started mapping soil types to improve management and prevent future devastation. The Soil Survey[37] maps show the boundaries of dominant soils types according to their USDA Soil Taxonomy,[38] along with information about their properties and suitability for various uses and management.

Vermont's Soil Survey[39] has mapped 384 distinct soil types. Soil types are further classified by their average slopes (commonly 0-3%, 3-8%, 8-15%, 15-25%, 25-60%) and notable rockiness such as "very stony" or "extremely bouldery" for over 1,100 distinct soil mapping unit names. While this level of detail is useful to soil scientists, the average person mainly wants to know what their soil is good for.

Many soil types in the Region are not suitable for development. Steep slopes are highly erosive. Hydric soils are saturated with water for most of the growing season and are indicative of wetlands. Many soil mapping units in are susceptible to flooding.

The Farmland Protection Policy Act[40] (FPPA, part of the 1981 Farm Bill) is intended to minimize the unnecessary and irreversible conversion of farmland to nonagricultural uses. As part of the FPPA implementation, the NRCS identifies high quality agricultural soils[41] as prime farmland, unique farmland, or land of statewide or local importance. Only 6% of the soil in Orange and Windsor counties meets the criteria[42] for Prime Farmland soils, but of that, 5% are frequently flooded (Prime(f)) and 8% is only prime if drainage is installed (Prime(b)) to mitigate severe wetness due to high water table in the cropping season. Just over 11% of Orange and Windsor County soils meet criteria for Farmland of State Importance, but of that almost 17% need artificial drainage (Statewide(b)) and over 1% have areas that are up to 15% slopes.

Just as flatter, deeper and better drained soils are more desirable for agriculture, they are also the most desirable soils for development. The Vermont Department of Environmental Conservation (DEC) has interpreted soil mapping units to generate On-site Sewage Disposal Ratings[43] based on soil permeability, slope, depth to bedrock and seasonal high water table. This means there is considerable overlap between primary agricultural soils and soils suited[44] for on-site sewage disposal and Vermont is losing farmland to development. (See Map 4 for soils data.)

The Land Use Chapter addresses the protection of agricultural lands while also meeting other development goals, but this primarily works only through Act 250. Local zoning and subdivision bylaws are a strong way to protect our precious arable lands. Vermont's Use Value Appraisal (UVA) program, also known as "Current Use," is a tax subsidy program allows landowners to enroll eligible farmland or forestland and pay taxes based on their "use value" rather than their commercial or development value. In 2026, enrolled agricultural land is valued at $537 per acre, which is substantially less than the assessed real value that would otherwise be taxed. To be eligible, agricultural land[45] must be:

- At least 25 contiguous acres of active agricultural use; or
- Smaller parcels which generate at least $2,000 annually from the sale of farm crops; or
- Actively used agricultural land owned by or leased by a farmer.

Parcels enrolled in the Use Value Appraisal Program reflect the lower Current Use valuation in their town's Grand List. The Current Use valuation results in lower municipal taxes and education taxes for owners of enrolled parcels.[46] The State then reimburses municipalities for this lost municipal tax revenue due to Current Use.[47] When a parcel is enrolled in Current Use, a contingent lien is place on the land to ensure that the Land Use Change Tax (LUCT), in addition to standard property taxes, is paid to the state if all or part of the land is unenrolled and developed. The LUCT is valued at 10% of the fair market value of the parcel that is developed. This penalty for conversion of lands in Current Use is much less than the recent increasing value of lands.

E. Mineral Resources

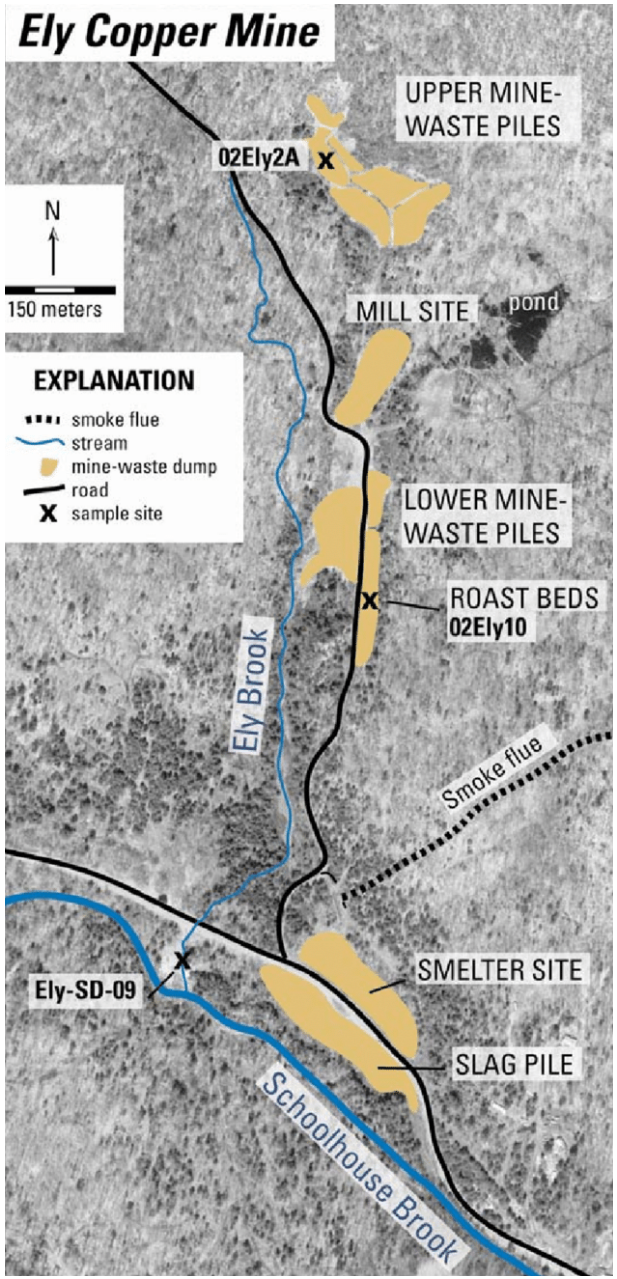
Background

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 mineral resources. 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



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

that cause aesthetically unpleasing conditions in the vicinity.

3. Traffic congestion and undue deterioration of 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 different 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 focus on PCBs in public buildings, PFAS in water supplies, and PCE in indoor air from old solvent products.

F. 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.

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 health and environmental quality.

Air Pollution

An "airshed" is a concept to describe how topography and meteorology can limit the dispersal of air pollution. For example, Los Angeles is still the smoggiest city in the US due to both the concentration of pollutant emissions and the city's location between the beach and the mountains, with temperature inversions that prevent the pollutants from dissipating.

Vermont typically enjoys good air quality, and

pollutants emitted within our Region typically disperse quickly, though sometimes it is possible to see a similar inversion to LA in lower valleys during wood stove season. However, 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. While local impacts from mid-Western coal plants have diminished with increased regulation, other impacts like Canadian or Californian wildfire smoke could continue to affect our Region. 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 over 70 percent of the Region's land forested [48], the vegetative cover 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.

G. Biodiversity and Natural Communities

Background

Just as fresh water, healthy soils and clean air are vital for human residents of the region, our natural communities also benefit from our efforts to protect and restore these vital resources. However, we would be remiss if we failed to appreciate the flora, fauna and fungi that share our landscape. We recognize the intrinsic value of each organism, and also the numerous ecological benefits we receive. The fungi and microbes build soil health, the vegetation cools our region and cleans our air, wildlife help maintain the balance and the natural world gifts us beauty and inspiration.

Natural Communities

Vermont's varied terrain and water resources host at least 97 distinct natural communities[49]. According to the Vermont Department of Fish and Wildlife, "Species migrate across the landscape over time, and many will move as the climate continues to change. Each natural community type thrives in specific physical settings. Some communities are generalists, like Northern Hardwood Forests, and can exist in a variety of conditions. Other communities, like Rich Fens, require just the right groundwater, topography, and bedrock. By protecting natural communities now, Vermont's varied bedrock and soil will help support the diversity of life over time, including species that migrate from other regions."

Vermont's natural communities are described by whether they are upland or wetland, their dominant vegetation, and notable species[50]. Natural communities are ranked by their rareness as follows:[51]

Table 6-3: Vermont Natural Communities

S1	very rare in the state, generally with fewer than five high quality occurrences
S2	rare in the state, occurring at a small number of sites or occupying a small total area in the state
S3	high quality examples are uncommon in the state, but not rare; the community is restricted in distribution for reasons of climate, geology, soils, or other physical factors, or many examples have been severely altered
S4	widespread in the state, but the number of high quality examples is low or the total acreage occupied by the community type is relatively small
S5	common and widespread in the state, with high quality examples easily found

Of Vermont's 97 natural communities, 32 are classified as Upland Forest, 15 are considered Open Uplands, 25 are Forested Wetlands and 25 are Open and Shrub Wetlands.

H. Upland Forests

Forest Cover

Forest is Vermont's dominant habitat, with recent forest coverage estimated at over 76%. However, this still represents a sharp decrease from the estimated 95% forest cover before European arrival.

The forest composition is also quite different today compared to the precolonial landscape. European arrivals to the Northern Forest wrote of "very tall and great timber[52]" from impressive oaks, elms, beeches, birches, and white pine trees up to 200 feet tall and 10 feet wide, which were claimed by King of Britain for ships masts and were pulled to harbor by teams of up to 200 oxen[53]. Some big trees[54] can still be found in Vermont, but they are not nearly as common as they were in the old-growth forest.

Figure 6-2: Estimates of Vermont forest cover over time from the arrival of Europeans to the present[72]

Year	Forest Area (Acres)	Forest %
1620	5,605,000	95.00%
1790	4,838,000	82.00%
1820	3,422,000	58.00%
1850	2,773,000	47.00%
1870	1,475,000	25.00%
1890	1,180,000	20.00%
1903	1,175,000	19.92%
1908	1,159,000	19.64%
1925	1,770,000	30.00%
2005	4,661,000	79.00%
2007	4,425,000	75.00%
2012	4,596,000	77.90%
2016	4,509,000	76.42%
2017	4,494,000	76.17%

Between clearcut logging, clearing pastures for sheep grazing and subsequent erosion, very little of Vermont's original forest remains. The trees we see today are the opportunists who were able to germinate and survive on deforested hillsides and abandoned pastures. The virtual deforestation of Vermont reached its peak in the early 1900s when less than 20% forest cover remained, only on the most inaccessible, wet or steep areas.

Forest Species Loss and Reintroduction

This dramatic habitat loss, exacerbated by over-hunting and bounties resulted in the complete extirpation of catamounts (1881) and wolves (1902), as well as turkey (1860), white tailed deer (1865), beaver, fisher, marten, lynx, moose, and passenger pigeons.

Game species were deliberately re-introduced, starting with deer in 1878, then beaver in 1921, fisher in 1959, turkey in 1969 and marten in 1989[55]. Coyotes moved into Vermont in 1948, taking advantage of the empty ecological niche left by the extirpation of wolves and catamounts. Vermont's forest ecosystem has recovered remarkably from profound destabilization.

Forest Fragmentation

Vermont's forest cover increased dramatically throughout the 20th century, but recently that trend has reversed. The new threat to forests is fragmentation due to development. As parcels are subdivided and new homes are built further into woodlands, habitat connectivity is compromised. Many of Vermont's forest dwellers, including bears, moose and lynx, require large territories and connectivity to enable juveniles to disperse and ensure genetic exchange. A 25 year study[56] of forest birds in Vermont revealed significant declines in 13 of 34 common species and a 45% decline in aerial insectivores. The Vermont Center for Ecostudies (VCE) attributes the decline to forest fragmentation, invasive species, climate change and acid deposition.

Forest Invasive Species

The integrity of forest habitat is threatened by invasive species. Balsam wooly adelgid, beech bark disease and beech leaf disease, chestnut blight, Dutch elm disease, hemlock wooly adelgid and hemlock scale, and emerald ash borer each target specific species of trees, which results in increased mortality and decreased regeneration. Chestnut and elm trees, which were once common in our forests, have virtually disappeared. Emerald ash borer may kill over 99% of mature ash trees. Spotted lanternfly, spongy moth, and other defoliators are less picky in their targets but can be devastating. Jumping worms and other invasive earthworms are dramatically changing the chemistry of forest soils by processing the organic matter much more quickly than ever before.

Climate Change Impacts to Forestry

As global climate change continues to escalate, warmer winters, hotter summers and more severe weather will continue to challenge Vermont forests. Climate conditions are changing faster than tree species can adapt. Earlier models of climate change predicted warming trends that would essentially shift climate conditions north and uphill, forcing species to relocate to stay in habitable zones in

a a phenomenon known as range migration (or range shifts[57]). It was predicted that, under the best climate scenario, the Northeastern United States would lose spruce/fir/paper birch type forests and that more oak/ hickory forests would move in, with assisted migration to compensate for forests' natural migration rate of 100 to 200 meters per year compared to the anticipated faster than 350 meter per year pace of climate change.

However, what we are seeing instead is more variability and unpredictability in seasonal weather patterns, from more intense and frequent freeze-thaw cycles, longer and colder polar vortices, more intense precipitation of all types, from heavy rain to freezing rain.

The species that have evolved over the last 15,000 years of stable climate in Vermont may no longer be the best suited for future survival in our state. Highly adaptable and vigorous invasive species are already outcompeting native species even under conditions that are more stable now than they will be in the future. Southern, warmer weather species may tolerate hotter summers better than Vermont natives, but might not survive the arctic extremes of recent winters. Our best chance for preserving a forested landscape will likely require proactive actions to foster increased biodiversity in desirable North American species while deterring monocultures of non-native invasive species.

Forest Management

While much of the forest has regrown and many species of wildlife in Vermont's forests are recovering from past practices, continuing management decisions must be made that could either help or hinder their progress. Many forest advocates agree that the goal is to reestablish old growth forest characteristics, but there is disagreement about how to get there. If given enough time, Vermont's young, even-age stands of successional growth from abandoned pastures could start to develop the complexity and carbon storing capacity typical of old growth forests. However, there is a need for local forest products for firewood to heat our homes and timber to build sorely needed new homes. There are responsible forestry and logging practices that can leave Vermont's woods better than they currently are by thinning overcompetition, cutting patches for regeneration, leaving slash for habitat, girdling or removing invasive species, leaving quality Vermont native seed trees and planting diverse and hardy North American species.

All logging, no matter the size, is required to be done in accordance with the Accepted Management Practices (AMPs) to prevent impacts to the environment, especially from sediment and runoff. Logging done to AMPs is presumed to meet water quality standards. Any violation of water quality standards should be reported to the State and can result in enforcement and fines. Forestry operations, including certain wood processing, are exempt from local zoning regulation as long as they comply with the AMPs. In Vermont, timber harvests above 2,500 feet in elevation trigger Act 250. Additionally, any heavy cutting of 40 acres or more requires a notice to the state and a permit. As noted above for agricultural soils, the Current Use program also serves to protect working forests through lowering annual property taxes. In addition to this, there is a new provision in the Current Use program for conserving forestland reserves that are managed to enhance ecological function, without a timber harvest requirement.[58]

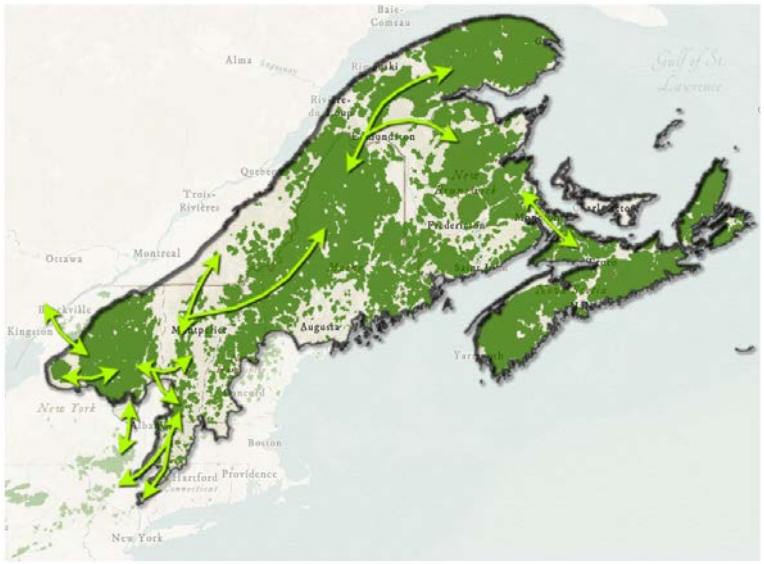
Vermont needs wood products, and it is best for our forests and the planet if the wood we consume is harvested from local forests and transported short distances for processing and use, which reduces fossil fuel combustion and prevents the further spread of invasive species.

Forest Conservation

To maintain a healthy forest ecosystem across the state and throughout the Northeast, there must be conservation of both large forest habitat blocks and also forested habitat connectors. The forested spine of the Green Mountains and large forest blocks in Vermont form a crucial crossroads for wildlife migration from the Northern Appalachian region to the Acadian region. The loss of forest connectivity in Vermont has bigger implications for wildlife in the entire Northeastern region.

The protection of forested landscapes must be addressed at the regional level and beyond. 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 all species. A large timber owner might conserve a sizable forest, but that does not support an industry or a bear or moose population. 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.

Figure 6-3: Staying Connected Initiative Map of Ecological Connectivity across the Northern Appalachian and Acadian Region



The TRORC Natural Resources map shows Vermont Conservation Design Highest Priority Forest Blocks and Connectivity Blocks in the TRO Region.

Chateauguay No Town (CNT)

The Chateauguay No Town (CNT) area exemplifies coherent forest conservation. This is a remote upland wilderness area consisting of approximately 55,000 acres covering parts of the Towns of Barnard, Bridgewater, Stockbridge, and Killington. Much of the CNT is 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. The Use Value Appraisal (UVA) Program, also known as the Current Use Program, helps keep land in forestry and farming through lower tax valuation for eligible acreage.

In late 1997, the Chateauguay No Town Conservation Project[59] 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.

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 bears 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[60] 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 were 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. The Brushwood Community Forest abuts the separate West Fairlee Town Forest and the 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

Coolidge State Forest (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 Department of Forests, Parks, and Recreation (FPR). CSF 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 Green Mountain National Forest (GMNF) is located within many TRORC towns, including Granville, Hancock, Rochester and Pittsfield along the well-known major GMNF habitat blocks along the spine of the Green Mountains and lesser-known smaller parcels along ridgelines through Stockbridge, Bridgewater, Barnard, Woodstock, Pomfret, Hartford, and Norwich. These 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, as well as laying a key foundation for east-west movement through the TRO Region.

Orange County Headwaters (OCH)

The Orange County Headwaters (OCH) Project was started in 2003 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, 34 OCH landowners have conserved 5,800 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 (see the recreation section in the Utilities and Facilities chapter).

I. Open Uplands

Vermont's open uplands include upland shores, upland meadows and bedrock outcrops and cliffs and talus. Most of Vermont tends to revert to forest, so open natural communities tend to have a specific environmental factor that deters tree growth, whether that is exposed bedrock, high altitudes, or shifting lands and riverbanks.

Upland Shores

The natural communities inhabiting openings along rivers, streams, lakes and ponds are likely among the most altered and human-impacted habitats in the state. Dams, river confinement, development and recreation have significantly affected the plants and animals that live along waterways. We will likely never know how many species have been lost from Upland Shores and they are crucial areas to protect for both wildlife and vegetation.

Alpine Meadows and Bedrock Outcrops

There are no alpine meadows in the TRO Region.

Bedrock outcrops are typically sparsely vegetated due to lack of soil, but can host rare and uncommon plants that have adapted to the inhospitable conditions.

Cliffs and Talus

Cliffs and talus are extreme environments, with greater than 60% slopes on exposed bedrock or the areas of rockfall underneath them. Peregrine falcons, reintroduced in 1977 and removed from the State Threatened and Endangered Species List in 2005, nest on exposed rock ledges of cliffs. The Fairlee cliffs are a well-known area for peregrine falcons. Ravens, who were also extirpated and are now common, nest on cliffs. Cliffs also shelter

eastern small-footed bats and eastern phoebes. Open talus provides important winter habitat for many species, especially snakes.

J. Wetlands

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

According to the 1996 National Wetland Inventory[61], Vermont was estimated to have about 243,000 acres of wetlands, about 4% of the state's total area. The Vermont State Wetlands Program estimates that historically the state had 341,000 acres of wetlands[62], so approximately 35% of the original wetlands have been drained, filled or developed.

Vermont state statute has protected significant wetlands since 1990, and the Vermont Wetland Rules categorize all wetlands into 3 classes. Class I wetlands are "exceptional or irreplaceable in its contribution to Vermont's natural heritage and therefore merit the highest level of protection. The Eshqua Bog in Hartland is the only Class 1 wetland in the Region.

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.

Any wetland that does not meet the criteria for Class I or Class II is considered a Class III wetland which is not protected under the Vermont Wetland Rules. Many smaller wetlands were not captured in the original National Wetlands Inventory, so the inventory is being updated with aerial imagery and LIDAR. 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 40 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.

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 Forested wetlands have also been recognized as containing critical spring food sources for black bears and other 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. . 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.

Vermont's forested wetlands (at least 25% tree cover) include floodplain forests, hardwood swamps, softwood swamps and seeps and vernal pools. Floodplain forests support amphibians, river otters, mink, beaver, raccoon, great blue heron and many other birds. They are also threatened by invasive species including Japanese knotweed, goutweed, garlic mustard, buckthorn, barberry and non-native honeysuckle. Hardwood swamps support salamanders, turtles, shrews, mink, black bears and many songbirds. Softwood swamps are dominated by conifers and support white tailed deer, porcupine, black bear, red squirrel, vole, hare and many songbirds. Woodland seeps are small wetlands with moving water from where groundwater emerges within upland forests. This habitat is critical for Northern dusky salamanders, spring salamanders and northern two-lined salamanders. Seeps are also important early spring food sources for black bear and woodcock.

Vernal pools are temporary aquatic habitat that form in shallow depressions in forests from spring snowmelt and rain runoff. This habitat is critical for invertebrates and amphibians, including wood frog, spotted salamander, Jefferson salamander, and blue-spotted salamander. The seasonal drying of vernal pools every summer is critical to ensure the habitat remains fish-free. 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' Vernal Pool Atlas, an interactive map showcasing almost 4,000 vernal pools.

Vermont's open and shrub wetlands include peatlands, marshes and shrub swamps, and have less than 25% tree cover. Open peatlands have stable water tables near the surface and generally do not flood seasonally. The vegetation is typically dominated by mosses, sedges and shrubs, with few stunted trees. These habitats support green frogs, songbirds and dragonflies with names like "ebony boghaunter" and "elfin skimmer." Marshes and sedge meadows have standing or slow-moving water with seasonally variable depth. Common plants include sedges, cattails, and bulrushes. Invasive species threatening these natural communities include purple loosestrife, reed canary grass, phragmites, water chestnut, and flowering rush. Shrub swamps tend to feature significant seasonal flooding with shrubs including speckled alder, willow, sweet gale, winterberry holly and buttonbush. These habitats support frogs, mink, moles, voles, ruffed grouse, woodcock, songbirds and the native ground-nesting bee Macropis nuda. Lastly, wet shores occur where there is seasonal flooding and scouring along the shores of rivers and lakes. These habitats support river otters, mink, raccoon, turtles, great blue herons and sandpipers. These areas can be very affected by dam operations and are susceptible to invasive species including purple loosestrife, flowering rush, Japanese knotweed, pigweed, and coltsfoot.

K. Fisheries and Aquatic Habitats

The Region's rivers and streams provide cold and warm water habitat for many species of fish.[63] 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.

L. Wildlife Conservation

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 species of wildlife cannot live where there is any amount of development, no matter how seemingly unobtrusive. This is why undisturbed interior forest blocks are so important.

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

Barred Owl at King Farm | *© Tory Littlefield*

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. Unless a project is in Act 250, an Intent-to-Cut Notification[64] 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.

Rare, 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)33, as well as being protected by the Federal Endangered Species Act (P.L. 93-205)34. The Vermont Department of Fish and Wildlife maintains lists of threatened or endangered plants and animals[65]. 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 Wildlife Diversity Program in the Department of Fish and Wildlife has identified and mapped special natural features, species and natural communities in the Vermont Natural Heritage Inventory. Several species of grassland birds, including the upland sandpiper and other endangered birds 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)[66] has recognized several species, such as the wood turtle, that are in decline and may soon become endangered.

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 (including plants, animals, fungi and pathogens) 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 disease that plagues Vermonters is Lyme disease,[67] which is spread through the bite from an infected blacklegged tick (other diseases can also be spread, but Lyme is the most prevalent). Vermont is well-known for its working landscapes and expansive outdoor recreational opportunities that span all seasons, which create exposure to infected ticks. There are many preventative measures that people can take to avoid contracting Lyme, such as wearing long socks and pants, using bug spray, and checking for ticks upon returning home. Reports of Lyme disease are increasing[68] and Vermont has the second-highest incidence rate[69] in the country (after Rhode Island, where the disease was first detected). Early diagnosis and treatment with antibiotics typically lead to a full recovery. Blacklegged ticks tend to acquire the Lyme disease pathogen (bacterium Borrelia burgdorfei) from small mammals and rodents, so forest fragmentation can increase Lyme transmission, while forest management that increases fox, bobcat, raccoon and opossum populations can decrease Lyme prevalence.[70]

Deer are plentiful in Vermont, and many Vermonters rely on wild game for food. Chronic wasting disease (CWD)[71], 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 is not currently transmissible to humans, 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.

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, restored 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. **(E=)**
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. **(E=)**
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 the 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 good quality waters based on existing and reasonably attainable uses as directed by water quality management goals.

Recommendations

1. Municipalities should 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. Municipalities in the Region are encouraged to cooperate on a watershed-wide basis when planning for surface water quality and use.
4. TRORC shall continue to participate in watershed and basin planning efforts.
5. The Vermont Department of Environmental Conservation's listing of threatened and impaired waters must be targeted for immediate attention by the Department. **(E=)**
6. 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.
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. 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.
9. 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.

Recommendations (continued)

10. 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.
11. 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.
12. TRORC will help Municipalities employ road maintenance techniques to prevent soil erosion and road surface deterioration to comply with the Municipal Roads General Permit.

Goal, 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 or 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 and Class 2 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. **(E=)**

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. **(E=)**
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: Soil Resources

Goals

1. Soil resources are managed for their highest and best use and long-term sustainability.
2. Primary agricultural soils are maintained for farming use.
3. Erosion is prevented.

Policies

1. Thoughtful conservation of Prime Farmland by landowners is encouraged.
2. Disturbance of highly erodible soils is discouraged.
3. Required Agricultural Practices and logging Acceptable Management Practices are supported.

Recommendations

1. Development should be concentrated in downtown centers, village centers and planned growth areas.
2. Municipal bylaws should avoid minimum lot sizes that can carve farmland in unusable sizes. Rather, it should be permissible to subdivide a small lot to split off a legacy farmhouse.
3. Municipal bylaws should guide development on prime soils to the margins of fields so that farming feasibility is maintained, even as haying or grazing leases.
4. Land trusts and conservation groups are encouraged to develop thoughtful easement terms that enable farm viability while conserving productive farmland and forestland soils.
5. The Current Use (Use Value Appraisal) Program should continue to fine-tune mechanisms to maintain the affordability of farmland and forestland ownership, with requirements for responsible use and management.

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 benefit 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:
        i. Extent of increase in heavy vehicular traffic;
        ii. Effects of weight loads on roadbeds and bridges;
        iii. Conflicts with pedestrians or bike users;
        iv. 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.

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 to cleaner burning models.
3. Wood burning as a method of disposal should be reduced.
4. Proposed developments must be reviewed for their direct and indirect impact on air quality.
5. 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. **(E=)**
6. Local education and enforcement activities are strongly encouraged to eliminate backyard burning of trash.
7. 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. **(E=)**
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 the Act 250 process in projects outside the Region that may significantly impact air quality within the Region.

Goals, Policies, and Recommendations: Biodiversity, Natural Communities and Wildlife Conservation

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. Public and private sectors should refrain from activities that spread invasive plants such as ill-timed roadside mowing or transporting invasive plants in ditch soil. Mowing and earthmoving equipment should be cleaned 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.
10. 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.
11. TRORC should work with municipalities to distribute information on Lyme disease and prevention.

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).
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. **(E=)**
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 (VPAtlas). 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.

Natural Resources Endnotes

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Natural Resources Endnotes

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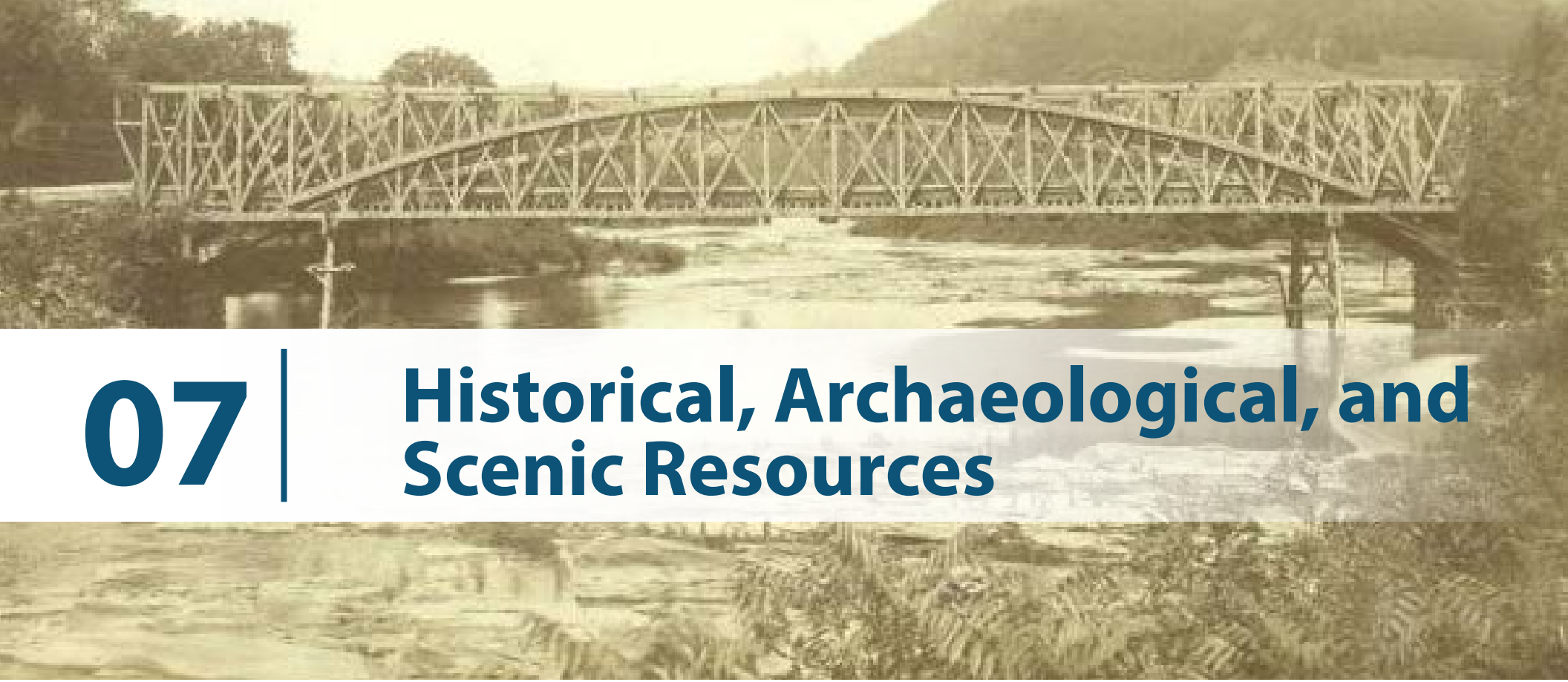


07 | Historical, Archaeological, and Scenic Resources

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

The landscape of the TRO Region hosts valued historical, archaeological and scenic resources. 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 means 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 for towns. Buildings of architectural merit help shape community identity. Preservation of important landmarks such as the Strafford Meeting House, Bridgewater Woolen Mill, Bethel Town Hall, and Fairlee Town Hall has 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—waste not, want not, make do or do without. Both 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

To aid in the preservation of the most notable historic resources, Congress in 1966 created the National Register of Historic Places[1], which is a

federally maintained list of culturally important districts, sites, buildings, and structures worthy of preservation. Inclusion in the Register offers a measure of protection under 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. Over 12,000 buildings, structures, sites and districts in Vermont are listed in the National Register[2], and many more are eligible to be listed.

More than 30,000 historic structures have been documented by the Agency of Commerce and Community Development's Historic Division under the Vermont Architectural Resource Inventory (VARI)[3]. VARI is a collection of survey information regarding properties of historic or architectural significance throughout Vermont. There are also state historic resource inventories for bridges, stone culverts, cemeteries and cultural landscapes.

Under the provisions of Section 106 of the National Historic Preservation Act[4], 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 National Register. In this case, the Vermont Agency of Transportation and the Federal Highway Administration were forced to waive modern 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 are actively involved in historic preservation and community development:

- Preservation Trust of Vermont[5]
- Division for Historic Preservation[6]
- Vermont Agency of Transportation[7]
- Vermont Downtown Program[8]
- Vermont Barn Preservation Grant Program[9]
- Vermont Historic Preservation Grant Program[10]

Local Historic Preservation Methods

Under the provisions of the Vermont Municipal Planning and Development Act (24 VSA §4414), municipalities can protect areas of historical significance by designating historic overlay districts[11] 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 impair the special character or significance of its surroundings.

For projects that fall under the jurisdiction of Act 250[12], Criterion 8[13] protects historic sites along with other rare and irreplaceable natural resources. See the Historical Preservation project review flowchart [14]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 Inventory, 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

The mile-high glaciers that had covered Vermont for 70,000 years began melting and retreating north 15,000 years ago. Archaeological evidence found throughout the State depicts a history of human occupation that dates back 13,000 years[15]. 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 archaeological record helps us understand how humans have lived on this landscape through the ages, and sheds light on past climates, natural communities, and ecosystem changes.

Although only a few archaeological sites in the Region have been designated on the Vermont Archaeological Inventory (VAI)[16], there are many areas whose topography and proximity to natural

resources indicate a likelihood of pre-European habitation. Most archaeological 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 archaeological importance; however, Act 250 only covers larger developments, and many archaeological sites may be located on private land. For areas of potential archaeological significance, private landowners need to know how best to preserve important resources on their land.

Since many archaeological 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 archaeological resources is limited. This is due partly to incomplete documentation of the resources, and partly to a narrow perception of what constitutes archaeological 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 archaeological resources would mean 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, with some of the finest examples of townscapes and rural scenic character in the world. Several blockbuster movies have been filmed in the Region, including Beetlejuice. 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 scenic 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.

Patterns for Development: A Community Standard

The aesthetic beauty of the Region is based on the visual relationship between historic town centers, the working landscape, and mountains and river valleys. Over the past fifty years, development patterns have emerged that propagate highway strip development, also known as sprawl, which detracts from the region's scenery. In addition to creating inefficiencies in services and undermining desired density and walkability, sprawl also destroys the valued traditional development character with clear transitions between town village centers and the countryside.

Meanwhile, the nature of the countryside is changing

Bradford Academy | © John Knox

as agricultural and forested lands are fragmented and developed. The region needs more housing, but also needs to support the viability of the working landscape to continue enjoying a landscape of functional farmland and forest habitat.

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

Prominent Scenic Landscapes

The following are likely to be areas of scenic significance:

1. Shorelands immediately adjacent to public lakes, rivers, or ponds;
2. Areas immediately adjacent to scenic corridors;
3. Prominent ridgelines, mountaintops, or 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. The TRO Region enjoys 3 designated scenic 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 has brought 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, as well as adverse impact on wildlife.[17]

In May 1996, the Chittenden County Regional Planning Commission published the Outdoor Lighting Manual for Vermont Municipalities.[18] The Manual explains how night vision works, common outdoor lighting issues and tools to achieve appropriate outdoor lighting. 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 like glare and darker shadows 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. 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 washes out the stars and diminishes our relationship with the night sky.

Cover of **Outdoor Lighting Manual for Vermont Municipalities** *(1996)* | *Source: Chittendenden 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).

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.
4. Local historical societies should continue research, documentation, education, and advocacy efforts.
5. Developers should incorporate historic structures and important architectural details into their project planning.

Goals, Policies, and Recommendations: Archaeological Resources

Goals

1. Archaeological 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 archaeological resource protection at the federal, state, regional, and local levels.

Policies

1. Existing archaeological resources must be protected where public interest is demonstrated. No land development should be permitted when it results in unnecessary loss of an archaeological resource.

2. Within archaeologically 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 archaeologist for further information.

3. To preserve significant archaeological 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 archaeological resources, TRORC encourages archaeologists, 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 archaeological 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 driveways;

   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, 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 are designed to conserve energy and minimize life cycle costs.

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. Lighting designs shall avoid sky glow through lighting plans that direct luminaries downwards and turn off unneeded lights after hours.
5. Excessively high lighting levels in rural or very low residential areas are inappropriate.
6. Lighting levels shall use the minimum necessary to achieve safety and security concerns.
7. Lighting schemes that serve as advertising or to attract attention are discouraged.
8. Illuminated signs that are excessively bright, causing glare and illuminating surrounding areas, are prohibited.

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.
3. TRORC will consider sponsorship of educational workshops for planning commissions, design professionals, and others to acquaint them with the principles of good lighting design.
4. 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.
5. 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

1 https://www.nps.gov/subjects/nationalregister/index.htm
2 https://accd.vermont.gov/historic-preservation/identifying-resources/nrhp
3 https://accd.vermont.gov/historic-preservation/identifying-resources/VARI
4 https://www.gsa.gov/real-estate/section-106-of-the-national-historic-preservation-act
5 https://www.ptvermont.org/
6 https://accd.vermont.gov/historic-preservation
7 https://vtrans.vermont.gov/highway/project-delivery-environmental/cultural-resources
8 https://accd.vermont.gov/community-development/designation-programs/downtowns
9 https://accd.vermont.gov/historic-preservation/funding/barn-grants
10 https://accd.vermont.gov/historic-preservation/funding/historic-preservation-grants
11 https://legislature.vermont.gov/statutes/section/24/117/04414#:~:text=(F)%20Local%20historic%20districts%20and%20landmarks
12 https://act250.vermont.gov/act250-permit/criteria
13 https://accd.vermont.gov/historic-preservation/resources-rules/laws-regulations/act-250
14 https://outside.vermont.gov/agency/ACCD/ACCD_Web_Docs/HP/Review_%26_Compliance/2018_Permitting_Flow_Chart-v1-2-WEB.pdf
15 https://accd.vermont.gov/historic-preservation/archaeology-center
16 https://accd.vermont.gov/historic-preservation/vermont-archaeological-inventory
17 https://www.nwf.org/Magazines/National-Wildlife/2023/Summer/Conservation/Light-Pollution-Wildlife
18 https://studiesandreports.ccrpcvt.org/wp-content/uploads/2017/01/vt_outdoor_lighting_manual_1996.pdf

08 | Homes in the Region

Chelsea | © John Knox

A. Background

Our homes are the foundation of our lives. Beyond shelter, they also form the basis of our health, our relationship to our community, and our access to necessary services and opportunities. For homes to meet residents' needs they must be affordable, healthy, safe, appropriate, and located well.

Statute requires that the housing element of the Regional Plan identify "the regional and community-level need for housing that will result in an adequate supply of building code and energy code compliant homes where most households spend not more than 30 percent of their income on housing and not more than 15 percent on transportation."[1] This need is identified through the use of state-level and US Census data, and the 2025 Vermont Housing Needs Assessment (VHNA), including incorporation of the regional housing targets provided in the VHNA.

Home affordability is defined in two ways. Homes that are 'affordable', be they rented or owned, require no more than 30% of a household's income, regardless of income. Of the ~25,000 households in the region, ~6,800 have homes that fail this test,[2] stressing people's finances and resulting in real impacts to their lives. However, some of these are higher income households that have high housing costs. "Affordable housing" is a statutory term that Vermont defines as an owned home that does not cost more than 30% of the gross income of a household at 120% of the county median income (or the state median income, whichever is higher); or a rented home that does not cost more than 30% of the gross income of a household at 80% of the county median income (or the state median income, whichever is higher).[3] This Plan uses homes that are "affordable" to cover housing needs across the income spectrum, and "affordable housing" as defined by statute.

Many of our households live in what the Department of Housing and Urban Development terms "inadequate housing." These units may lack plumbing, heating, electricity, or may have

substantial structural issues related to upkeep.[4] Local data on these conditions is limited, but with ~26% of the region's housing stock built prior to 1939,[5] much of our aging housing stock is likely in need of some repair, investment, or hazard abatement. This can have a disproportionate impact on older residents, who are often on fixed incomes and may be financially burdened by the upkeep and repair costs associated with older homes. We know that approximately 6% of our homes are in floodprone areas, and this is likely a low estimate, as many homes not in the mapped floodplain are prone to flooding. Many residents are living in homes that are not appropriate to their condition, especially those residents with physical limitations, and this situation worsens daily as our population of older adults rapidly expands. Many residents have had to choose homes that are too far from services or work, resulting in longer commutes, increased transportation costs, less quality time with family, and greater isolation.

This overall housing situation means thousands of households in the Region are making choices every day that they would not have to make in a world that meets Vermont's planning goals. Therefore, what is loosely called our 'housing system' where homes in their various forms are built and bought or rented, is not functioning in a way that meets people's needs.

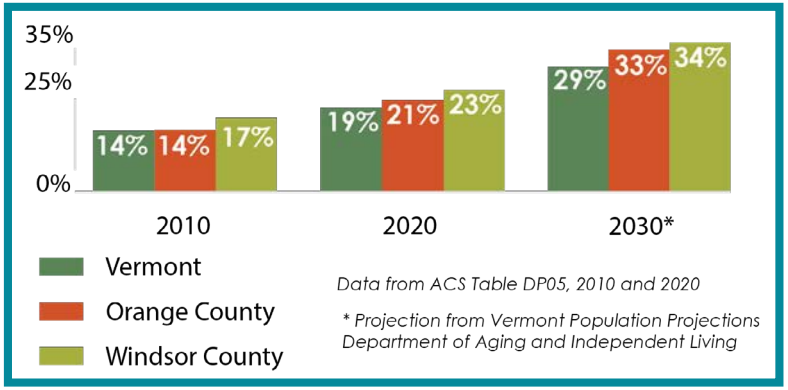
This dysfunctional housing system is mostly thought of as a private problem, and it is in many ways, but it is also a public problem. People get sick and the public has to absorb their medical debt, new families can't find a home so schools close, businesses lose workers and downtowns wither, commuters have to drive longer distances causing wear on roads and increased transportation costs, and some people lose their home to eviction, foreclosure, or condemnation, becoming homeless and dependent on public resources.

Vermont's planning goals explicitly require municipalities and TRORC to address these housing issues in plans. With this responsibility comes very little authority and essentially no money. However, there are steps towns and TRORC can take to help with housing, and especially to avoid making the problem worse. This chapter does not pretend that it will fix our housing problems, many of which are not fixable at the regional scale, but we can at least apply a planning lens to contextualize the problems, accurately frame the deficit of homes, and provide direction to what minor solutions are available in the public sphere. Unfortunately, there is no silver bullet solution locally or at the State level that will significantly lower the cost of homes and make enough available in the price range for those who need them. However, we have the obligation to use what few tools we do have to at least make the housing system marginally better.

B. Demographics and Housing

Today, the homes in our region do not align with the changing needs of our households. Vermont's demographics attest to this. The State's population is aging, with the elderly population expected to increase 103,000 by 2030, making up approximately 29% of the State's population.

Figure 8-1: Population over the Age of 65

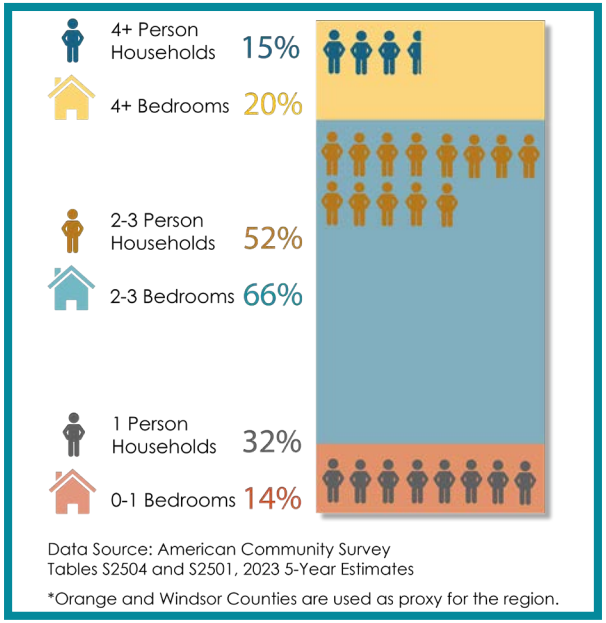


Within our region, we will see a comparable increase in residents over 65, from approximately 20,000 in 2020 to over 24,500 in 2030 (see Figure 8-1). Vermont's older adults would benefit from being able to downsize to smaller homes that enable aging-in-place (single floors, wider doors, grab bars and accessible shower units, smaller yards, etc.), but our communities lack many of these smaller housing options.

A second demographic trend is the steady decline in household size over the decades. Currently, nearly 85% of households just have between 1 and 3 persons, with the overall average close to 2 people per household (see Figure 8-2). While we have a large number of 2–3-bedroom homes, we have very few 0–1-bedroom homes to accommodate the many small households. This means these smaller households must often live in larger homes, taking on the higher maintenance costs, heating, taxes, rents and other expenses that these larger homes typically require.

Finally, as large shares of our population reach

Figure 8-2: Regional Housing Stock vs. Housing Need



retirement age, our region will need to find ways to attract and retain younger households to fill the employment opportunities left open by retirees leaving the job market. Without suitable housing options, younger households will decide not to move to the region, resulting in direct economic losses as jobs go unfilled, the tax base narrows, and school enrollment dwindles. Increasing the availability of 1- and 2-bedroom homes is crucial to meet the needs of both the younger residents looking to move to the area for employment, as well as the older, retirement age residents looking to downsize and remain in the community. It is likely that a larger proportion of our region's housing target should include the creation of these smaller 1- and 2-bedroom homes.[6] Whether these are small starter homes, accessory dwelling units, apartments, or condominiums, what is important is that the housing available reflects the needs of residents. If households can't find the home they are looking for, or the home they can afford, they will look elsewhere. Or, in the case of older adults, stay in a home that is larger and often more expensive than what they need or can afford.

C. Current and Prospective Characteristics of Our Homes

In 2024, as part of a sweeping legislation covering Act 250 and community resilience (Act 181), the State of Vermont published regional housing targets, estimating the quantity of new homes needed by region across the State by 2030. Regional Planning Commissions have been tasked with disaggregating the regional housing targets by municipality, and ensuring that our 'core settlements' (Village Centers, Downtown Centers, Planned Growth Areas, Village Areas, Transition/Infill Areas) can accommodate most of this housing need based on these state targets. To meet the expected housing demand of new households, and to help offset some of the high housing costs already being felt by many households in our region, we are looking at an estimated 2,400-3,640 new housing units across the region by 2030, and an additional 7,700-15,000 by 2050.[7] TRORC is using the 2030 target for the data presented in this chapter.

It is important to emphasize that the regional housing target is just that: a target. This Plan and its housing targets do not actually build homes, nor do they have any direct means to make this vision a reality. But the housing need is real, and this Plan is a first step in making that happen. We must also emphasize that we will not meet our goal of 3,640 units by 2030. To do so would require an average increase of nearly 10% of new housing units across the region by 2030. In stark contrast, the region saw less than a 1% increase in housing units between 2010 and 2020. Furthermore, this goal does not account for the ~6,800 households in the region that cannot afford the housing they currently live in. TRORC used the high range of the regional target since our deficit of housing that residents can afford is actually much higher than indicated by the State, as over a quarter of our region's households face cost burden or severe cost burden in paying for their housing.[8]

TRORC is tasked with breaking the regional housing target into municipal targets. We have done this proportionally, primarily based on each municipality's share of population. However, certain modifiers were used to increase or decrease that share. If a town has interstate access and has local water or wastewater infrastructure, the housing target was increased by 15%. If a town only meets one of these, it does not change. If a town has neither access to the interstate nor local infrastructure, the target was reduced by 30%.

As a result of the weighting and disaggregation, nearly 80% of our region's housing target is concentrated in the 13 towns with access to water, wastewater infrastructure, or both (see Figure 8-3). These 13 towns have existing infrastructure that can allow for a much greater level of density than our region's 17 more rural towns. Nearly 1/3 of the housing target is located in the two towns in the

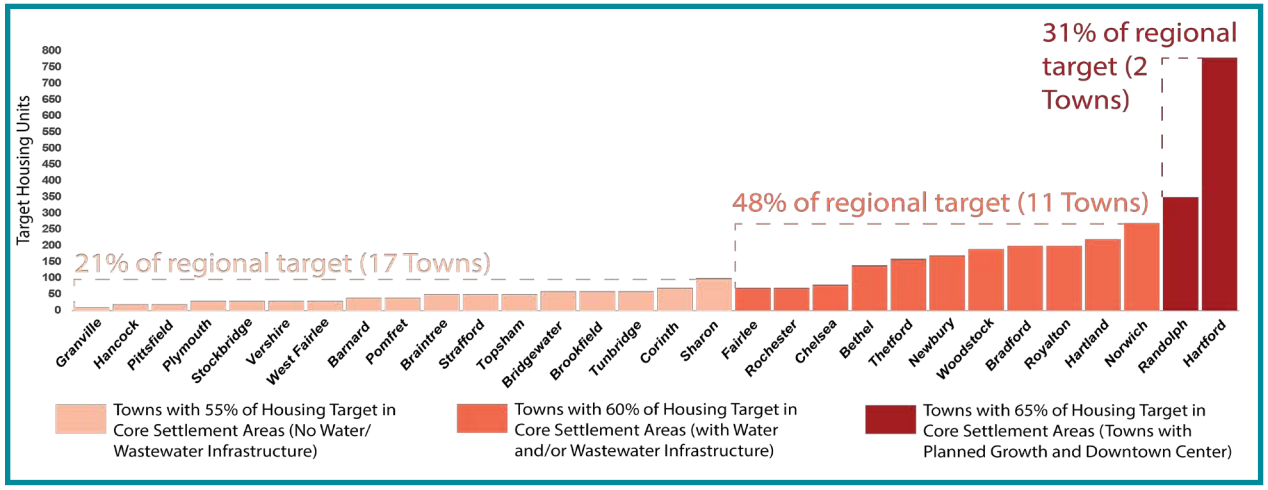
region with Downtown Centers and Planned Growth Areas: Randolph and Hartford. A few towns, such as Hartland, Norwich, and Thetford, have large populations and direct access to the interstate, though lack wastewater infrastructure. Thetford and Hartland have small, private water systems, so this infrastructure is not widely available and may not have additional capacity or the potential to expand. Most of our region's least populous and more rural towns comprise 1% or less each of the overall housing target. See Figure 8-4 below for the housing target provided for each town.

The need for housing units is not just disaggregated at the Town level, but by areas within Towns. TRORC is required by Statute to ensure that our Plan supports that a substantial majority of the housing unit targets be located in core settlements. For TRORC, this is between 55-65% of the target depending on whether towns have local infrastructure (water/ wastewater), or whether they have a Downtown Center and Planned Growth Area. See Figure 8-4 for a detailed breakdown of the housing percentage within core settlements.

In total, 60% of the 2030 regional housing target could and should be located in core settlements, while 40% should be located in rural areas, primarily the Rural General Future Land Use Area. Approximately 1/3 of the housing target planned to be located within the core settlements is expected to be in the towns with Planned Growth Areas and Downtown Centers (Hartford and Randolph), over 50% in towns that have some infrastructure (11 towns), and the remainder being located in the core settlements of the remaining 17 towns (Figure 8-5). As a result, on our Future Land Use Map most of our town's core settlement areas have expanded, allowing for adequate space for new housing (see the Land Use chapter). In rural areas, we expect the majority of new housing to be located in Rural General (75%). This largely aligns with the current housing unit breakdown in the three rural areas, with 67% of housing currently located in Rural General, 32% in Rural Agriculture and Forestry, and 1% in Rural Conservation. For the breakdown of disaggregated housing units by town, see Figure 8-4.

The current reality is that most existing housing is located in rural areas (~70%), while only ~30% is located in core settlement areas.[9] This is the opposite of State and regional goals. The Regional Plan supports a flip of this breakdown where a substantial majority of new housing is built in our core settlements, while acknowledging that the historic residential development trend has been one of incremental rural residential sprawl. Reversing this trend will involve the need to develop or expand infrastructure in our core settlements to facilitate higher densities and the construction of smaller, more affordable units, reexamine land use plans and bylaws, and create new financial incentives.

Figure 8-3: Two Rivers-Ottauquechee Region Housing Targets, 2030



D. Housing and Transportation

The cost of housing is closely tied to transportation. Often, homes and land become more affordable in areas further from our economic and commercial centers. However, this increased affordability often comes with additional expenses, including vehicle maintenance costs, fuel prices, and the time per day spent commuting. The 15 towns with the highest percentage of commuters (>68%) are all located some distance from the region's economic centers. The towns with the highest commuting population (>80%), include Braintree, Vershire, West Fairlee, Bridgewater, Topsham and Hancock.[10] Transportation costs, especially for residents who

Figure 8-4: TRORC Regional Housing Targets

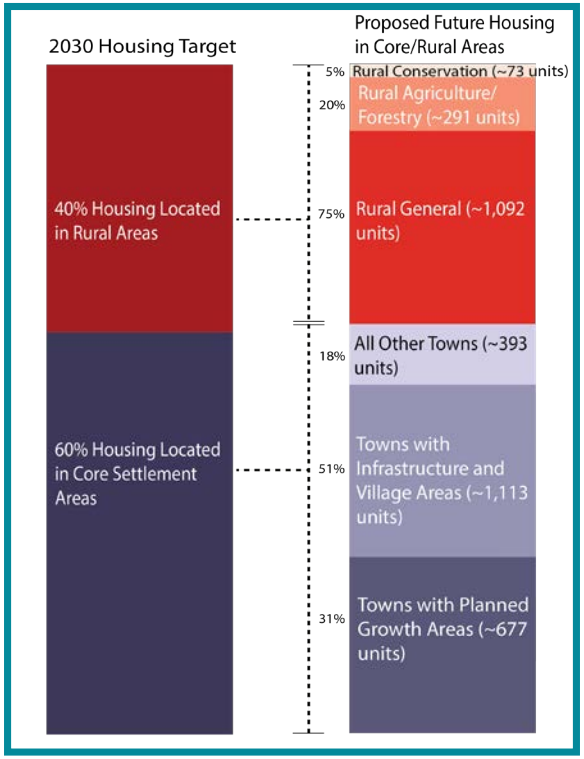
2030 TRORC Region Housing Targets			
Town	Townwide	55% in Core Settlements (Towns with no Infrastructure)	% of Region
Granville	10	6	0.3%
Hancock	20	11	0.5%
Pittsfield	20	11	0.5%
Plymouth	30	17	0.8%
Stockbridge	30	17	0.8%
Vershire	30	17	0.8%
W. Fairlee	30	17	0.8%
Barnard	40	22	1.1%
Pomfret	40	22	1.1%
Braintree	50	28	1.4%
Strafford	50	28	1.4%
Topsham	50	28	1.4%
Bridgewater	60	33	1.6%
Brookfield	60	33	1.6%
Tunbridge	60	33	1.6%
Corinth	70	39	1.9%
Sharon	100	60	2.7%
Town	Townwide	60% in Core Settlements (Towns with Water and/or Wastewater Infrastructure)	% of Region
Fairlee	70	42	1.9%
Rochester	70	42	1.9%
Chelsea	80	48	2.2%
Bethel	140	84	3.8%
Thetford	160	96	4.4%
Newbury	170	102	4.7%
Woodstock	190	114	5.2%
Bradford	200	120	5.5%
Royalton	200	120	5.5%
Hartland	220	132	6.0%
Norwich	270	162	7.4%
Town	Townwide	65% in Towns with Downtown Centers and Planned growth Areas	% of Region
Randolph	350	227	9.6%
Hartford	780	507	21.3%

rely on a private vehicle for transportation to work and to access services and amenities, can often offset the savings residents would otherwise accrue living further from their place of work or commerce.

While housing can occur in any of the Regional Future Land Use Areas, the Regional Plan adheres to the State Planning Goals and Smart Growth Principles that support new and infill development in and adjacent to our traditional centers and core settlements.[11] Supporting growth in these areas, especially for moderate and high density housing, allows for more pedestrian-oriented development and reduced reliance on vehicle ownership for transportation. Many of these traditional centers are already served by public transit, primarily through Tri-Valley Transit and Advance Transit. Bus routes through Tri-Valley Transit provide a commuter option for many village centers in the region, including South Braintree, Rochester, Tunbridge, Chelsea, South Strafford, Fairlee, and others.

The availability of Park and Rides throughout the region can also help reduce transportation costs by giving residents the option to coordinate group travel and put less wear on their vehicles over time. While public transit and park and rides are available in many towns, there is still a heavy reliance on personal vehicles for most travel. Over time, increased housing options in our core settlements can enable for more residents to go car-free, can enrich the lives of those without cars, or reduce their reliance on a car for daily travel needs.

Figure 8-5: Desired Location of New Housing



E. Act 181 Considerations

As required by Act 181, the Regional Plan must also estimate the total needed housing investments, including price, quality, unit size or type, and zoning district. These are outlined below.

Affording a Home

The price of housing is a significant factor limiting residents' capacity to afford the home in which they live, either to rent or to own. When viewed in terms of affordability for the median-income resident in

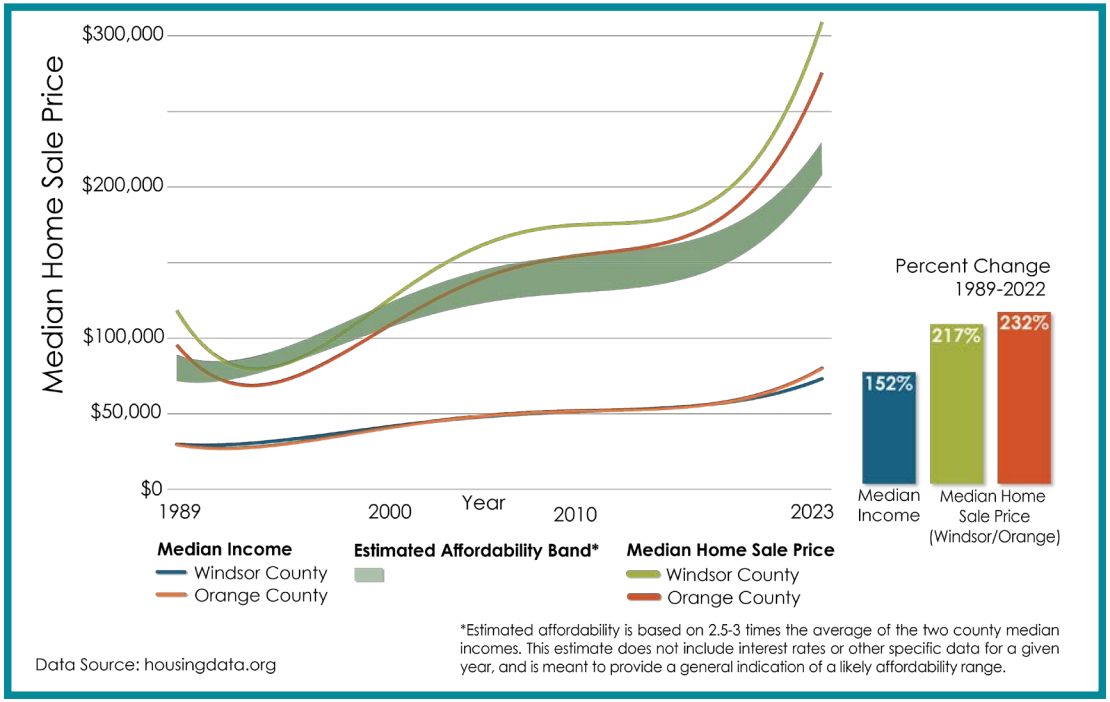
the Region's towns, most of the housing stock is valued in excess of residents' financial grasp – the average person can no longer afford the average home. This is true across all towns (See Table 17, Appendix E). This gap in affordability is largely due to the steep rise in home prices over the past several years, coupled with limited wage growth.

A higher percentage of household income devoted to housing costs has repercussions that trickle throughout the economy. Since 2019, the median home sale price in Vermont has increased by over 50%, according to data TRORC compiled from VHFA. In this same period, median income has only increased by 20%. This is a continuation of a long-term trend where incomes have not kept pace with the rising cost of homes (Figure 8-6).

To break this down a little more, between 1989 and 2000, homes in Windsor and Orange Counties were generally affordable. However, around the year 2000, the sale price of homes in Windsor County began to outpace residents' capacity to afford them, and have remained unaffordable since. Homes in Orange County continued to remain more affordable for several more years, though barely, up until the pandemic when these home prices also jumped sharply and has stayed well above what most residents can reasonably afford.

To put it another way, a household in Windsor County at the 2023 median income, could afford to spend approximately $224,000 on a home and not face a cost burden. Yet, the median home sale price was $315,000 in 2023, indicating a gap of over $90,000 to make the average home affordable to the typical household. If we want the housing in our current regional housing target for 2030 to be affordable to own for those at median income, then over $250,000,000 in public funding is needed to bridge the gap, in just the next four years. This is assuming we continue with approximately a 78% homeownership rate, and that most new units are single-family and built to own. Importantly, this is just an indicator of the affordability gap, and does not account for additional demand or how to meet it. In all likelihood, home prices would continue to increase if homeownership were made more viable through financial assistance, without adequately addressing the slow housing production in recent years.

Figure 8-6: Home Sale Price to Median Income



Getting an accurate picture of rental costs is more challenging, but the data indicates that those who rent experience much higher rates of cost burden and severe cost burden than those who own (Figure 8-7). Given the higher prevalence of cost burden among renters, it is likely that a higher proportion of affordable rental units is needed, especially for those residents who may be disproportionately impacted by housing costs.

We also know that across Vermont, minorities make up a higher percentage of renters as a subset of the population than white residents.[12] While minorities make up a small overall percentage of residents, they face a disproportionate level of cost-burden when it comes to meeting their housing needs. Similarly,

42% and 39% of renter households in Windsor and Orange Counties respectively are between 25 and 44 years of age, indicating that younger households are likely also disproportionately impacted by high housing costs than other age groups.[13]

The 2025 Vermont Housing Needs Assessment shows that for Windsor and Orange Counties, the median home sale price was 6.2 and 6.4 times the median renter income. To maintain affordability, housing costs should not exceed 3.67 times the median income. What this indicates is that most renters could not purchase a home on the market today. Many renters, therefore, are unable to take advantage of, or must delay building, generational wealth and equity through a long-term investment in a home. For rental unit and cost breakdown by town, see Table 18, Appendix E.

Median gross rents for Orange and Windsor counties were estimated at $1,145 and $1,089 respectively, based on available American Community Survey data for 2023. These estimates are likely low, but more accurate data on median or average rent is not available. In 2024, Zillow began publishing its Observed Rent Index for the Lebanon Metro Area. It is still too early to begin ascertaining trends, but the Zillow index does show generally higher monthly rent costs than the ACS numbers, and it could provide a useful complementary estimate to the ACS data in the future.

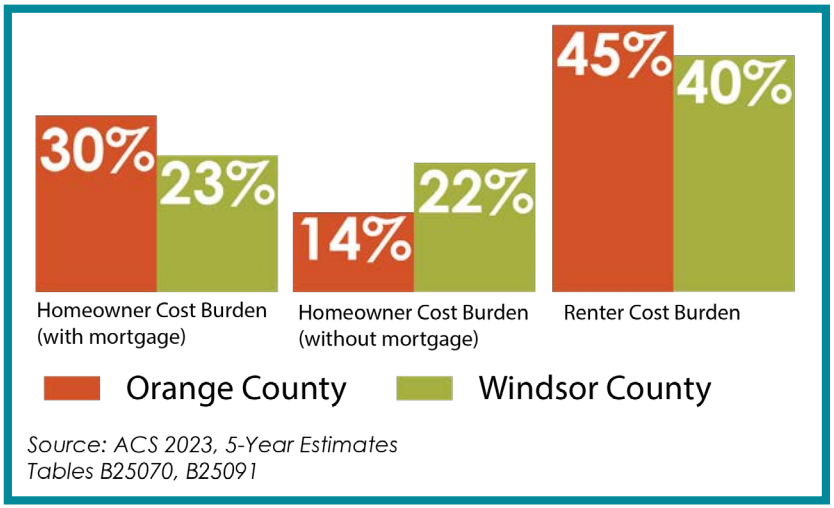
Some local employers, such as Dartmouth, the Co-op Food Stores, the Woodstock Inn, and others have made efforts in recent years to develop workforce housing, which lends recognition to the challenge local employers are facing to attain and retain local workers.

The Quality of Our Homes

There is no accurate data source we can rely on to assess the quality of our homes. What we do know is that much of our housing stock is older. Aging and older homes can present challenges for the homeowner. Older homes often have higher maintenance costs. The roof or septic system might need replacing. The furnace might give out, or the foundation might need costly repair. There may also be known and unknown hazards from materials used many decades ago. The presence of lead paint is very common in many older homes. Furthermore, older homes are often less energy-efficient, leading to higher utility and heating bills, especially in the winter months. State level programs exist to support weatherization and the transition to heat pump energy systems. These programs often still require large funding contributions by homeowners. The high cost of housing and level of cost burden across the region impede uptake of these incentives, especially as property owners prioritize more immediate needs such as food, healthcare, and transportation.

Local organizations, such as COVER Home Repair, Southeastern Vermont Community Action (SEVCA), Capstone Community Action, and others, can assist with home repairs and weatherization for low-income homeowners. With a high percentage of older housing stock, this work is critical to keeping housing units online, improve living conditions, and to prevent the loss of units through disrepair or neglect.

Figure 8-7: Cost Burden



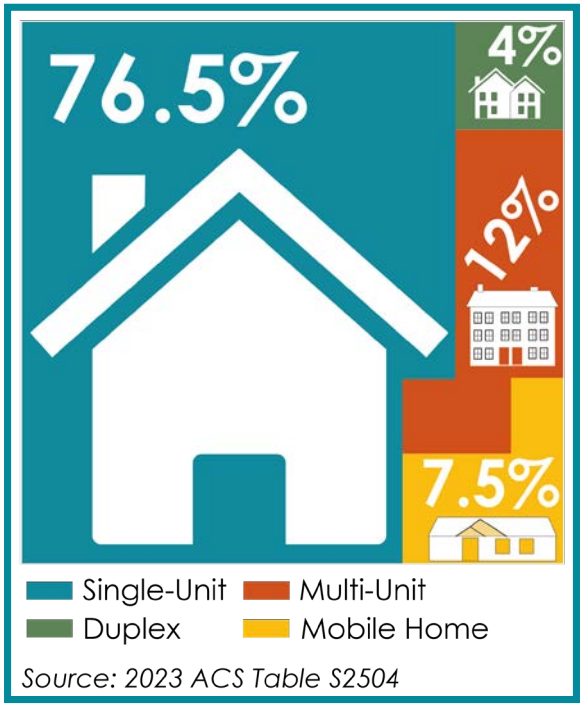
Source: ACS 2023, 5-Year Estimates Tables B25070, B25091

Aging in place can be costly for senior residents living in older homes. Often, these homes are not built with the accommodations needed for older residents, especially the high percentage of those living alone. Expensive renovations are often needed to make homes wheelchair accessible, retrofit bathrooms and entryways with grab bars or hand rails, replacing flooring, and making other necessary upgrades. While this work is critical, there are limited support options available for residents who need to undertake these sorts of upgrades.

To address energy concerns, new construction and renovations must be in compliance with the

Residential Building Energy Standards (RBES) for new single-family homes as required by State Statute, but enforcement of this is limited, and often property owners or contractors can self-certify compliance. Aside from the RBES, there is no standard building code compliance for new single-family residences in Vermont. Building codes apply to all other occupied buildings. While building code compliance can ensure better building and design outcomes for new homes, it adds to the upfront costs.

Figure 8-8: Current Types of Housing



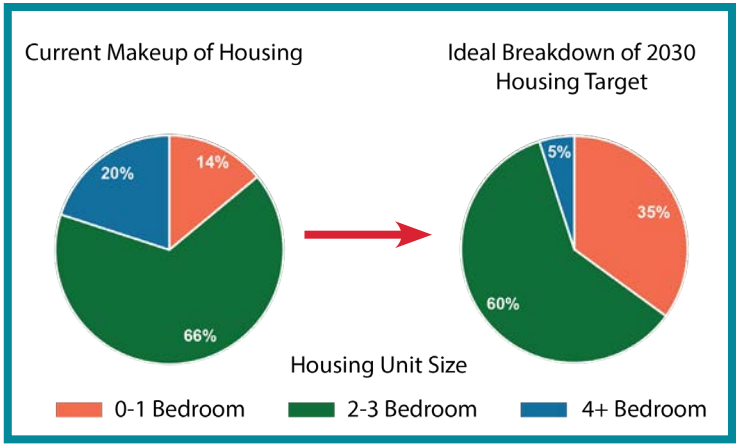
Source: 2023 ACS Table S2504

The Size and Types of our Homes

Most of the homes in our region are single-unit dwellings (Figure 8-8) located on larger lots (typically at least 1 acre, if not more, to allow for a septic system and a well).[14] This reflects the fact that most of our towns do not have water or wastewater infrastructure to allow for greater unit density. 12% of our housing is multi-unit, consisting of three or more units within a single structure. Most of this housing is located in our denser, more developed towns and villages, where local infrastructure is in place that can allow for greater housing density. The rest of our region's housing is made up of manufactured homes.

Most of the new homes needed to meet the regional housing target likely will need to be smaller 1- and 2-bedroom units, both to meet the needs of older residents looking to downsize from a larger home, but also to reduce entry level costs for those looking to purchase their first home. Figure 8-9 below contrasts the current housing with the future makeup of housing unit size we hope to see.[15] In larger towns with water and wastewater infrastructure, these units may take the form of apartments in multi-unit structures (3+ units). In smaller towns that lack this infrastructure, these will likely be standalone units on ½-1 acre lots with a well and septic. The need for a well and septic can add tens of thousands in costs for new construction and increase the amount of land needed. Development of public sewer and water systems at a town level reduces the upfront building costs, and also increases the possibility for a higher residential density within existing villages.

Figure 8-9: Desired Type of New Housing



Permitting for New Housing

Zoning has long been deemed an impediment to new housing, but recent changes in Vermont law, primarily Act 47 (The Home Act), broadly increased the opportunity for housing, especially for duplexes and smaller multi-unit (3 and 4 unit) structures. In areas served by sewer and water, towns are now required to allow a minimum of 5 units per acre. Towns cannot be more restrictive than this in areas where this infrastructure is in place.

Many towns in our region have undertaken bylaw modernization in an effort to both bring local zoning into compliance with the Home Act and other statutory changes, but also to reduce the recognized permitting hurdles new residential development might otherwise face. In total, over the past several years, ten towns in the TRORC region have undertaken bylaw modernization to help reduce the barriers to new housing within zoning and subdivision regulations. This work has included,

among other things:

- Streamlining and facilitating the permitting of Accessory Dwelling Units
- Requiring only site plan review (not conditional use) for 3- and 4-unit dwellings
- Creating new zoning districts, or expansion of zoning districts, that allow for greater residential density in compliance with the Home Act.
- Reducing parking requirements for new residential uses
- Allowing for adaptive reuse of older structures to be converted to new housing

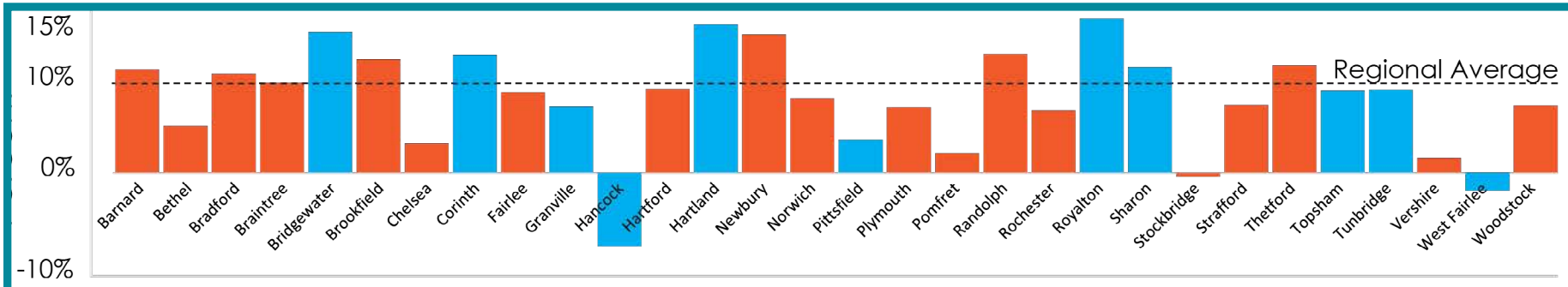
In the TRORC Region, zoning requirements are no longer a significant barrier to new housing development in most cases. Of the eleven towns in the region without zoning, most saw between 8% and 15% increase in new housing units between 2000 and 2020. For the rest of the towns with zoning, most saw an increase of between 7% and 14% over that same time period, so new unit production is generally comparable whether towns have zoning or not. Figure 8-10 below illustrates the percent change of housing units over a twenty-year period, as well as indicates whether a town has zoning or not.

However, there are still some places where zoning could allow uncommon housing types. These include 'cottage courts', boarding houses, seasonal dorms, and other novel or historical housing solutions. Even where zoning itself is not an impediment, local permits can be appealed and result in huge legal costs and years in court.

In addition to local permits, Act 250 jurisdiction adds time and cost to permitting on any sizable housing development. Until 2027 there are some exemptions for certain housing developments under Act 250 in certain areas. After adoption and approval of this Plan, that exemption will be replaced by more permanent exemptions in Downtown and Village Centers, Village Areas and Planned Growth Areas that opt for Tier 1B or 1A status (see Chapter 3). As noted in the Land Use chapter, these areas designated in the Plan have been designed so they can meet the substantial majority of a town's housing target.

It is likely that Act 250 has not been a substantial impediment to new housing projects. With the current exemption, large housing developments can be proposed in downtowns and village centers without triggering Act 250. While this has undoubtedly helped with new housing in some parts of Vermont, it has not led to a proliferation of new housing in most TRORC towns, lending credibility to the assertion that Act 250 is not the principal barrier to large housing developments.

Figure 8-10: Change in Housing Units, 2000-2020



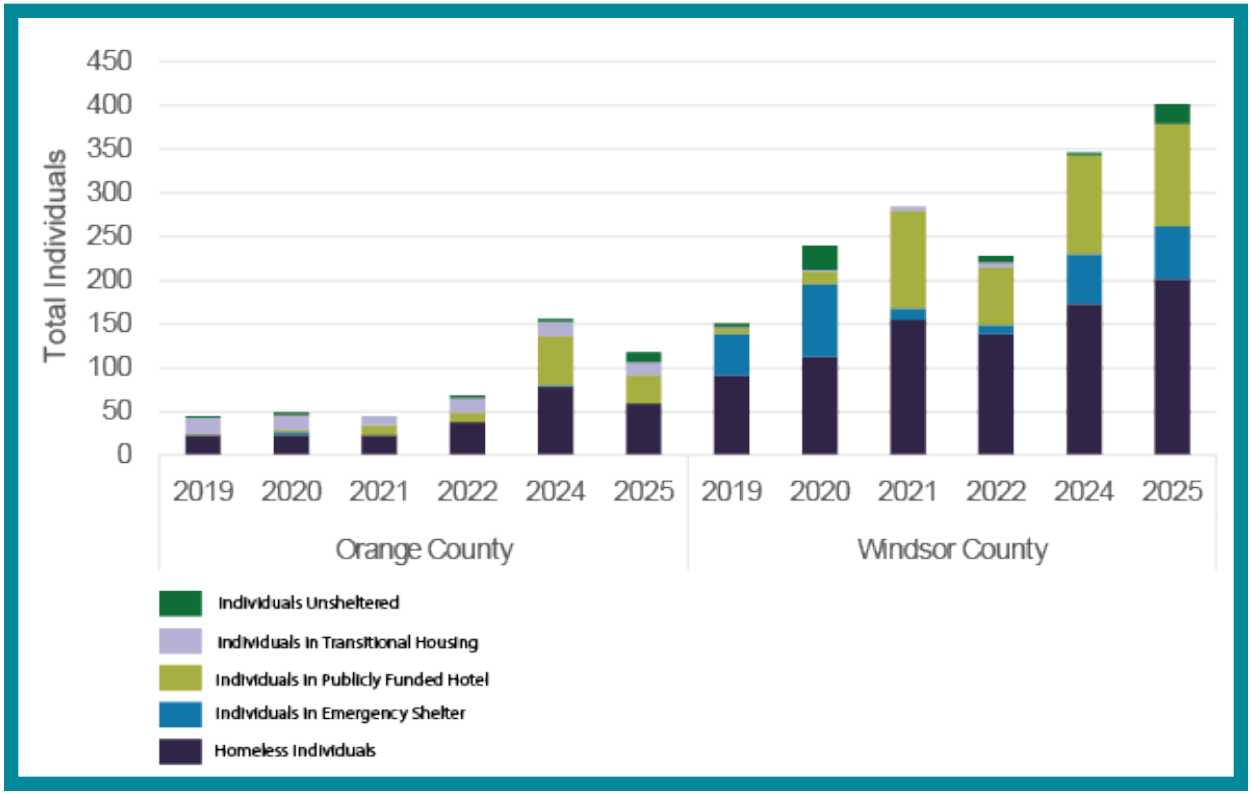
Sources: US Census Bureau, Table H1
Vermont Indicators Online

F. Reducing Homelessness and Sheltering the Unhoused

While many of our households pay more than they can afford in housing costs, some residents lack housing altogether. There are many possible reasons that residents find themselves homeless. Often, these reasons stem from a lack of a broader social or personal safety net at the societal level. There is little public support and investment to buffer residents from many forms of uncertainty, whether that be loss of income, onset of an unexpected medical condition, domestic abuse or conflict at home, or simply the inability to pay ever increasing housing costs. These and a myriad number of other reasons can result in neighbors, friends, relatives, and others becoming homeless.

There are few resources available in the public sector to ensure adequate, safe, and affordable housing for our residents most at risk. This lack of a broader safety net is reflected in higher levels of housing insecurity and homelessness. The cost of supporting the unhoused community is mostly shouldered by private nonprofit organizations that rely on some public funding and donations. These organizations, such as The Haven, Capstone, SEVCA, Listen, COVER Home Repair, and others, perform a vital role providing shelter and other services to the unhoused or those facing housing insecurity through temporary or long-term shelter, assistance for basic needs like fuel and food, and urgent home repair. However, the Region only has shelter space in a few locations, which means that many people who lose their housing also lose connections to their community, school, or job.

Figure 8-11: Point in Time Counts from Housingdata.org



It is difficult to quantify how many residents experience homelessness in our community in a given year, or even in a given day, as lack of secure housing exists on a continuum. Some individuals may have temporary shelter, such as staying with a friend or relative. This is not long-term housing. Others may have a home now, but face housing insecurity that makes their future housing situation uncertain. To get a sense of how many people in our communities experience homelessness, we rely on the Point in Time (PIT) counts, which are statewide counts of people experiencing homelessness on a single night each year. In both Windsor and Orange Counties, 2024 represented a large spike in the PIT count as compared with previous years (Figure 8-11). The data is also further disaggregated by shelter type.[16] Since 2021, the vast majority of individuals in Windsor County have been sheltered in hotels, while hotels took a more prominent shelter role in Orange County in 2024 and 2025. Utilization of publicly funded hotels increased substantially during the pandemic, when the State used federal funding to vastly expand its motel voucher program to thousands of households as a way to reduce

exposure and illness from Covid-19.

Across both counties, over 250 homeless individuals were counted in 2025, which is an increase from prior years. County-level data was not available for 2023.

Homelessness and housing insecurity are known challenges that impact residents and families across the region. These impacts are exacerbated by a lack of affordable housing options. The costly and tight housing market disproportionately impacts our most vulnerable residents. Local services and programs can help to alleviate some of the pressure by providing emergency housing assistance, home repair and weatherization services, or financial, educational, or other services to those most at risk of losing their home or being evicted. However, the PIT count is an indicator that, at the very least, hundreds of permanent homes are needed regionally to establish housing security for those currently or at risk of being unhoused.

G. Opportunities for New and Existing Homes

There is no single solution that will correct course and address the lack of adequate housing. The solutions listed below are not comprehensive, but provide an overview of some of the options available.

The traditional support for "affordable housing" has been provided through a variety of subsidies and tax credits at the State or Federal level. Subsidies through Section 8 vouchers, Low Income Housing Tax Credits, the Vermont Housing Improvement Program, and the Manufactured Home Improvement and Repair Program, are all ways in which new and existing housing costs can be partially offset.

Twin Pines Housing is our region's largest affordable housing provider with low and moderate income housing options in several towns in our region, and Downstreet Housing & Community Development has projects in the Randolph area. Together, they manage or have created 950 units of affordable housing in the TRO Region, most of which operate as subsidized rentals for low- to moderate-income or elderly residents, and with some housing available for veterans or homeless households. There are also an additional 117 units either in the planning phase or under construction between the two organizations. While these organizations are critical to the area's needs, much more robust financial support for new homes, either to rent or to own, is required to bridge our housing gap and help create future housing growth. Wait lists for subsidized housing are very long, and those with any kind of record (criminal record, mental illness, bad credit, etc.) find themselves with few to no options.

COVER Home Repair and the Upper Valley Habitat for Humanity use a volunteer-powered model to repair and build new homes, respectively, targeting household incomes up to 80% of the Area Median Income. COVER repairs 70-80 homes annually and Habitat builds an average of one home a year. Community action organizations, such as Capstone Community Action and SEVCA, are an additional resource for weatherization and home repair services for eligible households, helping households stay in their homes.

Manufactured housing and manufactured home parks offer an additional solution to the high cost and shortage of available housing. In 2024, according to Property Transfer Tax records, the median sale price for a mobile home with land in Windsor County was $111,750, far lower than the $308,500 for residential under 6 acres. Across the State, median rent for a lot in a mobile home park was $390 in 2023, and $413 in 2024 according to the Mobile Home Park Registry published by the Agency of Commerce and Community Development. This number does not include the cost of the mobile home, but given the much lower purchase costs of a mobile home versus the cost of stick-built construction, it is a more affordable option. The average sale price in 2023 for a new manufactured home in Vermont was approximately $124,100, according to the US Census Bureau Manufactured Housing Survey.

For the purposes of this plan, 'manufactured homes' and 'mobile homes' are used interchangeably when referring to manufactured housing, which has a very a specific statutory definition for "mobile home", found in 10 V.S.A. § 6201. State law already requires that mobile and manufactured housing be treated the same as conventional housing in local regulations, and that municipalities with zoning cannot exclude mobile home parks from the municipality.[17] As such, local regulations are often not a significant impediment to new manufactured housing construction in Vermont.

Often, there is a stigma associated with manufactured homes and manufactured home parks. This stigma can act as a barrier to these housing models being developed in many towns. In fact, new manufactured homes must meet a stringent HUD building code, regulating everything from energy

efficiency, durability, fire safety, materials quality, and disaster resilience.[18] This code ensures that new manufactured homes are of high quality and on par with stick-built construction. At roughly half the cost per square foot of a stick-built home, manufactured housing offers lower and moderate-income families the opportunity of homeownership, filling a critical housing gap at a price point where stick-built housing is virtually nonexistent.[19] Much of this affordability is due to the standardization of manufactured housing nationally, along with factory production which can eliminate weather-related setbacks and lead to higher unit output. Financing options for manufactured housing remain a challenge that will need to be addressed at the Federal level.[20]

Incentivizing the development of additional manufactured housing options could add much needed housing more quickly than traditional stick-built homes, and can lower the barrier to entry for first-time homebuyers or households in search of more affordable rental options. One trend threatening manufactured home affordability is the private purchase of parks by corporations that drive up rents. A counter to this is Resident Owned Communities (ROCs), whereby the residents purchase and operate the park.

Alternative housing models can lower ownership or rental costs. Homeshare Vermont is a program that pairs compatible homeowners and tenants that operate more like a single household. Homeshare is likely to continue to grow as a form of housing, as it is an affordable way for homeowners to rent out or share space within their home to someone in search of housing, without the need to invest in expensive upgrades to convert a portion of the home to an ADU.

Community land trusts are another model that separates the land from the housing that sits on it and perpetuates affordability. Owners get lower purchase costs but have caps on the amount of equity they can gain when selling the home back to the trust. Twin Pines Housing operates a shared equity homeownership program in the TRO Region, offering homeowners more affordable homeownership options with a cap on equity gains when property is transferred. Cohousing projects, such as cooperatives, are yet a third ownership model which can reduce housing costs by sharing common areas or other infrastructure.

Different approaches to construction can also lower costs. Modular or panelized homes can be assembled more quickly than traditional construction, reducing overall construction costs. Actions to streamline the permitting of modular housing and expanding the capacity to build modular housing in the state could improve overall affordability, both for homes to rent and to own. For those willing and able to build, free public housing plans that are code-compliant and have been designed for cost savings can reduce costs.

Towns can also be proactive in supporting local housing solutions. One approach is to identify town-owned parcels that would be suitable for new housing and conducting studies or preliminary designs to help guide future housing development. Municipal Planning Grants are available each year for a variety of planning-related projects throughout the State, including for exploring new housing opportunities.

The Community and Housing Infrastructure Program, or CHIP, was passed into law as part of bill S.127 in June of 2025. CHIP provides an alternative, project-based approach for tax increment financing (TIF). Whereas traditional TIF programs identify a specific district or area from which municipalities can borrow the “tax increment” to invest in public infrastructure, CHIP shifts this concept down to the parcel level, and focuses on infrastructure in support of housing. This is particularly beneficial for smaller towns in our region that are considering installing water systems or wastewater infrastructure, but are unsure of how to finance such projects. CHIP offers the benefits of a TIF program, but is project-based and does not require local management of a larger TIF area. Furthermore, CHIP is geared toward incentivizing new housing development, so the infrastructure paid for through CHIP must benefit new housing development.

Collaboration between and among public and private entities could foster solutions to bring additional housing online. The Keys to the Valley initiative is a cooperative effort between three Regional Planning Commissions, and includes collaboration with technical experts across the public and private sectors. One of the takeaways from this work is the possible formation of a ‘housing utility’, which could help cover some of the upfront costs of developing new housing units, particularly Accessory Dwelling Units. This work is continuing with leadership by Vital Communities.

Finally, some towns have active committees or boards that work directly on expanding housing opportunities. As an example, Local Deeds, a project of the Woodstock Community Trust, provides down

payment assistance for working families that exceed the income threshold for Twin Pines, and provides an avenue for homeownership for middle income households. This is funded philanthropically, but towns can also choose to set aside funding to support housing affordability initiatives, such as supporting landlords in providing rent support for local workers.

H. Other Considerations

Short Term Rentals

Short-term rentals are becoming more prevalent throughout the region, and in some towns more than others. These can be more lucrative than a long-term rental, and can provide the property owner with additional income for the property. In turn, this can drive up purchase prices beyond the carrying capacity of those that want to just live in such a home. A short-term rental can be an entire house, but it can also be an accessory dwelling within an existing house or as a standalone structure. In towns with high levels of tourism, the number of housing units converted to short-term rentals adds additional stress to an already tight housing market.

Towns can write and adopt short-term rental ordinances that regulate these uses locally. At the State level, one way to reduce the pressure short-term rentals put on the housing market would be to tax it differently. Requiring a higher tax rate for this use could incentivize more property owners to keep their housing units as long-term housing. Vermont already requires a surcharge tax on short-term rentals above and beyond the Rooms Tax. It is unclear whether this has a significant impact in limiting conversion of long-term housing units.

Emergency Shelters

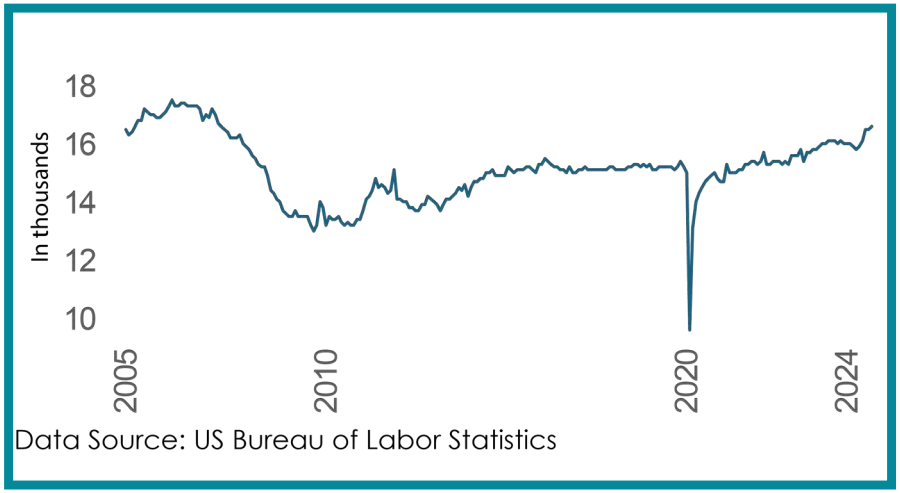
Emergency shelters are not a long-term housing solution, but are a needed temporary fallback. As part of recent changes in legislation, the State of Vermont now limits the effect of local zoning on emergency shelters, essentially curtailing regulation to compliance with dimensional standards, setbacks, density, and other physical layout criteria, so long as the regulation does not interfere with the intended functional use. These shelters act as a front-line safety net, providing temporary shelter and housing for those with nowhere else to go. This shelter often takes the form of a local nonprofit, that provides space and beds for temporary shelter. However, it is important that we explore other possibilities for emergency shelter. For instance, it could be possible that a campground with a septic system, shared kitchen, and power outlets also to be used as an emergency shelter. This and other possibilities should be explored, as emergency shelters fill a much needed and growing role in our housing safety net.

Labor Scarcity and Construction Costs

The costs of new construction can vary widely across the country. Many variables can impact overall costs, including building code and permitting requirements, overall real estate market, available labor, geographical constraints, and existing infrastructure, among others. According to the National Association of Home Builders (NAHB), construction costs account for approximately 64% of the average price of a new home.[21] While this is just a survey estimate, it is a good indicator that much of the cost of new housing is wrapped up in construction.

Nationally, residential construction employment declined sharply in 2008 following the financial crisis. Labor in this sector has been well behind what is needed to build sufficient housing nationally, according to a report published by the Home Builders Institute in 2024. Nationally, it is estimated that 1.5 million homes will not be built as a result of a shortage of labor in residential construction.[22] While we don't have specific numbers locally, we know this shortage in the residential construction workforce is also true in Vermont. Figure 8-12 indicates that the overall construction labor market has not fully recovered from the pre-2008 levels, and that the

Figure 8-12: VT Construction Employees



market remained low throughout the 2010s. While this is not specific to residential construction, it is a useful indicator of the construction labor market as a whole.

The labor shortage translates into less homes being built, pushing up prices and demand for the already existing housing stock. Often, the homes that do get built are high end, rather than much needed lower cost housing. Support for trade school and technical college programs could help to train young workers in this field, but that will take time. Tradespeople could choose to move to the region, but limited housing opportunities and high competition for existing homes means this is not likely to be a solution to the existing labor shortage.

An additional factor related to labor scarcity is its contribution to overall housing costs. Fewer workers in the residential construction sector can inflate overall wages, as employers compete to retain fewer employees. Higher wages for employees mean more livable wages, but also come at the expense of affordability of the fewer homes being built.

Infrastructure

Several towns in our region have high populations, but limited or nonexistent community water and wastewater systems. Some towns could benefit from small community water systems or developing a community wastewater system (See the Utilities and Facilities Chapter for more information). Without community water and wastewater systems that allow for greater density in our villages, pressure for new homes will be felt more and more in the rural spaces, driving up housing costs and also leading to residential sprawl and encroachment and fragmentation of agricultural, forested, and scenic resources. State level investment in support of small community systems can help larger villages to accommodate additional housing needs and also meet State Planning Goals.

State Rules

Regionally, the need for septic systems and a well can add $20-40,000 or more to the cost of a newly built single-unit home. Steep slopes, narrow river valleys, and poor soils all complicate the ability to safely handle wastewater. All septic systems are regulated by the State, but there may be opportunities to review the design requirements for systems that would lessen construction costs. Similarly, there may be places where the state building code could be modified to enable faster or cheaper construction, while still maintaining safety.

State Tax Reform

In recent years, efforts have been made to amend State tax law, particularly for non-principal residences. As part of Act 181, the property transfer tax for properties not used as the principal residence or as a long-term rental are now taxed at a higher rate than those used for long-term rentals or as principal housing. However, this effort falls short of capturing the lost taxes when home values increase year over year without a reassessment. The State should explore ways municipalities can recoup this lost tax revenue when property is transferred.

Summary

Our housing crisis has been decades in the making, and will likely take many years to correct (assuming it can be corrected). It will require vast amounts of public resources, funds, and creative solutions as there is no known viable market solution for the majority of our residents to simply go buy a house or rent one at a reasonable rate. Yet, we have many tools at our disposal, and each of these tools gets us a little closer to reaching our housing targets, though not at the speed with which we would like to reach them. Only with targeted funding and resources directed at this issue, both public and private, can we move in a significant way toward meeting our housing need.

Woodstock | © Braxton Freeman

Goals, Policies, and Recommendations: Homes in the Region

Goals

1. Sufficient primary homes (both rental and owned) are available and affordable for residents and needed newcomers.
2. Location and design of homes minimizes energy consumption and environmental impacts.
3. Homes are safe and suitable for our households' size and age. **(E=)**
4. New construction of homes is primarily centered in core settlements.

Policies

1. Municipalities must plan for their role in meeting municipal housing targets as identified by TRORC and in ways that focus growth around core settlements.
2. TRORC supports conversion of existing residential and commercial structures to affordable multi-unit housing.
3. When reviewing Town Plans and housing, TRORC will look for consideration of: **(E=)**
   - Aging in place
   - Accessible, safe housing
   - Low-income and affordable housing
   - Workforce housing
   - Fair housing that advances integration and inclusion
   - Energy efficiency
   - Connection to transit routes or walkability to services
   - Proximity to regional job centers
4. Small multi-family housing structures of 3-4 units should be a permitted, versus conditional use, where roads are adequate.
5. Assisted living facilities and group homes (including single room occupancy facilities), and senior housing are supported in close proximity to services along public transit routes, especially in areas with adequate public sewer and water service. **(E=)**
6. TRORC supports efforts to expand training for workers in the construction trades, including vocational and adult education.
7. Housing developments of 10 or more market rate units subject to Act 250 must include at least one affordable unit per nine market rate units. **(E=)**
8. Affordable housing developments are encouraged to have a mix of units so that some are market rate.
9. Newly developed or rehabilitated housing that has been subsidized with public funds (such as grants, loans, tax credits, or subsidies) must remain affordable for a period of at least 30 years.

Policies (continued)

10. Land trusts and other similar organizations must make reasonable provisions to allow compatible residential development on farm and forest parcels when drafting conservation easements in the Rural General area.
11. Maintenance and development of properly managed and sited manufactured home parks to meet the need for housing in communities are encouraged. **(E=)**
12. New housing projects subject to Act 250 shall minimize additional financial burden on municipalities and taxpayers by only locating with access onto paved roads.
13. New housing developments shall not be located in mapped special flood hazard areas outside of core settlements and are discouraged from all areas at risk from flooding. **(E=)**
14. Mitigation measures to address the vulnerability of existing manufactured home parks from hazardous events—such as flooding, fire, hazardous material spills, and other severe weather events—are encouraged. **(E=)**
15. Programs such as homeshares, co-operative housing, and shared equity housing are encouraged.
16. Towns are encouraged to serve core settlements with public sewer and/or water improvements to enable more dense housing.
17. Emergency shelters and supportive housing for the homeless should be located so as to fill this critical need throughout the region. **(E=)**
18. TRORC supports new high density housing construction in buildings up to six stories in areas served by both sewer and water infrastructure, where such housing is adequately designed and configured to blend with the landscape and uses around it.
19. Any public investment in public and private housing subject to Act 250 for the elderly, disabled, and low- or moderate income families shall be directed into core settlements, or areas within one mile of these along state highways and transit routes, and away from unsettled rural areas where no services exist.

Recommendations

1. TRORC will continue to assist municipalities, nonprofit housing organizations, and mission-driven developers in the development of affordable, workforce, and senior housing projects and programs when such efforts are consistent with the policies of the Regional Plan. **(E=)**
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.
3. Community leaders and larger businesses serving the Region should work with state housing agencies, nonprofit organizations, and lending institutions to ensure the availability of loan or grant funds for residents and workers to purchase, acquire, improve, or repair their primary homes, especially lower income households. **(E=)**
4. The State should implement tax reforms that create disincentives on short-term speculative ownership, reduce tax pressure from short-term housing on primary housing values, ensure that transfer taxes recoup lost property tax value if well above assessed value, and enable more local option taxation.
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.

Recommendations

6. TRORC will assist towns in writing strong housing components in Town Plans.
7. TRORC will actively help towns identify land that is suitable for residential development opportunities and use programs such as brownfields assessment and grant management to provide assistance.
8. 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.
9. TRORC should work on supporting small-scale developers through technical assistance, including taking on the role of a housing 'navigator' and the possible formation of a dedicated housing 'utility'. A key component of this assistance should be helping to connect developers with potential sources of capital that reduce or eliminate the need to take on large amounts of debt simply to get a project started.
10. Towns and the State should provide incentives to property owners to repurpose existing structures for workforce, senior and low-income housing.
11. Towns and the State should incentivize housing that meets residents' needs through a variety of methods, including regulatory bonuses, infrastructure grants, easier permitting, and direct subsidies.
12. TRORC will support the public awareness campaign of the Vermont Housing and Finance Agency and facilitate the education of our towns on the Federal Fair Housing Law, and will facilitate conversations between municipal leaders and social service providers to promote greater compassion and empathy for our most vulnerable community members. **(E=)**
13. 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.
14. The State should review septic and fire safety code standards to enhance affordability, energy efficiency, and occupants' health.
15. Towns should assess the impact of short-term rentals on their housing needs and investigate ways to lessen their impact on housing affordability.
16. The State should develop free designs for affordable and workforce housing.
17. TRORC should support organizations in their efforts to expand the short term, transitional, and low barrier emergency housing options, and the availability of showering, laundry, and kitchen facilities to address the local and regional need for these services. **(E=)**
18. TRORC should support organizations that provide rent/mortgage payment assistance, and that help people navigate barriers to stable housing. **(E=)**
19. TRORC should support efforts that empower housing-insecure community members to help design and implement innovative solutions to the housing crisis. **(E=)**
20. TRORC will support its member towns that are eligible for, and that choose to opt into, Tier 1B, when such areas are consistent with state statute. TRORC will also assist member towns eligible for Tier 1A with pursuing this area status, if they so choose and if the designation aligns with state statute.

Homes in the Region Endnotes

1 24 V.S.A. § 4348 (a)9
2 Data collected from housingdata.org. US Census Bureau, ACS 5-Year Estimates (2023) Tables B25003, B25070, B25091.
3 24 V.S.A. § 4303 (1)
4 "Worst Case Housing Needs 2025 Report to Congress", Department of Housing and Urban Development Office of Policy Development and Research, https://www.huduser.gov/portal/portal/sites/default/files/pdf/Worst-Case-Housing-Needs-2025-Report-to-Congress.pdf
5 US Census Bureau, ACS 5-Year Estimates (2020) Table S2504.
6 This is not to say that 3+ bedroom units are not also needed. We still need more, larger units as well. However, there is such a shortfall of smaller units, as compared with small households, that it is an important gap to emphasize.
7 Vermont Housing Needs Assessment 2025-2029, Vermont Housing Finance Agency, VHFA, p. 13.
8 Like cost burden, severe cost burden occurs when households spend over 50% of household income on housing expenses, including rent, mortgages, real estate taxes, insurance, mobile home costs, and condominium fees.
9 Based on TRORC Analysis of E-911 addresses within all future land use areas. Three units is automatically applied to all multifamily, so there is some approximation with the data.
10 US Census Bureau, ACS 5-Year Estimates (2023) Table B08009.
11 24 V.S.A. § 4302 (1)(A) and 24 V.S.A. § 2791(13).
12 Vermont data is used here, as the county and municipal level datasets were too small to be reliable.
13 US Census Bureau, ACS 5-year estimates (2023) Table B25007.
14 To reduce the margin of error, this dataset was gathered using ACS data at the county level, with Windsor and Orange Counties used as proxy for the region.
15 Characteristics of occupied housing units for Orange and Windsor counties. 2023 ACS 5-Year Estimates, Table S2504.
16 Point in Time count data obtained from housingdata.org.
17 24 V.S.A. § 4412(B) and (C).
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09 | Utilities, Facilities, and Services

Bridgewater Fire Station | © Kevin Geiger, TRORC

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 provides 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" [1]is nearly impossible without a public wastewater system, or at least, a public water system. Continued increases in density and development in our villages is unsustainable without water and wastewater facilities.

Long-range planning for such infrastructure investments and their maintenance, as well as town buildings, roads, and emergency services, is essential to avoid jumps in annual tax rates. Therefore, state statutes enable communities to create dedicated reserve funds and Capital Improvement Plan (CIP)[2] for the purposes of planning and investing in long-range capital facilities. 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, and therefore the priority for future investments is modernizing or replacing aging infrastructure. This will make these systems more sustainable and affordable and will protect against loss of service.

Goals and Policies: **Overall Utilities, Facilities, and Services**

Goals

1. The maintenance, expansion, or construction of new facilities and utilities that are 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 must support existing and future development.
2. The scale, type, and design of major public utilities and facilities other than recreational areas and water supplies 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 must be located within core settlements and Enterprise 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 must occur in or adjacent to core settlements, 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.

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, and most wastewater treatment taking place in on-site septic tanks and leach fields. While wells have more formal data and a longer history of state permitting, many older septic systems in rural areas had no formal design and are even unknown as to their components or location.

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)[3] plans, which help ensure that drinking water supplies will remain safe and untainted.

There are 214 public drinking water systems[4] in the TRO region. These systems are regulated under the Vermont Water Supply Rule[5]. The purpose of this rule is to protect the public health by assuring safe, affordable drinking water from Public Water systems, and to implement and enforce the provisions of the Federal Safe Drinking Water Act and Vermont statutes.

Table 9-1: Public Drinking Water Systems in the TRO Region

Status	C	NC		Total
		NTC	NTNC	
Active	39	91	39	169
Inactive	1	36	7	44
Planned	0	0	1	1
Total	40	127	47	214

The Vermont Water Supply Rules establishes a typology of public drinking water systems. Public community (C) systems (not necessarily publicly-owned or operated) serve at least 15 service connections or 25 residents year-round, while public non-community (NC) systems serve non-residential groups of people. Public non-community systems are further broken down into transient non-community systems (TNC) whose users change over time, such as restaurants and motels; and non-transient non-community systems (NTNC) whose users do not change over time, such as schools and offices. Systems can be either active, inactive, or planned.

Slightly more than half of the 40 public community water systems governed by the Vermont Water Supply Rules in the TRO Region serve private residential developments or manufactured housing parks. Of the remaining public community water systems, 19 are municipal systems that serve community areas in our Region. This figure includes municipal systems that are municipally-owned or privately-owned.

Table 9-2: Public Community Water systems in the TRO Region

Town	Village	Municipal Water System	Ownership
Bethel	Bethel	Bethel Water DEPT	Municipal
Bradford	Bradford	Bradford Village Water System	Municipal
Chelsea	Chelsea	Chelsea Water System	Municipal
Fairlee	Fairlee	Fairlee Town Water	Municipal
Hartford	Hartford	Hartford Water DEPT	Municipal
Hartford	White River Junction	Hartford Water DEPT	Municipal
Hartford	Wilder	Hartford Water DEPT	Municipal
Hartford	Quechee	Quechee Central	Municipal
Hartland	North Hartland	North Hartland Coop Water System INC	Private
Newbury	Newbury	Newbury Village INC	Municipal
Newbury	Wells River	Wells River Water System	Municipal
Norwich	Norwich	Norwich Fire District 1	Municipal
Randolph	Randolph	Randolph Village	Municipal
Randolph	Randolph Center	Randolph Center Water System	Municipal
Rochester	Rochester	Rochester Water System	Municipal
Royalton	South Royalton	Royalton Fire District 1	Municipal
Thetford	East Thetford	East Thetford Water CO	Private
Thetford	North Thetford	Union Water CO	Private
Thetford	Post Mills	Post Mills Water System	Private
Thetford	Thetford Hill	Thetford Water Coop INC	Private
Woodstock	West Woodstock	Town of Woodstock Water DEPT	Municipal
Woodstock	Woodstock	Town of Woodstock Water DEPT	Municipal

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[6]. Currently, the Vermont Agency of Natural Resources has created a PFAS Road Map[7] (2023) that helps town and state officials track public exposure of PFAS. The EPA has recently added a maximum contamination level (MCL) for six types of PFAS, ranging from 4-10 ng/L. And the Vermont Department of Environmental Conservation has set a limit of 20 ng/L for five types of PFAS in drinking water in the Vermont Water Supply Rule.

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, contact certified Vermont laboratories found on ANR's website here[8].

Currently, there are 12 municipal wastewater treatment facilities in 9 communities in our Region[9]. Most 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. In addition, Wells River Village is connected to the Woodsville, NH wastewater treatment system.

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

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 for the life of this Plan, as long as they are maintained.

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 and are logical places for investment in treatment systems. 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

Table 9-3: Public Wastewater Systems in the TRO Region

Town	Village	Wastewater Facility/System
Bethel	Bethel	Bethel Wastewater Treatment Plant
Bradford	Bradford	Bradford Sewage Treatment Plant
Bridgewater	Bridgewater	Bridgewater Municipal Sewage Treatment Facility
Chelsea	Chelsea	Chelsea Sewage Treatment Plant
Hartford	Quechee	Quechee Wastewater Treatment Plant
Hartford	White River Junction	White River Junction Wastewater Treatment Plant
Randolph	Randolph	Randolph Wastewater Treatment Facility
Rochester	Rochester	Rochester Sewage System
Royalton	Royalton	Royalton Pollution Abatement Facility
Woodstock	South Woodstock	South Woodstock Treatment Plant
Woodstock	Taftsville	Taftsville Treatment Plant
Woodstock	Woodstock	Woodstock Treatment Plant

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 a high quality of drinking water for public health. **(E=)**

Policies

1. Municipalities and private utilities should create capital budgets and reserve accounts for utilities and facilities management and operations.
2. TRORC supports proposals to install, upgrade, and improve existing public water supplies and wastewater treatment facilities that serve core settlements and Enterprise 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. Land development within existing or planned Source Protection Areas shall not pose a reasonable threat of contamination to public water supplies.
5. TRORC supports water conservation measures to reduce demand for water and to promote the life span and efficiency of water and wastewater facilities.
6. 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.
7. New water and wastewater systems should be designed to be energy efficient and secure.
8. The village areas of Norwich, Hartland, Sharon, Strafford, and Fairlee are the highest regional priorities for new wastewater treatment facilities.

Recommendations

1. TRORC will assist communities with the identification and prioritization of future capital improvements and repairs, grant writing, and project management.
2. TRORC will continue to offer capital budgeting services to the towns.
3. Water efficiency programs and codes should be adopted at the state or local level to reduce demand for municipal water systems.
4. TRORC shall seek grant opportunities to map water and wastewater systems throughout the Region.
5. When funding is available, municipal plans should inventory water and wastewater systems to identify current and projected capacity gaps.
6. Municipalities should conduct periodic auditing of all water and wastewater distribution systems to calculate infiltration and losses.
7. TRORC will work with local and state governments, the Vermont Bond Bank, and private water systems to explore consolidation of operations of multiple private water systems.

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)[10]. 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 2024 Materials Management Plan[1112]. 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 seven waste management districts[13]. In addition, Hartford has its own approved MMP. The Greater Upper Valley Solid Waste Management District[14] 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[15]. The third largest waste management district by population is the White River Alliance[16], which covers eight of the Region's towns.

As of 2023, there are 24 active solid waste facilities throughout our Region that have been certified by the State. Presently, the Region has 8 recycling facilities, 4 food scrap management facilities, and 12 transfer stations (see map). 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

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 continue to assist member towns, alliances, and the Greater Upper Valley Solid Waste Management District in the update and implementation of municipal and regional solid waste plans.
2. TRORC will support and participate in any future discussions regarding the development of regional waste management services.
3. TRORC should assist towns in meeting the Universal Recycling Law requirements through outreach and education, with assistance from the Agency of Natural Resources and local Alliances and Districts.
4. TRORC supports Legislative efforts to require manufacturers to facilitate the recycling of their products.

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[17]."

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 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[18]. Towns within the TRO Region are members of five different supervisory unions or supervisory districts and two different interstate school districts. The Hartford School District is the only town school district in the TRO Region.

Within the TRO Region, there are eleven private elementary and secondary schools[19]. Most of these private schools operate as day schools. Some of these schools provide specialized education or curriculum to their students.

While homeschooled children do not require educational provisions from school districts, there are actions that towns and local organizations

Table 9-4: Private Elementary & Secondary Schools in the TRO Region

Brookhaven Learning Center
East Valley Academy
Immersion Montessori School
Mid Vermont Christian School
Mountain School Program of Milton Academy
Open Fields School
Potter's House
The Sharon Academy
Thetford Academy
Upper Valley Waldorf School
Vermont Academy of Science and Technology - Vermont Technical College

Table 9-5: School Districts in the TRO Region in the 2025/2026 School Year

Hartford School District	Hartford
Mountain Views Supervisory Union	Barnard Bridgewater Pittsfield Plymouth Pomfret Woodstock
Orange East Supervisory Union	Bradford Corinth Newbury Thetford Topsham
Orange Southwest Supervisory District	Braintree Brookfield Randolph
Rivendell Interstate School District	Fairlee Vershire West Fairlee
School Administrative Unit 70	Norwich
White River Valley Supervisory Union	Bethel Chelsea Granville Hancock Rochester Royalton Sharon Stockbridge Strafford Tunbridge
Windsor Southeast Supervisory Union	Hartland

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 such children (See Healthy Communities Chapter).

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[20]
- Randolph Technical Career Center[21]
- Hartford Area Career & Technology Center[22]

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[23] 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 work readiness skills, including ACT WorkKeys 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[24] in Hartford and the two Central Vermont Adult Basic Education Centers[25] in Randolph and Bradford. Both of the Community Action Agencies covering the TRO Region (Southeastern Vermont Community Action[26] and Capstone Community Action[27]) 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.

Institutes of Higher Education and Continuing Education

The TRO Region has several institutes of higher education and continuing education that confer degrees or professional certificates. The Vermont Law and Graduate School[28] (VLGS) in South Royalton is the only law school in Vermont accredited by the American Bar Association. In addition to offering a juris doctorate degree, VLGS also offers several master's degrees in specialized programs. The Vermont State University – Randolph Campus[29] in Randolph Center offers many programs that bestow either associate, bachelor's and master's degrees, or professional certificates. In addition, the Community College of Vermont – Upper Valley[30] in Wilder offers several programs that bestow associate degrees or professional certificates. And The Center for Cartoon Studies[31] in White River Junction also offers a master's of fine arts degree for students interested in the artistic development of comic books, graphic novels, and other visual arts.

While not within the TRO Region, Dartmouth College[32] is located in nearby Hanover, NH. As one of the nation's Ivy League schools, Dartmouth College offers a wide diversity of undergraduate and graduate degrees to students from all across the world. The TRO Region benefits greatly from its close proximity to Dartmouth College. Many students, professors, and employees of Dartmouth College reside within communities in the TRO Region.

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.

The adoption of Act 73[33] in 2025 has established a process to consolidate school districts across Vermont. Beginning in the 2026-2027 school year, new minimum standards for class sizes for public and independent schools will go into effect. While discussions about redistricting are currently ongoing, these discussions will result in the creation of several large, consolidated school districts. These new school districts will begin operating in 2028. The establishment of new consolidated school districts and minimum class size standards will likely result in the closure of some schools within the TRO Region.

For many communities, the closure of a school is a drastic social blow, but it can also present new opportunities because schools are often located within villages or town centers. These 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

Lack of access to at-home high-speed Internet in portions of the Region hinders access to education

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. **(E=)**
2. Students have access to quality vocational and workforce training opportunities to prepare them for future careers. **(E=)**

Policies

1. The construction of primary and secondary educational facilities should occur in or within close proximity to core settlements so as to maximize their accessibility to people and infrastructure.
2. Expansion of continuing education and vocational education opportunities is encouraged.

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. **(E=)**
3. TRORC should assist Towns with planning for the adaptive reuse of vacant school facilities in a manner that enhances villages and downtowns and stimulates the local economy.

materials. 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.

E. Childcare Services

The availability of high-quality and affordable childcare is an important factor in the appeal 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 2023 American Community Survey, approximately 57,910 people live in the TRO Region. The number of children under the age of eighteen is a relatively small percentage of the Region's population: around 18.5 percent, or 10,694 individuals. Nationally, around 22.2 percent of the population is under the age of eighteen. This shows that the TRO Region has fewer children enrolled, or soon to be enrolled, in childcare facilities or primary and secondary schools than other regions of the country.

As of 2025, there are 101 registered childcare homes 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[34].

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[35], 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/ 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 difficult for parents in the Region, 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[36].

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[37]" curriculum. The Randolph Technical Career Center has a similar program in their "Education Services[38]" curriculum. CCV offers a degree in Education[39], 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)[40]. 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 is 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)[41].

Let's Grow Kids[42] 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[43], meaning they are 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[44]. 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[45], 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[46], 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)[47]. 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[48], up to 80 percent of tuition can be covered, along with other benefits.

In 2023, Act 76 (H.217)[49], 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.

Goals, Policy, and Recommendations: Childcare Service

Goals

1. An adequate supply of safe and affordable childcare services and facilities is available. **(E=)**
2. A regional network of high-quality childcare programs fulfills the needs of families and employers. **(E=)**

Policy

1. TRORC supports initiatives to develop childcare facilities in core settlements and Rural General Areas along commuter routes.

Recommendations

1. Major employers are encouraged (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. **(E=)**
3. TRORC should work with towns to address identified needs for childcare facilities or services by identifying publicly owned buildings throughout the Region that could be converted into childcare facilities.
4. Towns should review their zoning regulations (if adopted) to allow more flexibility within the regulations for childcare providers that operate, or plan to operate, within the town.

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.

The 2021 Vermont Ten-Year Telecommunications Plan[50] by the Public Utilities Commission is the State's policy document setting out a series of goals on the subject.

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. Village-wide Wi-Fi 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[51].

The East Central Vermont Fiber-Optic Network (EC Fiber)[52] is a consortium of 31 towns (including 27 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[53]. The lack of cell coverage is a major deterrent to both attracting businesses and younger families to the Region.

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[54]. 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[55]. The 248a process was created to enable a faster permitting process for networked telecommunication facilities 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[56] must review the environmental, economic, and social impacts associated with a particular project prior to issuing or denying a Certificate of Public Good[57]. The project is reviewed against both the Regional and Town Plan, and the recommendations of the municipal legislative bodies and planning commissions regarding their Town Plan, and the recommendations of the regional planning commission regarding their Regional Plan. These Plans and recommendations 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 applicable policies of the Town and Regional Plans and the recommendations of municipal planning commissions, legislative bodies, and regional planning commissions. Accordingly, it is appropriate that this Plan address these land use conflicts 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.

Goals, Policies, and Recommendations: **Telecommunications**

Goals

1. Universal broadband access using fiber optic cables or other technologies is available throughout developed areas in the TRO Region.
2. Universal mobile cellular service is available throughout all areas of 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 resources of our communities.
2. Efforts to provide free public broadband access in places such as village centers and public buildings are supported.
3. All new telecommunications facilities and related infrastructure (including access roads, site clearing, on-site power lines, lighting, and off-site power lines) 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.
4. All new telecommunications facilities and related infrastructure (including access roads, site clearing, on-site power lines, lighting, and off-site power lines) 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. State or federally designated 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.
   d. Threatened or endangered species habitat or communities identified by the Vermont Agency of Natural Resources or through site analysis.
   e. Significant natural communities identified by the Vermont Agency of Natural Resources or through site analysis.
   f. Necessary wildlife habitat, including core habitat areas, migration, and travel corridors, identified by the Vermont Agency of Natural Resources or through site analysis.
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 high priority forest blocks as mapped by the Vermont Agency of Natural Resources.
6. Telecommunications facilities development shall demonstrate they have utilized site location, construction methods and technologies to minimize site clearing at facility sites and along accesses to the maximum reasonable extent.

Goals, Policy, and Recommendations: Telecommunications

Policies continued

7. The developer shall take reasonable steps minimize the aesthetic impact of the telecommunications facility on the surrounding landscape. This includes through site location, options such as the utilization of "stealth towers" - asymmetrical monopoles disguised as trees, or camouflaged paint schemes, and retention of screening vegetation. When vegetation is used as screening, retention must be made a permit condition.
8. Telecommunications facilities shall be designed to be the minimum height necessary to achieve the applicant's coverage goal.
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 any of the three Rural Areas locations:
        i. Be located downgrade of any ridge.
        ii. Be sufficiently landscaped to screen the lower sections of the mast and related ground facilities from public vantage points, such as trails, roads, or water bodies.
    b. In more developed areas:
        i. 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.
12. Certificates of public good issued by the Public Utility Commission should require a bond for the removal of facilities that are no longer used.
13. In order to ensure public safety, the minimum distance from the base of any proposed mast to any property line or town or state highway right-of-way should be, at a minimum, 150% the height of the mast, including any vertical appurtenances.
14. Access roads to a new telecommunications facility should conform to the following requirements:
    a. A gate should be erected across the access road to deny public access at the point where access is exclusive to the facility operator.
    b. No access road should be created with a slope that exceeds a 25% grade.
15. Utility lines to a new telecommunications facility should either be erected overhead of, or buried underneath of, the access road. A separate approach for access roads and utility lines is discouraged.

Recommendations

1. Municipalities and 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.

G. Municipal Buildings and Properties

Municipalities own a variety of public buildings, including offices, meeting halls, garages, and libraries.

Each Town in the TRO Region and the Village of Wells River have an office building. Some of these office buildings also serve as the municipality's meeting hall, where town meetings and other events are held. In total, there are 41 different municipal offices and meeting halls in the TRO Region.

Municipalities with their own road crews also have their own garages, some of which are woefully inadequate for their function, and are often sites for salt and sand storage. Some municipalities own their own sand and gravel pit, but most contract this function out. In total, there are 29 municipal garages serving 28 different municipalities. The Town of Randolph is the only municipality with two garages, one located in Randolph Village and one in Randolph Center. The Town and Village of Woodstock each have their own garages. And the Village of Wells River and the Town of Newbury each have their own garage. Lastly, the Towns of West Fairlee, Granville, and Hancock do not have town road departments or their own garage.

However, West Fairlee does lease a former salt shed from VTrans in Thetford. This site serves as storage for their sand and salt. Public libraries play an important role in providing materials to inform, challenge, and inspire the Region's residents, as well as provide social services, Wi-Fi hotspots, and computer access. In Vermont, public libraries are established and

Pittsfield Town Hall | © Kevin Geiger

maintained either by a municipality or by a private association, corporation, or group that all or part of its annual financial support from public funds. Public libraries provide an essential public service to residents free of charge. Libraries also serve a critical function providing computer access for those that may lack it at home.

The Vermont Department of Libraries maintains a directory of public libraries[58]. In the TRO Region, most Towns have a public library, with the exception of Braintree, Bridgewater, Granville, and Topsham. The Town of Hartford has three public libraries, with one each in the villages of Hartford, Quechee, and West Hartford. The Town of Thetford also has two public libraries, with one each in the Villages of Thetford Hill and Post Mills.

Nearly all of the meeting halls, municipal offices, and public libraries 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. Municipal offices, meeting halls, and public libraries help to create a sense of community and give energy and importance to town and village centers.

H. State Office Buildings

Several Vermont state agencies have offices in the TRO Region. In addition, several Vermont state agencies operate state facilities in the TRO Region, such as the Vermont Agriculture and Environmental Laboratory (VAEL), Vermont Agency of Transportation (VTrans) maintenance garages, Vermont State Police barracks, and county courthouses.

The Vermont Department of Health operates a Local Health Office[59] in White River Junction. This Local Health Office provides public health services to individuals and families in a majority of the towns within the TRO Region.

In 2019, the Vermont Agency of Agriculture, Food, and Markets opened the Vermont Agriculture and Environmental Laboratory (VAEL)[60] on the campus of the Vermont State University – Randolph. The VAEL provides analytical testing services for Vermont state agencies who regulate and monitor environmental,

Bradford Library | © Kevin Geiger

agricultural, animal, and consumer health.

The Vermont Agency of Transportation (VTrans) has established nine maintenance districts[61] across the state. The majority of the TRO Region is within District 4. A few towns in the TRO Region are within Districts 3, 6, 7. The main administrative office of District 4 is in White River Junction. District 4 also operates a primary maintenance garage in White River Junction. In addition, Districts 3, 4, 6, and 7 operate several maintenance garages in the TRO Region, including ones in Bradford, Newbury, Randolph, Rochester, Thetford, Tunbridge, and Woodstock.

The Vermont State Police operate two barracks[62] in the TRO Region, one in Royalton and one in Bradford. And given that Chelsea and Woodstock are the shire towns of their respective counties, the Vermont Judiciary[63] operates two county courthouses in the TRO Region: the Orange County Courthouse in Chelsea and the Windsor County Courthouse in

Town Green and Gazebo in Rochester | © Kevin Geiger

Goal, Policies, and Recommendations: Municipal Buildings and Properties

Goal

1. The Region has adequate municipal buildings to serve town needs.

Policies

1. Municipal buildings must be carefully sited and designed to meet the future energy efficiency needs of the municipality and built with both construction and maintenance costs in mind.
2. Municipalities are encouraged to rehabilitate historic buildings that are located in existing developed areas for their offices.

Recommendations

1. Municipalities should assess expected maintenance and upgrades for municipal buildings and create reserve funds to cover these expenses so that these buildings remain in good condition.
2. TRORC should assist municipalities with planning, public dialogue, and grant writing, if requested, when considering, constructing, or renovating municipal buildings so that they meet community needs and are located wisely.

Goal, Policy, and Recommendation: State Office Buildings

Goal

1. The Region has adequate state office buildings and facilities to serve the public.

Policy

1. The State shall only construct new office buildings in core settlements.

Recommendation

1. The State must consider effects on the Region and our municipalities if they are considering siting new buildings so they fit well with the Region's needs.

I. Recreational Facilities

Many recreational opportunities are available to the Region's residents and visitors. The TRO Region's state and federal parks, municipal parks, playing fields, and town forests; and private recreation facilities provide ample opportunities for outdoor and indoor recreation. However, most of these amenities require that a person has a car to get to them. Increasing outdoor park space is needed in some neighborhoods.

The TRO Region has one national park—the Marsh-Billings-Rockefeller National Historic Park[64] in Woodstock. Associated with the Park is the privately owned Billings Farm and Museum[65], which offers farm educational programs. The western part of our Region is also home to a portion of the Green Mountain National Forest[66] and the Long Trail corridor[67]. The Appalachian Trail corridor[68] goes through the central part of the Region. Additionally, outdoor recreation opportunities are available at the Saskadena Six ski area[69] and Ski Quechee, many rivers and lakes, golf courses, public and private forests, Class 4 roads, and state-designated scenic byways. Indoor recreational opportunities include ice rinks, fitness centers, and the Upper Valley Aquatic Center[70]. Several Vermont state parks can be found in the TRO Region, including the Ainsworth State Park[71] and Allis State Park[72] in Brookfield, the Camp Plymouth State Park[73] and the Coolidge State Park[74] in Plymouth, the Quechee Gorge State Park[75]in Hartford, the Silver Lake State Park[76] in Barnard, and the Thetford Hill State Park[77] in Thetford.

There are several State Historic Sites in the TRO Region, including the Calvin Coolidge Historic Site[78] in Plymouth, the Senator Justin S. Morrill State Historic Site[79] in Strafford, and the Theron Boyd Homestead[80] in Hartford.

The Department of Forests, Parks and Recreation, and the Department of Fish and Wildlife also have several state forests, wildlife management areas, natural areas, and lake or river access points that offer additional outdoor recreational opportunities. The Vermont Agency of Natural Resources maintains an inventory of outdoor recreation sites across Vermont[81] as well as a map of state lands[82].

Several municipalities also offer 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. In addition, some municipalities operate and maintain recreation facilities for residents and visitors, including playground equipment, ball fields, courts, skating rinks, and other similar facilities. Often these facilities are located on or near public school sites. Many municipalities also maintain their village greens for recreational purposes, or allow the renting of their municipally-owned meeting halls for events.

Some municipalities also manage a modest network of municipal parks and forests, which may include hiking or biking trails. Some municipal trail networks are linked to the municipality's road network, and portions of these networks include Class 4 roads and legal trails.

The TRO Region's rivers and lakes offer opportunities for swimming, and boating[83], and fishing[84], 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 TRO 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 TRO Region rely on the willingness of landowners to allow access to private land. Several large private landowners allow access to their land.

Goals, Policy, and Recommendations: Recreational Facilities

Goals

1. The Region is home to a variety of indoor and outdoor recreational opportunities for all users. **(E=)**
2. The Region has a robust and prosperous outdoor recreation economy.

Policies

1. The maintenance and development of recreation trail networks (e.g., The Appalachian, Long , Velomont, Cross Vermont, and Cross Rivendell Trails; regional and state snowmobile networks, 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 is 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 the involvement of 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, and creating accessible parks within walking distance of dense neighborhoods.
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.

J. Emergency Management

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[85] (getting ready), response, recovery[86], 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 one of our focuses is on assisting towns and the State in preparing to meet the challenges that disasters will bring through better plans. We can also assist our towns post-disaster through supporting mitigation and recovery projects that can take months or years and require substantial administrative capacity.

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[87]. TRORC can also help towns undertake mitigation projects such as floodplain restoration projects and buyouts of damaged structures.

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[88] (THIRA), 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? This is then used to guide preparedness and mitigation activities.

Discussion by Hazard Type

Locally specific versions of this process are done when Local Hazard Mitigation Plans 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.

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 include train derailments, hazardous materials spills, dam failure, etc. Among these, hazardous materials incidents, primarily involving petroleum products, are the most common in the Region. The most memorable, and luckily not injurious, of these events was a rail car propane explosion in Fairlee in the 1970s.

Winter storms (snow or ice) are a regular 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.

Climate change is often thought of as a disaster, but it is not a traditional disaster type, as it is more of a catastrophic cause of disasters—a meta-disaster if you will. 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.

Contagious diseases, especially pandemic influenza, were not generally thought of as a risk until Covid-19 struck. 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 that boost our defenses against viruses, as well as good health practices and a robust health care system, remain our best deterrent against widespread disease.

Emergency Services

Law Enforcement

The primary law enforcement for most of the Region is the Vermont State Police[89], which provides coverage through a few of its many barracks[90]. 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. The State Police also house various specialized units[91] such as the bomb squad. The other large law enforcement agencies in the Region are the Sheriff's departments[92] that cover their respective county areas. 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, however most towns have no formal police departments.

Fire Protection/Hazmat

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 and a few other departments have a few paid staff. Although there are a variety of service arrangements, local governments have the responsibility to provide fire protection services. Local volunteer departments often have limited capacity to deal with hazardous materials incidents, and call on the state HazMat Team[93] for their advanced capabilities. The state Division of Fire Safety[94] has permitting and enforcement roles, as well as arson investigation. It also houses the Urban Search and Rescue Team [95](VT Task Force One) who are critical for incidents in collapsed buildings.

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[96], which coordinates and licenses them. FAST squads stabilize patients 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, Upper Valley Ambulance, and White River Valley Ambulance. 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[97] (DHART) and its two helicopters. The eighteen EMS services in the Region are located in four of the state's EMS districts[98]. As with fire departments, lack of volunteers, particularly for daytime coverage, is a pressing problem for FAST squads. The high cost 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.

Emergency services also rely on a communications system that includes dispatch centers, 911, 211, RACES[99] (radio amateur civil emergency service) ham radio operators, VTAlert[100], and the Emergency Alert System (EAS). 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 is a nationwide system being built to ensure cellular and data coverage for responders throughout the nation.

State and Local Emergency Management

Vermont's state emergency management duties are performed by Vermont Emergency Management (VEM)[101] 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 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[102] and have designated an Emergency Management Coordinator or Director to help facilitate local planning and coordinate preparedness, response, and recovery activities. 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)[103] covers all the towns in the Region and was established by state law to coordinate 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.

Goals, Policy, 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. New or rebuilt development shall not increase disaster risk and must take reasonable steps to reduce risk.
3. Mitigation actions that seek to avoid impacts of a hazard first, then reduce impacts that cannot be reasonably avoided; in ways that are mindful of the natural and human resources of the area and part of a larger systematic effort at disaster reduction are encouraged
4. Additional telecommunications towers and other technologies should be built to increase radio and cellular coverage for emergency responders, including FirstNet.
5. 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 facilities.
4. TRORC will continue to work with all communities to, ensuring that emergency 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.

Goals, Policy, and Recommendations: **Emergency Management**

Recommendations continued

6. 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.
7. TRORC should assist towns and VT ANR in refining river corridor maps.
8. 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.
9. TRORC will assist towns in response and recovery stages through damage documentation assistance and navigating federal and state grants.

K. Cemeteries

Under Vermont's statutes, a cemetery[104] is "any plot of ground used, or intended to be used, for the burial or disposition permanently of the remains of the human dead in a grave, a mausoleum, a columbarium, a vault, or other receptacle." This definition excludes private burial grounds – a portion of private land used for the burial of family members. Private burial grounds may become a recognized cemetery if they are abandoned and the responsibility for their upkeep is taken over by the Town or by a cemetery commission.

In Vermont, cemeteries are either owned and maintained by a municipality, a cemetery commission, or a religious or ecclesiastical society. No cemeteries may be owned by any other organization or individuals. Vermont statutes also do not permit cemeteries to operate as for-profit institutions.

Many Towns within the TRO Region have cemetery commissions, and many Towns within the TRO Region operate one or more town cemeteries which are actively used for burials. Each Town within the TRO Region also has several historic cemeteries which are actively maintained but no longer used for interring residents. By TRORC's own count, there are about 300 cemeteries or private burial grounds within the TRO Region.

There are several issues affecting cemeteries in the TRO Region. Many town cemeteries have limited additional space where new lots can be plotted. This issue has led some cemetery commissions to consider alternatives to plotting new lots, either by creating natural burial grounds – where un-embalmed human remains may be interred, or by erecting community mausoleums or columbariums. These structures would allow for the vertical interment of human remains. Individual niches within a community mausoleum or columbarium could be sold to offset the construction cost of these structures.

Many towns and cemetery commissions also find it difficult to meet all of their maintenance needs for their cemeteries. Cemetery maintenance entails mowing the grounds, removing any trees that may fall onto the grounds, resetting broken headstones, and mending any fences that are not in good repair. Regretfully, there are no dedicated grant funding sources for Vermont's cemeteries. And additional funding is often needed not just for the maintenance of cemeteries, but also for their expansion and capital improvements.

L. Opportunities for Shared Services and 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[105] 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, Policy, and Recommendations: Cemeteries

Goals

1. Towns within the Region have adequate options to inter the remains of their residents.
2. Town cemeteries and historic cemeteries are properly maintained by towns and cemetery commissions.

Policies

1. Towns and cemetery commissions should carefully plan for the expansion of town cemeteries and capital improvements.
2. Towns should adequately fund their cemeteries.

Recommendations

1. Towns and cemetery commissions should consider the use of natural burial grounds or community mausoleums or columbariums as part of their town cemeteries.
2. TRORC should assist towns and cemetery commissions with capital budgeting for their town cemeteries and historic cemeteries.
3. The State should consider making grant funding available for historic cemeteries.

Goals, Policy, and Recommendations: Shared Services and Infrastructure

Goal

1. Shared services and infrastructure increase, and are provided efficiently and effectively.

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.

Recommendations

1. TRORC will assist communities with the development of inter-local agreements, union municipal districts, and other cooperative agreements whenever possible.
2. TRORC will work with Legislative and local leaders to develop new governance structures needed to facilitate more shared service delivery.

Utilities, Facilities, and Services Endnotes

1 https://legislature.vermont.gov/statutes/section/24/117/04302
2 https://legislature.vermont.gov/statutes/section/24/117/04430
3 https://dec.vermont.gov/water/drinking-water/public-drinking-water-systems/source-water-protection
4 https://geodata.vermont.gov/datasets/VTANR::public-water-sources-1/explore?location=43.859947%2C-72.481149%2C8.62
5 https://dec.vermont.gov/sites/dec/files/documents/WSR%2024%20Feb%202024%20Rev.pdf
6 https://www.atsdr.cdc.gov/pfas/health-effects/index.html
7 https://dec.vermont.gov/sites/dec/files/documents/DEC-PFAS-Roadmap-December-2023-Final.pdf
8 https://dec.vermont.gov/water/drinking-water/pfas
9 https://anrgeodata.vermont.gov/datasets/waste-water-facilities/explore?location=44.165157%2C-72.360567%2C10.78
10 https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/SWIPGuidance_VermontMunicipalities_7.30.14.pdf
11 https://dec.vermont.gov/sites/dec/files/wmp/SolidWaste/Documents/DRAFT-2024-MMP.pdf
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10 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[1] (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[2], 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[3])

- "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[4])

- "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[5])

- "To improve substantially the energy fitness of at least 120,000 housing units and reduce greenhouse gas emissions by 0.15 MMTCO2e 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[6])
- The Global Warming Solutions Act[7] (Act 153 of 2020) mandated the creation of a Vermont Climate Action Plan (CAP)[8], which was released in 2021.

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

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

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[9] (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[10] 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

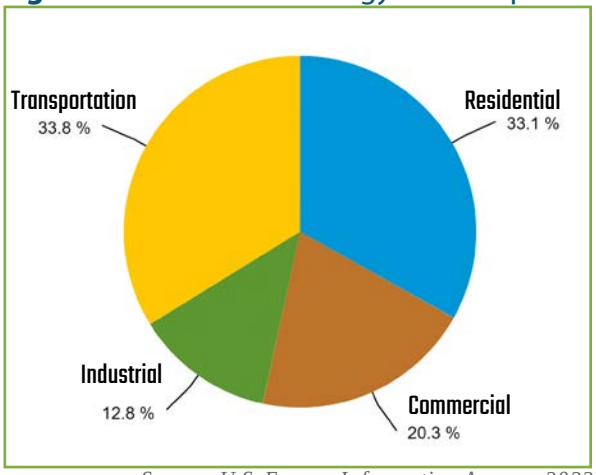
PSD-provided Low Emissions Analysis Platform (LEAP) data modeling shows that a nearly 50 percent decrease in overall energy use in the TRO Region is required to meet the CEP's goals for 2050, as well as the GWSA. At the same time, we must decarbonize the thermal and transportation sectors—mainly by converting 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 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

Figure 10-1: Vermont Energy Consumption



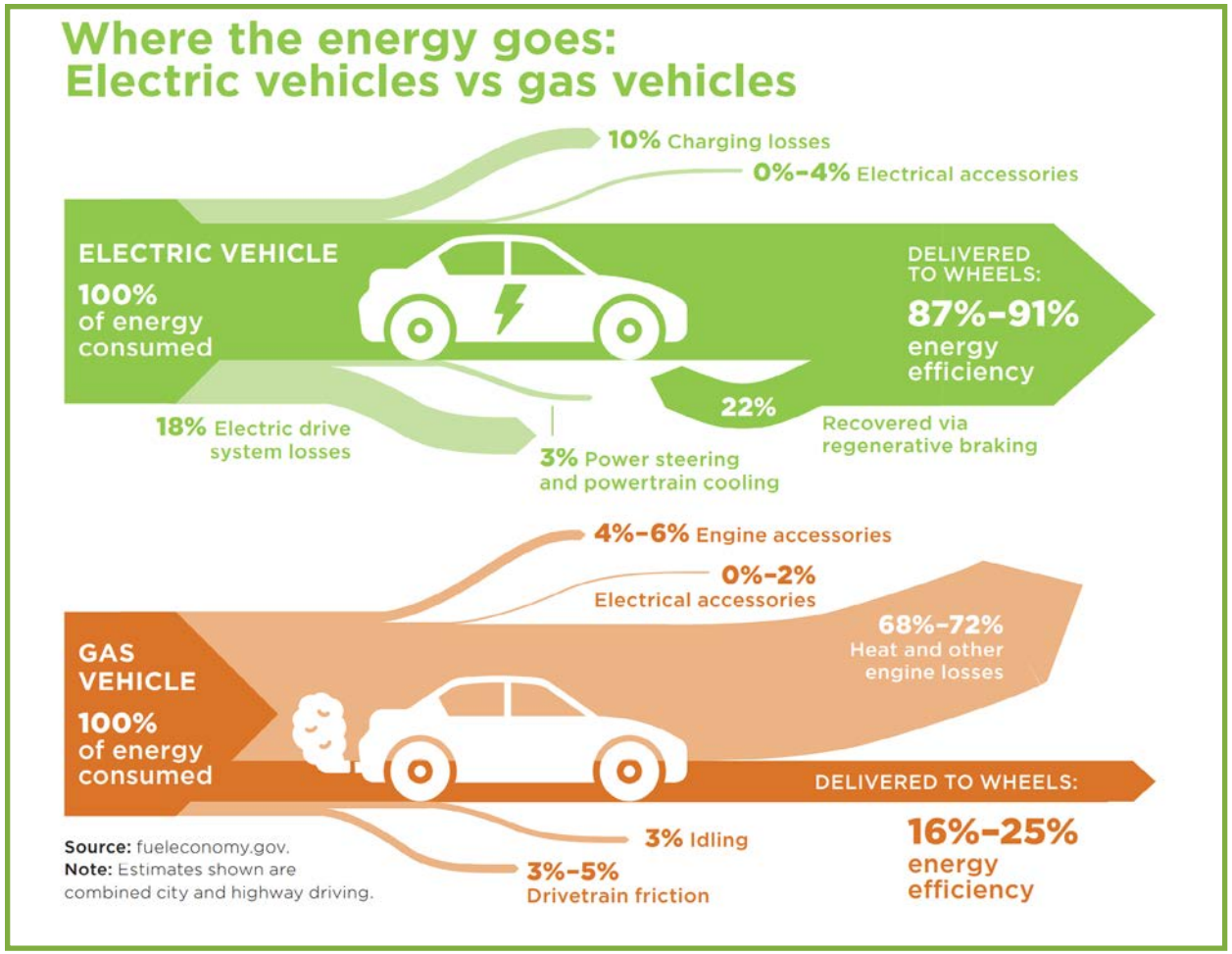
Source: U.S. Energy Information Agency, 2022

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[11]. Vermont's Renewable Portfolio Standard policy is called the Renewable Energy Standard, or RES[12], 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[13]. 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 their retirement in state should continue in order to ensure that the goals of the CEP are reached.

Figure 10-2: Going Electric Saves Money



Source: Energy Action Network

F. Transportation and Land Use

This section addresses the intersection of transportation, energy, and land use. The Land Use[14] and Transportation[15] 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 venders 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.

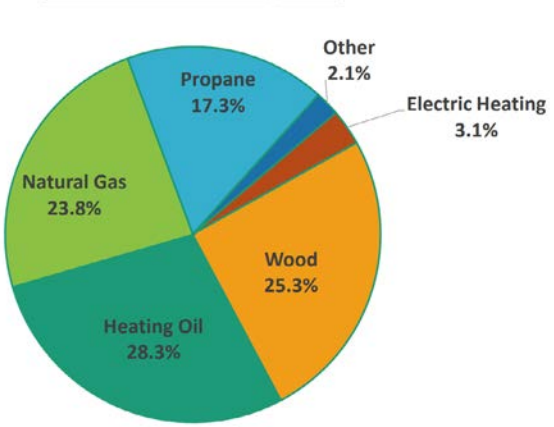
The lack of EV charging station infrastructure is an impediment to reaching the State's ambitious EV goals. While numerous models of EVs now have ranges of 250 miles or more, 'range anxiety' remains a major factor in the decision to purchase an EV. To support the State's EV adoption goals, EV charging stations will need to become ubiquitous. While, according to the Alternative Fuels Data Center[16], 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 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[17]. Complete Streets focus on multi-modal transportation, public

Figure 10-3: Thermal Sources Energy 2021



Source: 2024 Vermont Annual Energy Report

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.

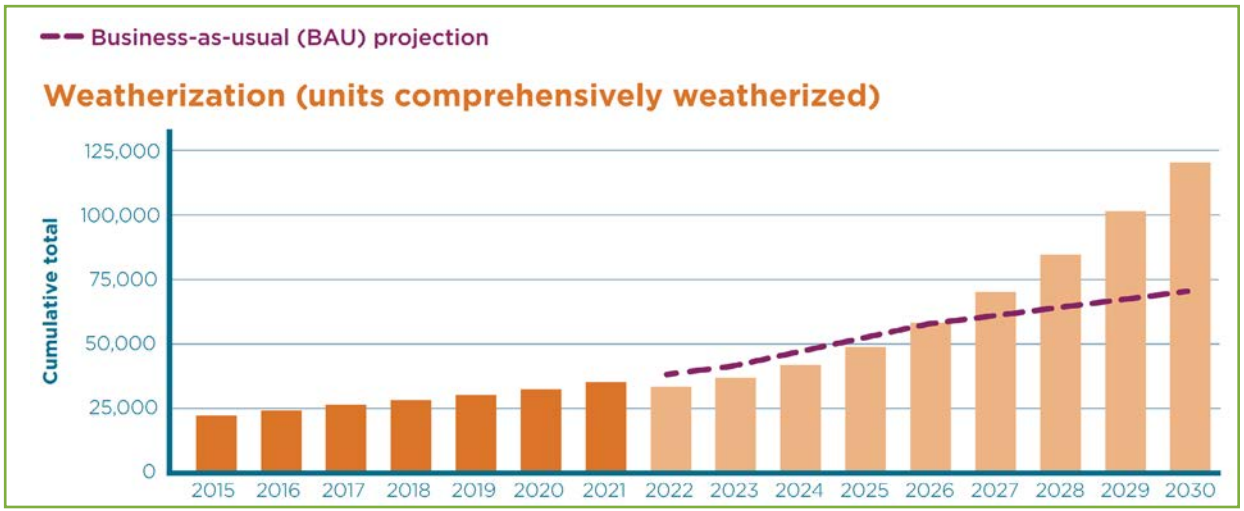
G. Thermal Energy

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[18], which consume far less energy to produce the same amount of heat than electric resistance, propane, or oil heating systems. In order to meetcontribute 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 expects cold-climate heat pumps to become the most common primary heating source in Vermont.

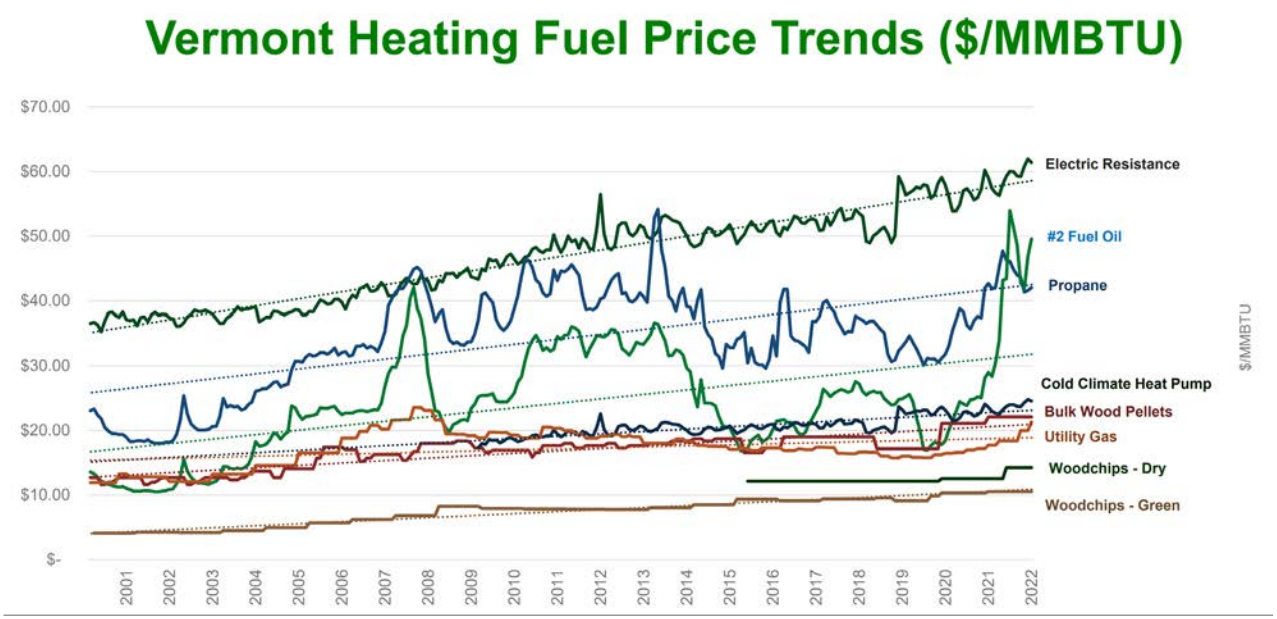
Geothermal or "ground source" heat pumps[19] are also a tremendous opportunity. These systems are substantially more expensive to install than air-source heat pumps but are even more efficient. They are better suited to new development than retrofitting into existing buildings due to the technology's requirements.

Figure 10-4: Vermont Homes Weatherized



Source: Energy Action Network, 2023

Figure 10-5: Vermont Heating Fuel Price Trends



Source: VT Public Service Department and the fuel price data came from the Energy Action Network, 2023.

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[20]. 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[21] 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[22].

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)[23] 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[24].

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 rachet 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[25] and VERMOD[26] 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.

H. Utility-Scale Renewable Energy Facility Siting

Vermont's Public Utility Commission (PUC)[27] 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[28]." Under Act 174 of 2016[29], 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 regionir 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

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

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

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)

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

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[30] (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.

I. 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.

Solar Array at Elizabeth Mine Site | *Source: Harry Falconer*

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[31] 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[32] for enhanced energy planning so that local preferences receive "substantial deference" in the Public Utility Commission's Section 248[33] 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[34] 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[35]).
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[36] 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. **(E=)**
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)[37] 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)[38], 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. **(E=)**

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[39], or agrivoltaics[40] 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
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-%2012-1-21.pdf
9 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/
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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
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
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)

40 https://puc.vermont.gov/sites/psbnew/files/documents/5100-net-metering-effective-3-1-2024.pdf

Quechee Balloon Festival | © Jericho Hills Photography

11 | 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.

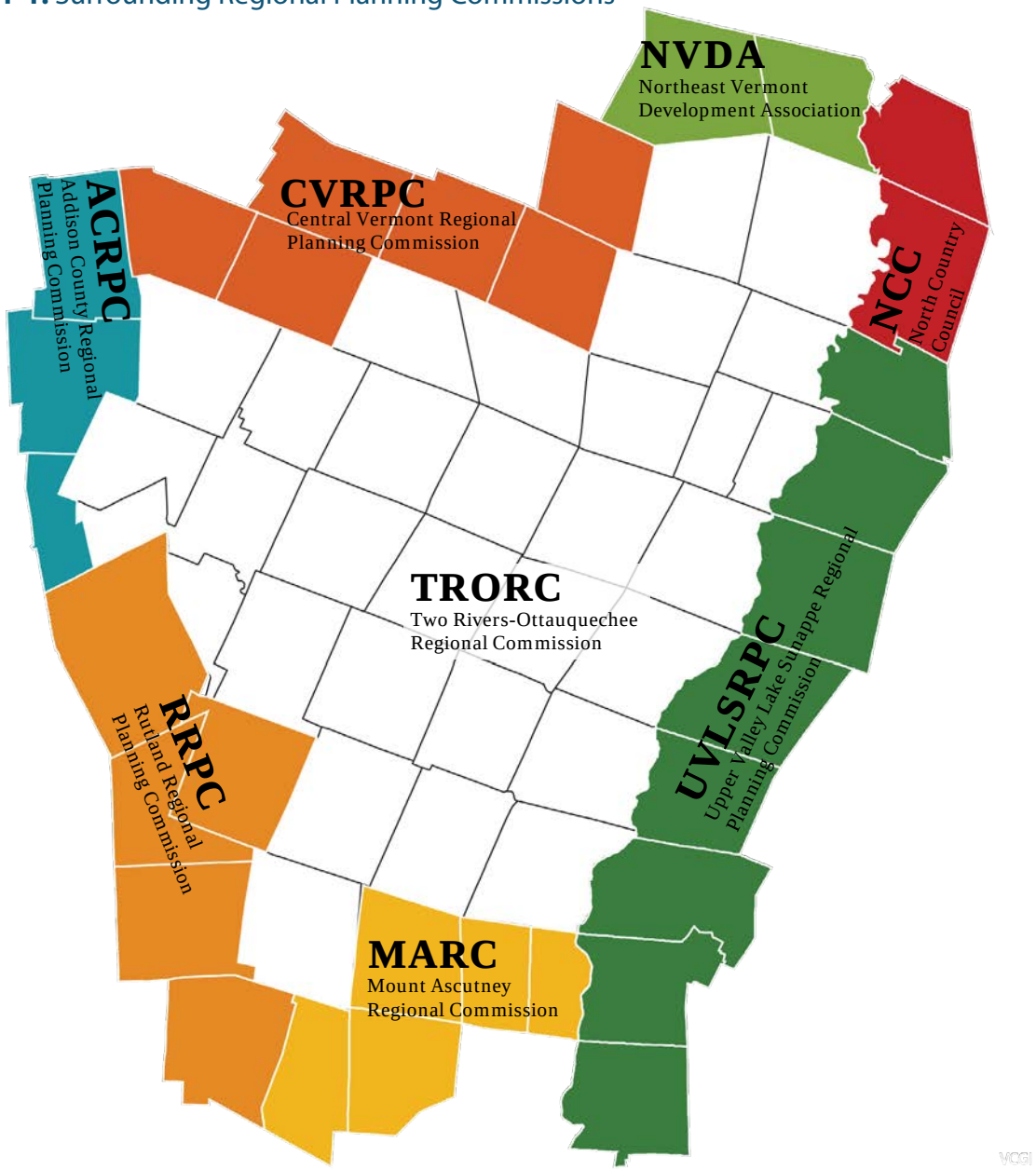
All six of these have a current regional plan in effect. Below are the dates of their adoption:

- Mount Ascutney Regional Planning Commission (MARC)[1]: Plan adopted October 14, 2022
- Rutland Regional Planning Commission (RRPC)[2]: Plan adopted June 18, 2018
- Addison County Regional Planning Commission (ACRPC)[3]: Plan adopted July 18, 2018
- Northeastern Vermont Development Association (NVDA)[4]: Plan adopted July 29, 2023
- Central Vermont Regional Planning Commission (CVRPC)[5]: Plan adopted July 12, 2016
- Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC)[6]: Plan adopted June 17, 2015

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 employment at centers like Dartmouth-Hitchcock Medical Center.

Figure 11-1: Surrounding Regional Planning Commissions



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, Killington, 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 MARC 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. Large development in Killington at the base of the mountain is underway and we are involved in the permitting process.

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 MARC 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 MARC 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 MARC Region, major erosion in Plymouth from Irene caused siltation to affect downstream waters in Ludlow.

One Main Tap & Grill, Randolph | © First Light Studios

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 issue. No

conflicts are noted when it comes to watershed and water quality planning.

Economic Development

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, MARC, and UVLSRPC), providing most of the shopping and employment. TRORC and MARC 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

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.

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

Much of the TRO Region serves as a bedroom community for larger towns, especially the economic centers just to our east.

TRORC, MARC, and UVLSRPC jointly work on ways to create 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 and Town Plans must 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 comptaible 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/

12 | 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. Such developments by their nature are regional in scope, likely to affect the character of growth and development or impact infrastructure in adjacent towns, or could affect natural resources that have regional or State importance. 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 core settlements or LOS C on regionally significant local or state highways in Rural General 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 capacity of public sewer or water supply systems, additional local 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 Rural Conservation 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 core settlement or 20,000 square feet or more of gross floor area inside such area; or

    m. will entail principal retail outside of core settlements; or

    n. will entail any commercial development with structures of more than 2,000 square feet of floor space in the Rural Conservation Area, or 4,000 square feet of floor space in the Rural Agriculture and Forestry Area; 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[1]). 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[2]). 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[3]). 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 of priority for major capital expenditures and sets

Flume Model Demonstration | *Source: TRORC Staff*

forth a means of financing the investments. Read more about capital planning on our website[4].

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[5]). 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 grant-making, 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 Forests or State Parks, and other areas. Towns are encouraged to coordinate through TRORC on areas of interest.

Bridgewater Better Back Roads Discussion | *Source: TRORC Staff*

Coordination with Regional Entities

Vermont law enables the creation of inter-municipal cooperative agreements, compacts, districts, and contracts by municipalities (24 VSA Chapter 121[6]). 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 coordinates with these entities, to the extent practical, to promote the implementation of this Plan.

Legislative Policy Processes

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

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 (see Introduction).

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

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

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

13 | 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.

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.

Density— A measure of the number of buildings per acre over an entire parcel that is being developed/subdivided. Buildings may be further defined as housing units or may simply be principal structures (which might contain many uses/units). Density differs from lot size.

Designated Centers— A state designation as defined by 24 VSA Chapter 76A coterminous with the Downtown Center Area and Village Center Area regional future land use areas.

Designated Neighborhoods— A state designation as defined by 24 VSA Chapter 76A, coterminous with the Village Area and Planned Growth Area regional future land use areas.

Downtown Center Area— As used in this Plan, "Downtown Center" or "Downtown Center Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

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.

EnterpriseArea–As used in this Plan, "Enterprise Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

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 Block–A contiguous area of forest mapped as a priority or high priority interior forest block on the ANR Biofinder[1] 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.

Governmental Use– Buildings operated by governmental entities for use by the public such as schools, offices, post offices, and hospitals.

Habitat Connector– Land or water, or both, mapped as a priority or high priority connectivity block on the ANR Biofinder[2] that links patches of wildlife

1 *https://anr.vermont.gov/maps-and-mapping/biofinder.*

2. *Ibid.*

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 regional future land use area identified as such in the Regional Future Land Use Area Map.

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.

Enterprise Area–As used in this Plan, "Enterprise Area" 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. Synonymous with multimodal.

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, self-storage, 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.

Outdoor Recreation—Commercial or non-profit outdoor recreational uses that may also include commonly related indoor spaces (changing areas, rental equipment, dining, etc.) Does not include shooting ranges, motorized racing, or concert venues.

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 Growth Area—As used in this Plan, "Planned Growth Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

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 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.

Resource-Based Recreation Area— As used in this Plan, "Resource-Based Recreation Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

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 as mapped by ANR 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 Areas—As used in this Plan, "Rural Areas" means the lands in three regional future land use areas (Rural General, Rural Agriculture and Forestry, and Rural Conservation).

Rural Agriculture and Forestry - As used in this Plan, "Rural Agriculture and Forestry" or "Agriculture and Forestry Areas" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

Rural Conservation - As used in this Plan, "Rural Conservation" or "Rural Conservation Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

Rural General - As used in this Plan, "Rural General" or "Rural General Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

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 12 of this Plan under the authority of VSA Title 24, Chapter 117 §4345a(17).

Structure—An assembly of materials for occupancy or use. A single structure may have several uses inside of it.

Tax Increment Financing (TIF)—Provides authority for municipalities to bond for indebtedness due to infrastructure improvements within a TIF District.

Downtown Center— As used in this Plan, "Downtown Center" or "Downtown Center Area" means the future land use area identified as such in the Regional Future Land Use Area Map.

Transition Area—As used in this Plan, "Transition Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

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 Area – As used in this Plan, "Village Area" means the regional future land use area identified as such in the Regional Future Land Use Area Map.

Village Center – As used in this Plan, "Village Center" or "Village Center Area" means the future land use area identified as such in the Regional Future Land Use Area Map.

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/regional-chapters-draft/**